What are the factors that mental health nurses use when deciding to give pro re nata medication for patient agitation?

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Abstract

Background

Pro re nata medication is an established treatment for managing patient agitation and aggression in mental health inpatient settings. Studies suggest that PRN medication administration varies significantly, with two- thirds of people receiving PRN medication during hospitalisation. The type of medication, dose and reason for giving varies, with little relationship to patient signs, symptoms or diagnosis.

Aims

To explore the factors that mental health nurses use when making decisions to give PRN psychotropic medication.

Methods

The thesis comprises of three studies: a scoping review of the literature about PRN medication administration, and two empirical studies using theoretical frameworks and models from cognitive psychology in a sequential mixed methods design. Firstly, an evaluative survey was carried out. Secondly, cognitive task analysis methods were used in a think aloud study and knowledge audit to explore if variation could be explained by novice- expert differences in reasoning. The Recognition Primed Decision (RPD) model was used as a theoretical framework. Fifteen nurses from five NHS Trusts participated.

Results

Variation was found in nurses' evaluations of severity of patient symptoms, likelihood of giving medication, and number of occasions medication would be given. The think aloud study highlighted that nurses' decisions involved assessing how the situation with the patient had arisen using hypothetico-deductive reasoning. Experienced nurses also appeared to make decisions in accordance with the RPD model of situation recognition, using mental models and mental simulation to establish both what had led up to the situation as well as possible futures. Enhanced perceptual ability allowed them to pre-empt situations and act proactively to help patients. Novices, by contrast, were unable to imagine futures for the patient scenarios. This limited their overall understanding of the situation, resulting in a fragmented and reactive approach. Variation can be explained by novice- expert differences.

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I declare that this thesis is a presentation of original work and I am the sole author. This work has not previously been presented for an award at this, or any other, University. All sources are acknowledged as references.

Chapter 1: Introduction

1.1 Setting the scene

Imagine that you are a patient on an acute mental health unit. You have been admitted under an informal arrangement for assessment- you have difficulty sleeping, you are easily distracted and feel anxious most of the time. You cannot function and want to be left alone. You feel out of control and because no one is listening, you start to shout at anyone- the staff, other patients, whoever is in your way. What happens next?

Depending on the unit you have been admitted to, the nurses caring for you may decide to use verbal de-escalation techniques to prevent the situation getting any worse. Alternatively, you may be in a unit where staff prefer to use pro re nata (PRN) psychotropic medication to manage your symptoms. It is estimated that between 20%- 50% of psychiatric inpatients have had PRN medication during admission (Douglas- Hall and Whicher, 2015). Will you be one of these? If you are, can you be sure the decision is the best one for you?

The nurses' decision about which strategy to use will have involved a number of factors about you, your symptoms and other considerations such as your age and perhaps previous admissions. Their choice of strategy may also be based upon factors related to themselves, such as years of experience or confidence with de- escalation versus medicine administration. The decision may have to be made quickly, and the nurse needs to balance your safety against the needs of others on the ward. The central question to be answered in this thesis therefore is how do nurses make these decisions, and what factors do they use?

This background chapter will introduce some of the key terms and concepts related to PRN medication administration in mental health settings. This first part of the background will be divided into four main sections, as follows:

1. What PRN medication is and why it is used
2. What constitutes agitation, its relationship to aggression, and the use of PRN medications to treat these behaviours

3. Evidence of effectiveness of PRN medications to treat agitation and aggression
4. Risks associated with the use PRN medications

After consideration of these key concepts, the chapter progresses with discussion of current policy about the use of medications, including medication safety and the notion of rational prescribing. I will argue that nurses' medication administration practice conforms to a form of instrumental rationality that is a result of learning 'on the job'.

Instrumental rationality occurs because of the uncertain and dynamic environment in which the decision to give medication is made, and is also a result of the acquisition and structuring of practice knowledge gained through experience as an adaptation to that environment. Nurses' knowledge is not *about* practice, it *is* practice. The implication, therefore, of this form of rationality is that variation in practice is a natural result. This introductory chapter concludes with an explanation of this, drawing together the factors that might be expected to produce practice variation.

The subsequent chapter will then outline relevant theories of decision-making to provide the framework by which nurses decisions can be explained and analysed. The utility of these in explaining variation will also be highlighted. Finally, in this introductory section of this thesis, results of a scoping review of the literature about PRN medication administration decision- making will be presented.

1.2 What is PRN medication?

The term pro re nata (PRN) when applied to medication administration means 'as required' or 'as needed'. PRN allows for the administration of additional medications to those prescribed as regular doses, given at the nurses' discretion in the prescriber's absence. Under the terms of the Human Medicines Regulations (2012) prescription-only medicines (POM) can only be administered by or in accordance with the directions of an independent prescriber. PRN medications are prescribed in a special section of a medication administration record, to be given at the discretion

of the nurse in response to patient need. As such, PRN medication regimes are valued by staff as they allow for flexibility in administration.

Giving PRN medications is a standard part of registered, and in some settings unregistered, nurses' work. It allows nurses a degree of autonomy about when to give a medication, and depending on the prescription this autonomy may extend to choosing between medications, from within a range of doses or selecting a route of administration.

1.3 Why do patients need PRN medications?

The use of regular, scheduled medication is a key intervention in the treatment of mental health disorders, yet whether newly diagnosed or with an existing condition, there are many contributory reasons why patients need admission to acute mental health units, and why they then may need PRN medication.

Response to regular doses of psychotropic medication can be unpredictable, with patients reacting better to some drugs than others. Admission to an acute mental health unit, therefore, may be due to the choice of regular medication therapy not being correct: commencement of antipsychotic medication is considered as an individual therapeutic trial because of the idiosyncratic reactions to these medications and finding the right drug for a patient is a process of trial and error (National Institute for Health and Care Excellence, 2014). Furthermore, antipsychotic medication can take several weeks to be effective (Usher and Luck, 2004). Until adequate plasma levels of the medication are achieved the patient will continue to experience symptoms.

In addition, poor adherence to medication is common in people with mental health conditions- for example, adherence rates of between 40%- 60% have been reported for people with schizophrenia (Sendt, Tracy and Bhattacharyyra, 2014). This contributes to poor dosing of regular medication and again, poor control of symptoms.

Once admitted to hospital, the relationship between regular and PRN medication is intended to be complimentary as PRN medication is used as

an adjunct to manage symptoms. Commonly used medications given both regularly and PRN include antipsychotics, anxiolytics, hypnotics and anticholinergics (Wright, Stewart and Bowers, 2012), collectively known as psychotropic medicines because of their effect on the mind, emotions and behaviour.

It is estimated that between 20%- 50% of mental health inpatients have had at least one dose of PRN medication (Bowers, 2005). Reasons for administration of PRN psychotropic medications include primarily managing patient agitation, to reduce risk of harm to the patient or others around them but also to help with sleep, and manage distressing symptoms such as hallucinations or hearing voices (Usher and Luck, 2004). The next section aims to clarify exactly what is meant by the term agitation and its relationship to aggression.

1.4 What is agitation?

Agitation is a common symptom of many mental health disorders including schizophrenia or other psychotic conditions, mania and certain personality disorders (Citrome, 2004). Dementia is also associated with agitated behaviour. Substance misuse, alone or in combination with a pre-existing mental health condition further increases the likelihood of agitation (Citrome, 2004). Attempts to define agitation are difficult- it is variously defined as:

- 'Inappropriate verbal, vocal or motor activity that is not explained by needs or confusion per se' (Cohen- Mansfield and Billing, 1986).

- 'A transnosological syndrome that describes a state of poorly organised and aimless psychomotor activity stemming from physical or mental unrest, with motor restlessness and heightened responsivity to stimuli hallmark features' (Lindenmayer, 2000).

- 'Excess motor or verbal activity' (Citrome, 2004).

The difficulty with agitation is that it appears to overlap with other states such as anxiety, aggression, hyperactivity, problem or disruptive behaviour, and non- purposeful behaviour (Schliefer, 2011, p91). In and of themselves, however, these behaviours may also be part of everyday response to events, indicative of various states of mind that do not necessarily indicate mental illness; Schliefer considers this overlap inappropriate and suggests that the term 'agitation' is often misused by healthcare professionals.

However, there seem to be some commonly recognised features of agitation. A concept analysis of agitation in dementia (Kong, 2005) identified several critical attributes that appeared frequently in the literature: excessive, inappropriate, repetitive, non- specific and observable. It is important to note, however, that these attributes are often judged normatively, dependent on the social standards and value judgements of the observer.

Indeed, Kong (2005) points out that depending on who's perspective is taken into account, agitation as a phenomenon moves from being inappropriate and therefore negative (in the view of professionals) to more positive in that it reflects a need or feeling when judged from the patients' perspective. This perspective asserts that agitation is a response to an unmet need, and as a symptom can indicate numerous antecedents including discomfort such as pain or hunger, functional factors such as communication impairment, social effects such as verbal interaction with caregivers, or response to medications or restraint. In patients with dementia, the presence of agitation can indicate pain, constipation, infection or be a side effect of current medication (National Collaborating Centre for Mental Health (NCCMH), 2007).

What seems to be clear, however, is that the presence of agitation raises the risk of development to aggressive behaviour and is a 'red flag' symptom for mental health nurses (Citrome, 2004). Aggressive behaviour involves harm to patients themselves, other patients, staff or property. Figures indicate that about a third of inpatients felt threatened or unsafe whilst in inpatient care, rising to 44% for clinical and 72% for nursing staff (Healthcare Commission, 2005).

Aggression encompasses a continuum from hostile behaviour to outright violence; consequences of violence include injury, sometimes severe.

Aggressive behaviour within acute mental health settings is viewed as 'conflict' (Bowers et al., 2013). Other behaviours categorised as conflict include self- harm, suicide, and rule- breaking such as refusing to eat or drink, refusing to see health workers or smoking where not allowed (Bowers et al., 2013). Within the context of an acute mental health unit they can be viewed as antisocial and possible precursors to more challenging behaviour that can threaten the safety of staff and others around them. Management of agitation, therefore, aims to prevent escalation to more challenging behaviours.

1.4.1 The relationship of agitation to aggression

Considering who becomes aggressive and why, aggressive behaviour has been attributed to different factors that have been broadly classified into internal, external and situational models (Duxbury, 2002). Internal factors are individual patient variables and include such factors as the experience of fear, anger, agitation, as well as their attitude towards treatment and management of their presentation.

There appears to be a link between mental health illness and aggression (Duxbury, 2002). A literature review (Bowers et al., 2011) of aggression and violence in acute mental health units found a number of demographic factors associated with increased risk of aggression as an inpatient: being male, younger, involuntary admission, diagnosis of schizophrenia, and history of substance abuse. However, evidence of this link remains inconclusive due to limitations of included studies.

The model of external factors is in opposition to that of internal factors, and considers the impact of the environment, including limited space, overcrowding, poor facilities, hospital shifts and timing of violent episodes (Duxbury, 2002). Bowers et al., (2011) concur, suggesting that high levels of heterogeneity in their meta- analysis may be because psychiatric settings differ greatly in setting, routines, ward rules and atmosphere.

Aspects related to staff have also been considered- gender, experience, training and grade are believed to have some impact on patient incidence of aggression and violence. The situational model argues that levels of

patient aggression and violence are likely to be an interaction between aspects of both the internal and external models (Duxbury, 2002).

Despite the fact that both agitation and aggression are complex phenomena in acute mental health units, that are only partially understood, what is clear is that staff have to be able to somehow predict and manage the continuum of patient behaviour from agitation to aggression and possibly to violence. If all the factors of patient, staff and environment are taken into account, the complexity of doing this makes it easy to envisage that variation in treatment response can occur.

The management of agitation therefore presents 'a staggering challenge', as clinicians must manage the acute symptoms and make a diagnosis: treatment of the former often impedes the latter (Schleiffer, 2001, p91). The chain of decision- making then, from establishing what the problem is to selecting a suitable treatment if one is needed (including giving a PRN medication and in what dose) involves numerous steps, each with the potential for variation, as the practitioner decides what to do. The next section looks at what specifically PRN medication aims to do.

1.5 The use of PRN medication to treat agitation and aggression

One of the goals of care within acute mental health units is to maintain the safety of patients and staff. Staff can use a range of strategies to manage antisocial and threatening behaviour, including de- escalation techniques, seclusion, restraint if necessary, special observation and PRN medication (Bowers et al., 2013).

PRN medication has, for some years, been the favoured strategy and is viewed as routine (Stein- Parbury et al., 2008). The contemporary goal of giving PRN medication to an agitated patient is to calm them sufficiently so that they are no longer a danger, but not so much that they cannot communicate or participate in care (Royal College of Psychiatrists, 2014).

Indeed, one view of giving PRN medication to acutely agitated patients is that it calms them sufficiently to be able to participate in therapeutic activities (Stein- Parbury et al., 2008). The current view of medication use is

that it is useful but in itself does not constitute de-escalation (National Institute for Health and Care Excellence, 2015): a distinction between the therapeutic value of verbal exchange and its ability to promote understanding as opposed giving a medication to make the problem go away.

It is important here to make the distinction between giving PRN medication to calm patients as part of an overall strategy (that may include other measures such as verbal de-escalation techniques), and rapid tranquillisation (RT). Rapid tranquilisation is a pharmacological technique used when patient's behaviour is violent or destructive enough to cause serious concerns for both their safety and of those around them.

RT involves giving a medication orally or more often intramuscularly in order to sedate the patient sufficiently for the violent behaviour to cease. There is some confusion between the two strategies of RT and PRN medication administration: as the National Institute for Health and Care Excellence (NICE) (2015) point out, if a small dose of oral medication is given early on in a violent episode with the hope of preventing it escalating, then although this is part of the RT process, it is not the same. RT is an emergency intervention, a last resort, and involves little negotiation with the patient; PRN medication administration carries with it an element of choice as alternative de-escalation strategies may be available to deal with the problem. This study is primarily concerned with PRN administration not RT, although it is recognised that overlap may occur. The next question concerns how well these drug interventions work.

1.6 How effective are PRN regimes?

Surprisingly, for an intervention that is so key to mental health practice, there is only patchy evidence for effectiveness or efficacy of medications used. For people with schizophrenia, the most recent systematic review (Douglas- Hall and Whicher, 2015) could not find any high- quality randomised- controlled trials that compared effectiveness of PRN regimes with regular medication regimes for managing symptoms.

All other studies examined PRN medication use as part of RT. Zaman et al., (2017) conducted a systematic review of 20 trials looking at the use of benzodiazepines alone, in combination with antipsychotics, placebo, or with antihistamines. Three major classes of drugs are commonly used for RT: typical antipsychotics, benzodiazepines and atypical antipsychotics. They found insufficient trial data to support or reject the use of benzodiazepines singly or in combination with an anti-psychotic medication as included trials were of low quality.

However, Zaman et al., (2017) found that adding a benzodiazepine to haloperidol reduced the risk of extra-pyramidal symptoms (EPS) compared to haloperidol alone. In addition, benzodiazepines were more likely to induce sleep, were better tolerated and caused fewer side effects.

Head- to- head trials of antipsychotic medication have been conducted but the evidence is inconclusive. For example, Satterthwaite et al., (2008) conducted a meta- analysis of RT techniques for the management of agitation and found that intramuscular second- generation antipsychotics (SGA) had a lower risk of EPS than haloperidol alone. Intramuscular haloperidol alone had a higher risk of acute dystonia compared with haloperidol plus promethazine or SGAs.

However, some important limitations were noted. The primary outcome for the meta- analysis was likelihood of developing EPS, not effectiveness of reducing agitated behaviour. Patients with a primary psychotic disorder such as schizophrenia were over- represented in included RCTs, and most had had antipsychotic medication before. Satterthwaite et al., (2008) therefore cautioned that the results may not be generalizable to first episode psychosis.

Furthermore, most studies included non- elderly adults; acute dystonia is more common in the young so the applicability of the analysis to elderly people was limited. Also, patients may have been excluded from trials due to the inability to give informed consent as they were too agitated. Effectiveness in all populations could not be established (Satterthwaite et al., 2008).

Therefore, as empirical data on the best medication is lacking, practitioners must use other sources of evidence to inform their practice. The potential

for variation here is obvious as there is no clear recommended PRN medication for treatment of agitation. However, any medication has the potential for inducing adverse or side effects: this is explored in the next section.

1.6.1 Risks associated with PRN and RT regimes

Medications used PRN can induce unwanted side- effects. A service evaluation in 218 wards in 32 mental health services evaluated the prescribing of antipsychotic medication, particularly combined antipsychotics, and the inherent risks of the medications involved (Paton et al., 2008). They found that 72.9% of patients were prescribed antipsychotic medication PRN to manage behavioural problems, often in combination.

An earlier survey (Paton et al., 2003) found that patients were being prescribed antipsychotics where no diagnosis of psychosis existed. Stated indications for typical antipsychotics at the time included anxiety, whereas for atypical antipsychotics the indications were clearly for schizophrenia or psychosis. Patients, as a result, had the potential to be exposed to high doses of antipsychotics, a practice counter to contemporary recommended prescribing advice as they are known to cause a range of side effects individually, which is magnified in combination.

The Royal College of Psychiatrists (2014) advise that most patients receiving rapid tranquilisation will already be taking an antipsychotic medication, and that the tolerability and efficacy of additional doses has not been tested. They state that there is evidence to show that PRN antipsychotic medication causes increased incidence of side effects, including:

- sedation
- confusion
- extra-pyramidal symptoms including acute dystonia and akathisia
- postural hypotension
- neuroleptic syndrome, a potentially fatal condition
- adverse cardiac events
- seizures

Benzodiazepines increase the risk of respiratory depression (Broadstock, 2001), and should not be used in people with pre-existing respiratory conditions. Thus, there are many factors that need to be taken into account when giving PRN medications, including current and past medical history, other medication usage, previous responses to medication and any known adverse drug reactions.

In summary, evidence for either effectiveness or efficacy of medications used PRN is incomplete. Combinations of antipsychotic medications should be avoided, and benzodiazepines appear to be as effective as antipsychotic medication for treatment of agitation. All medications carry risk of side- effects, some severe. Practitioners, however, are guided by evidence in the form of protocols or guidelines that recommend the use of particular medications to be used as needed. The next section explores these recommendations- what they say, and how well they are followed.

1.7 Evidence for practice

The Royal College of Psychiatrists (2014) state that there is no 'gold standard' for rapid tranquilisation. The same can be said for PRN psychotropic medication- Stein- Parbury et al., (2008) suggest that practice is based in clinical experience and expert/ consensus guidelines rather than on high- quality evidence from clinical trials.

The Maudsley Prescribing Guidelines (Taylor et al., 2018, p8), state that for management of symptoms in schizophrenia, antipsychotic medications should not be given as PRN sedatives; instead, short courses of benzodiazepines or general sedatives such as promethazine should be used instead. The Royal College of Psychiatrists (2014) identify principles of good practice in their consensus statement:

- Choice of medication and dose should be individually tailored to the patient
- The lowest dose required for effective treatment should be used. BNF maximum doses should only be exceeded and with caution
- Indications for PRN medication should be explicit, clearly documented and reviewed on a regular basis

- Oral and IM medication should be prescribed separately
- Combination medication from the same class should be avoided wherever possible
- Patients should be regularly monitored for clinical benefit and side effects
- Rapid tranquilisation should be used after careful clinical judgement, weighing the risks of the intervention against those of not using it or of using non- pharmacological methods [such as de-escalation techniques]

These recommendations have not changed significantly in recent years, and Brown (2011) asked whether clinical practice in psychiatric intensive care units, where the most agitated patients can be found, follows such guidance. His answer was no, not really. In his opinion, an oral atypical antipsychotic was most likely to be prescribed, with haloperidol or lorazepam to be given PRN, orally or IM. A patient could, therefore, be receiving a number of drugs at any one time, in combination, by a variety of routes.

1.7.1 The value of guidelines in shaping clinical decision- making

The opinion of Brown (2011) raises an interesting question about the compliance to guidelines of those who prescribe and administer PRN medications. Clinical guidelines are 'systematically developed statements that assist clinicians and service users in making decisions about appropriate treatment for specific conditions' (Mann, 1996). The aim of guidelines is to improve the uptake of research findings by assimilating them into accessible formats (Grol and Grimshaw, 2003) and to standardise systems of care to make them safer by reducing error (McDonald et al., 2005).

Reasons given by Brown (2011) for why clinicians fail to follow guidelines were that they were not convinced by evidence for newer drugs, see few adverse drug reactions in daily practice and have realistic concerns about the risks of under- treatment. The risk of serious assault is perceived to be higher than the risk of adverse reaction to medication.

Financial risks due to litigation and complaints lie with hospital Trusts however, and as a consequence ensuring quality care can reduce insurance premiums payable under the Clinical Negligence Scheme for Trusts (Parker and Lawton, 2000). In the view of Brown (2011) it seems that clinicians may be making a trade- off between the perceived serious risk of assault from a patient against the lower risk of an adverse drug reaction in someone who is unwell anyway.

Previous research into compliance with protocols has shown that among the medical profession compliance with guidelines is low (Yoonget al., 1992) and that clinical practice guidelines have little effect on behaviour (Lomas et al., 1989). A systematic review of implementation of treatment guidelines for specialist mental health care (Barbui et al., 2014) identified five very low quality trials fit for inclusion; there was some evidence from single studies that implementation of guidelines may exert a small effect on mental health practice. However, they concluded that a knowledge gap still exists.

Reasons for lack of uptake of guidelines can be related to differing factors- Grol and Grimshaw (2003, p1227) suggest three broad categories- organisational, social and professional. The organisational context includes lack of time and patient expectation. The social context includes usual standards of practice, the views of opinion leaders, obsolete knowledge, and advocacy, for example by pharmaceutical companies.

The professional context highlights differences among medical and nursing staff in uptake of guidelines. Used to being self- reliant and largely unsupervised, at least at consultant level, a culture of professional independence is valued among medical staff. In a study of attitudes to protocol violations among midwives, nurses and doctors (Parker and Lawton, 2000), doctors were more tolerant of violations even when the outcome was poor. Nurses were equivocal- they were tolerant of the violation if the outcome was good but not if it was bad. Nurses, it was argued, were more willing to accept and follow rules- it seems that nurses view guidelines as a key element in providing safe, good quality care (McDonald et al., 2005). Doctors, on the other hand, view protocols as decision- making tools rather than prescriptive rules.

One of the outcomes of adoption of guidelines is to reduce variation in care (Cook et al., 2018). However, criticism of such efforts to standardise care exists: guidelines are viewed as methods to promote public confidence at the expense of acknowledging the inherent uncertainties in healthcare, reducing the discretion of practitioners when giving care (Harrison and Smith, 2004). This is particularly relevant to mental health care and the management of agitation and aggression. As has been argued, uncertainty exists from classifying symptoms, making a diagnosis, assessing risk, then to choosing and administering a therapy. Indeed, Grol and Grimshaw (2003, p1227) suggest that professional reasons for not following guidelines include clinical uncertainty, where a patient's symptoms may be ambiguous.

However, even if well written, guidelines may not state how to care for *this* patient in *this* situation. Despite the existence of guidelines therefore, variation in practice appears to occur at the level of medication prescription; the question is, does it occur at the level of medication administration too, and if so, to what extent? When considering what shapes care on a macro level, current national policy about the treatment and care of mental health patients has changed philosophy to be more holistic, promoting partnership working. In addition, there is an important intersection with policy guiding medication safety and use. The next section, therefore, turns to a brief outline of both past and current policy in both these areas, and its influence on patient care.

1.8 The use of PRN medications in inpatient psychiatric services

The discourse around the use of PRN medications within mental health settings has been primarily within the context of managing behaviour rather than helping patients with distressing symptoms. In 2002, Duxbury discussed how 'traditional' methods of seclusion, restraint and medication were commonly used. Medication in particular was used frequently as a chemical restraint, leading to debate about its effectiveness. At that time, de-escalation was not widely used, instead, 'going in strong' had widespread support, including from the Royal College of Psychiatrists. Acting reactively rather than proactively was the order of the day.

Duxbury (2002) also highlighted that staff and patients viewed the causes of aggression differently- staff blamed patients, whereas patients blamed poor interactions with staff. As only 13% of the aggressive incidents in Duxbury's (2002) study were directly attributable to mental illness, the use of medication to control behaviour, and through this action patients, was brought into question.

Over time, the philosophy and care of patients with mental health illness has changed. Involving patients in decisions about their care is seen by NICE as a cornerstone of good practice. The latest NICE (2015, pp114, 116) guidance on short- term management of aggression in mental health settings advises that pharmacological management should be individualised to the patient, avoiding routine prescription of medication without consideration of patient factors such as age, health status and current medication. Any medication used to calm or sedate patients needs to be prescribed with a range of measures to protect their safety and manage risk, including defining target symptoms, total daily dose of medication allowable, therapeutic response and emergence of unwanted effects. The use of PRN medication should, in fact, be a last resort; instead, non- pharmacological interventions should be the first choice (Hilton and Whiteford, 2008).

Other pertinent national strategies in the United Kingdom include NICE guidelines to improve the experience of people receiving mental health care (National Institute for Health and Care Excellence (NICE), 2011b). This stresses that assessment needs to take place before any treatment, including discussion about drug and psychological treatments, and that control and restraint will be used competently, safely and only as a last resort with minimum force. Furthermore, NICE Guidelines on Medicines Adherence (2009) recommend that patients are offered the opportunity to be involved in decisions about medicines to the level they wish, including information about the aims of treatment, and explanation of benefits and risks. Involving patients is therefore a point of national policy.

This change in philosophy, from custodial and restraining to a therapeutic partnership may take time to percolate into clinical areas; uptake by individual practitioners may take longer still. Staff who have been around for longer may find that old habits die hard while those more recently

qualified are primed with the new attitude. Each of these factors therefore, will have the effect of causing variation in practice. What is not known is to what extent.

1.9 Patient safety and improving the use of medicines

In response to a number of problems associated with medication use in healthcare systems, the concept of medicines management emerged at the start of the 21st century. Primarily these problems were cost and safety. It became apparent that medicines accounted for a substantial proportion of healthcare budgets due to the ageing population and accompanying increase in long- term conditions, rising patient expectations, stricter clinical targets and the availability of new, expensive medications. In addition, through improved measurement and monitoring, awareness was growing that healthcare itself presented a threat to patient safety (Krska and Godman, 2011).

In the middle of the 20th century, many viewed complications as a result of healthcare as being inevitable (Sharpe and Fadden, 1998). This view has changed as some types of incident became viewed as unacceptable, largely due to being preventable. Various reports such as 'An Organisation with a Memory' (Donaldson, 2000) were produced to encourage a reduction in breaches of safety. Building a Safer NHS for Patients: Implementing an Organisation with a Memory (DH, 2007) set out how organisations could learn from adverse events by analysing the systems that led to the event, changing the culture from one of blame of individuals to one of active, shared desire to learn the lessons and improve to reduce the risk.

1.9.1 Medication as a threat to patient safety

Aside from the incidence of adverse and side effects, discussed above, the process of medication prescription and administration also carries with it

risk, made manifest through error. Quality of prescriptions is a recognised source of error in the medication process, including wrong doses, routes and indication (Maidment, Lelliott and Paton, 2006). Approximately 70% of medications in hospital are prescribed by the most junior medical staff (Audit Commission, 2001, p21) and communication of the intent of the prescriber about the rationale for giving certain drugs, or of drug changes has been found to be sub-standard.

Examples of errors include those found by Franklin et al., (2007), who identified at least one error in 9.2% of prescriptions for regular, PRN and discharge medications screened by the pharmacists in their pilot study of giving feedback to doctors about prescribing errors. Types of errors made included sub- and supra- therapeutic dosing, incorrect total daily doses, inappropriate abbreviation, incorrect timing, missing instructions for use, incorrect route and contra- indications to prescribed medication.

Nurses seem to be no better- Keers et al., (2013), in a systematic review of the causes of medication errors in hospitals, found patients were not identified correctly or drugs were misread. Mental states including lack of concentration, complacency or carelessness were also reported. Staff inexperience contributed to errors as they were not familiar with medication, procedures or the environment. All of these studies were conducted in acute, general settings- however it is not unreasonable to assume that similar findings would be seen in mental health units. A systematic review (Alshehri et al., 2017) of medication errors in acute mental health hospitals identified an error rate between 10.6 to 17.5 per 1000 patient- days. Medication administration errors occurred in 3.3- 48% of opportunities for error.

Why is this information included here? It serves to show that the competence of doctors and nurses in prescribing and administering medications is perhaps inadequate. It calls into question their ability to be able to manage the complex process of getting the right medication to a patient. Reason (2000)) identified the 'Swiss cheese' model of medication error, whereby at each stage of the medication process there is the potential for error to occur. Due to the mainly discrete responsibilities of each participant in the process an error can slip though the holes in the

metaphorical cheese, unnoticed by each subsequent participant until in the end the patient gets the wrong medication.

Within nursing, the '5 Rights of Medication Administration' (Tyreman, 2010) are presented as a checklist to help: 'the right drug needs to be given to the right patient via the right route at the right time in the right dose'. Table 1 illustrates the factors considered to apply to each of the '5 Rights'.

Right Drug	Knowledge of therapeutic uses of the drug, common side effects, contraindications and interactions with other drugs or food.
Right Patient	Using name bands to match the patient to the medication from the MAR.
Right Route	For example oral, intravenous, intramuscular. Not giving oral medication intravenously.
Right Time	As indicated on the MAR and within time tolerances as set out in local policy.
Right Dose	Numerical skills to work out dosing.

Table 1. The five rights of medication administration

As can be seen, medication administration appears to encompass various underpinning skills, knowledge and judgements. The '5 Rights' are presented as a method by which, if adhered to, nurses can administer medications with minimal error and therefore maximise patient safety. These requirements mean that nurses need pharmacological, procedural, numerical, pathophysiological, communication, information seeking, documentation and legal knowledge in order to fulfil their duties and be accountable for their actions.

This view is endorsed within nursing literature: Sulosaari, Suhonen and Leino- Kilpi (2010) carried out a literature review and identified 11 areas of medication competence, all of which each nurse should be competent in in order to give medication safely in the 'complex and dynamic medication process'. This presents quite a challenge. If staff are making mistakes, their knowledge of what they are doing must be called into question. What, exactly, do nurses know about medication administration?

1.10 What do nurses know?

There has been some empirical work examining what nurses know about the medications they administer. For example, Hand and Barber (2000), Mayo and Duncan (2004) and Tang et al., (2007) found that nurses believed drug administration errors occurred because of their lack of knowledge of drugs. Manias and Bullock (2002) identified that undergraduate nurses appeared to lack basic pharmacology knowledge, including lack of understanding of medication family groups and terminology.

King (2004) explored qualified nurses' pharmacology educational needs and found that 70% of the respondents had limited understanding of pharmacology, illustrated by the requirement to discuss anti-hypertensive drugs. The respondents suggested that their pharmacology education prior to qualifying was inadequate, lacking in content and structure, and as a result they felt anxious and under-prepared on qualifying. Post-registration education tended to be related to specialties with little input on medications therefore did not meet their professional developmental needs.

Ndosi and Newell (2008) tested 42 experienced surgical nurses on their knowledge of four most commonly administered drugs. Most participants demonstrated adequate knowledge of normal doses, indications and side effects but other types of knowledge, including mechanism of action and interactions was poor. A positive correlation between years of experience and pharmacology knowledge was evident, however.

Furthermore, understanding of mathematics is also a current hot topic within nursing literature. Nurses are expected to have key numeracy skills

in order to calculate accurately dosages of medications. However, examination of nurses' numeracy skills has found this area of competence to be lacking too (Grandell- Niemi et al., 2006; Glaister, 2007) and 'these deficiencies have been reported for decades' (Dyjur, Rankin and Lane 2011).

The impression is that nurses do not know enough and cannot be trusted. This is evidenced in empirical papers examining prescribing of PRN psychotropic medications. Paton et al., (2003) found that prescribing of antipsychotic medication often deviated from recommended practice; in the discussion she also points out that nurses have considerable discretion over what they give and who they give it to, and that due to a lack of knowledge of psychiatric medications the quality of their decisions must be called into question.

1.10.1 Non propositional knowledge and nurses' medication work

At this point, however, it is worth considering afresh the medication work that nurses do, as the picture may not be as bleak as painted by the literature considered above. McBride-Henry and Foureur (2007) conducted a qualitative study exploring nurses understanding of medication safety, in particular how organisational culture impacts upon decisions. Inspired by the depiction of nurses as 'incompetent practitioners' (p59), they sought to understand in more detail the nursing contribution to safe practice.

McBride-Henry and Foureur (2007) found that nurses did have an adequate working knowledge of the drugs they administered, and that this was essential for the nurse in order to feel safe in their role. If they did not know something, as it was difficult to retain information about every drug administered, they knew how and where to find out.

In addition, Manias and Street (2001) studied nurses' and doctors' communication through medication charts and found that while nurses often had superior knowledge of medications compared with the doctors and were able to advise them, their decisions were invisible as the prescribing responsibility rested with the doctors and it was this that was represented on the drug chart.

McBride-Henry and Foureur (2007) suggest that nurses' contribution to medication safety needs to be reframed as those interviewed for their study demonstrated significant depth and breadth of knowledge of the culture they were working in, particularly the safety aspect. This reframing is not new however- Gibson (2001) presented a critical analysis of how nurses are positioned in the literature around medication safety. She argued that it is important to separate the 'truth' from the various social, economic or cultural hegemonies that are presented as 'truth'. The 'five Rights' for example, is drilled into nurses as a policy and it is stated by educators, writers and managers that if followed, errors will be kept to a minimum. A 'good' nurse will do this and maximise patient safety, and by implication, a 'bad' nurse will not.

Folkmann and Rankin (2010) agree, and state that the view so far on nurses' medication work is partial, and that a great deal of what nurses know, culturally and socially, is isolated from the numerous interruptions and complexities that actually exist in the real world, that nurses must work around in order to administer medication. This has important implications for understanding PRN medication administration decision-making, as the context in which these decisions are made cannot be ignored. Jennings et al., (2011) argued that in fact, giving medication is so all encompassing an endeavour that it temporally structures a nurse's day.

Managing the demands from institutional policies, technical devices, patients, the physical environment and the medications themselves took a huge amount of a different type of knowledge: in this case, procedural or craft knowledge (Higgs and Titchen, 2000). Furthermore, nurses often used 'workarounds'- practices which allowed them to get around barriers created by the system- in order achieve the goals of care. However, these could often violate hospital policy (Jennings et al., 2011).

Procedural knowledge is gained and honed in practice, and Higgs and Titchen (2000) liken it to intuition, with the depth of clinical judgement of an expert being a result of continued immersion in practice, combined with processing of prior learning. Knowledge, they argue, is constructed by the individual in the field through the processes of learning, processing of experience and testing of new forms of knowledge.

This distinction, between 'knowing that' and 'knowing how' (Pope, 2002) serves as a useful frame for understanding nurses decision- making. 'Knowing how' involves conceptualising within the context of certain norms of legitimacy and significance (Prosser and Walley, 2006). Nurses seek each other and local culture as the main source of their knowledge, the effect of which is that they learn to manage the uncertain world of recognising an agitated patient, distinguishing this from other clinical presentations, deciding what treatment to give, and possibly selecting and administering a medication. Furthermore, the individual process of learning in practice is filtered through individual perspectives and skills (Prosser and Walley, 2006). Hence, each occasion of giving a medication PRN is like a mini- trial: if it works, carry on, if doesn't, don't do it again.

1.11 Chapter summary: Sources of variation

Any decision that a mental health nurse makes in respect of giving or withholding a PRN medication is influenced by numerous factors. At each stage of the decision- making process a number of potential choices must be made, and as highlighted above, these choices are made under conditions of uncertainty. This final section therefore focuses these factors through the lens of the causes of practice variation. This is important because three attributes- equity, effectiveness and efficiency- are considered to be the hallmarks of care that delivers the best outcomes for patients (Appleby et al., 2011), which would be consistent with both contemporary mental health and medication use policy.

There appear to be two types of variation: good variation, which is allowable if it represents patient preferences and clinical differences, and bad variation, which, by contrast, is unwanted and dependent on numerous factors extrinsic to the patient including the individual decision- maker, local culture, and the healthcare system as a whole (Appleby et al., 2011; Krumholz, 2013). Sources of variation are complex, however (Appleby et al., 2011). If the nurse's decision is taken as the central point, these factors can promote variation:

- prevailing custom

- presence of clinical guidelines
- resource availability

Currently, the philosophy of mental health care is trying to change from paternalistic and controlling to working more in partnership with patients, taking their views into account where possible. Within this national attitude lie layers of belief about the reason for and delivery of mental health care, from the institution to the individual nurse. In addition, the presence or absence of clinical guidelines, although designed to provide guidance for practice, will still require judgement on the part of the nurse to decide if they apply to particular patients.

Furthermore, nurses work around guidelines in order to get the work done and get through the shift. Conditions that are argued to promote variation (Krumholtz, 2013, p151) suggests that preference- sensitive decisions are those that involve considerable trade- offs as there is no option that is superior in all respects. Think back to being a patient on a mental health ward. Your symptoms may suggest agitation- the nurse has to decide if you are likely to become aggressive. You may want a PRN medication anyway to calm your fears. If you become aggressive, how bad will it be?

The choice here is between giving a medication or trying another strategy to de-escalate the situation. The ward is busy and the nurse has little time to make the decision. Her colleagues believe that medication should be given early on in an aggressive episode; the nurse is not so sure. The prescription chart gives a choice between two medications- benzodiazepines are recommended but an antipsychotic is prescribed as well. The nurse prefers the antipsychotic but the guidelines say benzodiazepines. What to do?

The rational decision for the nurse is the one that is the best fit in this uncertain situation. The next chapter to be presented will explore theories of decision- making, in order to understand how rationality might be conceptualised and methods for testing this. The third chapter is a scoping literature review of empirical studies about nurses' decision- making when giving PRN medication.

Chapter 2: Theories of Decision Making

2.1 Introduction to the chapter

This section identifies and describes key theories of cognitive processes of decision making (DM). This will allow the scope of the field of decision-making to be outlined, including influential theoretical positions, areas of overlap and current thinking. It will also allow identification of how nursing decision- making has been conceptualised by identifying evidence within nursing literature for the key DM theories. It is not intended to be a comprehensive overview of all theories of decision- making- this is beyond the scope of this thesis. Theories have been selected on the basis of two factors:

- There is evidence of their use in explaining nursing decision-making, and
- They offer a method by which variation in practice might be understood

Theories of DM can be categorised in various ways. Commonly, the terms normative, prescriptive and descriptive are used. Prescriptive theories describe how decisions could be made- the aim is to provide help to decision- makers improve the quality and outcome of their decisions (Thompson and Dowding, 2009b, p59.) To do this, two other approaches are required. Normative DM theory aims to identify how decisions should be made, that is a 'correct' way (Cooksey, 1996, p43). Here, an external measure such as a rule of mathematics or logic can used to guide how the decision should be made.

Descriptive theories, on the other hand, do not aim to recommend how a decision should be made; instead they describe the process by which the decision *was* made. Cooksey (1996) also adds prediction to the categorisation- such theories aim to be able to predict how decisions will be made in the future. Some theories fall neatly into one or other category, others fit more than one. This chapter is organised into the following sections:

- Normative theories of decision- making, including expected and subjective utility theory
- Intuition, including the nature of expertise and knowledge structures
- System 1 and system 2 thinking
- Cognitive continuum theory
- Heuristics
- The adaptive decision- maker framework
- Social judgement theory

2.2 Normative theories of decision- making

To make a good decision, normative theories emphasise a particular form of rationality whereby people will make a choice that optimises outcomes. This is based on utility- a combination of probabilities of outcomes occurring combined with personal values. Originating in the fields of economics and mathematics, two main perspectives in this domain are expected utility theory (EUT) and subjective expected utility theory (SUET).

These decision- making models are useful when making decisions under conditions of uncertainty where a choice is needed (if one clear choice dominates, there is no uncertainty and therefore no decision to be made). In order to make a good decision, EUT requires that the decision- maker knows about all the choices available, the attributes of these choices and the probability that each choice will occur. Armed with this knowledge, the decision- maker has a complete picture of the choices open to them and can weight each attribute in terms of its desirability or utility. Logically therefore, the option with the highest expected utility, or that does the most good, will be the one that the individual chooses.

To derive an answer to a decision problem, EUT assumes logical rules are applied and followed. Transivity is one such rule, which states that if A is better than B, and B is better than C, then A must be better than C. Connectedness is another rule, whereby for any situation, A might be better than B, B might be better than A, or they are equally good (Baron, 2004). There is always an outcome- the utility is derived from which is best, given the decision. Comparison of the all of the options available is a requirement

in order to maximise utility, and selection of an option after consideration will be of the option that is best in some, if not all respects. This will be a rational decision, and in following the requirements of logic and probability can be described as having 'coherence'.

Subjective expected utility theory uses the same logic to make a decision. It differs in that instead of probabilities being based on verifiable information such as empirical evidence, they are derived with reference to the personal values of the decision- maker before making the decision, hence the subjectivity.

This theory recognises that people are not always entirely rational in their decision- making, and that what is important for one may not be as important for another. Bayes theorem can be used as the mathematical model for both theories (Cooksey, 1996, p27), and this takes into account both the probability of something occurring and the likelihood of the outcome. Bayes theorem is valuable for SEUT in that it can also take into account any effects of learning and allows decisions to be revised in the light of new information.

The practical application of EUT and SEUT is in decision analysis, thus transforming a normative theory into a prescriptive model. Decision analysis involves constructing a decision tree which includes the probability of different outcomes and assessment of patient values or preferences to form a measure of utility for each outcome. It is useful for complex decisions where no single outcome is clearly and obviously preferable over another.

Benefits of using these models include providing an explicit and systematic approach to decision- making, as it enables clinicians and patients to see how a decision was made (Elwyn, Edwards and Eccles, 2001). It allows the patient to be directly involved in decisions about their care. However criticisms of decision analysis include the fact that asking people to judge a health state of which they have no experience is flawed- Hastie and Dawes (2001) give the example where patients rate their health state before diagnosis (e.g. being HIV positive) as being more negative than when they rate it a year after diagnosis.

Criticisms of EUT and SEUT as theories of decision- making are numerous, but mainly based around observations that humans do not behave in logical ways. Violations of normative decision- making have been found to be common and depending on theoretical perspective can be viewed either as biases (for example the heuristics and biases programme (Tversky and Kahneman, 1974)), or as useful processes which evolved in adaption to the environment (for example fast and frugal heuristics (Gigerenzer, 2004)).

Either way, normative decision- making is difficult in environments where there are many uncertainties, and it is difficult, if not impossible, to know all of the necessary information in advance. This is particularly true of nursing, where decisions must often be made in the absence of empirical evidence about which intervention is best, for example. The notion of rationality too is not fixed. Rationality, in the sense of following a normative set of rules, is a generally reliable mental process (Over, 2004) and has an outcome that is likely to be true given its premises. However, a rational action may not conform to such rules yet still be rational given the context and the goals of the individual concerned.

These personal goals are often expressed via reasoning: for example a nurse might suggest that she withheld analgesia because giving it would sedate the patient too much and the patient needed to go home. Given that the patient wanted to go home and bed availability was low, this is a very good reason. However, when measured against a normatively expressed standard, it may not be a good decision, yet there is instrumental rationality for the action that makes sense in the given context.

Normative decision theory would suggest that all rational decision- makers would arrive at the same decision in the same context and yet it can be imagined that a different nurse, with different goals, would make an alternative decision, expressed with an equally compelling reason. Furthermore, utility from the patient's point of view is not a primary concern here, highlighting conflict within decision- making.

Further issues with EUT and SEUT concern the difficulty of making decisions where there are multiple attributes to consider. Trade- offs must be made where competing options are available, with a variety of positive and negative attributes. Multi-attribute utility theory (MAUT), developed from EUT and decision analysis, is a further normative and prescriptive

model intended to guide decision- makers. Making decisions in this way also involves identifying choices and calculating utilities.

However, Shafir and LeBoeuf (2004) outline some of the difficulties faced by people when making such choices. Preferences are not stable, and violations of the logic of MAUT have been found when experiments about peoples' decision- making have been conducted. These violations can be induced by the order in which options are presented, whether the decision-maker is required simply to choose or if payment is required, or whether the options are presented one at a time or all at once.

The desire to avoid conflict implicit in complex decisions does not form part of normative DM models, but has been shown to be a key aspect of peoples' option selection- they will go for the 'default' option rather than consider each option on its merits or even defer making a choice altogether (Shafir and LeBoeuf, 2004). The implications of these findings are that peoples' decisions are rarely made consistently but are heavily context and person dependent. Deviation from the requirements of EUT is not a failure of decision making, but reflects the fact that people process information in different ways from that which classical decision- making would suggest.

Decision analysis itself appears to be costly and time consuming, and is difficult practically due to a lack of available probabilistic data, incomplete knowledge of all alternatives, and few techniques of reliably combining patient utility (Thompson and Dowding, 2001). There are some examples of its use within nursing: Lanza and Bantly (1991) used it to improve quality of care for patients in mental health units at risk of aggression. Baumann and Deber (1989) attempted to apply decision analysis within an ITU, but their experimental study found it could not be applied in situations where there was a large number of available options and people could not agree which represented the 'gold standard' decision.

Indeed, Shafir and LaBoeuf (2004) describe how making a decision using decision analysis may result in disappointment- it feels forced and divorced from reality. However, value judgements do influence decisions as they guide nurses in deciding how to get to a desired end- point of patient care, that is, instrumental rationality. The issue is that nurses do not have the unlimited cognitive capacity or complete knowledge required by normative

theories, nor is the decision- making environment predictable and stable. This leads to the question of how, in real life, do nurses decide what to do?

2.3 Descriptive theories of decision- making

Descriptive decision- making theories aim to explain how people make decisions, rather than how they should. When making decisions in real life, people are constrained by two things- their cognitive capacity and the environment within which they find themselves. These parameters were outlined by Simon (1955) in influential work that has shaped much decision-making theory since the mid- twentieth century. His starting point was that there are areas of agreement between normative decision- making theories and descriptive theories, in that:

- There needs to be a choice or set of alternatives
- There will be a subset of alternatives to be considered by the decision- maker
- There will be a future state, to which the decision is directed
- There is some kind of trade- off, representing the value or utility of the alternatives
- Some information is available about the outcome that will occur if each alternative is chosen, and
- Information about the probability of each outcome occurring is known

However, observation of how people actually make decisions led Simon to question the value of normative decision- making theory. Human decision-making, he argued, has evolved in response to the environment. Short-term working memory is small compared with long- term memory capacity, so not all the information available or collected about a decision can be used. Attention is highly selective, and people will direct their attention to certain types of information and use it in a particular ways. Rationality cannot mean taking into consideration all available options; rather people have constrained or 'bounded' rationality.

Additionally, as highlighted earlier, not all information is usually known about the choices available or probability that an outcome will occur given

the choice made. Simon argued therefore that instead of maximising utility, decision- makers use a satisficing strategy, settling for the option that is good enough rather than optimal. Furthermore, instead of knowing all alternatives in advance, alternatives can be generated via some kind of mental process. These observations have led to a rich field of DM theories that aim to describe the processes that people use when making decisions. Theories that have emerged include:

- The information processing approach
- Heuristics and biases
- The adaptive decision- maker
- The naturalistic decision- making approach

This next section provides a description of these theories, and explores application of them to explain how nurses make decisions.

2.3.1 Information processing theory (IPT) and the use of hypothetico-deductive reasoning

Building upon Simon's work, the information processing paradigm has been a theoretical and methodological framework underpinning much recent research into judgement and DM (Payne and Bettman, 2004). How clinicians make decisions about diagnosis or reason clinically has been studied extensively.

With origins in information- processing theory, Elstein, Shulman and Sprafka (1978) described the clinician as problem solver, who arrives at a diagnosis from a patient with a set of symptoms and signs using hypothetico- deductive reasoning. Hypothetico- deductive reasoning is ubiquitous and constantly used to make sense of complex environments (McKenzie, 2004).

The difficulty when making a diagnosis is that the signs and symptoms upon which it is based may only be probabilistically related to it. Some signs and symptoms can be suggestive of many diseases or patient problems, requiring the clinician to narrow down the range of options. Some signs and symptoms are highly suggestive, whilst others may be redundant

in the context of a particular illness. Characteristic of many clinical decisions, this is decision- making under conditions of uncertainty. This is in stark contrast to normative DM, where all options and probabilities are known.

Decision- makers therefore rely on strategies to simplify the problem, choose, process and combine data. Short- term memory is used to gain access to stores of information held in long- term memory using a four stage process (Elstein and Bordage, 1988):

- The first stage is the acquisition of cues via patient assessment
- Secondly, using information stored in the long- term memory, a small number of hypotheses- usually 5 to 7- are tentatively generated which provide alternative explanations for the problem. Hypotheses are developed from a combination of cues or from one salient cue. Knowledge of disease probabilities appears to be important, rather than other considerations such as seriousness of disease
- The third stage involves reinterpreting the cues to confirm or disconfirm the hypotheses. Cues may also be considered non-contributory
- Finally, the last stage involves weighing up the pros and cons of each alternative hypothesis- the one chosen will be that which the evidence favours. Alternatively, a decision will be made about any further actions needed, for example tests.

To these 4 stages, Carroll and Johnson (1990) added a pre- stage of the decision- making process which starts with realising that there is a decision to be made, and includes such aspects as who noticed the problem and what had to happen for it to be labelled as a decision problem. Schön (1988) argued that the stage of problem setting, or the process by which the problem is defined and the ends and means selected, is as important as problem- solving. This involves the decision- maker making sense of an uncertain situation, turning a problematic situation into a problem. Problem formulation, therefore, is a process of 'imposing coherence ….which allows us to say what is wrong and in what directions the situation needs to be changed' (Schön, 1988, p66).

Hypothetico- deductive reasoning has been used as a framework for studying nurses' DM. It is variously referred to in the literature as linear (Hallett et al., 2000), forward- reasoning (Botti and Reeve, 2003) or systematic reasoning (Corcoran, 1986). Crow, Chase and Lamond (1995) identified the same concept as procedural rules, which provide strategies for gathering and combining data.

Use of this reasoning strategy has been studied in community nurses (Hallett et al., 2000) and nurse practitioners in general practice (Offredy, 1998), who used it to narrow down options when making a diagnosis. This then guided them in their choice of subsequent interventions. To weigh up pros and cons of each alternative, experienced nurses, in some cases, used knowledge of probabilities to guide diagnosis, for example likelihood of the menopause for women's complaints (Offredy, 1998). In this case, the nurses' belief in their diagnosis depended on their assessment of the relevant probability.

Lamond, Crow and Chase (1996) argued that differences can be observed in how expert and non- expert nurses make decisions using hypothetico- deductive reasoning. Experts use forward reasoning- the process described above- whereas less experienced nurses use backward- reasoning to structure their data collection. This involves using a hypothesis very early on to guide what data to look for. This has the effect of constraining the data used, making it likely that data that does not fit the hypothesis is ignored or reinterpreted to fit.

Botti and Reeve (2003) studied student nurses' decision- making, using written scenarios of increasing complexity. The scenarios were explicitly designed to be sensitive to variations in performance. Novices ignored disconfirming data, or reinterpreted it to fit the hypothesis. Hypothetico- deductive reasoning has also been found to lead graduate nurses to consider problems in a routine, uniform way (Manias, Aitken and Dunning, 2004) and the nurses in their study often did not ask questions in order to generate alternative hypotheses. Failure to do this can lead to incorrect diagnosis of a patient's problems.

This effect can also be seen in experienced nurses in unfamiliar situations (Offredy, 1998; Twycross and Powls, 2006). In both of these cases practitioners were more likely to ignore disconfirming cues or search for

data to confirm, rather than disconfirm, hypotheses. This confirmation bias presents a difficulty with hypothesis generation as a decision- making strategy- McKenzie (2004, p208) identifies that people are more likely to be influenced by the presence of a factor rather than its absence, and that extremes or rarity are preferred, leading to 'confirming and disconfirming outcomes being more equal in informativeness than they actually are'.

Thompson (1999) suggests it is expected that nurses revise their diagnoses in the light of new evidence. However, Hammond et al., (1967) found that although nurses did revise their decisions it was not as much as calculated probabilities would suggest. Nurses were labelled cautious in their revisions. This is not unique to nurses, and occurs with physicians, as Elstein and Bordage (1988) point out.

A further criticism of hypothetico- deductive reasoning is that practitioners do not make decisions in this serial, linear way, rather they overlap, change and repeat stages (e.g. Corcoran, 1986). Decision- making in clinical practice is often dynamic rather than a single, discrete event. Information is collected and an action may be taken, which can act as an end- point or decision but it can also act as a way of testing a hypothesis, giving further information that feeds into the overall decision, narrowing down choices.

These criticisms, including the lack of explanatory fit (Thompson, 1999), prompted study of intuitive decision- making. Intuition in nursing has been studied for a generation and has been hugely influential in shaping understanding of nursing knowledge; cognitively, it is accepted as a genuine and valuable strategy when making decisions in certain conditions (Rew and Barrow, 2007). The next section explores the use of, and criticisms of intuition in clinical decision- making.

2.3.2 Intuition

Using intuition allows nurses to be able to make decisions that are complex, for example resolving ethical dilemmas or predicting consequences based on incomplete or inadequate information (Rew and Barrow, 2007). It can be defined as:

'A component of complex judgement, the act of deciding what to do in a perplexing, often ambiguous and uncertain situation.' (Rew, 2000)

The work of Benner (1984), based on the work of Dreyfus and Dreyfus (1986), began the interest in intuition, positing it as an overlooked and devalued strategy that nurses use to make decisions. Dreyfus and Dreyfus (1986) first studied intuition in order to develop effective training programmes, and they demonstrated several principles of skills acquisition as people move from novice to expert practice. Intuitive thinking was argued to develop like this:

- Firstly, novices use abstract or context- free rules to perform a specific task. Because they lack experience, novices have no internal ability to make sense of a situation or task. For example, a novice nurse might be able to take a blood pressure or apply a particular dressing using aseptic technique by relying on structured rules to perform.

- After much experience in a particular learning environment, the stage of competence is reached. Recurrent meaningful patterns emerge, and are stored in the brain as wholes, not single pieces of information. When faced with similar patterns, the whole is recalled. For a nurse, meaningful patterns might include recognising that a patient has a low blood pressure post- operatively, and knowing how to manage such a situation.

- Proficiency is reached when the meanings of situations have relevance to a long- term goal. A specific situation, experienced in different ways, is treated as different situations. If a patient has low blood pressure, this might indicate hypovolaemia in the case of a post- operative patient, or hypervolemia in the case of patient with acute heart failure. The goal or treatment in each situation is different, and certain elements of the situation are more or less important, or salient.

- The stage of expertise is reached when each situation faced brings about an automatic or intuitive response. Nurses operating at this

level would be able to identify a patient problem and decide what to do automatically, without recourse to rules or guidelines to help them decide. Therefore, characteristics of expert performance, according to Dreyfus and Dreyfus (1986), are that recollection of events is situational, recognition of problems is holistic and decisions are intuitive.

Benner (1984) studied intuition using a phenomenological approach. Observation of participants showed that nurses appeared to demonstrate decision- making activity in accordance with the model proposed by Dreyfus and Dreyfus (1986). Benner and Tanner (1987) further suggested that intuition had six key aspects:

1. Pattern recognition involves recognising relationships between cues, and is context- dependent. Benner (1987) makes it clear that this type of pattern matching is different, less narrow, than the traditional definition, and is more of an unconscious process suited to the ill- structured nursing environment

2. Similarity recognition: recognising the same feature, even when its presentation appears different between patients. Conversely, this allows recognition of states of dissimilarity, which would prompt a search for why

3. Common- sense understanding that allows nurses to make use of patient's perspectives to inform decisions of care

4. Skilled know- how, where information is integrated into a whole and can be visualised by the nurse, rather than separate elements that cannot be drawn together. This enables the nurse to practice fluently

5. Sense of salience, where some aspects or features stand out as being more important than other, given the context of the situation

6. Deliberative rationality, where the expert has a range of perspectives to draw on to guide care. This is based on learning from past situations about what worked and what did not. Experts play out situations in their mind to test hypotheses.

Intuition has been studied in nurses from various settings including home health agencies and critical care units (Rew, 1988), community (Luker and

Kenrick, 1992), psychiatric units (Rew, 1991) and emergency departments (Lyneham et al., 2008). Intuitive decision- making is associated with all stages of decision- making (Lauri and Salantera, 1998), and as a method of problem identification it allows expert practitioners to unconsciously and automatically perceive a problem in terms of the ultimate goal of care.

This is exemplified in a study by Jacavone and Dostal (1992). They explored the assessment and management of chest pain, and found that expert nurses appeared to know what they were looking for, and had a comprehensive knowledge of the actions and safe doses of vasoactive drugs. They used this information to make continuous and rapid judgements of how much to infuse and were able to use drugs in combination to obtain the best outcome for the patient.

Novice nurses, by contrast, had less well- developed knowledge and were cautious and hesitant when adjusting drug infusion regimes. The internal rules used by expert nurses to govern the use of information also indicated there was no need to search for any further data. Patients with cardiac pain exhibited a particular pattern of withdrawal and energy conservation not seen with other types of pain. This knowledge helped the nurses distinguish between cardiac and non- cardiac pain, also when medications were relieving cardiac pain.

Thus, the ability to make a decision intuitively appears to emerge from a combination of knowledge, experience, personality, the environment and client relationships (McCutcheon and Pinchcombe, 2001; Lyneham, Parkinson and Denholm, 2008). Indeed, the use of intuition appears to be a hallmark of expert reasoning (Benner, 1987). However, this implies that only experts, with their deep well of clinical experience to draw from, can use intuition.

To try to understand further the link between use of intuition in practice and in everyday life, Pretz and Folse (2011) used various measures of intuition to describe the relationship between domain specific and domain general intuition among nurses with different levels of expertise. Factor analysis of survey responses showed no correlation between domain specific and domain general measures of intuition; in other words, use of intuition was specific to the domain. Use of intuition in everyday life was not, therefore, correlated with its use in the clinical environment. Experience in the domain

was found to have an independent and significant relationship with nurses' willingness to use intuition, self- perception as a skilled clinician and use of intuition to innovate in practice.

Further support for the willingness to use intuition with greater experience can be found. King and McLeod- Clarke (2002) explored nurses' use of intuition in surgical and intensive care environments. Using the four levels of nursing expertise described by Benner (1984), nurses classified as advanced beginners experienced a sense of unease about patients' status, but were unsure of what these feelings signified. They often responded by 'keeping an eye' on the patient, but did not use their feelings as a trigger to further assessment. They described reluctance to act on their feelings, for fear of appearing stupid.

Expert nurses, however, were confident in their ability to look at a patient and know immediately if they were fine or not, and also to act on their feelings, usually by systematically searching for concrete evidence to explain their perceptions. However, Ruth- Sahd and Hendy (2005) found that novice nurses also felt that they used intuition, with older age, more hospitalisations and greater social support correlating with greater use of intuition.

2.3.3 The nature of expertise: knowledge structures

For experts, it is argued that it is not reasoning style that enables their superior decision- making performance, but access to domain- specific knowledge held in long- term memory (Crow, Chase and Lamond, 1995). Domain- specific knowledge has been shown to be important in nurses' ability to solve problems as with experience gained from the clinical environment, knowledge is added to and structured to produce schema called 'illness scripts' (Schmidt, Norman and Boschuizen, 1990).

With increasing clinical exposure, expertise develops- the illness scripts can be viewed as list- like structures including clinical features and contexts of a disease. These categories of information are linked together through rich patterns, and there are multiple ways of retrieving this information (Greenwood and King, 1995). These mental representations not only

enable recognition of similarities to enable diagnosis, but also any dissimilarity. Because the illness scripts are context dependent and develop as an adaptation to the environment, if an expert is asked to make decisions in an unfamiliar domain, their decision- making deteriorates to resemble that of a novice (Lamond and Farnell, 1998).

When faced with a decision task, experts appear to collect a lot of information initially- the same amount as novices- but seem to be able to recognise the salient information in a decision- task. They also spend relatively less time than novices deliberating- this leads to experts making quick, effortless decisions while denying a decision has been made (e.g. Phillips, Klein and Sieck, 2004). Reischman and Yarandi (2002) studied expert and novice critical care nurses' cue utilisation. Novices recalled significantly more total cues than experts, but experts tended to use a higher proportion of highly relevant cues as a proportion of total cues recalled.

This has been replicated in other studies (Lamond and Farnell, 1998; Fuller and Conner, 1997), although Thompson, Yang and Crouch (2012) found, using high- fidelity simulation with a mannequin, that expert nurses were no more likely to be able to separate signals (confirming cues) from noise (disconfirming cues) than novices. Differences in these results could be explained in part by study methods used and the way experience/ expertise of staff participating was operationalised.

A further feature of expertise, emphasised by Benner, Tanner and Chesla (1996) is that of knowing the patient and being emotionally engaged. Knowledge of the patient was explored by in a handful of studies. Bourbonnais and Baumann (1985) and Junnola et al., (2002) found that nurses were able to identify patient problems without having extensive information, and were able to prioritise the problems. However, considerable variation was noted about the order in which they would have addressed the problems.

Lauri et al., (1998) found that nurses exhibited patient- orientated decision- making, by stating they would use the patient's own views as the frame of reference for the decision, and involve them in checking that their interpretations have been correct. Radwin (1998) used grounded theory to identify attributes of expert nurses. 'Knowing the patient' emerged as a key

attribute, both generally in knowing antecedents and consequences of patient situations, and specifically, related to particular patients and their interpretation of their problems.

Hence, in agreement with Benner (1984) the final stage of intuitive decision making can be characterised by non- analytical pattern matching. However, pattern matching can exist in two states (Offredy, 1998). Whereas intuitively it occurs unconsciously, when used analytically it is a conscious process. In this case, information is 'chunked'. Drawing on well- structured networks of stored knowledge allows those with experience to match perceptions, where new patients match similar cases previously seen. This also allows for anomalies to be detected, such as features that should be present but are missing.

Pattern- matching is used by clinicians for diagnosing common conditions and can be very efficient (Thompson and Dowding, 2009a), although it can also be problematic as increasing confidence in diagnosis can lead to a corresponding loss of accuracy (Oscamp, 1982). In addition, states of high emotion or motivation increase the availability of some thoughts (Loewenstein, 1996) with a corresponding reduction in others- meaning that the information that is salient to a condition is automatically overridden by other concerns. In this respect emotions help to focus attention, though this focus may be misdirected.

As a study of the meaning of intuition to practitioners, Benner's work has been important in underlining that many nursing decisions are made intuitively, and how an understanding of all the components of a situation (including the patient's perspective, available resources and knowledge of the local structures and politics of the workplace) combine into a whole to enable expert practitioners to make rapid decisions about patient care.

Criticisms of intuitive decision- making models, particularly the work of Benner, centre on some notable inconsistencies and gaps in their explanatory power. The notion of expertise is fluid and difficult to correlate with years of experience, and categorising people into stages is empirically difficult (van der Maas and Molenaar, 1992). Empirical evidence suggests that factors such as time and interfering tasks affect expert performance, so rapid perception and analytical step- by- step thinking are both used (Gobet

and Chassy, 2008). In other words, the contribution of more analytic reasoning styles is underestimated and undervalued.

Finally, if intuition allows nurses to make decisions instantly without consideration of any alternatives (e.g. Rew, 1986; Rew, 2000; King and MacLeod- Clarke, 2002), the visibility of decisions and ability of nurses to explain them is lacking. The rules by which nurses and clinicians decide in these cases is unclear, which is one of the major criticisms of intuitive decision- making models (Thompson, 1999). Benner's work situates intuitive decision- making as the pinnacle of expert performance, yet work into heuristics has revealed that intuition may be prone to systematic biases, leading to incorrect diagnoses and faulty reasoning. Without the ability to explain how a decision was reached, nurses are not in a position to examine the quality of their decisions, nor identify how they can be improved.

2.3.4 System 1 and system 2 thinking

Intuitive and analytical thinking are viewed in contemporary cognitive psychology as two separate but complementary processing systems (Stanovich and West, 2000). System 1 thinking is characterised by being rapid, parallel and automatic in nature, with only the final product emerging into consciousness. This type of thinking is considered the 'oldest' form of thinking and arises from associative learning (Evans, 2003), that is through adaptation and feedback from the environment. Using this form of thinking, people decide on the basis of past events and what has worked in the past. Studies into the use of intuition, discussed above, appear to provide evidence of this system: rapidity, seeing the problem and solution as one, knowing without rationale. Learning from the environment is key, as experience in the domain has been shown to correlate with ability to use intuition.

System 2 thinking by contrast, is slower, deliberate and over which people have conscious control. System 2 thinking also allows for the ability to make mental models of future events. This is important for decision-making in environments of uncertainty as it enables possibilities to be explored before a final decision is made.

These two systems can interact in different ways. System 2 thinking can be used to exert control over the outcomes of System 1 processes: judgements made via System 1 thinking can either be acted upon straight away, or confirmed or modified by the more deliberate System 2 thinking (Cobos, Almaraz and Garcia- Madruga, 2003), for example by supressing default knowledge and beliefs (Evans, 2003) through correction (Payne and Bettman, 2004).

An alternative model suggests that whether System 1 or System 2 modes are used depends on contextual factors such as time pressure or cognitive load. Payne and Bettman (2004) argue that from an evolutionary perspective, good judgements are very often made by System 1 thinking, as this is an adaptive function of the environment. Only in rare or unusual circumstances would System 2 thinking be needed. However, correction of System 1 judgements by System 2 thinking may be rare, depending on awareness of error as well as motivation and ability to correct (Wilson and Brekke, 1994). Important questions are raised about these systems: do people choose to use one or other system, and if so, how do they decide?

2.3.5 Cognitive continuum theory (CCT)

Considering both thinking systems, Hammond (1966) rejected the traditional duality between intuition and analytical thinking, and suggested that they occupy either end of a continuum, with varying degrees of quasi-rationality in between. Cognition, that is judgement mode, moves back and forth along this continuum. Hammond (1986) further suggested that judgement tasks themselves are made up of properties that can induce intuition or analytical cognition. As such, tasks can be ordered along a continuum in the same way that the judgement mode can be ordered. Hammond proposed that if the judgement style matches the task property in terms of position on the continuum, then the decision is likely to be the most accurate or appropriate one. In other words, a decision made intuitively rather than analytically, where the task conditions induce intuition, will be the best decision. However, as Hammond (1987) points out, these conditions are not deterministic. Analysis can be applied to intuition-inducing tasks, for example if there is sufficient time, and intuition can be

applied to analysis- inducing tasks, e.g. if time is short. Tasks are made up of three principal features (Hammond, 1986), which are:

- Complexity of task structure

This includes task properties such as number of cues available for the judgement, how they are presented (sequentially or simultaneously), cue redundancy, if a judgement scale is to be used and distribution of the cues (mean, standard deviation, for example).

- Ambiguity of task content

This refers to conditions that enable the task to be organised, and includes the presence of any organising principle for combining cues (e.g. a formula or decision aid), if an outcome is known (ecological criterion), familiarity of judges with the task, and availability of feedforward and feedback.

- Form of task presentation

This category includes aspects that affect how the task presents itself, for example if it can be broken down into sub- steps before the decision or if it is decomposed afterwards; how the cues are presented- pictorial, verbal, numerically and so on; and response time permitted. Task presentation also includes whether reliance on memory is required, or if the role of memory is minimised.

Testing to see what conditions might induce either thinking system, Dowding et al., (2009) used CCT to analyse how features of two observed decision types ('hard' and 'easy') undertaken by heart failure nurses influenced their decisions. They found that when making decisions about medications for patients with heart failure (the 'easy' task), nurses used mentally held 'checklists' to ensure they didn't miss important information. The characteristics of the medication decision induced a quasi- rational mixture of intuitive and analytical decision- making styles, with decision strategies being an experimental 'try it and see what happens' approach, or based on internalised guidelines or discussion with peers. By contrast, palliative care decisions were felt to be difficult because of the uncertain nature of the disease trajectory, and the imperative to get the timing of this decision right. A lack of guidelines and the unpredictability of the situation induced a more intuitive style.

Studies disagree about which thinking strategy is used first. Pirret (2007), in the study of intensive care nurses mentioned above, found that many nurses had worked in the unit for years, and work had become routine. Intuition was cited as a major strategy used to formulate decisions, except for when caring for particularly sick patients when a more analytical decision- making strategy would be used. In contrast, examining nurses' wound care decisions, Hallett et al., (2000) found that whilst useful initially, linear reasoning was superseded by a more rapid, intuitive style as the decision became more complex, taking into account patients' attributes such as weight or compliance with treatment and the various roles nurses had to adopt such as health promoter or diagnostician. Decision outcomes were not consistent between nurses, resulting in an individualistic approach to wound care decision- making.

2.3.6 Heuristics

If intuition is accepted as a decision- making strategy, what directs the focus of the perception upon which the whole decision is based? Kahneman (2003, p669) takes accessibility of information as a starting point, arguing that 'the intuitive operations of System 1 thinking generate impressions that are not voluntary or verbally explicit.' These impressions arise under appropriate circumstances, that is, are triggered spontaneously and effortlessly. Whether an impression is accessible or not depends upon various factors such as salience of the stimulus, attention, training, and activation of ideas by association and priming. The effortless decisions that are characteristic of expert performance, relying on activation of the illness-like scripts mentioned above, are dependent on associations of signs and symptoms into an overall impression.

When making a decision in an uncertain environment, information is often incomplete- it may be missing, or some of it may be redundant. Higgins (1996) also stated that human judgement is guided by available information, yet bounded rationality and a need for decision- makers to satisfice rather than optimise means that decision short cuts or heuristics are frequently used. Simon (1990, p11) argued that people use heuristics

as they allow '…satisfactory solutions to be found with minimal amounts of computation'.

It is important to recognise that the use of heuristics is an adaptive mechanism to real- world environments. Two leading theories of heuristic use however, describe them either as deviations from normative rules leading to biases (exemplified by the work of Kahneman and Tversky) or as adaptations that make us smart, given the uncertain nature of the environments in which they are used (exemplified by the work of Gigerenzer). Here, rationality is not measured by correspondence with normative rules, but by ecological rationality, or how well the adaptive mechanisms produce accurate decisions, given the environments in which the decisions are made (Todd and Gigerenzer, 2000).

Examples of heuristics from the heuristics and biases approach (Tversky and Kahneman, 1974) include:

- Representativeness. In this case, when asked to choose between two options, a simple comparison is made. The one chosen will be the one that is felt to be a 'typical' representation. For example, if asked to judge whether getting 5 heads in a row in a coin flip is representative of randomness, people will judge this to be unrepresentative as it does not fit their mental model of random.
- Availability. When given a choice, the one chosen will be the one that comes to mind (is recalled) more easily. Cases seen recently or frequently will be at the forefront of a decision- maker's short- term memory, and with lack of knowledge of base rates are more likely to be chosen.
- Anchoring. Here, judgements are influenced by initial values which may be suggested by an internal or external source (Keren and Teigen, 2004). When generated internally, the anchor is used as a benchmark against which adjustments to the estimate can be made, in order to arrive at what feels like a correct answer.
- Hindsight bias. Experimental evidence shows that where options exist, knowledge of an outcome inflates the likelihood of it being selected compared with no knowledge of the outcome (Fischhoff, 1975).

- Confirmation bias. This takes several forms, including inability to revise diagnosis in the light of new evidence, ignoring disconfirming data, or searching for and interpreting data to fit an existing hypothesis (Chapman and Elstein, 2000).

For Todd and Gigerenzer (2000) heuristics can take two forms- those that satisfice, to guide search for information, and fast and frugal, that use limited information to make decisions. Examples include:

- Recognition heuristic. In a situation where one of two objects is recognised and the other is not, the recognised object will be most useful in respect of the criterion.
- Take the best. This is a one- reason heuristic. It has a search rule, one- reason stopping rule, and one- reason decision making. Where multiple options exist, it involves searching through cues (attributes) in order of validity. If one cue comes up highest by comparison with the others, then stop the search. If it doesn't, exclude it and return to the comparison.

However, as a paradigm of research, despite being influential in the field of decision- making over the past 30- odd years some criticisms have been levelled at the approach. Keren and Teigen (2004, p100) summarise some of these criticisms. Firstly, methodological criticisms suggest that often heuristics have been elicited experimentally, and the conditions under which this elicitation has occurred may not be apparent in real- life decision- making.

In addition, researchers may have been too quick to conclude experimental results as being evidence of particular heuristics. They further suggest that proposed heuristics are vague and not readily testable. Gigerenzer (1996) argued that heuristics such as representativeness or availability at once explain too much, as post- hoc could be applied to any experimental result, and too little, in that the antecedents and processes of their use are not clear. Furthermore, defining the correctness of a decision against probability results in narrowly drawn norms- there is no reason why decisions should comply with probability theory. Probability theory itself is concerned with repeated events, and appealing to it as a norm against

which decisions are evaluated violates its principles. Gigerenzer further states that experiments into heuristics ignore context and content of information, both of which are important in making a decision.

Evidence of nurses' use of heuristics is limited. Cioffi (1998) identified that staff used the representativeness heuristic when triaging patients, particularly the more experienced staff with prior experiences to draw upon. Simmons et al., (2003) claim to have found 11 different heuristics used by experienced nurses. However, their categorisation of data into heuristics is unconvincing. One nurse described how "He [the patient] was getting out of bed on his own so I just put all the side rails up times 4". This was described as the heuristic of providing explanations, however it is difficult to distinguish this from one- reason decision making.

Riva et al., (2011) found that a sample of 423 nurses and doctors tended to fully anchor their pain assessments to their initial impression, and revision of their judgement was insufficient when they were made aware of the patients' own pain ratings. The anchoring heuristic has been used to explain hindsight bias (Keren and Teigen, 2004): testing this, Mazzacco and Cherubini (2010) found that a clinical decision was affected by knowledge of outcome of a prior, similar decision. Where the outcome was negative, some staff were less confident in a subsequent decision. A positive outcome made no difference to the subsequent decision.

In summary then, the heuristics and biases programme is appealing as it seems to explain how intuitive decisions can be made. However, as a theory the programme lacks predictive power- it is not clear which heuristic will be induced or used in any given circumstance.

2.4 Social judgement theory (SJT)

A further theory about the influence of adaptation to environments is SJT (Brunswick, 1952). This emphasises the adaptation that organisms (in this case nurses) make to the environment in which they find themselves. Events or occurrences in the environment (or ecology) present themselves as proximal stimuli to the perceptual system of the decision- maker. These proximal cues are processed within the organism and some kind of

response occurs. However, cues are said to be only probabilistically related to the environment and are not perfectly reliable or valid representations of the ecology. Similarly, the response from the decision- maker will only be probabilistically related to the proximal cues as a result of the uncertainties inherent in how the information should be used. Brunswick proposed that the interface between how cues are perceived, and the relationship between cues and the ecology can be seen as a lens- that is, the lens through which the nurse will perceive patient cues.

Commentators have called into question whether SJT is truly a theory as it does not allow predictions to be made and hypotheses tested (Brehmer, 1988). However, as a method of examining decisions it is powerful because of the emphasis on the relationship of the ecology to the decision. The lens, through which cues are perceived, is constructed from experience, values, personality and many other factors that individuals bring to bear on their decisions, unwittingly or not.

In fact, SJT has the ability to be able to make visible decisions that are made intuitively, that nurses are unable to explicate as through experience perception of cues and seeing the goal of care have, over time, become one thing. SJT allows nurses' own evaluation of the weighting and relationship of cues to be modelled, and the two compared to ascertain the accuracy, weighting and therefore the variability in use of cues between nurses. The form of rationality emphasised in SJT is *ecological rationality*, or the fit between the information as found in the world, and the information- processing of the mind.

This technique has been used to study nurses decisions. Thompson et al., (2005) used a factorial design to model student nurses' use of cues when diagnosing shock using controlled information. They found that there was little consensus in student nurses' judgements of likelihood of shock, and considerable variation in relative weighting of the cues presented. In another study, Thompson et al., (2008) used simulated paper- based cases to explore if heart failure nurses' decision- making varied depending on whether a task was considered 'hard' or 'easy'. For both tasks, nurses varied considerably in the relative weights of cues used, with half of the importance of information accounted for by just 2 cues in each decision. Of these cues, weighting varied from 0- 50% of the judgement, while

agreement between nurses for the 'easy' task was 0.42 (S.D. 0.24) and 0.40 (S.D. 0.20) for the hard task. Similar results have been found elsewhere (e.g. Thompson et al., 2007). This model was used to underpin the first study presented in this thesis- further explanation is provided there.

2.5 Recognition- primed decision model

This final theory of decision- making to be considered concerns the reasoning of experts. In a programme of research studying how experts make decisions in the real world, (Klein, 1993) developed and refined the recognition- primed decision (RPD) model.

The model weaves together situation assessment and mental simulation to explain how decisions are made in familiar, less familiar and unfamiliar situations where time pressure and complexity are a constraints on decision- making. By assessing the situation for plausible courses of action, then using mental simulation to evaluate them one at a time, a decision is made. The model describes four main factors that influence how a decision is made, and the final outcome:

- Plausible goals. Based on experience of what works, expert decision- makers will understand what can reasonably be accomplished in a given situation.
- Relevant cues. Based on recognition of cue patterns built up through experience, the decision- maker can quickly identify what is normal and also when anomalies are present. The plausibility of goals influences the importance of certain cues over others.
- Forming expectations that act as a check on the accuracy of the situation assessment. If something contradicts the expectations then the situation has been misunderstood.
- Taking a course of action.

The simplest version of the model is the Simple Match. Here, there is nothing in the situation to violate expectancies: the cues are recognised as being normal, and goals are plausible. In mental health assessment, a nurse may assess a patient as being anxious or agitated. Why? Because

they have only just been admitted to an acute care unit. If the patient seems co-operative and not at risk of harming themselves or others, the nurse may decide to use one-to-one time in a low stimulus environment to calm the patient and help them. Here, a course of action is decided on quickly- experienced practitioners will not compare options. The decision has been made intuitively once the situation has been recognised.

The next version is where one of the expectancies of the situation is violated, so something about the situation or patient does not meet the criteria for Simple Match - perhaps the patient seems that they may not be quite as co-operative. The mental health nurse needs to further assess the situation, so they may try one-to-one time, but if this does not work and the patient seems to be getting more agitated (anomaly) they may try other options such as using another member of staff to engage the patient, or giving PRN medication to calm the patient. Mental simulation may be used here to test the options.

Version three of the model is for situations where the solution is not immediately obvious. In the case of an agitated patient, perhaps the cause of their agitation is not clear- they may have been in hospital for a few days with few outbursts. To make sense of the situation, the nurse must build a plausible story about the patient. Is the agitation due to their personality, are they reacting to something, or is their psychosis worsening? Ongoing assessment is needed here, and actions will be tried and tested to see which the most effective one is.

For all of these versions of how a decision may be made, once a good enough outcome has been identified, no further options will be considered. This concept of stopping at a good enough decision is important. Satisficing characterises the way most people make decisions- approximately 90- 95% of decisions are made this way (Klein, 2009).

Techniques of enquiry such as observation in the field and various methods of cognitive task analysis have enabled models of NDM to be developed that reflect how experienced people make decisions within their domain. According to the RPD model therefore, experienced mental health nurses will decide whether to treat an agitated patient with a medication or to use another strategy, and this choice will depend on the working knowledge they have built up through repeated exposure to similar situations. This

experiential knowledge that means nurses can make rapid decisions by relying on their knowledge- for proponents of NDM, this is intuitive decision-making (Klein, 2015).

2.6 Chapter summary and implications

There are numerous theories of decision- making that are available to understand how nurses make decisions to give or withhold PRN medication. Descriptive, as opposed to normative theories are most relevant here, and results from the information- processing paradigm show many ways in which nurses decisions may vary. Nurses appear to use a combination of analytical and intuitive reasoning styles, yet how much each of these styles contributes to the final outcome depends on numerous task, individual and contextual factors.

Intuitive decision- making is argued to be a function of experience, as complex structures of information develop in the minds of decision- makers that allow them to perceive the problem and goal of the decision as one thing. Their decisions, therefore, appear effortless- almost like no decision has been made at all. This means that nurses struggle to describe decisions made intuitively. Furthermore, novices lack these mental structures.

Intuitive thinking relies on mental short cuts or heuristics, and these arise as an adaptation to the environment. Decisions made this way can be accurate, even when compared with those that use all available information, and have the benefit of reducing cognitive load. However, they can also lead to faulty reasoning through reliance on such factors as how representative a problem is to others, or how easily information comes to mind.

Decision strategies also seem to adapt not just to the cognitive load but also to the frame through which the decision is viewed. These frames arise out of experience, personality and context, so that dependent on the frame, a nurse may be solving a different problem from another, yet using the same information. The impact of all of these decision styles and judgement processes is that variation between nurses is far more likely than not. The

next chapter presents results of a scoping literature review into PRN medication administration and the factors that nurses use to decide. Types and sources of variation will be examined, as well as what can be learnt about the decision- making styles used.

Chapter 3: Scoping Review of Empirical Studies of PRN Decision- Making

3.1 Introduction to the chapter

This chapter presents a review of published research of nurses' decision-making in relation to PRN drug administration. The method chosen is a scoping review, following the framework set out by Arksey and O'Malley (2005). In contrast to systematic reviews, which have a tightly- defined question and lead to inclusion of specific types of evidence, scoping reviews can address broader questions and so may include a variety of study designs.

Arksey and O'Malley suggest that scoping reviews need to identify and include all relevant literature in respect to the question, regardless of study design. This approach is particularly appropriate as research about nurses' decision- making includes a '…variety of theoretical descriptive and prescriptive models…' (Harbison, 2001, p126), leading to the use of a number of different research designs and methods.

In addition, assessment of the quality of the research does not usually form part of a scoping review because of the range of literature and other types of published evidence that may be included (Arksey and O'Malley, 2005). In this scoping review, evidence was not included or rejected on the basis of study design or methodological quality; rather any published empirical evidence that could illuminate nurses' decision-making was considered appropriate for inclusion. However, quality appraisal was undertaken on all included studies, and this assessment of quality forms part of the review overall.

The following section describes the first stages of the review:

- Identifying relevant studies
- Developing inclusion and exclusion criteria
- The process of data extraction

Note on terms

The term PRN has several synonyms in the literature including 'as needed', 'as required', 'on demand'. In this literature review, the term PRN will be used unless quoting directly from a study, where instead the author's own terms will be used.

3.2 Identifying relevant studies

3.2.1 Aim of the literature review

The review aims to be comprehensive in identifying studies relevant to the central guiding question of 'what are the factors that influence nurses' decision-making when administering pro re nata medication to patients?'

More specifically, its objectives are:

1. To identify and describe empirical studies of nurses' decision-making when giving PRN medication
2. To identify the medication types, doses and frequencies of administration, as found in the included studies
3. To identify the cognitive processes used by nurses when making decisions to give PRN medication
4. To identify sources of variation in medications given, and explanations for this variation
5. To identify gaps in the research that may form the basis of future studies.

The process of identifying evidence for inclusion in a scoping review is iterative (Arksey and O'Malley, 2005). Once some sense of the volume and scope of the field has been gained, the initial search strategy can be piloted and refined in the light of early search results. Therefore, at the start of the search process only two inclusion criteria were used:

- the studies should have been published since 1990 (a test search showed very limited evidence of consideration of PRN medication prior to 1990)
- and be written in English (no translation facilities were available to the researcher).

3.2.2 Search strategy for databases

The majority of studies included in the review were located in electronic databases. The search strategy was devised with the help of an Information Scientist from the University of York in order to ensure all relevant studies were found, whilst minimising the number of irrelevant studies. Key terms including 'pro re nata' and 'PRN' were used; full details of the searches and number of hits can be found in Appendix 1.

Databases accessed via the University of York's library service were:

- AMED
- CINAHL
- Cochrane library
- Embase
- Medline
- PsychINFO
- Social Policy and Practice
- Social Science Citation Index
- Web of Knowledge

3.2.3 Search strategy for internet resources

An internet search of sites likely to contain information on PRN medication was conducted:

- National Institute of Health and Care Excellence (NICE)

  https://www.nice.org.uk

 No studies were identified from here.

3.2.4 Search strategy for professional bodies

The Royal College of Nursing (RCN) and British Pharmaceutical Society (BPS) were consulted to establish if they were aware of any additional

empirical research about PRN decision- making. No additional studies were identified for inclusion in the review.

3.3 Inclusion/ exclusion criteria

Once studies had been identified within the publication date period January 1990- September 2017, inclusion and exclusion criteria were applied (see Table 2).

Inclusion	Exclusion	Rationale
Empirical studies	Non-empirical literature, for example reviews, opinion pieces, continuing professional development articles. Grey literature: 'That which is produced on all levels of government, academics, business and industry in print and electronic formats, but which is not controlled by commercial publishers.'(Greynet Grey Literature Network Service, 1999). This included national or local policies pertaining to medication administration, government documents such as audits or reports, conference proceedings and academic theses.	The aim of the review was to map the current research in order to identify gaps. Therefore, only published empirical studies were necessary. PhD theses were also excluded.
Main focus is PRN drug administration and decision-making	Studies where the main focus is not nurses' decision-making, for example drug treatment trials, self-administration of medication.	The primary aim was to understand what medications are administered PRN and how these decisions are made.
Published in English	Not published in English	No translation facilities.

Table 2 Inclusion and exclusion criteria applied to the literature

3.3.1 Rejected literature

Literature was rejected at two stages in the search process- firstly, at the initial review of titles and abstracts after limits had been applied (following stage 1 in Figure 1), then at the final review stage (stage 3 in Figure 1). Examples of rejected literature are presented to illustrate the types of study not included- in particular studies that may, from the detail given in the abstract, be expected to be included in this review (for example Cramer et al., 2000; Decker, Culp and Cacchione, 2009) (Tables 3 and 4). Some studies were rejected because they examined medication administration regimes in general, not just PRN (for example assessment and management of pain with analgesia), or therapeutic interventions including but not limited to PRN medication (for example choice of physical or chemical restraint in mental health setting). These studies either did not reveal any significant new information regarding PRN medication decision-making, or they overlapped too much with other therapeutic interventions and the focus on PRN medication was lost. In addition, a small number of studies were found to be based on samples reported in other publications. To avoid skewing the results of the literature review, these studies were carefully evaluated, and if the outcomes in either publication were sufficiently different and new information was provided, each study would be included. However, where outcomes were the same (but worded slightly differently between publications) the study with the most inclusive outcomes was selected. Studies finally included in the scoping review, therefore, were those that focussed on PRN drug administration in any setting, where the decision was made, or to be made, by nurses.

3.3.2 Backwards citation search

The final step was to review the references cited in all of the found studies. This resulted in 8 additional studies for inclusion in the review.

Reason for rejection	Article title
Literature reviews	Baker, Lovell and Harris (2008) A best-evidence synthesis review of the administration of psychotropic pro re nata (PRN) medication in in- patient mental health settings.
Trials comparing effects of 'as required' medication regimens with regular regimens.	Chakrabarti et al., (2007) 'As required' medication regimes for seriously mentally ill people in hospital.
Professional articles	Comeaux, Smith and Stern (2006) Tech [*sic*] update. Improve PRN effectiveness documentation.
PRN abbreviation for 'pain right now'.	Corli et al., (2013) How to evaluate the effect of pain treatments in cancer patients: results from a longitudinal outcomes and endpoint Italian cohort study.
Focus not PRN medication administration	Cramer et al., (2000) A drug use evaluation of selected opioid and non-opioid analgesics in the nursing facility setting.
PRN used as proxy measure for other interventions	Herrmann et al., (2011) Changes in nursing burden following memantine for agitation and aggression in long-term care residents with moderate to severe Alzheimer's disease: an open-label pilot study.
Evidence for practice	Drew et al., (2004) The use of "as needed" range orders for opioid analgesics in the management of acute pain: a consensus statement of the American Society for Pain Management Nursing and the American Pain Society.
Patients self- medicating.	Miaskowski et al., (2001) Lack of adherence with the analgesic regimen: a significant barrier to effective cancer pain management.

Table 3 Examples of articles rejected at stage 1.

Reason for rejection	Article title
Evidence for practice	Baker et al., (2007b) Multidisciplinary consensus of best practice for pro re nata (PRN) psychotropic medications within acute mental health settings: a Delphi study.
Professional articles	Boughton et al., (1998) Impact of research on pediatric pain assessment and outcomes.
Focus on PRN not explicit	Decker et al., (2009) Evaluation of musculoskeletal pain management practices in rural nursing homes compared with evidence-based criteria.
Trials comparing effects of 'as required' medication regimens with regular regimens.	Patterson et al., (2002) The 2002 Lindburgh Award. PRN vs regularly scheduled opioid analgesics in pediatric burn patients.
Patients self-medicating	Tse et al., (2012) The effect of a pain management program on patients with cancer pain.
Studies based on a single sample but reported in two or more publications	Richardson et al., (2015) Describing precursors to and management of medication nonadherence on acute psychiatric wards. Bowers et al., (2013) Identification of the 'minimal triangle' and other common event- to- event transitions in conflict and containment incidents. (Both studies reported on the same sample with similar outcomes to Stewart et al., 2012, which was included.)
Studies examining broader therapeutic interventions	Coker et al., (2010) Nurses' perceived barriers to optimal pain management in older adults on acute medical units.

Table 4 Examples of articles rejected at stage 2.

3.4 Results of the literature search

In total, 87 studies met the inclusion criteria. Figure 1 summarises the final results of the search, and the numbers of studies found from each source.

1. Electronic databases (number of studies identified)

Cochrane database (1)
CINAHL (699)
Embase, Psychinfo, Social Policy and Practice (988)
Medline (2964)
NICE (450)
Web of Knowledge (172)

↓

2. 5274 titles & abstracts → 4907 excluded as ineligible due to topic or focus e.g. drug trials, drug adherence, reviews of dosing schedules, self-administration of drugs.
Limited to 1990- 2017

↓

3. 367 articles reviewed → 288 rejected. Removal of literature where main focus not PRN and decision-making. Duplicates, reviews and non- empirical articles removed.

↓

4. 79 studies met inclusion criteria → 8 additional studies added from reference lists

↓

5. 87 studies in total

Correct as of 1 September 2017

Figure 1 Study selection flowchart

3.5 Data extraction and synthesis

Where reported, the following data were extracted from each of the 87 papers:

- authors
- publication year
- country of origin
- study design
- method of data analysis
- main study aims
- sample size
- research setting
- summary of results
- possible decision-making factors identified
- strengths and limitations.

The terms internal and external validity, which can be used to evaluate the rigour with which a piece of research has been conducted, were rejected in favour of 'strengths and limitations'. This allowed for critique of the research whilst avoiding arguments about different research paradigms' measures of study quality. Studies were organised into the template according to study type, then year of publication.

3.6 Scoping the field: initial mapping

This section maps the included studies by study design, year of publication, geographical distribution, healthcare setting and medications studied. These categories provide a quick overview of the studies.

3.6.1 Designs of empirical studies exploring the factors that influence nurses' decision-making when administering PRN medication

Seven types of research design were identified within the included studies. Table 5 lists the study designs and definitions used to research PRN medication practices. The majority of studies were chart reviews, accounting for 44% of the total.

Study Design	Number
Quality assurance study Studies comparing observed performance against a pre-determined quality indicator, e.g. national guideline or local policy.	2
Chart reviews Studies extracting data from patient documentation, such as medication charts, nursing or medical notes.	39
Observational studies Studies reporting correlations and associations (National Institute for Health and Care Excellence, 2012a), but no interventions are assigned by the researcher. Such studies can be cross- sectional or longitudinal.	7
Surveys Structured data collection, usually by questionnaire.	9
Quasi- experimental studies Studies using experimental design but without methods to control bias such as random selection, randomisation to intervention or a control group.	12
Mixed method studies Studies combining or integrating methods, for example from qualitative and experimental paradigms to give multiple perspectives and/ or to triangulate results.	7
Qualitative studies Exploratory studies collecting non- numerical data to describe or interpret phenomena related to the social world.	11

Table 5 Distribution of studies by study design (n= 87)

3.6.2 Year of publication of studies

Table 6 shows the number and proportion of year of publication of studies evaluating PRN medication administration. The majority have been published since 2005.

Year of publication	Number of studies
1990- 1994	8
1995- 1999	8
2000- 2004	19
2005- 2010	28
2011- 2014	15
2015- 2017	9

Table 6 Year of Study Publication

3.6.3 Geographical distribution of studies that identify the factors that influence nurses' decision-making when administering PRN medication

Table 7 shows the number and proportion of studies that were carried out, by country. The greatest interest is shared between the United States of America (USA) and Australia, followed by the United Kingdom (UK) and Canada. Studies from the rest of Europe are far fewer in number.

Country in which study was based	Number of studies
Australia	23
Canada	13
Finland	1
France	1
Germany	2
Italy	1
Netherlands	2
Norway	1
Saudi Arabia	1
Thailand	1
United Kingdom	16
United States of America	25

Table 7 Geographical distribution of studies exploring nurses' decision making when giving PRN medication (n=87).

3.6.4 Healthcare setting of studies that identify the factors that influence nurses' decision-making when administering PRN medication

Table 8 shows the distribution of studies by healthcare setting. The total number of individual settings studied is 100- some studies examined PRN medication practice in more than one setting. Some studies examined a particular medication across several different settings, for example use of opioids in acute adult general and psychiatric inpatient units. By far the greatest interest has been in the field of adult mental health inpatient settings, accounting for 39% of studies. These include acute units, one alcohol withdrawal unit, secure units and admission units. Fewest studies have been completed in learning disability or hospice settings.

Healthcare Setting	Number (%)
Mental health adult inpatient	39 (39%)
Mental health child/ adolescent	7 (7%)
Elderly mental health (inpatient)	3 (3%)
Older adult inpatient (includes 'geriatric')	3 (3%)
Adult surgery	10 (10%)
Adult medicine	7 (7%)
Adult critical care	4 (4%)
Midwifery	2 (2%)
Obstetrics and gynaecology	1 (1%)
Oncology	1 (1%)
Outpatients	1 (1%)
Nursing homes (elderly long- term care)	10 (10%)
Traumatic brain injury (rehabilitation)	1 (1%)
Paediatric surgery	3 (3%)
'Paediatrics'	2 (3%)
Learning disability long stay	2 (2%)
Learning disability acute assessment	1 (1%)
Hospice adult	1 (1%)
Hospice child	1 (1%)
Home care	1 (1%)

Table 8 Healthcare settings of studies that identify the factors that influence nurses' decision-making when administering PRN medication.

3.6.5 Medications included in the studies

Table 9 shows the frequency with which medications were studied. The majority of studies focussed on medication by drug type- for example, psychotropic medication or analgesia. Some studies explored use of any

PRN medication in a particular setting, for example long- term elderly care facilities. It is worth noting that terms for some medications have not been consistently used - for example typical antipsychotics are also referred to as first- generation antipsychotics, and atypicals as second- generation antipsychotics.

Furthermore, terms have changed over time- the outdated designation 'minor tranquilisers' can encompass benzodiazepines and anxiolytics, while 'major tranquilisers' includes neuroleptic or antipsychotic medication. Some studies did not differentiate between drugs within categories, instead including them all in the one 'psychotropic' or 'anxiolytic' category- in such cases it was not possible to separate them.

To ensure consistency of categorisation for this mapping exercise, Anatomical Therapeutic Codes (ATC) (World Health Organisation Collaborating Centre for Drug Statistics Methodology, 2017) were used (to the 3rd or 4th level as needed) for clarity. For simplicity, where antipsychotic, antidepressant, anxiolytic and sedative/hypnotic medications were detailed individually in studies, they have been documented here according to British National Formulary categories. This method provided category names familiar to nurses whilst avoiding the complex 5th level ATC coding based on chemical structure.

Drug Class	ATC Code	Frequency (n)
Anti- emetics	A04	2
Anti- diarrhoeal	A07	1
Laxatives	A06	3
Antihistamines (allergy)	D04	1
Analgesic	N02	11
• Opioid	N02A	13
• Non- opioid	N02B	10
• Non- steroidal anti-inflammatory	M01A	5

Drug Class	ATC Code	Frequency (n)
Anti- epileptic drugs	N03	6 (1 study categorised them as 'mood stabilisers')
Any PRN		6
Anticholinergic	N04A	12
'Antipsychotic' (inc chlorpromazine, zuclopenthixol)	N05A	20
• First generation		16
• Second generation		16
Anxiolytics	N05B	4
• Chlordiazepoxide		5
Benzodiazepines	N05B	30
Sedative/ hypnotics	NO5C	6
• Barbiturates		2
• Chloral hydrate		4
• Clomethiazole		1
• Z drugs		10
Antidepressants	N06A	2
• SSRI		2
• Tricyclic		1
• Other		3
Antihistamines (systemic)	R06	4
'Indigestion'		2
'Medical'		1
'Minor tranquiliser'		1
'Nervous system'		2
'PRN'		3
'Psychotropic'		4

Table 9 The frequency of which medications were studied

3.6.6 Summary of characteristics of included studies

In total, 87 studies were included in the review of PRN medication decision-making. The mapping exercise shows that:

- The majority of studies were chart reviews, followed by quasi-experimental and qualitative studies
- Most studies have been published in the last 11 years, with a peak during 2005- 2009
- Most studies were set in the USA and Australia
- Adult mental health settings accounted for the majority of the studies of PRN medication decision- making
- The medications most studied were psychotropic medications. These were reported together and separately in studies, resulting in difficulty with accuracy of categorisation.

3.7 Description, results and quality appraisal of included studies

This section will describe in more detail the characteristics of the 87 included studies, organised by study design. Most studies were easy to categorise. However, a small number of studies were of a particular design using a method of data collection that in itself was a separate category- for example quasi- experimental studies that used chart review as the data collection method. In such cases, studies were categorised according to the study design.

In this review, for each study design the clinical setting, participants and sampling (method and size), and outcome measures are summarised. This is followed by synthesis of study results and quality appraisal, again by study type. Additional categories are used for quasi- experimental studies and qualitative studies, as needed, in order to adequately describe them. Studies are presented in this order:

- Quality assurance studies
- Chart reviews
- Observational studies
- Surveys

- Quasi- experimental studies
- Mixed method studies
- Qualitative studies

3.7.1 Quality assurance (QA) studies

There were two QA studies in total.

Clinical setting
- Orgill, Krempel and Medina (2002) was conducted in adult surgery.
- Baker et al., (2010) was based in older adult inpatient mental health settings.

Participants and sampling

Sampling varied between studies. Table 10 details the sampling procedures used.

Study Authors	Sample size (n)	Sampling	Sample drawn from
Orgill, Krempel and Medina (2002)	37	Medical records for laryngectomy patients over 34 months	1 ward
Baker et al., (2010)	154	Medication charts for all inpatients on one day	11 wards within 3 NHS Trusts

Table 10 Participants and sampling in quality assurance studies

Outcome measures

Both studies examined local prescribing and drug administration practice. These are process (as opposed to outcome) indicators, examining activities involved in the delivery of healthcare (Catts et al., 2010). In both studies, prescribing and administration practice was evaluated against a benchmark: locally developed care pathway to examine analgesia use

following laryngectomy (Orgill, Krempel and Medina, 2002) and NICE guidelines to assess psychotropic medication use among older people (Baker et al., 2010).

Results of the studies

These studies highlight both prescription and drug administration as sources of variation in PRN medication use.

Baker et al., (2010) found that 56% of elderly people in inpatient mental health units were prescribed 145 different combinations of 14 psychotropic drugs PRN. However, a maximum of 17% of patients actually received any medication. Links to care planning or alternative interventions were not seen in the majority of nursing notes, leaving the reason for PRN administration unexplained.

Orgill, Krempel and Medina (2002) found that although prescriptions were at or above analgesic dosing guidelines, none of the patients concerned received the intended doses, resulting in sub- optimal pain control.

Quality appraisal of QA studies

These studies were appraised using the Criteria and Indicators for Best Practice for Clinical Audit Guidelines (Healthcare Quality Improvement Partnership (HQIP), 2012). QA is a form of clinical audit, which can be valuable to highlight compliance with standards and expose variation. Both studies did this. Ensuring involvement of all stakeholders is a key marker of robust quality assurance studies (Healthcare Quality Improvement Partnership (HQIP), 2012). Patient groups within each study were clearly defined, yet there was little evidence of patient involvement in development of patient- defined outcomes in any of the studies.

Data collection methods were clearly defined in Baker et al., (2010). In Orgill, Krempel and Medina (2002) some detail was omitted, for example the number of data collectors and how they were prepared, so the potential

for bias in data collection is possible. None of the studies indicated how representative the sampling was of the area in which the audits took place.

Overall therefore, QA study quality is mixed. Also, as there are only two studies in total, spanning two countries and eight years, the body of evidence assessing the compliance of prescribing and administration of PRN medication to national or local standards is very small. As a result, conclusions about the prescription standards or nurses' medication administration practice cannot reasonably be drawn.

3.7.2 Chart reviews

Thirty- nine studies were chart reviews.

Clinical setting

Table 11 details the studies by clinical setting. Notable features include:

- 22 studies were undertaken in adult inpatient mental health units (including psychiatric intensive care). This represented the most-studied clinical setting. Years of publication ranged from 1990- 2017

- 5 studies were conducted in child and adolescent mental health settings. Years of publication ranged from 1997- 2016

- 6 studies were in long- term elderly care settings, including nursing homes. There is some overlap with mental health settings here: Exum et al., (1993) was conducted in a designated unit for elderly people with dementia

- Only 1 study was conducted in a learning disability setting- this was published in 2013

- General hospital settings, including surgery and medicine, accounted for only 6 studies. Years of publication ranged from 1990- 2015.

Setting / Authors	Elderly care	Medicine	Obstetrics	Paediatrics	Surgery	Acute adult inpatient psychiatry	Child and adolescent inpatient psychiatry	Elderly inpatient psychiatry	Long term psychiatry	Psychiatric rehabilitation	Nursing home	Intellectual disability
O'Reilly & Rusnak (1990)	✓	✓	✓	✓	✓	✓					✓	
Walker (1991)						✓						
Exum et al., (1993)											✓	
Fishel et al., (1994)						✓						
Craig & Bracken (1995)						✓		✓	✓			
Gray, Smedley and Thomas (1997)						✓						
Kaplan & Busner (1997)							✓					

Setting / Authors	Elderly care	Medicine	Obstetrics	Paediatrics	Surgery	Acute adult inpatient psychiatry	Child and adolescent inpatient psychiatry	Elderly inpatient psychiatry	Long term psychiatry	Psychiatric rehabilitation	Nursing home	Intellectual disability
Kaasaleinen et al., (1998)											✓	
Roberts et al., (1998)											✓	
McKenzie et al., (1999)						✓				✓		
Bernard & Littlejohn (2000)							✓					
D'Mello et al., (2000)						✓						
Reoux & Miller (2000)		✓				✓						
Usher & Lindsay (2001)						✓						
Geffen et al., (2002a)						✓						

Setting / Authors	Elderly care	Medicine	Obstetrics	Paediatrics	Surgery	Acute adult inpatient psychiatry	Child and adolescent inpatient psychiatry	Elderly inpatient psychiatry	Long term psychiatry	Psychiatric rehabilitation	Nursing home	Intellectual disability
Curtis and Capp (2003)						✓						
Thapa et al., (2003)						✓						
Hales & Gudjonsson (2004)						✓						
Stokes, Purdie and Roberts (2004)											✓	
Dean, McDermott and Marshall (2006)							✓					
Curtis, Baker and Reid (2007)						✓						
Philip et al., (2008)						✓						

Setting / Authors	Elderly care	Medicine	Obstetrics	Paediatrics	Surgery	Acute adult inpatient psychiatry	Child and adolescent inpatient psychiatry	Elderly inpatient psychiatry	Long term psychiatry	Psychiatric rehabilitation	Nursing home	Intellectual disability
Simons & Moseley (2008)				✓								
Stein-Parbury et al., (2008)						✓						
Dean, McDermott and Scott (2009)							✓					
Bergeron, Bourgault and Marchand (2010)					✓							
Martin et al., (2010)						✓						
Mullen & Drinkwater (2011)						✓						

Setting / Authors	Elderly care	Medicine	Obstetrics	Paediatrics	Surgery	Acute adult inpatient psychiatry	Child and adolescent inpatient psychiatry	Elderly inpatient psychiatry	Long term psychiatry	Psychiatric rehabilitation	Nursing home	Intellectual disability
Lindsey & Buckwalter (2012)								✓				
Stewart et al., (2012)						✓						
Delafon et al., (2013)												✓
Akram, Slavin and Davies (2014)						✓						
Haw & Wolstencraft (2014)						✓						
Staveski et al., (2014)				✓								
Neumann, Faris and Klassen (2015)								✓				

Setting / Authors	Elderly care	Medicine	Obstetrics	Paediatrics	Surgery	Acute adult inpatient psychiatry	Child and adolescent inpatient psychiatry	Elderly inpatient psychiatry	Long term psychiatry	Psychiatric rehabilitation	Nursing home	Intellectual disability
Dörks et al., (2016)											✓	
Green et al., (2015)	✓											
Hayes & Russ (2016)						✓						
Martin et al., (2017)						✓						

Table 11 Clinical setting of chart reviews of PRN medication (n=39)

Participants and sampling

Studies used different approaches to sampling, with 35 reviews using the patient as the sampling unit. Three studies (Mullen and Drinkwater, 2011; Staveski et al., 2014 and Martin et al., 2017) used occasions of PRN drug administration. Sample sizes varied from 13 patients to 3590. Most studies were conducted in 1 to 5 units or wards within a single hospital. Three studies sampled from within a geographical area, rather than one or two institutions:

- Dörks et al., (2016), 21 nursing homes (in North Western Germany)
- Akram, Slavin and Davies (2014), 10 units in 10 localities (all in Scotland)
- Stewart et al., (2012), 84 hospital wards (3 health regions in Southern England)

Only two studies specified random sampling (Kaplan and Busner, 1997; Martin et al., 2016). Martin et al., (2016) was the only study to conduct a sample size calculation. All the other studies used convenience sampling, taking all admissions over a specified period of time. Table 12 details sampling in the included chart reviews in order of decreasing sample size.

Authors	Sample size (n of patients unless specified)	Sample drawn from
Mullen & Drinkwater (2011)	Sampling unit = incidences of PRN medication	1 unit
Staveski et al., (2014)	Sampling unit = incidences of PRN medication	1 unit
Martin et al., (2017)	368 incidences of PRN administration	Unspecified number of wards in 1 hospital
Hayes & Russ (2016)	3590	9 units in 1 hospital
Philip et al., (2008)	1912	Unspecified number of wards in 1 hospital

Authors	Sample size (n of patients unless specified)	Sample drawn from
Roberts et al., (1998)	1022	16 nursing homes
Craig & Bracken (1995)	973	Unspecified number of in 1 hospital
Dörks et al., (2016)	852	21 nursing homes
Stokes, Purdie and Roberts (2004)	801	13 nursing homes
Stewart et al., (2012)	522	84 wards in 34 hospitals
Bernard & Littlejohn (2000)	500	1 unit
O'Reilly & Rusnak (1990)	476	1 hospital (exact number of wards not specified)
Thapa et al., (2003)	447	3 units from 1 hospital
Stein- Parbury et al., (2008)	420	Unspecified number of wards in 4 hospitals
Dean, McDermott and Marshall (2006)	257	1 unit
Haw & Wolstencraft (2014)	242	18 units in 1 centre
Geffen et al., (2002)	184	2 units from 2 hospitals
Simons & Moseley (2008)	175	Unspecified number of wards in 2 hospitals
Reoux & Miller (2000)	172	Unspecified number of wards in 1 hospital
Neumann, Faris and Klassen (2015)	170	5 units in 1 hospital
Kaplan & Busner (1997)	150	3 wards from 3 hospitals
Walker (1991)	138	1 ward
Martin et al., (2010)	135	1 unit
McKenzie et al., (1999)	122	3 wards; number of hospitals unspecified
Dean, McDermott and Marshall (2006)	122	1 unit
Delafon et al., (2013)	119	Unspecified number of units in unspecified number of settings (hospital or residential unit)

Authors	Sample size (n of patients unless specified)	Sample drawn from
Fishel et al., (1994)	109	3 wards in 2 hospitals
Lindsey & Buckwalter (2012)	108	2 units in 2 hospitals
Usher & Lindsay (2001)	90	2 units from 2 hospitals
Kaasalainen et al., (1998)	83	1 nursing home
Akram, Slavin and Davies (2014)	75	10 units in 10 separate localities
Curtis, Baker and Reid (2007)	64	1 unit
Curtis and Capp (2003)	54	1 unit
Gray, Smedley and Thomas (1997)	44	2 wards in 1 hospital
Hales & Gudjonsson (2004)	42	1 unit
Exum et al., (1993)	36	1 nursing home
Bergeron, Bourgault and Marchand (2010)	36	1 unit
Green et al., (2015)	20	1 ward in 1 hospital

Table 12 Participants and sampling in chart review studies

Outcome measures

The majority were conducted retrospectively, with the exceptions of O'Reilly (1999) and Gray, Smedley and Thomas (1997), which were done prospectively. The study by Fishel et al., (1994) did not clarify this aspect of their research.

Study outcomes included frequency of PRN medication, the drugs and doses given and the relationship to patient demographic variables such as age, gender, diagnosis and symptoms. Some studies evaluated the quality of prescriptions, examining their clarity and accuracy and inferring the likely

effect of this on nurses' drug administration practices. Nursing notes were also examined in some studies, with outcomes being documented indication for PRN administration, frequency of adverse effects or statements of the effectiveness of the medication.

Results

As well as measuring the outcome of the decision- making process, chart review studies have also made clear variation in the use of PRN medication. This is dominated by research from mental health settings. Thirty out of the thirty- nine studies presented figures for the percentage of patients given PRN medication: notable is the variation in rates of drug administration between clinical areas describing themselves similarly, e.g. as acute mental health units (see Table 13). The two studies from Canada in particular report high rates of PRN medication use.

Study	Mental health setting (Country)	% patients given PRN psychotropic medication during the study period
Usher et al., (2001)	Inpatient adult (Australia)	63%
Geffen et al., (2002)	Inpatient adult (Australia)	82%
Curtis, Baker and Reid (2007)	Acute inpatient adult (Australia)	73.4%
Stein- Parbury et al., (2008)	Acute inpatient adult (Australia)	83.8%
McKenzie et al., (1999)	Inpatient acute and rehabilitation wards (adult) (Australia)	60.3%
Curtis & Capp (2003)	Locked unit adult (Australia)	79.6%
Mullen & Drinkwater (2011)	Psychiatric intensive care unit adult (Australia)	28.6% then 17.9% (different time periods 4 years apart)

O'Reilly and Rusnak (1990)	Acute adult psychiatric unit (Canada)	94%
Martin et al., (2017)	Acute adult psychiatric unit (Canada)	91%
Craig & Bracken (1995)	Inpatient units adult (UK)	22.9% overall. (27.8% on acute admissions, 51.6% chronic unit, 20.6% psychogeriatric)
Hales and Gudjonsson (2004)	Secure unit adult (UK)	39% administered PRN medication more than 10 times over 6 month period. 29% had none.
Stewart et al., (2012)	Acute adult psychiatric wards (UK)	68%
Akram, Slavin and Davies (2014)	Psychiatric intensive care unit adult (UK)	65%
Haw & Wolstencroft (2014)	Secure adult psychiatric unit	51.1%
Walker (1991)	Voluntary adult inpatient psychiatric unit (USA)	70%
Fishel et al., (1994)	Locked adult inpatient wards (USA)	53% in both state psychiatric hospital and university medical centre
Thapa et al., (2003)	Acute adult inpatient unit (USA)	79%
Philip et al., (2008)	Acute adult inpatient (USA)	64%
Dean, McDermott and Marshall et al., (2006)	Adolescent (Australia)	45.5% then 25.6% (different time periods, 1 year apart)
Swart, Siman and Stewart (2011)	Children's tertiary residential centre (Canada)	50.3%
Bernard and Littlejohn (2000)	Child, adolescent mental health	61%

	(UK)	
Kaplan (1997)	Child, adolescent mental health (USA)	80% (university hospital), 18% (state hospital), 22% (private hospital)
Neumann, Faris and Klassen(2014)	Elderly mental health (Canada)	41%
Lindsey & Buckwalter (2012)	Elderly mental health (USA)	67.3% and 75% (two units)
	Long- term elderly	**% patients given any PRN medication**
Stokes, Purdie and Roberts (2004)	Nursing homes (Australia)	54.8%
Kaasalainen et al., (1998)	Elderly long-term care (Canada)	19% cognitively intact, 8% cognitively impaired
Dörks et al., (2016)	Nursing homes (Germany)	74.9%
	Intellectual disability	**% patients given any PRN medication**
Delafon et al., (2013)	Intellectual disability, inpatient and residential	25%
	Surgery	**% patients given any PRN medication**
Simons and Moseley (2008)	Paediatric surgery (UK)	Paediatric unit/ children's hospital: 53%/ 68% given paracetamol PRN where prescribed, 84%/ 29% codeine, 45%/ 60% diclofenac, 42%/ 17% ibuprofen.
Bergeron, Bourgault and Marchand (2010)	Adult surgery, after stopping IV analgesia (Canada)	When IV stopped 25%; after 3 hours 58.3%.

Table 13 Percentage of patients given PRN medication, by clinical setting and country.

As well as measuring frequencies of PRN drug administration, a number of studies sought to establish the association between patient factors and observed drug administration rates. Seven studies examined the relationship between patient mental health diagnosis and PRN administration (Walker, 1991; Geffen et al., 2002; Philip et al., 2008; Stein-Parbury et al., 2008; Dean, McDermott and Marshall, 2006; Martin et al., 2010; Swart, Siman and Stewart, 2011).

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There is evidence that patient diagnosis is not a good predictor of likelihood of receiving PRN medication, as no consistent relationship between diagnosis and PRN drug administration was apparent when comparing studies. For example, major depression was the most common diagnosis for receiving PRN psychotropic medication (Walker, 1991) compared with mania/ mixed affective diagnosis (Geffen et al., 2002) or emotionally unstable personality disorder (Delafon et al., 2013). A study of people with intellectual disability found no significant relationship between either mental health diagnosis or autistic spectrum disorder, and likelihood of receiving PRN medication (Delafon et al., 2013).

As with diagnosis, signs and symptoms are not good predictors of PRN medication use. In mental health settings, the number of reasons for drug administration identified varied considerably between settings, from 3 (Geffen et al., 2002) to 1266 (Stewart et al., 2012).

Agitation was the most common reason for administration of psychotropic medication (Walker, 1991; Fishel,1994; Kaplan, 1997; McKenzie et al.,1999; Usher et al., 2001; Geffen et al., 2002; Curtis and Capp, 2003; Curtis, Baker and Reid, 2007; Philip et al., 2008; Dean, McDermott and Marshall, 2006; Stewart et al., 2012; Delafon et al., 2013; Haw and Wolstencraft, 2014; Martin et al., 2017). However, Curtis and Capp (2003) identified that agitation was treated in some instances but not in others. Agitation is a clinical risk factor for violence (NICE, 2005) is it can escalate into aggressive behaviour: medication was often administered to prevent escalation of patient behaviour from verbal abusiveness to physical violence (Stewart et al., 2012).

There is evidence that some medications are preferred over others. For example, in mental health settings benzodiazepines were the most common medication type administered though the specific medication used varied between settings (Walker, 1991; Fishel et al., 1994; Craig and Bracken, 1995; McKenzie et al., 1999; Usher et al., 2001; Geffen et al., 2002; Curtis and Capp, 2003; Curtis, Baker and Reid, 2007; Stein- Parbury et al., 2008; Dean, McDermott and Marshall, 2006; Martin et al., 2010; Mullen and Drinkwater, 2011; Lindsey and Buckwalter, 2012; Stewart et al., 2012, Haw and Wolstencraft, 2014, Neumann, Faris and Klassen, 2015).

Benzodiazepines have been the recommended medication for treatment of agitation or anxiety in mental health settings for some time (for example RANZCP Committee on Psychotropic Drugs and Other Physical Treatments, 1999; NICE, 2005). However, the second most frequent medication given varied widely: for example within units described as acute inpatient psychiatry, chlorpromazine, diphenhydramine, lorazepam, diazepam, thioridazine, haloperidol and chlorpromazine were identified. Polypharmacy- the practice of administering several medications for the same indication- was common. Children and adolescents in mental health units too were given a range of psychotropic medications (Kaplan and Busner, 1997; Bernard and Littlejohn, 2000; Dean, McDermott and Marshall, 2006).

In some cases, medications were given for reasons other than stated indications: for example, elderly patients were given antipsychotic medication (Lindsay and Buckwalter, 2012), yet the reasons given did not include psychosis. A study of the management of behavioural and psychological symptoms of dementia showed that administration of benzodiazepines and anti- psychotic medications were common, despite the known risk factors associated with these medications in the elderly (Neumann, Faris and Klassen, 2015).

These data suggest medication administration to be variable at the level of the individual or the hospital/ unit. There is, however, evidence from one study that the use of a protocol reduced variation in the type and frequency of medication given to patients withdrawing from alcohol (Reoux and Miller, 2000). The protocol guided nurses by providing a score based upon patient symptoms, so PRN medications could be administered once a threshold score had been reached. When compared to clinical areas that did not use the protocol, those that did demonstrated statistically significant reductions in medication doses, amounts, frequencies and duration of administration, yet the patients experienced effective management of alcohol withdrawal with no increase in adverse events.

PRN prescriptions often offered a range of doses from which nurses could choose, presenting a further source of variation. Mental health studies reported dose variation (Bernard and Littlejohn, 2000; Philip et al., 2008; Dean, McDermott and Scott, 2009, Akram, Slavin and Davies, 2014). One

study compared PRN drug administration practice at two different sites. At one site, 57% of patients received 1mg of lorazepam compared with 85% at the other (Fishel et al., 1994).

Another study found variation in all psychotropic medications given: for example, the mean dose of chlorpromazine administered to patients was 76.06mg per day, with a range of 1.79mg to 350 mg (Geffen et al., 2012). Administration of high doses of PRN psychotropic medication was not uncommon, though 'high dose' was not categorised consistently between studies, making comparison difficult. One study categorised high dose as 4 or more administrations during the study month (Craig and Bracken, 1995); in another it included those receiving over 40 doses of medication PRN during their admission (Stein- Parbury et al., 2008). The length of the admission period varied from 21 days to 267 days in this study.

Unsurprisingly, patients with longer stays in hospital received more PRN medications, however this result was not clear cut. Length of stay for the group receiving fewer than 40 PRNs ranged from 1- 270 days, compared with 37 to 267 days for those receiving more than 40 PRNs. Reasons for high dose administration must have been due to other factors than simply length of stay.

The association between ethnicity and PRN medication administration in mental health settings was tested in two studies. Results were contradictory, possibly due to the sample size of each study - a positive association between being Afro- Caribbean and increased use of PRN medication was found in one study (Bernard and Littlejohn, 2000) but not another (Hales and Gudjonsson, 2004). Sample sizes were 384 and 42 respectively.

An inconsistent association between PRN use and gender was also found. For example, Usher et al., (2001) found that more males received PRN psychotropic medication than females (35% vs 15%). Geffen et al., (2002) found that males received higher daily doses of antipsychotics than females, whereas females received more benzodiazepines than males. No statistically significant relationship was found between gender and PRN administration in people with dementia (Neumann, Faris and Klassen, 2015) or people with intellectual disability (Delafon et al., 2013).

Aside from patient factors, context or workplace factors that may influence medication administration were identified. A study of the use of PRN sedatives and analgesics on a paediatric ITU found that all medications, with the exception of morphine, were given more frequently at night than during the day (Staveski et al., 2014).

Several mental health studies also reported an association between time of day and PRN psychotropic medication administration. Peaks of administration occurred at night, mealtimes and visiting times (Akram, Slavin and Davies, 2014). This included 'transition times' such as from night to day shift, where staff: patient ratios changed (Exum et al., 1993; Fishel et al., 1994, Neumann, Faris and Klassen, 2015) or (as stated by study authors) where patients were required to be co-operative to accommodate institutional routine such as getting washed and dressed in the morning.

Exum et al., (1993) for example, showed that there was some predictability in that more PRN medications were administered just before breakfast and evening meals than at other times of day. Some studies highlighted that most PRN psychotropic medications were given early in the patient's admission - in the first few days - with the frequency tailing off as time went on (McKenzie et al., 1999; Curtis and Capp, 2003). Study authors felt this unsurprising as symptoms would be most severe in the initial days of admission.

Quality appraisal of chart review studies

Chart reviews have been appraised using the principles set out in Matt and Holzmann (2013). Patient charts are a rich source of relatively accessible data, which makes their use attractive to researchers (Gearing et al., 2006). A key strength of the chart review method is its use of 'real- world' documents, which increases ecological validity. However, threats to external and internal validity can be found. The main threat to external validity is that many of the included studies had small sample sizes, often taken from single wards or units, or a small number of units within one hospital. Only five studies drew on large samples from multiple clinical areas or geographical locations.

Regarding internal validity, some studies took care to report their data collection methods, providing a useful degree of transparency. However, because patient records are not designed as research data collection instruments the risk of biased or incomplete data is high (Wu and Ashton, 1997). Craig and Bracken (1995, p58) acknowledged this, stating that '…a few doses might have failed to be recorded.' In addition, different studies describe a variety of documents from which data was collected, yet the accuracy of this reporting varied. Some described in detail the charts used (Stein- Parbury et al., 2008; Exum, 1993; Buckwalter, 2012, Delafon et al., 2013, Akram, Slavin and Davies, 2014, Haw and Wolstencroft, 2014), while Stewart et al., (2012, p541) just stated 'medical and nursing notes'. However Stewart et al., (2012) did describe in detail the information collected. The remaining studies' data collection methods were only partly reported, so the completeness of data collection cannot be judged.

In addition, data abstraction from charts should be guided by definitions or protocols to promote consistency (Gilbert et al., 1996). How missing or incomplete data was recorded, or how professional jargon was interpreted by researchers affects the accuracy of data collection, yet for many of the studies in this review insufficient information about this was provided, meaning a judgement of quality could not be made.

Some studies (Exum, 1993; Kaplan and Busner, 1997; Kaasaleinen et al., 1998; Roberts et al., 1998; Geffen et al., 2002; Thapa et al., 2003; Stein-Parbury et al., 2008; Dean, McDermott and Marshall, 2006; Martin et al., 2010; Lindsey and Buckwalter, 2012; Stewart et al., 2012; Delafon et al., 2013; Akram, Slavin and Davies, 2014; Haw and Wolstencroft, 2014; Dörks et al., 2016; Green et al., 2016) stated that a standardised data collection tool was used. Stokes, Purdie and Roberts (2004) indicated that data was collected alongside someone trained in interpreting medical terminology.

A further point here concerns inter and intra- rater reliability, which is also a potential source of measurement error. Only 3 studies detailed measures (such as ensuring agreement between data collectors) to ensure reliability: Exum (1993), Fishel and Hopkins (1994) and Neumann, Faris and Klassen, (2015). Therefore, the consistency of data collection is in doubt in the remaining studies- PRN administration may be under or over estimated as a result.

Considering the reasons *why* the variation in PRN medication administration exists, chart review studies have serious limitations. Only seven studies attempted to account for potential confounding variables using analysis of variance (Geffen et al., 2002; Dean, McDermott and Marshall, 2006; Green et al., 2016) or regression analysis (Roberts et al., 1998; Stokes, Purdie and Roberts 2004; Delafon et al., 2013; Neumann, Faris and Klassen, 2015).

However, attribution of reasons (cause) for giving medication (effect) remains difficult in chart review studies. For example, in the studies that include reasons for the timing of PRN medication giving, many doses of psychotropic medication were given in the evening or at night. This is attributed to medications being given to aid sleep. However, it is possible that practitioner preference for medication over other methods of aiding sleep could account for the apparent association. The origin of this preference, or the knowledge and beliefs of the practitioner that guide their clinical actions, cannot be revealed in chart review studies. Therefore, study designs are needed that can identify the knowledge, attitudes and values of nurses making the decisions, rather than just the end-point as measured in chart reviews.

In summary, chart reviews have been useful in modelling the use of some medications given PRN, including their frequency, dose, and the associations with various patient and environment factors. However, chart reviews within this review are of low to moderate quality due to the numerous noted threats to internal and external validity.

There is relatively convincing international evidence from eighteen of the studies that PRN psychotropic medication administration varies between mental health settings- the total number of patients included in these constitutes a sample of thousands.

However, there is significantly less evidence from other patient settings or of other medications, and as discussed, some notable omissions. In addition, it is difficult to draw conclusions about why this variation exists: contextual, patient, task and staff factors may account for the variation, but chart review studies are not the right method to examine these explanatory issues.

3.7.3 Observational studies

Seven studies used an observational design. Three studies were cohort studies, where a group of patients were observed over a period of time to ascertain the relationship between patient factors and PRN medication administration (Kaur, Daffern and Thomas, 2009; Winterfield et al., 2009; Voyer et al., 2015). Four studies were cross- sectional, whereby the exposure and outcome were measured simultaneously at one point in time (Duxbury, 1994; Nygaard and Jarland, 2005; Goedhard et al., 2007, Kaunomäki et al., 2017).

Clinical setting

Table 14 details the clinical settings from which sampling occurred. Mental health settings were most frequently reported (n= 3).

Setting / Author	Adult general	Adult mental health	Child and adolescent mental health	Nursing home
Duxbury (1994)	✓			
Nygaard and Jarland (2005)	✓			
Goedhard et al., (2007)		✓		
Kaur, Daffern and Thomas (2009)		✓		
Winterfield et al., (2009)			✓	
Voyer et al., (2015)				✓
Kaunomäki et al., (2017)		✓		

Table 14 Clinical settings of observational studies (n=7).

Participants and sampling

Most studies concerned patients, with the exception of Duxbury (1994), who studied nurses. Table 15 details sampling in the retrieved observational studies, in descending order of sample size. The majority of studies sampled from multiple clinical areas.

Study Authors	Sample size (n)	Length of data collection period	Sample drawn from
Kaunomäki et al., (2017)	331	6 months	1 ward
Winterfield et al (2009)	187	4 months	1 ward
Voyer et al., (2015)	146	6 months	7 nursing homes
Nygaard and Jarland (2005)	125	3 months	3 nursing homes
Goedhard et al., (2007)	125	9 months	3 wards, unclear if from 1 hospital
Kaur, Daffern and Thomas (2009)	38	12 months	7 wards in 1 hospital
Duxbury (1994)	20	20 nights	2 wards in 1 hospital

Table 15 *Participants and sampling in observational studies.*

Outcome measures

All studies measured PRN medication use as one of their outcomes. Exposure (risk factors for receiving PRN medication) was patient- related in five studies: patient aggression (Goedhard et al., 2007; Kaunomäki et al., 2017), cognitive status (Nygaard and Jarland, 2005), various factors including diagnosis and age (Winterfield et al., 2009) and behavioural and psychological symptoms of dementia (Voyer et al., 2015). Kaur, Daffern and Thomas (2009) examined the effect of staff perceptions of patient drug-seeking behaviour on PRN drug administration rates. Duxbury (1994)

examined PRN medication use as a function of different philosophies of nursing care between two wards.

Results

Patient factors affecting medication administration decisions were examined in the majority of these studies. For forty- four percent of all patients in the study by Nygaard and Jarland (2005), presence of pain did not lead to administration of analgesia. Patients with a dementia diagnosis received less PRN analgesia than those who had cognitive impairment arising from other causes. Those patients in turn were significantly less likely to receive PRN analgesia that those who were cognitively intact. Voyer et al., (2015) found that the behavioural or psychological symptoms (BPSD) of dementia most likely to be given PRN antipsychotic medication were night waking, disturbing others in the night and asking for attention or help when not needed. Behaviours that did not attract the use of such medication included being uncooperative, resisting care, fighting and physical aggression. Current guidelines on the use of antipsychotic medication for people with dementia (eg NICE, 2011) suggest they be given only instances of severe psychological distress or risk of harm to others.

In adult inpatient mental health units, patient aggression made it more likely that PRN psychotropic and somatic medication would be given (Goedhard et al., 2007). Medication was also more likely to be given in the 36 hours following an aggressive incident rather than in the 36 hours before. According to the authors, this suggested attempts by staff to regain control or prevent further escalation of aggression, yet positive action to avoid escalation of agitation to aggression was considered less often. Kaunomäki et al., (2017) identified that giving PRN medication was the most frequent intervention for patients at high risk of aggressive behaviour, followed by seclusion, then talking with a member of staff.

In child and adolescent psychiatric units, a variety of medications were given PRN, including anti- psychotics, benzodiazepines, anti- epileptic and anti- parkinsonian drugs (Winterfield et al., 2009). Medications were given

predominantly for disruptive behaviour, rather than aggression, and most frequently in the evening, especially at bedtime. Patient age and gender were not significantly associated with PRN medication administration.

There is evidence from two studies that normative beliefs influence nurses' decision making. Duxbury (1994) explored nurses' administration of night sedation, comparing two wards with different nursing philosophies of care. Nurses on both wards recognised the value of sleep to patients' recovery, and felt the need to intervene in some way to help this. Patients on one ward had half as much PRN night sedation prescribed compared with the other ward, yet nurses gave almost three times as much. The nursing philosophy was argued by the study author to exert a normative influence that allowed administration of PRN medication to be the first and only choice of therapy. However, the study also identified that personal beliefs enabled staff to act counter to prevailing ward philosophy, meaning that normative beliefs were not the sole predictor of likelihood of giving medication.

Kaur, Daffern and Thomas (2009) identified that in mental health units, the labelling of patients with co-morbid drug and mental health problems as 'drug- seeking' had no effect on the likelihood of receiving PRN medication. This was a surprise to the authors, who highlighted the prevalence of negative attitudes towards patients with drug use disorders. Overall, however, the effect of normative and individually held beliefs on nurses' PRN drug administration practice is unclear.

Quality appraisal of observational studies

These studies have been appraised using the Critical Appraisal Skills Programme (CASP) (2017) cohort study checklist. The observational studies included in the review have been valuable in examining some of the patient factors that predict use of PRN medication. However, observational studies cannot establish causation, and internal validity is threatened by the presence of potential confounding factors and a lack of experimental control.

The risk of bias can be minimised by strategies such as careful selection of comparison groups, observation of the care provided, and robust methods of outcome detection, yet none of the studies included demonstrated low risk of bias in all of these areas. Differences in comparison groups at baseline can be found in Goedhard et al., (2007), Winterfield et al., (2009), and Duxbury (1994)- here, the nursing philosophy on 2 wards was compared for influence on administration of night sedation. However, the baseline characteristics of patients on each of the wards were not provided, so it is impossible to know if they differed on important characteristics such as age, cognitive or other functional impairment. Such differences make any variation in PRN administration harder to attribute confidently to the nursing philosophy used, and the risk of confounding is high. Nygaard and Jarland (2005), in contrast, adjusted statistically for the potential confounding effect of several patient factors. Kaur, Daffern and Thomas (2009) provided no information about their groups at baseline.

The cohort study by Goedhard et al., (2007) aimed to explore the use of PRN medication for aggressive and non- aggressive mental health patients. However, systematic differences in care given to each group is a possibility: different staff administered the medications and the confounding effect of nurses' approaches to care cannot be discounted. Such staff factors were also not adequately controlled for within Winterfield et al., (2009).

How the outcome of observational studies is ascertained can result in detection bias (NICE, 2012), which can result in under or over- estimation of effect. For example, the study by Goedhard et al., (2007) had a long enough follow- up period to detect administration of PRN medication in the days (not just hours) following an aggressive episode, leading to a more complete picture of medication use. In addition, medication administration frequencies were standardised.

More robust methods were used by Winterfield et al., (2009), who used DSM-V categories, while Nygaard and Jarland (2005) used a validated scale to measure mental state. Voyer et al., (2015) and Kaunomäki et al., (2017) also used validated instruments to capture patient data in their studies.

In summary, observational studies have established potential associations between PRN medication use and some factors likely to lead to

administration, furthering insight into the outcome of decisions and reasons why they may vary. However, there are threats to internal validity from questionable or inadequately reported study methods, so results must be interpreted with caution. In addition, these observational studies originate in different settings, further diluting the strength of the evidence overall. There is, therefore, a very small body of moderate quality evidence showing that patient factors such as cognitive ability, aggression and length of stay influence PRN medication administration rates.

3.7.4 Surveys

Nine studies were surveys, using questions to measure knowledge, attitudes or behaviours of staff or patients regarding PRN medication administration.

Clinical setting

Table 16 details the clinical areas used within each survey. Most studies sampled from a small range of settings, with the exception of two (Edwards et al., 2001; Gordon et al., 2008) who sampled more widely. The setting most studied was adult surgery (four studies), then adult psychiatry and adult medicine, with three studies apiece.

Clinical settings were described differently between papers, making categorisation difficult. Those areas in inverted commas are recorded here as they were described in the respective studies. The study by Edwards et al., (2001) sampled from many different clinical areas, however, the majority (29.4%) of respondents came from surgical/ peri- operative areas. Similarly, the sample in the study by Gordon et al., (2008) included nurses from a variety of settings, the largest of which was 'other' (28%), closely followed by adult medicine (26%) and surgery (23%).

Authors / Setting	Hagman (1990)	Ross, Bush and Crumette (1991)	Edwards et al., (2001)	Geffen et al., (2002b)	Petti et al., (2003)	Gordon et al., (2008)	Sturmey (2009)	Pizzi, Chelly and Martin (2014)	Youngcharoen, Vincent and Park (2017)
Accident and emergency			✓			✓			
Adult critical care			✓			✓			
Adult medicine	✓		✓			✓			
Adult psychiatry	✓		✓	✓					
Adult surgery			✓			✓		✓	✓
Child and adolescent psychiatry					✓				
'General nursing'			✓						
Gerontology			✓						
Home care						✓			
Learning disability							✓		
Maternity			✓			✓			

Authors / Setting	Hagman (1990)	Ross, Bush and Crumette (1991)	Edwards et al., (2001)	Geffen et al., (2002b)	Petti et al., (2003)	Gordon et al., (2008)	Sturmey (2009)	Pizzi, Chelly and Martin (2014)	Youngcharoen, Vincent and Park (2017)
Oncology			✓						
'Other'						✓			
Outpatients						✓			
'Paediatrics'		✓	✓						
Paediatric surgery		✓							
'Recovery unit' (general)						✓			

Table 16 Clinical settings from which survey participants were sampled (n=9).

Participants and sampling

Within the included surveys, sampling was primarily of nurses (seven studies); two of these included doctors. One study directly sampled patients (Petti et al., 2003). The study by Sturmey (2009) was a secondary analysis of survey carried out by the Healthcare Commission in the UK, where the sampling unit was the clinical unit. Table 17 summarises the sampling from the included surveys, in descending order of sample size.

Study Authors	Sample size (n)	Study participants	Sample drawn from
Sturmey (2009)	3904	People with learning disability	Any NHS or independent institutional (including residential) setting- 509 units in total
Gordon et al., (2008)	602	Nurses	1 medical centre and 1 large hospital in 2 states
Edwards et al., (2001)	446	Nurses	Professional nursing organisation in 1 state
Youngcharoen, Vincent and Park (2017)	140	Nurses	Unspecified number of wards in 3 hospitals
Geffen et al., (2002b)	124	Nurses and doctors	2 hospitals
Ross, Bush and Crumette (1991)	113	Nurses	4 hospitals in 1 state
Petti et al., (2003)	42	Patients	1 hospital
Pizzi, Chelly and Martin (2014)	28 shifts	Nurses	1 unit
Hagman (1991)	Not specified	Nurses and doctors	1 medical centre

Table 17 Sampling in surveys of PRN medication use.

Outcome measures

Four of the studies evaluated nurses' knowledge of and use of analgesics (Ross, Bush and Crumette 1991), specifically opioids in the case of Edwards et al., (2001) Gordon et al., (2008) and Youngcharoen, Vincent and Park (2017). Edwards et al., (2001) and Youngcharoen, Vincent and Park (2017) used a questionnaire based upon the Theory of Planned Behaviour (Ajzen, 1991). These were the only surveys to use a deductive approach to study nurses' administration of PRN medication.

Pizzi, Chelly and Martin (2014) conducted a 'time study', measuring how long nurses took to administer PRN analgesia.

Three studies (Hagman, 1991; Geffen et al., 2002b; Petti et al., 2003) explored knowledge and opinions of PRN psychotropic medication. Geffen et al., (2002b) surveyed nurses' and doctors' knowledge of psychotropic medications and the symptoms for which they could be used. Petti et al., (2003) asked children and adolescents about their opinions of the value and efficacy of PRN medication following administration, while Hagman (1991) surveyed nurses and doctors about their opinions of who should instigate PRN medication administration.

Sturmey (2009) conducted a secondary data analysis of a UK- wide survey into the use of control and restraint in learning disability units. Outcomes were frequencies of the use of various measures, including PRN medication.

Results

Evidence from surveys has identified the potential influence of beliefs, attitudes, and knowledge of nurses on the decision- making process when giving PRN medication, so providing further clues as to the sources of variation.

Edwards et al., (2001) used the theory of planned behaviour (TPB) (Azjen, 1991) to hypothesise that the influence of attitudes, norms and perceived control '…would predict a significant proportion of variation in nurses' intentions to administer PRN opioids for analgesia.' The starting point for

this study was previous literature indicating that nurses do not consistently administer sufficient opioid analgesia to control patients' pain. When modelled, three factors emerged as significant in predicting nurses' intentions to adminster opioids.

Firstly, nurses who percieved a high degree of control, whereby they felt they had influence over patients' pain management, were more likely to intend to administer opioids. Secondly, intention to give opioids was greater where nurses perceived normative pressure to do so, and thirdly, when they reported positive attitudes to pain control (Edwards et al., 2001, p154). However, overall, the model only explained 39% of the variance in intention scores. This led the authors to speculate that unmodelled factors such as pain management knowledge, past experience of dealing with pain, or years of nursing experience may account for some of the unexplained 61% of variance.

Youngcharoen, Vincent and Park (2017), also using the TPB, explored pain assessment and management using opioids among nurses with differing levels of experience. Nurses with greater than 10 years' experience had a more positive attitude to pain assessment when compared to nurses with less than 5 years' experience or 5 to 10 years experience. The most experienced nurses were more likely to perceive they had the ability and skills to assess pain, and they agreed that other healthcare colleagues would expect them to administer opioids. They were also more likely to agree that they would intend to administer PRN opioids when next caring for a patient in pain. Yet, the most experienced nurses were over 60% less likely to administer an opioid to a patient within a vignette than those with 5-10 years' experience. The study authors speculated that this was due to the nurses becoming 'hardened' to patient pain, but there was no evidence for this in the study.

Further detail on the relationship between knowledge and decision outcome can be found in three studies (Ross, Bush and Crumette, 1991; Geffen et al., 2002b; Gordon et al., 2008). Ross, Bush and Crumette (1991) used vignettes and a questionnaire to understand factors affecting nurses' decisions to administer PRN analgesia to children post- operatively. The questions asked about nurses' knowledge of, and confidence in, opioid drug administration. The study found that there was no statistically

significant interaction between nurses' knowledge about childrens' pain expression and child development, and amount of analgesia administered. However, statistically significant correlations were found between nurses' knowledge of both analgesia administration in general and specifically of opioids, and their likelihood of administering opioid medications. Confidence with, and knowledge of the medication appeared exert more influence on opioid administration than how children in the vignettes expressed their pain.

Gordon et al., (2008) also used vignettes to explore nurses' knowledge about timing and doses of PRN opioid analgesia. The study showed that approximately a third of nurses erred on the side of caution when administering PRN opioids, even when the vignette indicated severe pain and minimal or no drug side effects. In a question about the patient factors to consider when administering opioids, the most common responses were sedation level (66%), pain intensity (50%), then respiratory rate (47%) and patient's response (47%). Nurses were balancing therapeutic effects with side effects.

However, in another study (Ross, Bush and Crumette, 1991), half of the nurses surveyed over-estimated the likelihood of addiction to opioids developing as a result of short term analgesic use. This raises questions about the salience of medication knowledge and the relative impact of such knowledge on nurses' decisions. Addiction to opioids when used for treatment of acute pain is a low- risk side effect, yet it was important to nurses, shaping their decisions more than other side effects which may be both more harmful and more likely to happen.

The study by Geffen et al., (2002b) provides evidence of the possibility of two types of knowledge used by nurses in their decision- making: working (non- propositional) knowledge and propositional (theoretical) knowledge (Higgs and Titchen, 2000). Doctors and nurses were surveyed about their use of medications for treatment of psychoses. Sixty percent of nurses preferred to use anti- psychotic medication to treat agitation, even though over three- quarters of nurses knew that benzodiazepines were also effective for treating agitation, and less harmful to the patient. However, they had seen anti-psychotic medication work, and this experiential knowledge appeared to have the greatest influence on practice.

The authors of the study also stated that nurses may have had concerns about the potential for patients to become addicted to benzodiazepines, causing them to be cautious in the administration of these drugs. Similarly to the use of opiates, the possibility of side effects was a feature of nurses' choice to use one drug in preference over another. Knowledge of side effects can be propositional and non- propositional. There is evidence that nurses use both kinds of knowledge in their decisions; what is not apparent is the relationship between each kind and the decision outcome.

Involvement of patients in PRN decisions was examined in two studies. The survey by Hagman et al., (1991) indicated that the majority of nurses felt patient and nurses should decide together about the need for PRN medication. However, the study by Petti et al., (2003) showed that in 55% of cases the staff alone decided, and joint decision- making happened in only 12% of cases.

In learning disability settings, just over 80% of units surveyed used PRN medication as a form of restraint (Sturmey, 2009). However, the use of PRN medication varied considerably: per service user, the rate of use of PRN medication ranged between 0 – 150 occasions, with a mean of 7.9 and a median of 2. Some service users therefore received PRN medication much more than others.

Quality appraisal of surveys

The included surveys have been appraised using the BestBETS (2017) survey checklist. Surveys have been valuable to the study of PRN medication decision- making as they have been used to collect information on the knowledge, attitudes and beliefs of nurses, doctors and patients. In addition, theoretically- driven surveys enable focus on selected explanatory factors for the variation in medication use shown in the QA and chart review studies.

Two surveys included in this review used a deductive approach to data collection and analysis used the Theory of Planned Behaviour (Ajzen, 1991). However, the model accounted for only 39% of the variance seen in one study; recent criticisms of the TBP centre on the fact that in a variety of

studies exploring many behaviours, a similar expression of variance is seen (Sniehotta, Presseau and Araujo-Soares, 2014). This suggests that the theory itself is insufficient. Therefore, other factors must be involved in nurses' decision- making.

It is interesting that three surveys from different settings try to identify the relationship between nurses' knowledge and their medication administration decisions (Ross, Bush and Crumette, 1991; Geffen et al., 2002b; Gordon et al., 2008). However, 'knowledge' has been operationalised inadequately.

Ross, Bush and Crumette (1991) used some questions taken from a previous study. Five questions related to nurses' 'knowledge and confidence' about opioid administration, yet only one asked about knowledge that could be derived from theory (the likelihood of a child becoming addicted to opiates if administered in an acute pain situation). The other four questions were reflections of nurses' personal confidence with opioid administration (for example confidence in 'handling respiratory depression'). Whilst the latter question may have a theoretical component which underpins the confidence level- the facts about what to do in a case of respiratory depression- the question, as worded, does not ascertain this knowledge. Therefore, the claim that there is statistical significance between nurses' 'knowledge and comfort' and amount of opiates administered is open to question.

Furthermore, Ross, Bush and Crumette (1991) explored the relationship between analgesia administration and nurses' knowledge of child development and childrens' pain expression. It is possible that this knowledge is not useful to nurses- other types of knowledge such as pharmacology may be more useful; alternatively knowledge from different domains may interact. The psychometric properties of the study questions were not adequate to distinguish between such different types of knowledge.

Ross, Bush and Crumette (1991), Gordon et al., (2008) and Youngcharoen, Vincent and Park (2017) used vignettes in their surveys, which offered short descriptions of patients, including several factors considered to be important by the researchers to understanding decision- making. Carefully constructed vignettes are valuable as they provide concrete, rather than

abstract situations for respondents, and in their approximation of real- life allow insight into cognitive processes and information used by respondents (Morrison, Stettler and Anderson, 2004). As such, information presented to participants can be controlled and responses compared. Both studies took advantage of this and possible sources of variation (such as the educational level of staff) were tested in order to explain findings.

However, the use of vignettes is contested, in part due to the similarity of written vignettes with real- life. Vignettes are necessarily simplified versions of reality, and construction of them prioritises some aspects of real- life over others (Hughes and Huby, 2002). How these aspects are selected is important: a common starting point is review of relevant literature (Brauer et al., 2009). None of the studies detailed how they selected the factors included in their vignettes (though Ross, Bush and Crumette (1991) used vignettes from a previous study). Gordon et al., (2008), however, did attempt to maximise face validity by developing and piloting with representative staff.

Other methods of data collection also present the possibility for bias. Face-to- face interviews as used by Petti et al., (2003) have a low cognitive burden for respondents compared with written questionnaires (Bowling, 2005) and so are easier to undertake. However, social desirability, 'yes-saying' and reduced willingness to disclose sensitive information present potential for bias.

This is of particular concern for the study by Petti et al., (2003), having been carried out with young children who had received psychotropic medication within the few hours preceding each interview. Questions included whether or not the medication received had been the best for them, and if there had been anything else that could have been offered instead of medication. It is hard to be confident that the answers given by the children represent the 'truth', given the degree of insight they may have had into alternatives to the medication given and the nature of the difference in status between them and the researchers.

Sampling strategy varied between surveys too, with a consequent effect on external validity. Response rates varied from not indicated (Hagman, 1991) to 98% (Geffen et al., 2002b). Non- responders may have systematic differences from responders, but no survey attempted to characterise non-

responders. Two surveys sampled in order to maximise variation: Edwards et al., (2001) sampled nurses from the largest professional organisation, while Sturmey (2009) conducted a secondary analysis of data of people with learning disabilities from 509 units.

Youngcharoen, Vincent and Park et al., (2017) conducted a sample size calculation, which informed their sampling from 3 different hospitals in one locality. Four studies (Ross, Bush and Crumette, 1991; Geffen et al., 2002b; Gordon et al., 2008) sampled from multiple units within one hospital, or hospitals within one geographical area. In these cases a clustering effect may be likely, such as when measuring attitudes or beliefs that may be affected by local norms. The remaining studies (Hagman, 1999; Petti et al., 2003; Pizzi, Chelly and Martin, 2014) used convenience samples.

Overall, the nine surveys included in the review have added information about some of the attitudes, beliefs and knowledge that influence nurses' PRN decision- making in a variety of clinical settings. They point to the existence of different types of knowledge- propositional and non-propositional, and the importance of experiential knowledge to nurses' decisions. However, threats to internal and external validity limit the conclusions that can be drawn about the impact of these influences on decisions.

3.7.5 Quasi- experimental studies

Twelve quasi- experimental studies were included in the review.

Clinical setting

Table 18 details the settings where quasi- experimental studies took place. The majority were conducted within acute adult mental health (n= 7).

Setting / Author	Adult mental health	Adult medicine	Adult surgery	Brain injury unit	Long- term care
Kovach et al., (1999)					✔
De Rond et al., (2000)		✔	✔		
Hagen et al., (2005)					✔
Donat (2006)	✔				
Thomas et al., (2006)	✔				
Hunter andCyr (2007)			✔		
Baker, Lovell and Harris (2008)	✔				
Beaulieu et al., (2008)				✔	
Chaichan (2008)	✔				

Setting / Author	Adult mental health	Adult medicine	Adult surgery	Brain injury unit	Long- term care
Smith et al., (2008)	✓				
Friedman et al., (2012)	✓				
Al-Sughayir (2017)	✓				

Table 18 Settings within which quasi- experimental studies were conducted (n= 12)

Participants and sampling

Sampling strategies varied between studies. The majority evaluated interventions in one hospital. Sample sizes ranged from not specified (Donat, 2006) to 703 patients (de Rond et al, 2000). No study mentioned having conducted a sample size calculation. Table 19 details sampling in the retrieved quasi- experimental studies, in descending order of sample size.

Study Authors	Sample size (n)	Sample drawn from
Hagen et al., (2005)	2443	24 facilities
De Rond et al., (2000)	703	3 hospitals
Al- Sughayir (2017)	359	2 wards in 1 hospital
Hunter and Cyr (2007)	357	1 unit
Thomas et al., (2006)	228	1 hospital
Beaulieu et al., (2008)	222	1 unit
Friedman et al., (2012)	166	1 hospital
Kovach et al., (1999)	104	32 facilities
Chaichan (2008)	76	1 ward
Baker, Lovell and Harris (2008)	35	2 wards
Donat (2006)	Not stated	1 hospital
Smith et al., (2008)	All patients over 15 months	9 hospitals in 1 state

Table 19 Participants and sampling in quasi- experimental studies.

Study designs

Ten of the studies used a pretest- posttest design, measuring outcomes prior to and following an intervention (Kovach et al., 1999; de Rond et al., 2000; Donat, 2006; Hunter and Cyr, 2007; Baker, Lovell and Harris 2008; Beaulieu et al., 2008; Chaichan, 2008; Smith et al., 2008; Friedman et al., 2012, Al- Sughayir, 2017). In these studies the control group consisted of those available prior to the introduction of the intervention.

Hagen et al., (2005) and Beaulieu et al., (2008) used an interrupted time-series design. In these studies, data was collected repeatedly over a period of time following the intervention.

Thomas et al., (2006) utilised a cross- over design. Two wards took part in the study: one ward received the intervention for a month, followed by the other. The period in which no intervention was received acted as a comparison or non- equivalent control.

Hunter and Cyr (2007), Chaichan (2008), Smith et al., (2008) and Al-Sughayir (2017) were retrospective studies; the others were prospective.

Interventions

Education programmes for staff were the focus of five studies (Kovach et al., 1999; de Rond et al., 2000; Hagen et al., 2005; Hunter and Cyr, 2007; Beaulieu et al., 2008). Kovach et al., (1999) and de Rond et al., (2000) supplemented their programmes with protocols to guide the assessment and management of pain.

Baker, Lovell and Harris (2008) introduced a good practice manual, designed to guide staff about PRN medication administration.

Donat (2006) and Friedman et al., (2012) evaluated the impact of regular, structured feedback about PRN medication use to treatment teams, which consisted of psychologists, psychiatrists, social workers, nurses and other professional groups who contributed to patient care.

Chaichan (2008) introduced a symptom evaluation scale in order to structure patient assessment and decisions about the need for PRN medication.

Smith et al., (2008) evaluated the discontinuation of the use of PRN psychotropic medication within mental health facilities.

Thomas et al., (2006) evaluated the introduction of structured daily activity sessions on patient behaviour, for which PRN psychotropic medication use was a proxy measure.

Finally, Al- Sughayir (2017) evaluated the administration of PRN benzodiazepines before and after hospital accreditation (strategic planning to promote the quality of clinical practice).

Outcome measures

All studies included the frequency of PRN medication use as an outcome. Two studies evaluated use of analgesia, with the aim of improving pain assessment and management with increased use of analgesics (Kovach et al., 1999; de Rond et al., 2000). The remainder explored methods of reducing the use of PRN psychotropic medication.

Results

Studies evaluating the educational programmes showed mixed results. The use of an education programme that also included the use of a protocol to guide staff with the subsequent assessment and treatment of patients showed greater success than providing education alone. Kovach et al., (1999) found that for the treatment of discomfort in patients with dementia, there was an increase in the use of both PRN analgesic and psychotropic medications following education and introduction of a protocol- this finding was not statistically significant. The study aimed to improve assessment of pain- related behaviours such as agitation, ideally leading to increased administration of analgesia and reduced administration of psychotropic medication. This aim was, therefore, partially achieved. However, the use

of regular analgesia and of non- pharmacological comfort measures also increased, resulting in patients exhibiting fewer behaviours associated with discomfort or pain.

de Rond et al., (2000) found that after introduction of a pain management protocol plus staff education, patients on surgical and medical wards received more PRN non- opioid and weak opioid analgesia, which was a statistically significant finding, and of benefit to the patients.

The studies that delivered and evaluated staff education programmes alone showed less success. Hagen et al., (2005) aimed to reduce the amount of PRN psychotropic medication given to residents, as there was concern about over- use of these drugs. However, after the educational intervention, a statistically significant increase in the percentage of residents receiving such medications was seen.

Hunter and Cyr (2007) aimed to lower the incidence of delirium in post-operative patients by reducing the administration of medications known to be a contributing factor to its development. After delivery of the educational intervention, there was a statistically significant decrease in the amount of a particular anti-emetic administered to patients, known to exacerbate delirium. The use of analgesics did not change, while the use of benzodiazepines and antipsychotic medication increased- though this was not a statistically significant finding, it was not the desired outcome.

Least success was found by Beaulieu et al., (2008), who aimed to improve treatment of aggression in patients in an acute brain injury (ABI) unit by reducing all types of restraint, including medications. However, the use of most types of restraint increased following the education intervention. The authors speculated that the training programme increased awareness of restraints and medications; drawing attention to them was felt to account for the increase in use.

Further evidence for the value of a decision aid to nurses' decision- making was found in the study by Chaichan (2008), who retrospectively evaluated the use of a validated scale (Positive and Negative Syndrome Scale Excited Component, Montoya et al., 2011). The scale aided assessment of agitation and aggression in patients with schizophrenia, and PRN psychotropic medication could only be administered once patients'

symptoms had exceeded a pre- determined score on the validated scale. Although there was no statistically significant difference in PRN medication administration between groups prior to and following introduction of the scale, more PRNs were administered to patients in the first three days of patient admission than before the intervention was introduced. The mean number of episodes of patient aggression was significantly lower in patients who had been assessed using the scale, which was a successful outcome.

Interventions that helped staff to evaluate existing practice or to integrate new knowledge into practice appeared to be successful in changing behaviour. Studies evaluating the use of feedback to healthcare staff had the greatest effect on PRN medication use. Both Donat (2006) and Friedman et al., (2012) demonstrated a statistically significant reduction in psychotropic PRN use following regular feedback after episodes when PRN medication was used. Responses to the feedback included changes to timing or dosage of regular orders, selection of different drugs, as well as increased utilisation of a range of non-pharmacological interventions.

Baker, Lovell and Harris (2008) had moderate success with the introduction of a good practice manual, with an overall reduction in use of benzodiazepines and antipsychotic medications but an increase in use of hypnotics. Al- Sughayir (2017) found a statistically significant reduction in the use of benzodiazepines in acute mental health wards after the introduction of a quality improvement programme. This included the use of clinical practice guidelines, an objective symptom rating scale, and rapid patient evaluation by a multi- disciplinary team.

Quality appraisal of quasi- experimental studies

These studies have been appraised using the checklist for quantitative intervention studies (National Institute for Health and Care Excellence (NICE), 2012a). Quasi- experimental studies are useful when it is not feasible or ethical to conduct a randomised- controlled trial (Grimshaw et al., 2000, Harris et al., 2006). However, quasi- experimental studies have methodological limitations that make it difficult to establish if the intervention caused the effect, or if some other mechanism was at work.

These limitations can include the lack of a control group, no random selection or allocation of participants, and no blinding of participants or researchers. Harris et al., (2006) suggest a hierarchy of quasi-experimental studies based upon their ability to reduce bias: those without control groups being the least effective at demonstrating causality through to interrupted time- series designs as the best.

The weakest studies among those reviewed therefore are those that used a pre-test, post-test design (Kovach et al., 1999; de Rond et al., 2000; Donat, 2006; Hunter and Cyr, 2007; Baker, Lovell and Harris, 2008; Beaulieu et al., 2008; Chaichan, 2008; Smith et al., 2008; Friedman et al., 2012; Al-Sughayir, 2017). These studies measured outcomes prior to and following introduction of an intervention, however there was no control group to which participants were randomly allocated. Participants acted as their own control if they were present in the clinical setting for the duration of the study, or those in the pre- test phase acted as the control.

Studies like this are prone to serious threats to internal validity, as the inability to control for potential confounding factors such as differences in patient or staff attributes between the two phases of the studies mean the results cannot confidently be attributed to the intervention. Additionally, two studies tested both an educational programme and protocol for assessment and treatment together (Kovach et al., 1999; de Rond et al., 2000). Here, it is difficult to tell which particular intervention caused the effect on medication administration.

Hagen et al., (2005) attempted to improve the internal validity of their study in a number of ways. Because local physicians practised in several facilities, the researchers attempted to control for contamination of the intervention by ensuring that control and intervention units were separated geographically. In addition, the study attempted to match similar units to provide a control. Although this offers advantages over no control, even apparently well- matched groups can differ, which may lead to overestimation of the intervention effect (Grimshaw et al., 2000).

With the attempts to minimise bias and the large sample size, this study is superior to weaker quasi- experimental designs; however the results must still be viewed with caution. Thomas et al., (2006) used a crossover design: while internal validity was improved by establishing a temporal effect, this

study has limted external validity due to sampling from only two units within one hospital.

Using frequency of PRN medication adminsitration was a proxy measure for patient- related outcomes in some studies. Hunter and Cyr (2007) aimed to reduce the use of medications known to increase the likelihood of post- operative patients developing delirium. Although there was a change in the use of some medications post- intevention, the effect of this on the development of delirium in the target patient group was not measured. Therefore, it is unclear what effect, if any, the intevention had on the development of delirium.

Similarly, de Rond et al., (2000), Thomas et al., (2006), Hunter et al., (2007), Beaulieu et al., (2008) and Smith et al., (2008) aimed to establish the effect of a change in medication adminstration practice on patient outcomes. The use of PRN medication as a proxy measure assumes a direct association between its use and the desired patient outcome.

However, this assumption may be incorrect due to phenomena such as the Hawthorne effect. Observing practitioners may have induced a change in their behaviour that could account for both measured changes in PRN medication use and un- measured changes in patient outcomes. Alternatively, there may be no change in patient outcomes, meaning the change in practice was not necessary.

Understanding the effect of the interventions, therefore, on patient measures would have enhanced the internal validity of these studies, such as found in Kovach et al., (1999), who aimed to improve the comfort of patients with dementia by improving pain assessment. As well as measuring the frequency of PRN medication adminstration, they assessed patients behaviour. Following the study intervention, analgesia use increased and patients also appeared more comfortable. A temporal effect was therefore found, allowing greater confidence in attribution of the intervention to both outcomes.

Length of follow- up was variable, and in some studies the follow- up period was very short. Kovach et al., (1999) had the shortest follow- up period at two weeks post- intervention. The longest was Friedman et al., (2012) at 24 months. The other studies had follow- up periods somewhere in

between. Follow- up needs to be sufficient to establish the permanence of any effects induced by the intervention, beyond the temporary change in knowledge or behaviour of practitioners. The interupted time- series design used by Hagen et al., (2005) and Beaulieu et al., (2008) would be most effective in measuring trends over time; however this needs to be balanced against other considerations such as changing patient populations (different attributes at baseline) or changes in staff during the course of the study.

In summary, the quasi- experimental studies examining PRN medication decision- making are of low to moderate quality due to inherent methodological weaknesses that make it difficult to attribute any change in PRN medication administration practice to the intevention. However, the results are interesting in that they indicate how difficult it can be to change practitioners' habits.

If it is accepted that at least some learning about when and how to give PRN medication occurs in the practice setting, nurses develop procedural or non- propositional knowledge as a result of adaptation to the environment in which they practise. Attempting to change this by adding facts and knowledge has not been wholly successful, as nurses have not been able to integrate it into their daily practice. The most successful interventions appear to be those using feedback: allowing staff to adapt to information, presented frequently and regularly, appeared to have more effect (although these strategies were not directly compared to one another). Interventions that included some sort of protocol to guide practice were also successful.

3.7.6 Mixed method studies

Seven mixed method studies were included in this review.

Clinical setting

Studies took place in a range of clinical settings, including psychiatry, elderly care and paediatrics. Adult (including the older adult) were the settings most commonly used. Table 20 details the settings used.

Authors / Setting	McLaren et al., (1990)	Titler et al., (2003)	Lamb and Henry (2004)	Mezinskis et al., (2004)	O'Brien and Cole (2004)	Kwasny, Hagen and Armstrong (2006)	Smyth and Toombes (2011)
Adult Medicine		✓				✓	
Adult psychiatry	✓			✓			
Adult surgery		✓				✓	
Elderly care assessment and rehab unit						✓	
Elderly care dementia units		✓		✓			
Orthopaedics		✓					
Paediatric infectious diseases			✓				
Paediatric medicine			✓				
Paediatric surgery			✓				✓
Psychiatric close observation unit					✓		
'Various'			✓				

Table 20 Clinical settings from which mixed method study participants were sampled (n=7)

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Participants and sampling

Sampling strategies varied between studies, including participants, sampling procedure and sampling frame (see Table 21). Three of the studies sampled from a range of settings; the remainder just one ward or unit.

Study Authors	Sample size (n)	Sampling procedure	Sample drawn from
Titler et al., (2003)	709 patients 172 nurses	Random selection of patient records from those admitted over 1 year. Stratified random sampling of nurses (90% response rate)	13 units from 12 hospitals
Lamb and Henry (2004)	313 patients, plus: the doctors who had prescribed paracetamol for the first 100, and the nurses who administered it	All admitted to the hospital over 3 months	4 wards in 1 hospital
Mezinskis et al., (2004)	307 patients 160 nurses	Selected by site coordinators. No other detail given	14 facilities in 3 US states
Smyth and Toombes (2011)	95 patients 18 nurses	Convenience sample admitted over 2 month period Not detailed for nurses	I ward
O'Brien and Cole (2004)	88 patients, relatives and carers	All admitted over 1 month	I unit
Kwasny, Hagen and Armstrong (2006)	43 patients 140 nurses	All admitted over 1 month who had received tranquilisers Convenience sample of nurses (65% response rate)	6 units within 1 hospital
McLaren et al., (1990)	32 patients	All admitted the unit over 103 consecutive days	1 unit

Table 21 Sampling in mixed method studies.

Study designs

The typology developed by Cresswell and Plano- Clark (2007, p85) has been used to categorise the designs of the included mixed method studies. These categories are briefly outlined in Table 22. Designs of the included studies are detailed in Table 22, to show the relationship between study design and the methods used.

Design Type	Timing	Mix	Weighting/ Notation
Triangulation	Concurrent	Data merged during interpretation or analysis	QUAN + QUAL
Embedded	Concurrent	Main study supported with sub-study	QUAN (qual) or QUAL (quan)
Explanatory	Sequential: quantitative followed by qualitative	Data connected between the two phases	QUAN → qual
Exploratory	Sequential: qualitative followed by quantitative	Data connected between the two phases	QUAL →quan

Table 22 Mixed method study designs (adapted from Creswell and Plano- Clark, 2007)

Study methods

Chart audit was used in all studies, usually as the first component. The second component used either qualitative methods, usually interviews with participants (McLaren et al., 1990; O'Brien and Cole, 2004; Smyth and Toombes, 2011), or surveys (Mezinskis et al., 2004; Lamb and Henry, 2004). Two studies used validated surveys to understand influences on decision- making: Titler et al., (2003) and Kwasny, Hagen and Armstrong (2006). Table 23 details the study designs and methods used.

Method / Authors	McLaren et al., (1990)	Titler et al., (2003)	Lamb and Henry (2004)	Mezinskis et al., (2004)	O'Brien and Cole (2004)	Kwasny, Hagen and Armstrong (2006)	Smyth and Toombes (2011)
Chart audit	✓	✓	✓	✓	✓	✓	✓
Interview	✓		✓		✓		✓
Observation							✓
Survey		✓		✓		✓	
Triangulation					✓		
Embedded							
Sequential explanatory	✓		✓				✓
Sequential exploratory							
Other		✓		✓		✓	

Table 23 Methods used within mixed method studies.

Three studies had to be categorised as 'other' as they did not fit into the typology. Titler et al., (2003), Mezinskis et al., (2004) and Kwasny, Hagen and Armstrong (2006) used both a questionnaire of nurses and a retrospective chart review. Therefore, none of these studies fitted neatly into one of the typology categories.

Outcome measures

All of the studies aimed to identify the type of medications given PRN, plus the frequency with which they were given. Studies also aimed to understand the influences upon these decision outcomes. This included

attitudes (Titler et al., 2003; Kwasny, Hagen and Armstrong, 2006), or medication administration processes such as patient assessment (McLaren et al., 1990; Lamb and Henry, 2004; Mezinskis et al., 2004; O'Brien and Cole, 2004; Smyth and Toombes, 2011).

Results

Results from these studies highlighted relationships between PRN medications given and staff factors such as knowledge of and attitudes to medication, patient factors such as cognitive ability, and contextual factors such as the amount of guidance given within a prescription.

Two studies highlight the relationship between nurses' knowledge and attitudes, and the effect of this on PRN medication administration. Nurses caring for elderly patients in acute medical wards displayed a 'liberal' attitude to the use of tranquilisers (an out- dated term that includes antipsychotics and benzodiazepines) (Kwasny, Hagen and Armstrong, 2006).

Reasons ranked by nurses for using these medications included protecting staff and other patients from physical abuse. Management of patient behaviours, such as pulling out feeding tubes or catheters, were also frequently cited as reasons. At the time of the study, it was known that use of tranquilisers exposed elderly patients to an unacceptable risk of serious side effects, and that they should be used only as a last resort. Accepting the use of tranquilisers to manage behaviour- that is, a chemical restraint- was argued by the study authors to be, therefore, liberal. However, only 8.6% of patients were prescribed such medications- no data was given on administration rates so the effect of these attitudes was not be established.

The other study examining attitudes explored pain assessment and administration of analgesia (Titler et al., 2003). Around- the- clock (ATC) administration of PRN analgesia is considered to be best practice in maintaining good pain relief, yet although 87% of nurses questioned knew this, just 34% believed they should use that practice themselves. Only 15% of nurses always administered analgesia ATC. A review of patient charts

found that analgesia was given ATC to 22% of patients on the first day of admission to hospital following hip fracture. This tailed off to 12% of patients by day 2, and 8% by day 3.

The study also revealed considerable variation in practice as 13 different analgesics were given to patients for the treatment of pain, plus 6 other medications including benzodiazepines and anti- psychotic drugs. This study used the Diffusion of Innovations Model (Rogers, 1995) to guide data collection. The model suggests that adoption of practice recommendations depends on characteristics of the environment, the decision- maker and the recommended practice itself. Despite some nurses in these studies knowing the potential benefits of the recommended practice, they were not persuaded to incorporate it in their own decision- making.

Mezinskis et al., (2004) identified that the probability of receiving a PRN analgesic was significantly lower in patients who had impaired ability to understand others, whose speech was impaired, who lacked the ability to be understood, or had reduced cognitive ability. Eighty percent of qualified nurses in this study used a pain assessment tool, compared with only ten percent of unqualified staff. However, the tools used required patients to be able to verbalise the characteristics of their pain, which clearly some could not do. Nurses instead relied on behavioural indicators such as increased irritability or change in usual behaviour to establish if a patient was in pain.

The use of behavioural indicators was also identified in another study (Smyth and Toombes, 2011). The patients in this study were children- some of whom were very young- and in common with elderly residents in the study by Mezinskis et al. would have been unable to verbalise their pain. Nurses had to use alternative methods of assessing the need for analgesia. Becoming familiar with the child was helpful, as it allowed nurses to recognise behaviours indicative of comfort or pain. When deciding whether to give analgesia, nurses had an idea of what medication to give based upon the length of time since surgery, the type of procedure, and other goals of care, such as discharge home.

Evidence for the role of contextual factors affecting nurses' practice can be found in a study exploring administration of PRN paracetamol to children (Lamb and Henry, 2004). Examination of patient medication charts

revealed that over the study period, 74% of children were prescribed paracetamol for a range of conditions.

Comparison of reasons for prescription of the drug against reasons for administration showed some clear discrepancies, attributed by the study authors to be due to an absence of guidelines for administration within the prescription- only one prescription out of over three hundred indicated precisely what temperature constituted a fever, for example. Nurses seemed to administer paracetamol for fever at much lower temperatures than doctors intended, although why was not explored. Furthermore, it was clear from the charts that individual nurses interpreted prescriptions differently, leading to differences in the frequency or doses of paracetamol for the same patient problem.

Two studies were completed in mental health settings. McLaren et al., (1990) identified that half of PRN psychotropic medications were given prior to or following an episode of patient aggression. In most episodes, other strategies had been tried before resorting to medication. A study of mental health nursing practice in a close- observation area (O'Brien and Cole, 2004) showed that agitation was the most common reason for PRN medication administration. However, the context within which the study took place- a close observation area- highlighted how the oppressive milieu affected both patient behaviour and nursing practice.

Quality appraisal of mixed method studies

These studies have been evaluated using a mixed method appraisal tool (Pluye et al., 2011). The aim of mixed method (MM) studies is either 'to achieve a fuller understanding about a target phenomenon, or to verify one set of findings against the other' (Sandelowski, 2003). This could not be achieved by the use of a single method alone and so is particularly useful for studying complex social phenomena (Greene and Caracelli, 1997), of which decision- making is an example. Therefore, MM studies have value in establishing both the outcome of a decision, and factors that led to that decision.

Three studies used a sequential explanatory design, whereby an initial quantitative study was followed by a qualitative study (McLaren et al., 1990; O'Brien and Cole, 2004; Smyth and Toombes, 2011). In all three cases, the quantitative study was an audit of patient charts, while the qualitative was an interview with staff. The aim in all studies was to establish some idea of causality: that is, to describe factors that led to the nurses giving PRN medication in the frequencies and doses identified in the chart audit.

In order to make claims about causality, both the robustness and integration of each part of MM studies must be considered (Heyvaert, Hannes et al., 2013). McLaren et al., (1990), for example, used chart audit and interviews with nurses. On selected days, medication charts were reviewed for any PRN drug administration and the administering nurse was interviewed to explore interventions before and after drug administration, plus their reasons for giving the medication. Both parts of the study were integrated in the results, giving some insight into the overall process of choosing and administering PRN medication.

However, examination of both parts of the study reveals weaknesses. Data collection from the charts was inadequately described, omitting information about how this activity was standardised. The qualitative part was limited to brief questions identifying what other strategies had been used before and after PRN medication had been given. Thus the study gave limited insight into the thought processes, beliefs or knowledge of the decision- makers that led them to give the medication.

Similarly, Lamb and Henry (2004) did not report their methods in sufficient detail to be able to judge reliability of data collection, nor measures taken to ensure internal validity or robustness of either study part. However, the integration of both methods in the analysis stage enabled understanding of not only how many children received paracetamol, but potential sources of variation as evidenced by differences in practice between the staff groups.

Smyth and Toombes (2011), by contrast, collected data from patient charts about PRN administration frequency but then conducted interviews with staff two years after the initial data collection. In effect, their work was two separate studies rather than an integrated whole. Any claims from the second study, therefore, cannot reasonably be seen as explanations for the frequency of medication administration in the first.

Three studies (Titler et al., 2003; Mezinskis et al., 2004 and Kwasny, Hagen and Armstrong, 2006) used both a questionnaire and chart review. As both components were quantitative, these may be more appropriately described as multi- method studies (Creswell and Plano- Clark, 2007). The primary criticism of the study by Mezinskis et al., (2004) is of integration- the parts of the study were conducted two years apart, and were not integrated at any point.

By contrast, both parts of the study by Kwasny, Hagen and Armstrong were conducted within one year. The data collection methods of the chart review were inadequately described. However, the questionnaire utilised a previously validated tool with a Chronbach's alpha coefficient of 0.95. Therefore, the tool was a reliable measure of the nurses' perceptions of chemical restraint with tranquilisers. Integration of both studies was non-existent: the chart review examined prescription rates of tranquilisers, yet examined the attitudes of nurses who administered medication. No data on administration rates was provided, therefore the influence of attitudes upon nurses' practice could not be described.

The study by Titler et al., (2003 was the most complete- data collection instruments and sampling were adequately described, and both parts of the study were integrated in the discussion.

One study mixed methods by triangulating data in a convergent design (Creswell and Plano- Clark, 2007). The study aimed to describe mental health nursing practice in close- observation areas, within a framework of participatory action research. Rates of PRN medication administration, obtained via chart review, were used as a proxy measure for patient agitation. Patients and relatives were interviewed individually or within a focus group. Although the individual parts of the study were inadequately described, together they had coherence that strengthened the conceptual linkages between each part. Results were integrated within the discussion and therefore, the role of context as a factor leading to decisions to give PRN medication was made clear.

In summary, therefore, individual MM studies are of low to moderate quality- either because of deficiencies in study quality of individual components, and/ or due to poor coherence and integration of MM approaches. Taken together, these studies provide limited evidence of

personal, contextual and patient related factors that influence nurses' PRN decision- making practice.

3.7.7 Qualitative studies

The review includes 11 qualitative studies. One study used non- participant observation (Twycross, Finlay and Latimer, 2013). The others all used interview or focus group methods. Carder (2012) used both interviews and non- participant observation.

Clinical setting

Five out of eleven studies used participants from mental health settings. The remaining six studies were split between five different clinical settings. Table 24 details the settings used.

Setting / Authors	Adult surgery	Adult medicine	Adult acute mental health	Adult secure mental health	Adult mental health rehabilitation	Elderly care dementia units	Paediatric palliative care	Paediatric surgery
DiGiulio and Crow (1997)	✓							
Manias et al., (2004)	✓	✓						
Baker et al., (2006)			✓					
Baker, Lovell and Harris (2007a)			✓					
Usher et al., (2009)			✓	✓	✓			
Usher, Baker and Holmes (2010)			✓					
Baker (2011)			✓					
Rashotte et al., (2011)							✓	
Cleary et al., (2012)			✓					
Carder (2012)						✓		
Twycross, Finlay and Latimer (2013)								✓

Table 24 Clinical settings from which qualitative study participants were sampled (n=11).

Participants and sampling

Sampling strategies varied between studies, including participants, sampling procedure and sampling frame (see Table 25). Five studies sampled from a range of healthcare staff. Two studies sampled patients (Baker et al., 2006 and Cleary et al., 2012). Sampling was done by convenience in most studies (n=6). Two studies did not detail their sampling strategy clearly (Baker et al., 2007a and Cleary et al., 2012).

Study Authors	Sample size (n)	Sampling procedure	Sample drawn from
Baker, Lovell and Harris (2007a)	38 qualified and unqualified mental health nurses 16 psychiatrists 5 pharmacists	Unclear- both convenience and purposive stratified methods mentioned	4 inpatient sites in 3 mental health Trusts
Usher et al., (2009)	16 nurses 1 doctor 2 psychiatrists	Convenience	3 mental health units from 2 regional centres
Usher, Baker and Holmes (2010)	16 nurses 1 doctor 2 psychiatrists	Convenience	3 mental health units from 2 regional centres
Baker (2011)	11 nurses 10 psychiatrists 5 pharmacists	Purposive stratified	2 mental health Trusts
DiGiulio and Crow (1997)	5 doctors, 5 nurses	Convenience	1 unit in 1 hospital
Carder (2012)	16 unlicensed (unqualified) nursing staff	Convenience	3 care homes
Twycross, Finlay and Latimer (2013)	Nurses caring for 10 inpatients	Inpatients selected purposively	1 ward

Study Authors	Sample size (n)	Sampling procedure	Sample drawn from
Manias et al., (2004)	12 nurses	Stratified. Sampling continued until no new themes emerged.	Unspecified number of wards in 1 hospital
Rashotte et al., (2011)	6 nurses	Convenience	1 hospice
Cleary et al., (2012)	40 inpatients	Not specified	Unspecified number of wards within 1 larger mental health facility
Baker et al., (2006)	22 inpatients	Convenience	4 inpatient units in 1 city

Table 25 Sampling in qualitative studies

Study designs

The majority of studies reported using a generic qualitative approach rather than adopting a specific theoretical perspective. Generic qualitative research '…is not guided by an explicit or established set of philosophic assumptions in the form of one of the known qualitative methodologies' (Caelli et al., 2003, p2). The 'known' qualitative methodologies include phenomenology, ethnography and grounded theory (Kahlke, 2014). There was one exception: Rashotte et al., (2011) used hermaneutic phenomenology. Di Giulio et al., (1997) used the information processing model to study the clinical reasoning of nurses and doctors. This was the only qualitative study to use a cognitive theory of decision- making to structure data collection and analysis.

The majority of studies collected data via individual interviews. A variety of methods were used to analyse the data: thematic analysis was stated most commonly. Most studies took steps to enhance the credibility of their findings, usually by more than one person analysing the data. Table 26 details the data collection methods, data analysis methods and any measures taken to enhance credibility.

Study Authors	Data collection	Data analysis	Measures to enhance credibility
DiGiulio and Crow (1997)	Individual interviews	Protocol analysis and chi squared	None reported
Manias, Aitken and Dunning (2004)	Individual interviews	Framework analysis	Data analysis done by two researchers
Baker et al., (2006)	Individual interviews	Thematic content analysis	Independent analysis by two researchers
Baker, Lovell and Harris (2007a)	Individual interviews	Constant comparative method	None
Usher et al., (2009)	Individual interviews	Open coding and continuous comparison	Independent analysis by two researchers
Usher, Baker and Holmes (2010)	Individual interviews	Thematic analysis	Independent analysis by two researchers
Baker (2011)	Focus groups or individual interviews	Constant comparative method	None
Rashotte et al., (2011)	Individual interviews	Thematic analysis	Initial analysis done by four researchers. Participant feedback about analysed data
Carder (2012)	Observation of nursing staff. Individual interviews two weeks later.	Coding 'using three stages common to grounded theory'	Initial analysis done by researcher and a graduate student.
Cleary et al., (2012)	Individual interviews with patients	Thematic and content analysis	Data analysis done by two researchers
Twycross, Finlay and Latimer (2013)	Observation of nursing staff	Content analysis of field notes. Examination of nurses' actions when patient's pain score over 5. Comparison of analgesia given with pain scores.	Participant feedback about analysed data

Table 26 Summary of data collection methods, data analysis methods and measures to ensure credibility.

Study aims

The majority of studies aimed to explore the experiences and perceptions of staff about their PRN medication administration decision- making. This included advantages and disadvantages of PRN medication, and processes such as patient assessment and interaction with other staff members in making decisions. Reasons for medication administration or withholding were explored, including patient factors and underpinning evidence for practice such as policies, protocols or assessment tools. The two observational studies (Carder, 2012; Twycross, Finlay and Latimer, 2013) aimed to identify what nurses did in the workplace when making decisions about giving PRN medication.

Baker et al., (2011) aimed to explore staff views of administering PRN medications using patient group directions (PGDs) as opposed to the usual individual patient prescription.

The two studies (Baker et al., 2006; Cleary et al., 2012) focussing on service users' views of PRN medication explored their perceptions and experiences of receiving PRN medication in acute mental health settings.

Results

Data from the qualitative studies has illuminated how nurses recognise that patients need PRN medication and influences upon how the decision is made to give or withhold it.

<u>Recognising patient need</u>
The first stage in the process of PRN medication administration is recognising patient need. The included qualitative studies provide some clues about how this may occur. In mental health settings, PRN medication was reported as being given in response to patient need, particularly patient distress, and for diagnoses of psychosis or agitation (Usher et al., 2009). Information about the patient history, their mental state and risk assessments would inform these decisions (Baker, Lovell and Harris, 2007). These studies did not identify the relative importance of these pieces of information to mental health nurses' decisions, nor how they were

combined. However, two studies from other clinical settings did evaluate this aspect of decision- making.

Observation of nurses in paediatric surgical settings showed that they relied on two factors to decide if analgesia was needed: behavioural cues, and an expected trajectory of pain based upon length of time following surgery. Pain assessments using scoring tools were not consistently carried out, nor did scores necessarily guide choices about how to relieve pain.

Nurses did ask children about their pain; however children's own reports of pain tended to be discounted especially if a discrepancy between the self-report and the behavioural cues was perceived by the nurses (Twycross, Finlay and Latimer, 2013). Nurses could not reconcile childrens' self-reports of moderate to severe pain if their behaviour did not seem to correspond to what might be expected for such levels of pain. Similar findings can be found in the think- aloud study by Di Giulio and Crow (1997): three out of five nurses indicated that the fictitious patient's pain may not be as bad as reported. All nurses in this study collected information on the patient's behaviour, which subsequently informed their decisions.

Nurses in paediatric palliative care revealed that 'being in the know' was an important aspect of PRN medication management (Rashotte et al., 2011). Nurses learnt to recognise how seizures manifested themselves in individual patients. By recognising a particular child's 'seizure pattern' (p65) nurses were able to make sense of the event and distinguish a seizure from other problems. However, this could only occur once familiarity with a child had been attained.

In long- term care facilities too, knowing the patient with dementia well was key for establishing if analgesia was needed or not. This knowledge, acquired through experience, was considered more useful than training about medication administration in knowing what to do (Carder, 2012).

Identifying options
The options available to participants in these studies were whether to give a PRN medication (selecting the drug and dose), or to use an alternative therapeutic intervention. One study identified a simple decision rule used by graduate nurses to establish the need for PRN analgesia (graduate nurses

were those that had qualified within the past year). If the patient's medication chart showed they had not had any pain relief in recent days, nurses did not enquire about further need. Their search for information stopped there. If a medication needed to be given, the same nurses would start with the lowest dose of the weakest drug available (Manias, Aitken and Dunning, 2004).

Nurses in paediatric palliative care utilised the options available, including giving medication, watching and waiting to see if a seizure would end, or giving supportive care (Rashotte et al., 2011). In paediatric surgery, nurses appeared to consider fewer options- their role in pain management appeared to be synonymous with giving medication and non-pharmacological methods of treatment were seldom considered (Twycross, Finlay and Latimer, 2013).

Evidence from mental health settings suggests nurses have different approaches. One nurse commented:

'I like to discuss it with the patient first as to their needs- it is too easy to give PRN medication on a whim.' (Usher, Baker and Holmes, 2009, p986).

However, in other mental health settings nurses seemed to consider PRN medication as a first resort- one study (Baker, Lovell and Harris, 2007) highlighted how all patients, at the behest of nurses, were prescribed the same two medications on admission regardless of diagnosis or need. What guides these strategies? Evidence from the included studies points to two potential influences- workplace norms and individual goal- directed behaviour.

Workplace norms, or expectations of how staff should practice in given situations, can be transmitted via protocols or policies. Observation of paediatric surgical nurses identified that pain assessment was not always carried out or documented in accordance with hospital policy (Twycross, Finlay and Latimer, 2013). By contrast, staff in paediatric palliative care reported being well aware of protocols to manage seizures, and used these to help guide them in what to do (Rashotte et al., 2011).

Two mental health studies showed that staff were aware of the existence of PRN protocols, yet mentioned them very little when describing influences

on their decision (Usher, Baker and Holmes, 2009; Usher et al., 2010). However, a different study, using vignettes, identified that mental health nurses *would* consider other treatment options such as de-escalation, restraint or 'time out' (Usher et al., 2010). The study authors felt that most responses were in keeping with *accepted guidelines and common practice* [emphasis added].

Notable here, given that all respondents saw the same vignettes, was the variation in response as to how they would treat the fictitious patients, with staff identifying various pharmacological and non- pharmacological strategies to manage the patients described. The *common practice,* highlighted in this study, is important. The existence and influence of unwritten workplace norms is illustrated by this quote:

'Now in…..where I worked previously if I had administered that dose of medication I would have got severely disciplined.' (Baker, Lovell and Harris, 2007, p166)

Here, the nurse appears to be suggesting that what was tolerated in their previous workplace would not be in their current unit. Contextual influences, therefore, may be important in in guiding decision- making. Rashotte et al., (2011) identified that nurses who moved from acute care environments, where the primary aim is to stop seizures quickly, struggled initially in the palliative care setting. In this new context, the primary aim was maintenance of quality of life for the children, which may have meant letting a seizure stop of its own accord rather than treating it immediately.

Another key influence on decision- making was the goals of individual nurses within their particular decision- making situations. Evidence from two mental health studies examining service users' experiences of PRN psychotropic medication indicate tension between patient and staff goals (Baker et al., 2006; Cleary et al., 2012). Service users felt that PRN medication was valuable and empowering by enabling control of symptoms- particularly in the early days when their minds were over-active- but less so after the initial days as it hindered development of other coping mechanisms.

However, they also commented that staff did not routinely seek consent from patients to give PRN medication (Cleary et al., 2012), and that

medication could be used to keep patients quiet so staff could get on with other jobs. Goals of the staff- to get other things done- meant that alternatives to medication, such as talking or recreational activities, were not routinely used. In a different study, when asked, staff stated that PRN medication *would* be given after thorough patient assessment (Baker, Lovell and Harris, 2007). However, some staff were known to use PRN psychotropic medication more than others. One participant reported (p166) that:

'You get it on nights. You get certain night nurses and the team know who they are. They say so and so are on tonight. It will be quite a night then.'

Similarly, staff in another study also indicated that:

'It [PRN medication] can be used for the wrong reasons…it can be used as an easy option...' (Usher, Baker and Holmes, 2009, p986).

Evidence from included qualitative studies in mental health settings offer possible reasons for why decisions to give PRN medication were made in this way. These reasons relate to the patient, the environment, and the decision- maker. Patient factors included those who were aggressive, had a psychotic disorder or who had elevated mood (Usher, Baker and Holmes, 2009). Being young, male and black were also identified, as was the presence of very unwell patients, because their actions would threaten the well- being of other patients. Environmental factors included staffing levels: being short staffed made it more likely that PRN medication would be given, rather than exploring alternatives.

Lastly, attributes and beliefs of staff members also appeared to affect the likelihood of medication being administered. Staff who believed their role was custodial were more likely to administer PRN psychotropic medication (Usher, Baker and Holmes, 2009). Inexperience, being female, and having being assaulted at work also made it more likely that PRN would be administered in mental health settings (Baker et al., 2006; Baker, Lovell and Harris, 2007).

This paints a negative picture of nurses' PRN decision- making. However, more positive aspects of the need to balance giving medication with other aspects of patient care were identified in the included studies. Nurses

needed to be aware of competing organisational or patient care goals and find ways of using prescribed medication to a patient's advantage. These studies provide further evidence of learning on the job, that is, the development of procedural knowledge. This knowledge guided the actions of the nurses. For example, adult nurses suggested that they were reluctant to administer enough analgesia to eliminate pain as it would make patients too drowsy to engage in activities to prevent post- operative complications (DiGiulio and Crow, 1997). Similarly, unqualified nurses caring for patients with dementia stated that although training about the use of medications was felt to be useful, one suggested that:

'I think what was most useful to me was just learning it myself, because there's no surefire way of administering meds to somebody with dementia.' (Carder, 2011, p52).

In summary, evidence from qualitative studies shows that nurses rely initially on patients' behavioural cues to decide if medication is needed. How these cues are interpreted, however, depends upon attributes of the decision- maker, such as familiarity with the patient or prior experience.

Context also influences decisions: nurses appear to work within social systems whereby acceptable and unacceptable practices are determined to some extent by normatively- held values. However, whilst there is some evidence that such norms can guide PRN administration practice, there is also evidence that these norms are not shared by all nurses. In addition, nurses balance the need to give medication with other care considerations. Taken together, it is possible that these factors multiply to produce variation in PRN decisions seen in other studies, above.

Quality appraisal of qualitative studies

These studies have been appraised using a qualitative appraisal checklist (National Institute for Health and Care Excellence (NICE), 2012b). The qualitative studies included in the review have been valuable as they have enabled nurses to detail their own experiences of giving PRN medication. Through observation of nurses' behaviour and verbalisation of their perspectives, the process of giving medication cannot be viewed as a

standardised technical procedure, despite the presence of policies and protocols to guide decision- making.

The quality of qualitative research designs is maximised by careful consideration of such factors as underpinning theoretical approach, approach to sampling, data collection, and data analysis (NICE, 2012b). Only 2 studies adopted a specific theoretical approach- Di Giulio and Crow (1997) and Rashotte et al., (2011). The value of Di Giulio and Crow's (1997) deductive study was that in using the think aloud technique it was possible to see the information that nurses would collect and use in order to make a decision about whether to administer analgesia to a fictitious patient. This method was therefore coherent with the underpinning theory of the study. Rather than talking in generalities about what they might do in various circumstances, the nurses were able to state what they would do in the particular circumstance presented to them. Hence, the information they would focus on and how it was structured in managing the clinical problem could be made explicit.

The study by Rashotte et al., (2011) used hermaneutic phenomenology to understand the meaning of PRN medication administration to the nurses involved as they carried out their patient care. Working within the palliative care unit's philosophy of enhancing quality of life, the study was able to show directly the link between this workplace value and the nurses' decisions. In other words, the frame through which the nurses viewed their role and the impact of this was made visible.

The remainder of the studies used a generic qualitative descriptive approach (Kahlke, 2014) to explore PRN decision- making (Manias, Aitken and Dunning, 2004; Baker et al., 2006; Baker, Lovell and Harris, 2007; Usher, Baker and Holmes, 2009; Baker et al., 2010; Usher et al., 2010; Carder, 2011; Cleary et al., 2012). This approach is designed to produce a 'low- inference' description of a phenomenon (Sandelowski, 2000), and one of the benefits of such studies is the ability to remain close to the data as inference is minimised. In exploring a little researched area, some of these studies have reflected how nurses interpret their role differently, and the impact this has upon their PRN medication administration practice. Additionally, studies have identified nurses' procedural knowledge- that is, how they do what they do.

In adopting a particular qualitative approach, consideration needs to be given to the choice of methods used. This should show congruence with the epistemological and theoretical frameworks of the study (Crotty, 1998). Regarding sampling, most of the qualitative studies used convenience samples. Consistent with descriptive research that aims to explore a little-studied phenomenon, access to participants who are willing, available and who have specialised knowledge can provide a valuable insights (Hesse-Biber and Leavy, 2011).

However, it cannot be known how the views of the sample used would differ from those not included in the study. Stratified purposive sampling has benefits as it enables respondents to be selected on the basis of what they can add to the emerging data: if the aim of generic descriptive studies is to reach a broad understanding, then aiming for maximum variation is consistent with this (Neergaard et al., 2009).

Two studies used stratified, purposive sampling of nurses (Manias, Aitken and Dunning, 2004; Baker, 2011). Unfortunately, these studies did not compare and contrast the responses from different staff grades in the analysis- it would have been worthwhile to explore if different experience levels influenced the findings. No study mentioned data saturation or comparable indicator as a method by which they determined sample size sufficiency.

Information about data collection was not always adequately described: Baker et al., (2006) and Usher, Baker and Holmes (2009) provided the questions used in their studies, and it is clear that the focus was on procedural matters such as knowledge of protocols and procedures. Rashotte et al., (2011) indicated only the opening question, stating that flexible, open- ended questions were subsequently used. Although the pressure of publication word- limits constrain what can be reported, indication of the questions used is vital for understanding the data collected and subsequent development of themes.

All but two of the studies used individual interviews with their respondents. Such interviews are valuable in that they can allow respondents the privacy and freedom to express personally held views. Use of focus groups, for example, would not have been as effective in identifying individual approaches to decision- making, and certain professional or socially

questionable practices may not have been outlined as a result of peer-pressure. Identification of such practices was useful as it allowed for the effects of personal frames on decision- making to be made explicit.

Eight different methods of data analysis were identified (see Table 26). In all but two of the studies (Rashotte et al., 2011 and Twycross, Finlay and Latimer, 2013) the process of developing the themes was not made clear. All studies except for Di Giulio and Crow (1997), however, provided quotes from participants. This increased the trustworthiness of the studies by allowing the reader opportunity to judge the link between the theme and the provided quote.

Most studies did describe how reliability of coding was maximised with the use of more than one researcher- exceptions are Baker, Lovell and Harris, (2007) and Baker et al., (2011). Credibility was further promoted with the use of participant feedback in the studies by Rashotte et al., (2011) and Twycross, Finlay and Latimer (2013). They describe how participants agreed with the interpretation of the data. In particular, this is consistent with the use of interpretive phenomenology as used by Rashotte et al., (2011), and participants agreed that the findings represented how they felt. Twycross, Finlay and Latimer (2013) changed some of their interpretation in line with the views of the respondents.

Overall, the quality of the qualitative studies is moderate as some of the principles of good qualitative research design have been adhered to and reported. The 11 studies present information from 1997- 2013- a period of 14 years. Less than one study per year represents a small body of evidence overall.

Furthermore, the range of clinical settings and countries from which participants were drawn mean that inferences may not be transferable to all settings. It could be argued that the context- specific nature of the studies is a weakness, however, it was possible to identify some common features about decision- making in several of the studies.

In summary, the qualitative studies have been of value to the literature review, despite threats to the trustworthiness of interpretation of the data. They have shown that nurses decision- making as a cognitive process has

similarities between settings, but that this is mediated through individual and contextual factors that have yet to be clearly elucidated.

3.8 Summary of description, results and quality appraisal of included studies

The included studies can be summarised in terms of their quality and focus:

- A variety of study designs and methods have been used to evaluate PRN medication decision- making. However, only one used any decision- making theory to underpin its design.
- The majority of studies evaluated the drug administration practice of nurses. Some studies also included the views of doctors (as prescribers), usually as a comparison against which nurses could be evaluated. A very small number of studies included the views of patients.
- Most studies used convenience sampling, with patients from local hospital Trusts or facilities. A few studies used multiple sites from within a larger geographical area.
- Medications used, doses, times and frequency of administration were key aspects of data collected by chart reviews and mixed method studies. Variation in all of these was found.
- Observational studies identified correlations between nurses' decisions to administer PRN medication and patient factors including cognitive ability, patient aggression and staff perceptions of patients.
- Surveys identified that nurses and doctors have different knowledge about medications, related to their respective roles. Nurses decisions appear to be primarily shaped by experience, leading to knowledge learnt 'on the job'. Normative and individual attitudes also influenced decisions.
- Quasi- experimental studies tested the impact of educational programmes on nurses' PRN drug administration practice. Overall, the programmes made little difference to nurses' practice.

Feedback to nurses, or use of protocols to aid decision- making, were the most effective interventions.

- Qualitative studies revealed that nurses rely on cues obtained from patient observation to decide if a PRN medication is necessary. However, decisions to give PRN medication are, in part, related to nurses' conceptions of their role in patient care. This varied between clinical settings. Getting the job done involved balancing medication giving with considerations such as other treatment goals or wider goals related to ward functioning or patient/ staff safety.

- Variation in administration of PRN medication appears to be due to a combination of patient, staff and contextual influences, leading to unpredictability. Decisions are most commonly made intuitively, although there is evidence for a more quasi- analytical approach.

- Short- cuts appear to be used when deciding whether to give medication, such as looking whether a patient has had any PRN medication recently, or automatically starting with the lowest dose from within a range.

3.9 Discussion

3.9.1 Variation and what makes a good decision

The studies of PRN medication decision- making highlight the existence of variation in choice of medication, administration frequency and doses used, even within clinical units that describe themselves in the same way, such as 'acute mental health'. The simplest explanation for this observed variation is that patient populations vary between these units in terms of attributes such as diagnosis or symptoms.

However, evidence from the included chart review studies suggests that this explanation is too simplistic, as (to continue the example) in mental health settings there appears to be little correlation between diagnosis or signs and symptoms and the medication given PRN. A similar phenomenon can be found in other settings, therefore any attempt to predict PRN medication use solely from patient attributes will be incomplete.

In making a decision to give PRN medication, the question of what makes a 'good' decision, can be viewed in different ways. Normative theories of decision- making specify a form of rationality that is congruent with an external (for example mathematical) standard. Here, the nurse would carefully weigh up available options, assign utilities to choices, then decide on the final choice. Inherent in normative models of decision- making is the assumption that all relevant information pertaining to the decision is known. However, there is no evidence in the empirical studies that nurses make decisions to give PRN medication in this way. This is not to say that their decisions are irrational, but that an alternative definition of rationality needs to be considered.

In keeping with current policy about patient involvement, the perspective of the patient might indicate if a decision to give a PRN medication is a good one. Findings from this review of the published literature suggest that mental health patients view PRN medication as useful, particularly in the early days of their illness as it helps to calm and reduce distressing symptoms (Baker et al., 2006; Cleary et al., 2012).

Contemporary UK policy recommends increased involvement of patients in their own care (NICE, 2009; Department of Health, 2012). Such increased involvement of patients should lead to greater individualising of care- indeed NICE (2015) state that any pharmacological intervention to manage patient aggression in mental health settings should be individualised to the patient, avoiding routine prescribing.

Therefore, an alternative explanation for the variation seen in practice might be the increasing influence of the values of contemporary policy. However, the adoption of these values by nurses is not uniform, as patients in the included studies reported that once the initial symptoms of their illness had diminished PRN psychotropic medication was still being given, which they experienced as restrictive, humiliating or stigmatising.

This suggests that some nurses are giving medications beyond the point at which patients find them useful. On this evidence, it seems that factors other than those related to the patient are involved in nurses' decisions. Theoretical frameworks of decision- making may help understanding and investigation into what these factors are and therefore how variation occurs. In the following discussion, the frameworks that will be used are

information- processing theory (Newell and Simon, 1972), the naturalistic decision- maker framework (Klein, 1993) and social judgement theory (Brunswick, 1952).

3.9.2 Information- processing theory

Information processing theory (IPT) (Newell and Simon, 1972) examines the cognitive processes used in making decisions, including reception, storage and processing of information from the environment (Harbison, 2001).

Hypothetico- deductive reasoning allows an open- ended, poorly- defined problem to be focussed, so making it more manageable. Evidence from the included studies indicates that nurses perceive cues in the form of patient behaviours, question the patient, and take other measurements such as vital signs. These symptoms and results then allow them to classify the patient as being in pain or agitated or not.

In the single included study to use any decision- making theory, Di Giulio and Crow, (1997) used IPT to guide their study of the cognitive processes used by experienced nurses when diagnosing and treating post- operative pain. Nurses collected information about the patient's behaviour, vital signs and psychological variables- between them, information on 49 different cues were acquired throughout the decision- making cycle. Hypotheses about causes of the pain were first generated after a mean of 2.4 pieces of data, so consistent with IPT individual nurses did not comprehensively search for information (cues) before generating hypotheses. It is notable that as well as collecting data about 49 different cues, nurses generated 18 different hypotheses to explain and treat the patient's pain. As the study used a single vignette, this represents a considerable range and in itself highlights variation- unfortunately, the study did not provide any further explanation about cues or hypotheses, which would have been useful to understand where nurses attention was directed and if a relationship existed between collected cues and generated hypotheses.

Up to this point in the decision- making process, the predictions of IPT were supported by the findings of the study. One of the assumptions of IPT is

that processing of information occurs serially (Payne and Bettman, 2004), that is one cue is evaluated followed by another and so on, with interventions being proposed at the end of the assessment phase once a suitable hypothesis (or explanation for the patient state) has been generated.

In Di Giulio and Crow's (1997) study however, nurses proposed solutions and interventions throughout the task, rather than at the end, as might be expected. The study authors felt that interventions represented the end point of the decision- making process, and should occur after information collection (cue acquisition).

However, the researchers' conceptions about what constitutes 'information' here may be too narrow, as other studies show that interventions can form part of the data that are collected. This enables a complex decision to be decomposed, or broken into smaller sub-problems. There is evidence in the included studies that this occurs. For example, when caring for people with dementia, nurses found that testing options allowed them to explore the problem of diagnosing pain (Carder, 2012). These options included ruling out hunger, before considering pain or emotional needs as sources of agitation.

Similarly, nurses looking after paediatric patients described a sequence of events where once a seizure had begun, they would wait to see how long it would last. If it resolved, no further action was needed; if not PRN medication would be given. If the seizure did not stop at this point, oxygen saturations would be measured, then a second PRN given if needed (Rashotte et al., 2011). Using this example, once the initial pattern of the seizure had been recognised, further information would be collected and actions tested. This qualitative study, however, is based upon nurse's memories of their decision- making. It is possible that the nurses interviewed only remembered particular instances of treating childhood seizures, for instance those that were obvious and successfully treated.

Although some patient conditions are unmistakeable, interpretation of signs and symptoms is known to vary between clinicians (Eddy, 1988), in part because they do not always provide reliable indicators of one particular illness or condition. The next section, then, examines evidence for how

nurses judge patient signs and symptoms as being indicative of patient states that may require treatment with a PRN medication.

3.9.3 Signs and symptoms

Evidence for the uncertainty of interpreting patient signs and symptoms can be found from included studies exploring nurses' responses to patient agitation or pain. The relationship of the cues to the 'real' state of the patient raises an interesting question about what counts as salient information within that which is used to make the decision to give medication. Nurses seem to rely on observable behaviours to indicate patient states such as pain or agitation (e.g. Twycross et al., 2013).

However, observable behaviours indicative of such patient states are not stable, that is, not expressed the same by every patient. Two examples illustrate this: firstly, patients with cognitive impairment were found to receive less analgesia than patients who were cognitively intact (Nygaard and Jarland, 2005), while those who had difficulty making themselves understood (Kaasaleinen, 1998) also received less analgesia.

Secondly, in mental health settings, agitation is a known risk factor for aggression and violence. Yet, findings from several of the included chart review studies show that agitation was treated in some instances and not others. Not all cases of agitation result in violence. Furthermore, the attributes of agitation- repetitive, inappropriate, excessive motor or verbal activity- could be suggestive of other patient states, for example withdrawal from drugs. The particular behavioural cues used by nurses when judging someone to be agitated may therefore be only probabilistically related to the actual condition of agitation- some cues might be highly suggestive whilst others might be redundant in the face of other, more dominant cues.

Certain cues, such as aggressive behaviour, may override the presence of any other cues, making them redundant. Additionally, cues often present simultaneously, not one at a time, requiring nurses to perceive them in patterns. Nurses must therefore make judgements about patients based upon perceptual information that may be 'incomplete and fallible'

(Goldstein, 2004), requiring them to infer patient states that go beyond the cues themselves. How might they do this?

3.9.4 Intuitive decision- making

In some of the included studies, nurses stated they would take time to assess patients and weigh up alternatives to giving medication (Baker et al., 2006; Baker et al., 2007a; Kwasny, Hagen and Armstrong, 2006). This form of decision- making is serial, effortful and rule- based, and is akin to the hypothetico- deductive model described above. However, some of the included studies pointed to less effortful methods of decision- making. PRN medication giving was described in a small number of studies as intuitive (for example Baker et al., 2007a; Stewart et al., 2012).

In addition to the ability of experienced nurses to recognise patterns of cues to infer patient states, when giving a medication some action is required, be it to give or withhold a medication. There is some evidence of this type of decision from within the included studies. When administering opioids, nurses considered the patient factors of sedation level, pain intensity, respiratory rate, and patient's response. Nurses needed to know this information to guide them in choosing which was the most appropriate medication and dose- opioids would not be given to patients whose respiratory rate was too low or whose sedation level was too high. Nurses knew the attributes of this type of medication and the effects of it on patients, and matched the medication to the specific patient situation, trading off superior analgesic properties for a reduction in side effects. They were able to 'run through' what would happen if they gave an opioid to a patient whose respiratory rate was already depressed.

Similarly in mental health settings, Baker et al., (2007a) identified that some nurses would spend time with patients, trying to establish what the issue could be, before then deciding on whether medication or a different therapy would be best. It must be noted that none of these studies aimed specifically to test which decision rule nurses used or under what conditions they could be elicited: this argument therefore is only tentative. The consideration of the conditions that would elicit each decision- making style

is important however- arguably, each method would produce a different response (Stanovich and West, 2008, p659).

3.9.5 Decision- making response

The use of intuition is argued to be promoted by various features of the task at hand, including simultaneous presentation of cues, high cue redundancy, lack of organising principle and brief time available for judgement (Hammond, 1986). Some evidence can be found in the included studies for these features:

- Lack of an organising principle for cues. A small number of studies have explored the use of decision rules, in the form of scoring or rating scales. These can be useful as they make pertinent cues obvious to nurses and so provide some way of organising them. However, evidence for their value is mixed- Reoux and Miller (2000) found that use of a scale to guide assessment of alcohol withdrawal allowed more consistent administration of PRN medication. This scoring tool was based primarily on patient observation and to a lesser degree, patient report. In contrast, a study observing nurses' management of patients' pain found that pain scoring tools were used but if the results did not correspond to nurses' observations, the scores were ignored (Twycross et al., 2013).

- Task complexity. Experts' cognitions change in response to the complexity of tasks (Corcoran, 1986). Novices use an opportunistic approach in tasks of even a simple nature as they have yet to develop a mental representation of the problem, and so have no organising principle for the cues presented. In the case of PRN medication, evidence for the effect of experience can be found in studies such as Geffen et al., (2002). Here, nurses with more experience were less likely to be opportunistic, and more likely to try other strategies to treat agitation rather than just relying on PRN medication.

- Limited time- when the ward was busy, PRN medication was more likely to be given (Exum et al., 1993; Fishel et al., 1994; Baker, Lovell and Harris, 2007a). Examination of alternatives did not occur.

Thus far, the variation seen in administration of PRN medication may be explained by decision- making style, which is dependent on both task and personal characteristics (Simon, 1990). Those with more expertise are able to respond to salient cues and in doing so, make a decision quickly.

However, to return to the point made earlier about decision outcome, process models such as hypothetico- deduction or RPD do not make any judgement about the 'correctness' of decisions made. Indeed, intuitive decision- making is argued to be characterised by feelings of certainty (Bowers et al., 1990), and in the context of nursing decision- making, Benner and Tanner (1987)- advocates of intuitive decision- making- make no mention of the fallibility of decisions made in this way. Two final points therefore emerge about PRN decision- making: how do nurses recognise the salience of cues, and mental shortcuts (or heuristics) as a way of making decisions.

3.9.6 Recognising salient cues

One of the main findings from the review is that nurses use goals to direct care and that once a goal has been established it dictates subsequent actions. This allows nurses to perceive cues, but then consider them in the light of future events. They may then 'see' a decision as being the right one as it avoids other potential problems from occurring. This is consistent with the RPD model (Klein, 1988).

What counts as salient information, therefore, seems to be at least partially dependent on goals of care. For example, in one study, the amount of analgesia nurses would give was shaped by other concerns such as the patient being unable to carry out activities of daily living or be discharged from hospital (Smyth and Toombes, 2011). Adult nurses suggested that they were reluctant to administer enough analgesia to eliminate pain as it

would make patients too drowsy to engage in activities to prevent post-operative complications (Di Giulio and Crow, 1997).

The association noted in several mental health studies between time of day and rate of PRN psychotropic medication administration (Exum et al., 1993; Fishel et al., 1994; Baker et al, 2007) also points to goal- directed behaviour: PRN medication could be given as a first resort even where alternatives existed, especially if the ward was busy or short staffed. The goal here was on 'getting the job done'. However, the influence of goals on nurse decision- making when giving PRN medication has not been explicitly tested, so these conclusions can only be tentative.

One of the important features of intuitive decision- making is that it is considered to be emotionally- driven (Epstein, 1994). Looking at findings from the included qualitative studies, having been assaulted at work made it more likely that PRN medication would be given on mental health settings. This is not surprising. However, the point is that how the patient's behaviours or the decision outcome are framed suggests that even within one decision- problem, different decision- makers will be, in effect, dealing with a different problem. Although these frames have not been directly observed, evidence from nurses' statements about their own and others' practice suggests that such frames do exist, and that they can offer a partial explanation for variation in PRN medication administration practice.

3.9.7 Heuristics

Pizzi, Chelly and Martin (2014) studied the length of time it took a nurse to administer a PRN analgesic, from the patient asking for medication, to giving the medication, then reassessing pain and finally going on to the next task. The mean time taken to administer a single dose of analgesic was 10.9 minutes (range 2.8 to 33 minutes). Whilst giving an individual dose of medication does not take long, a number of medications multiplied by several patients could represent a significant proportion of a nurse's day.

Of course, nurses will be engaging in multiple other tasks, and Pizzi, Chelly and Martin (2014) identified that nurses often had to interrupt one task in order to give a PRN medication. Under conditions of high cognitive

demand, simplifying mechanisms such as elimination by aspects (EBA), lexicographic strategies (LEX) or satisficing (SAT) may be used (Payne and Bettman, 2004). In responding to an assessment of patient need, nurses may give medication PRN or try something else. However, rather than having a well- defined and stable set of preferences, multiple simplifying mechanisms may be used instead, depending on the context and task.

In studies of PRN analgesia use, more powerful analgesics such as opioids would be given, or given more frequently, on the first day post- operatively (Ross et al., 1991; Twycross, Latimer and Finlay, 2013). Once past the first day post- operatively however, nurses generally preferred non- opioid analgesia rather than tailor the medication to presenting pain levels. This limited the choices to be made by immediately eliminating any medication known to sedate or reduce respiration rate.

Another study identified a cognitive short- cut used by graduate nurses to establish need for PRN analgesia: if the patient had not had any pain relief over recent days, nurses did not enquire about further need (Manias et al., 2004). Their search for information stopped there. Note the role of satisficing: these mental shortcuts, consistent with the predictions made by IPT, show nurses opting for the 'good enough' option, rather than searching for the most optimal. In time- pressured and uncertain conditions, use of such experientially learned heuristics would save time and facilitate quick decision- making.

3.10 Studying variation

In appraising the quality of included studies, one of the criticisms frequently made concerns the concept of generalisability, or the ability of particular study findings to be extended to other people or situations than those directly studied (Maxwell, 2012). In producing findings that aim to be generalisable, techniques including large sample sizes and probability sampling is necessary in order to ensure those sampled are as representative as possible of the wider population. One of the problems of generalisability is that it is conceptualised in terms of participants. Furthermore, statistical analysis such as analysis of variance produces aggregated data, masking individual performance (Cooksey, 1996, p7).

Chart review studies have shown wide variation in decision- outcomes as evidenced by different medications, doses and frequencies of administration. To understand this variation more completely, examination of individual decision policies is needed, in addition to trying to establish general principles obtained from analysis of large samples. To do this, the psychologist Brunswick (1952) advocated an 'idiographic- statistical' approach to understand judgement and decision- making. This method allows for analysis of an individual's decision policy, exploring its uniqueness within the context of the local setting or ecology.

Representativeness in this case would mean examining the decisions of an individual by using cases (for example vignettes) made up of selected attributes (cues); the range and level of each attribute could be varied to produce a range of decision- making situations. Representativeness therefore relates to a sample of decisions using cues as would be found in the environment in which nurses work, as well as a representative sample of participants. This would reflect the complexity of making a decision where the cues upon which the decision is made may be individually salient or highly correlated. Using such a design would mean that sources of individual variation can be examined, before aggregating to explore group variation.

To summarise this discussion, explanation for the variation observed in rates of PRN medication administration can be found in the intersection of various features of both the task at hand and characteristics of the decision- maker. If intuition is indeed the primary decision- making strategy used by nurses, this leads to a very different type of rationality from the normative form of classical decision theory. Nurses, in the real life of decision- making, might use an adaptive decision- making strategy that leads to ecological rationality, where the decision makes sense given the context in which it takes place.

If this is the case, then the variables described above- probabilistic relationship of symptoms to the 'true' patient state, goal- directed decision- making, use of intuition, experience and simplifying mechanisms- can lead to the variation in PRN medication administration rates found. The question is how these factors interact. If the decision- making of experienced nurses is a product of learning through experience, that is, an adaptation to the

environment, it would be expected that nurses from different clinical environments would make different decisions, even when presented with the same cues.

The impact of learning in and how to practise, shaped by the environment in which this occurs, must have a fundamental effect on the outcomes of any decisions- the 'knowing how' of medication giving. The problem of studying clinical decision- making, where intuition is the main cognitive strategy used, is that nurses cannot articulate clearly what factors led them to the decision: the process has become too automatic as it operates under the level of consciousness.

There is a need, therefore, to study PRN medication decision- making using different methods from those used to date, such as those from the field of cognitive psychology. These methods, underpinned by theories and models of cognition, would enable the characterisation of what nurses know, and the specific effects of this on decision- making. Once understood, decision support and interventions to enhance the decision- making performance could then be developed, with the aim of reducing variation unless arising out of patient need.

3.11 Recommendations for practice emerging from the scoping study

Firstly, nurses need to acknowledge that variation in PRN drug administration practice occurs, and be prepared to examine the reasons why.

Novice nurses need to be supported to examine their decision- making processes, including how to identify the most important cues for a given decision. Validated protocols that simplify decisions are useful here.

PRN medication should be used within the context of a wider set of interventions to help patients. Choice of strategy needs to be individualised to patients as much as possible. Allowing nurses to discuss their decisions as part of quality improvement appears to be effective in reducing undesirable practice, while promoting good practice.

Feedback, given as soon as possible after an event, seems to be the most effective way to change PRN administration practice. Educational interventions, given alone, are limited in effect.

Patients need to be involved in their own care, including treatment options. This implies that they must be informed of the risks and benefits of treatments.

3.12 Recommendations for research emerging from the scoping study

Approximately two- thirds of the included studies were from adult mental health settings, with the remainder from a mixture of other clinical areas. There are many clinical areas where there has been little or no attempt to explore PRN medication use, including emergency settings, acute medicine, high- dependency or intensive care, paramedicine, hospices, and inpatient or residential learning disability settings. There are also many commonly used medications given to patients PRN that have not been examined, for example treatment for constipation, anti- emetics, or cardiac medication such as glyceryl trinitrate (GTN). Ways of prioritising which to study might include cost, severity of side effects, or consideration of ethical provision of healthcare.

A significant limitation to understanding decision- making is the lack of underpinning theory. Use of theory would add explanatory power to understanding the variation in nurses' judgements, for example by exploring nurses' use and weighting of cues when making a decision (Social Judgement Theory), how experts and non- experts make decisions in practice (Naturalistic Decision- Making) or the effect of the characteristics of the judgement task on decision- making (Cognitive Continuum Theory).

The impact of experience or expertise on PRN medication decision- making has not been adequately explored. Identifying the knowledge used when experienced nurses make decisions will enable greater understanding of how they assess situations, identify critical cues and solve clinical problems.

The majority of studies about PRN decision- making have been chart reviews. Many of these have been conducted in very local settings. Whilst useful to healthcare professionals in those settings, results cannot be generalized to wider populations. Furthermore, the low quality of some chart reviews reduces the internal validity of results. Outcomes from a meta- analysis of high quality chart reviews would be able to provide data on risk factors for receiving PRN medication, including data stratified by patient sub- group. With this in mind, chart reviews should be conducted with explicit and transparent methods to ensure study quality, which would maximize potential for inclusion in future meta- analyses.

Studies exploring interventions to change the behaviour of staff when giving PRN medication should make use of randomized, controlled trials. More complex designs, such as factorial designs, would be able to tease out the effectiveness of more than one intervention at a time.

Chapter 4: Survey Study

4.1 Introduction to the chapter

This chapter begins with a brief recap of pertinent results from the scoping review in order to present the justification for the subsequent two empirical studies. Following this, a brief explanation of the choice of a mixed methods approach is given, accompanied by a project plan that ties the scoping review and two studies together.

The chapter continues with the method, results and discussion of the first study, a survey. This includes a discussion of social judgement theory which was used to inform the survey design. Following this, development of the vignettes used in the survey is explained. The survey tool underwent two revisions, and due to poor response rate data collection deviated from the original protocol- reasons for this are discussed. Finally, presentation of the results and discussion conclude the chapter.

4.2 Statement of the research problem

Evidence from the scoping review suggests that decisions to give PRN psychotropic medication are made intuitively. As a method of problem identification, intuition allows practitioners to unconsciously and automatically perceive a problem and to make decisions instantly without any consideration of alternatives (e.g. Rew, 1986; Rew, 2000; King and MacLeod- Clark, 2002).

A by-product of intuitive decision- making is that the rules by which nurses decide in these cases is unclear (Thompson, 1999). Research exploring mental health nurses' decision- making when giving PRN psychotropic medication has used two main methods- chart reviews and qualitative studies. Chart reviews have been valuable to highlight variation and show that among the mental health units studied, there is no discernible relationship between patients' diagnoses, signs or symptoms, and the drugs used. The doses of drugs given, frequency and timing of administration are also subject to variation between mental health units.

Qualitative studies have been useful as they have teased out the factors that nurses view as important to their decisions. However, if nurses do use intuition to make these decisions, they will be unable to articulate the precise factors and weighting of these to the final decision as they are said to be 'unrecoverable' (Hammond and Brehmer, 1973). Therefore, there is inadequate assessment of, and explanation for, the variation that exists.

4.3 Project Design

The overall design for the project is a sequential mixed methods study. This section outlines the design logic, timing of study phases, integration of studies, and prioritisation of quantitative and qualitative strands. These considerations are recommended as hallmarks of good quality mixed methods research (Plano Clark and Ivankova, 2017).

The rationale for using a mixed methods approach is twofold. Firstly, it is important to understand the amount of variation possible when giving mental health nurses the same patient information. A study designed using the principles of social judgement theory will capture this variation. Vignettes will be used that represent acutely ill mental health patients with varying attributes of agitated behaviour. This controlled information enables critical factors to be elicited when nurses make decisions to give or withhold PRN medication- that is, the cues used and the relative importance of the cues to the final decision. Regression analysis will model the relationship of the cues to the final decisions, additionally enabling the reliability of nurses' judgements to be evaluated.

A strength of this method is that it allows the cues that are actually used in a decision to be elicited. Reporting methods based on hindsight rely on participants being able to verbalise their decisions and the factors that led to them. Thompson et al., (2005) highlight that when using this method, the cues reported may not be the cues that are actually used in the decision. Studies based on social judgement theory overcome this problem.

However, using social judgement theory to design a survey based on the attributes of agitation assumes they are the only external factors that influence nurses' decisions. In the 'real- world', decision- making is also

influenced by other external factors such as the context within which the decision is made, resources available, and time. In addition, decision-making is influenced by qualities of the decision- maker, such as experience in the field, age or gender. The survey is a 'black box' in that the processes of decision- making are not elucidated. Therefore, a second, qualitative method is necessary in order to overcome the limitations of the quantitative survey.

One of the key benefits of conducting a qualitative study is that it will address the 'how' of PRN decision-making for agitated patients, that is, why certain factors are critical to the decision. A theoretical framework grounded in exploring how decisions are made in real situations will be used, underpinning a think- aloud study and knowledge audit. These methods are designed to elicit differences in expert and novice nurses' decisions and decision- making processes.

In this way, both the quantitative survey and the qualitative study address the overarching question of what factors nurses use when making decisions to give PRN medication, with the second method developing understanding of findings from the first. The methods will be integrated at the discussion phase, bringing findings from each to the overall analysis, therefore allowing further understanding of significant factors in a sequential mixed methods study (Plano- Clark and Ivankova, 2017).

Study Overview

Figure 2 shows an overview of the overall study plan, highlighting the stage at which mixing of methods occurs. The scoping review is included, being a research method in its own right that led to the choice of research question.

| **Scoping review**

Identifies what is known about nurses' PRN administration, and gaps in published studies. | **Survey**

Identifies critical factors used when mental health nurses make decisions to give PRN medication.

Analysed using descriptive statistics and regression analysis. | **Think aloud study and knowledge audit**

Explores reasons for use of critical factors; decision- making processes; novice-expert differences.

Analysed using framework analysis. | **Mixed analyses**

Presented side by side in the discussion. |

Figure 2 Study overview

4.4 Aims and objectives of study 1: survey

Aim

To measure the use and weighting of factors used by mental health nurses, when making decisions to give PRN psychotropic medication for patient agitation.

Objectives
1. To determine how much variation exists in nurses' judgements of symptom severity
2. To determine how much variation exists in nurses' decisions to give PRN psychotropic medication, individually and collectively, to treat patient agitation
3. To determine how much variation in decisions can be explained by nurses' use of and weighting of cues related to patient agitation
4. To determine the correlation between mental health nurses' use of cues and that of a panel of mental health experts, in determining whether patients should receive PRN medication.

4.5 Study design

An experimental method of studying decisions is to use the lens model technique, developed from judgement analysis (Brunswick, 1952; Cooksey, 1996). Here, the cognition involved in decision- making is represented by a 'lens', through which a decision- maker perceives their world. This method has three key principles that potentially made it a valuable technique for modelling decision- making, while overcoming the limitations of chart reviews and qualitative methods in understanding sources of variation. These principles are:

1. Representative design. In order to study decision- making using cues as they are found in real situations, the lens model technique uses several cues at once. No attempt is made to test cues one at a time. This is because cues are only probabilistically related to the environment and are not perfectly reliable or valid predictors, in this

case of whether a patient needs PRN psychotropic medication. Cues may be overlapping or redundant, but a nurse must still make a decision, regardless of the relationship of cues to each other.

2. As well as uncertainty in how cues are related to the environment, there is also uncertainty in how decision- makers respond. Using several cues at once allows the range of individual practitioner's decisions to be tested, highlighting any variation in response. This idiographic analysis is a strength of the lens model technique.

3. As well as individual use of cues when making a decision, the lens model technique can be used to model the relationship of the cues to the situation or criterion (whether or not a patient should have received PRN medication) as judged by a panel of experts in mental health care. This is a 'double- system' design (Cooksey, 1996, p55); it is advantageous as it allows the relationship between the decision- maker's cognition and the task to be examined, and inferences about accuracy of judgements can be made.

Figure 3 illustrates the lens model diagrammatically, as well as the key correlations that can be identified from it. The left hand side of the model represents the ecology, or criterion, about which the judgements are made. In this case, the criterion is whether the patient should receive PRN psychotropic medication, as judged by a panel of mental health experts.

The right hand side of the model represents the judgements of the decision- makers, in this case mental health nurses, while the cues in the middle (X_1, X_2 …X_k) represent the lens through which the decision is made. The key correlation in a lens model study is Ra or achievement, which represents the correlation between the judgements made by each nurse and the criterion, or whether PRN medication should have been given or not based upon the cues given.

Figure 3 *The Lens Model of Cognition*

Ecology (criterion)   **Subject (judgements)**

Cues

$\hat{Y}e$ Y_e X_1 Y_s $\hat{Y}s$

We1   Ws1

We2   Rij   Ws2

We3 X_2 Ws3

R_e **Predictability** R_s **Control**

Wek X_3 Wsk

Ye-   **Ys-**

X_k

R_a

G/R_m

C

Unmodelled knowledge
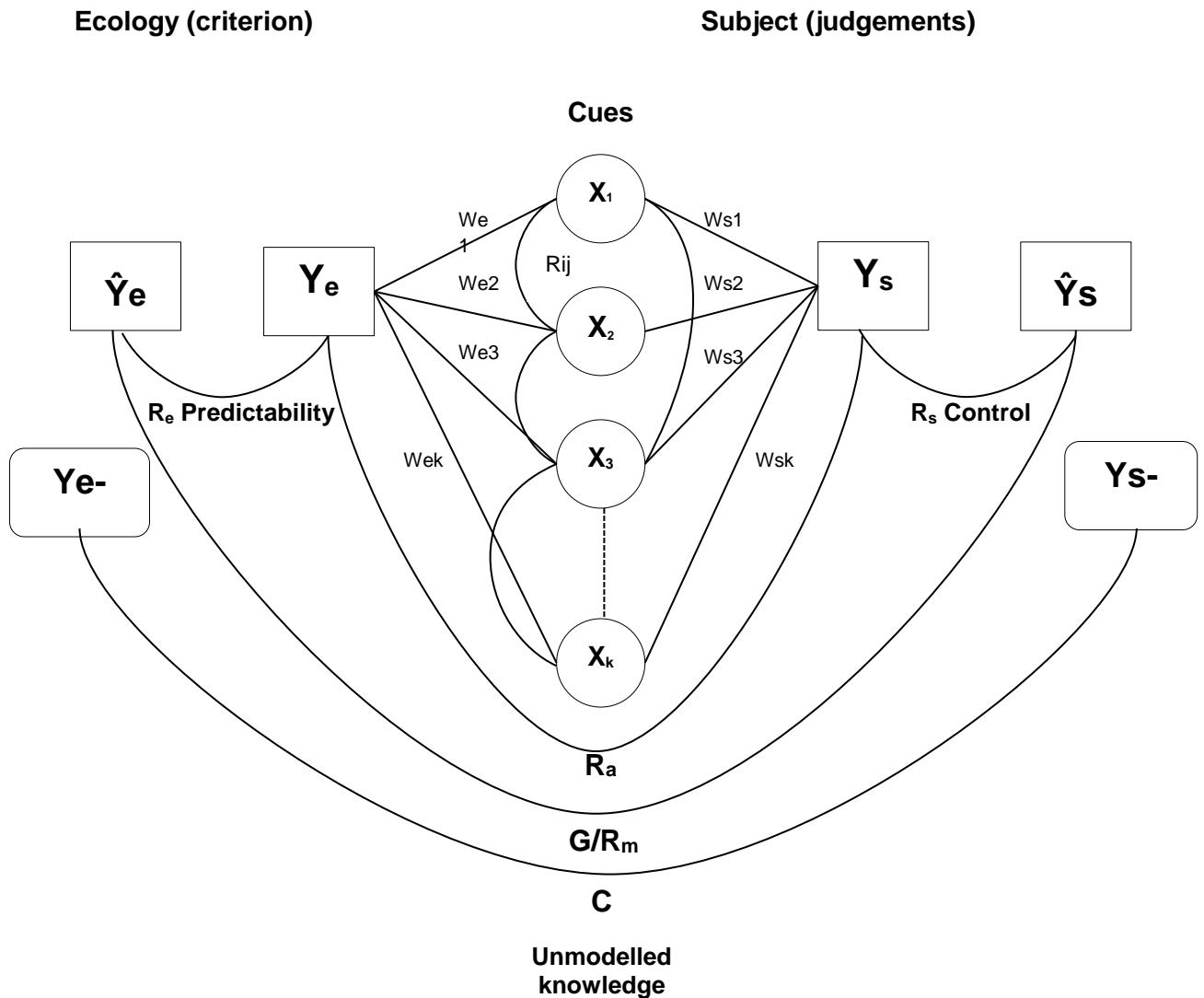
Key

Ye ecological criterion value (should PRN medication have been given)

Ys actual judgement (made by nurse)

Ŷe predicted criterion value (from regression analysis)

Ŷs predicted judgement (from regression analysis)

X1- Xk information cues

W1- Wk relative weighting of information cue to the model

Ra achievement (correlation between judgement and criterion)

Rij intercue correlation

Re predictability of the criterion (should PRN medication have been given) given the cues

Rs (cognitive control) similarity of the individual nurse's use of cues when making the decision to the regression model

C unmodelled knowledge, or variation in nurse's judgements not predictable from knowledge of cue use

G/Rm linear reasoning (intuitive reasoning) minus predicted judgement + predicted outcome

4.6 Study method

The survey used written patient cases, or vignettes. A vignette 'is a short…description of a person, object or situation, representing a systematic combination of characteristics' (Atzmüller and Steiner, 2010, p128). This method was chosen because:

1. The information included in each vignette can be selected to aid understanding of individual decision- making as a source of variation. The complexity of real- life decisions are presented in a simplified form (Alves and Rossi, 1978), though it is acknowledged this is both a strength and a weakness
2. Cue (characteristic) values can be varied within the vignettes, giving a quasi- experimental design
3. The information included in the vignettes can be standardised, so participants are responding to the same stimulus (Atzmüller and Steiner, 2010) in a within- subjects design
4. Consistent with judgement analysis designs (Cooksey, 1996, p55), vignettes allow a representative sample of cue profiles to be presented to the decision- maker.

4.6.1 Design of vignettes

The first consideration when designing the vignettes was which attribute of mental health illness to focus on. The scoping review highlighted that agitation was the most common reason for administration of psychotropic medication. As discussed in the background, the concept of agitation is difficult to define; practically, it can be hard for mental health nurses to know if an episode of agitation will remain self- contained, or if it will escalate into aggression. Therefore, as agitation appears to be common, yet conceptually and practically ambiguous, it was chosen as the focus for the vignettes.

When developing a lens- model study, Cooksey (1996) emphasises the representativeness of the design. Brunswick (1952) argued that it was as important to have a representative design as it was to have a representative sample of participants, because cues are only probabilistically related to the state of affairs which they represent.

From the perspective of the decision- maker, information available as distal stimuli in the environment are perceived as proximal cues, then processed centrally by the decision- maker. Brunswick argued that a decision- maker learns how to make decisions in their environment (the ecology) by repeated exposure to this information. Two sources of uncertainty exist here- the distribution of cues in the ecology, and the way in which the decision- maker uses cue information to make the decision. To understand variance in behaviour, the natural variation and distribution of cues should therefore be replicated as far as possible.

A further implication of representative design is that of the inter-relatedness or correlation between cues. Many experimental designs test and retest the cue values to produce an orthogonal design, whereby cues are independent of each other. Main effects and interactions are then easy to estimate. However, this can have the effect of producing unrealistic cases, a particular problem when experienced decision- makers are used. For this study, cues were presented with no initial estimate of their correlation- although it is noted that the definitions of cue values for agitation were taken from a validated assessment tool, for which each component of

agitation was tested for discriminatory and convergent validity using factor rotation, and therefore can be assumed to be independent.

4.6.2 Development of the vignettes

To ensure construct validity, ideally data from real patient cases would have been used. Unfortunately, for ethical and cost reasons real patient cases could not be accessed, however the 'patients' were devised where possible using existing patient data from national reports in order to maximise representativeness.

The study aimed to test nurses' use of eight cues and their attributes in making their decision to give psychotropic PRN medication. The cues used and rationale for their choice were as follows:

Mental health diagnosis

The diagnoses included were schizophrenia, dementia, bipolar disorder, no diagnosis, and presence or absence of substance misuse. These conditions represent diagnoses associated with symptoms of agitation according to the DSM-V (American Psychiatric Association, 2013). To maintain representativeness to real patients, where possible the distribution of these diagnoses within the vignettes was determined by analysis of local mental health admissions data obtained from the most recent Hospital Episode Statistics (HES) available (year 2013 to 2014) (NHS Digital, 2016).

Although the classifications used to collect patient data include a broader range of mental health illnesses than used in this study (for example the term organic conditions as used in the database includes post- head injury mental health illness as well as dementia), the data offered a useful basis with which to maximise representativeness and therefore content validity of the vignettes.

Calculating frequencies of mental health diagnoses involved:

- Using HES data (NHS Digital, 2016) from Birmingham and Solihull Mental Health Foundation NHS Trust, 2Gether NHS Trust and

Worcestershire Health and Care NHS Trust, from which the majority of study participants were likely to be drawn

- Calculating the percentage represented by each diagnosis of total admissions for the year 2013- 2014

- Each diagnosis was given a number; these were entered into an online random number generator to identify the order of diagnoses as they would appear in the vignettes (www.random.org). Diagnoses were then selected sequentially according to the calculated proportions to give the frequency of each diagnosis within the vignettes.

Table 27 shows the frequency and percentage of each diagnosis associated with agitation, across the three NHS Trusts.

Diagnosis	Birmingham and Solihull NHS Trust	2Gether NHS Trust	Worcestershire Health and Care NHS Trust	Total (%)
Organic	60	140	No data (ND)	200 (6.5%)
Substance misuse alone	30	60	ND	90 (2.9%)
Schizophrenia, schizotypal and delusional disorders	100	250	ND	350 (11.3%)
Mood disorders	100	265	ND	365 (11.7%)
No diagnosis	1925	170	850	2095 (67.5%)

Table 27 Frequency and % of mental health diagnosis, per Trust

As the prevalence of substance misuse alone among patients admitted to mental health units was so low, this was combined with the other

diagnoses to give eight possible conditions (see Table 28). UK prevalence data for comorbid drug use and mental health disorders in the mental health inpatient population exists only for schizophrenia (Carra, Johnson and Bebbington, 2012) and is 35%. In the absence of figures for the other conditions, this was used for the total proportion of vignettes showing drug use.

Condition	Presence of substance misuse	
Bipolar disorder	Yes	No
Schizophrenia disorders	Yes	No
Dementia	Yes	No
No diagnosis	Yes	No

Table 28 Mental health conditions used within the vignettes.

Symptoms of agitation

As stated, empirical research shows that agitation is the most common reason for administering PRN psychotropic medication. The DSM-V Manual (American Psychiatric Association, 2013) defines it as excessive motor activity associated with a feeling of inner tension. Scales developed to measure agitation reflect three components common to most definitions: strong emotion, excessive motor and vocal behaviour and inappropriate or non- purposeful motor/ vocal behaviour (Citrome, 2004).

The Positive and Negative Syndrome Scale- Excited Component (PANSS-EC) (Kay, Fiszbein and Opler, 1987), developed in the context of psychosis, takes five factors relating to excitement in agitation: hostility, uncooperativeness, excitement, tension and impulsive behaviour, and gives a value to the severity of symptoms between 1 (absent) to 7 (extreme). The scale forms part of a more extensive tool that measures psychopathology, however only the Excited Component is useful here.

The sub- scale has been used as the primary outcome measure in clinical studies of interventions to reduce agitation in a range of conditions including schizophrenia (San et al., 2006), bipolar disorder (Barzman et al., 2006), and dementia (Zhong et al., 2007). The sub- scale has been shown

to have good internal consistency, construct and discriminatory validity (Montoya et al., 2011), so it enables acceptable assessment of agitated patients.

The PANSS-EC provides descriptors for all levels of each component, enabling discrimination between different levels of agitation within the vignettes. For these reasons, the excited components of the PANSS-EC are accepted as measures of agitation for this study, except for 'tension'. This appears to be too similar to anxiety in description and does not add to the vignettes. These five components of agitation made up a further five cues in the patient cases. In order to increase the ecological validity of the patient cases, the distribution of cue values for agitation were taken from a study into the use of olanzapine, which gives the baseline mean and standard deviation of these symptoms for schizophrenia, dementia and bipolar disorder (FDA Psychopharmacological Drugs Advisory Committee, 2001). Using this data, cue values were then generated using randomisation with Gaussian distribution using www.random.org.

For no diagnosis, cue values were devised using simple randomisation from the same website, as no distribution data was available. Some values obtained from the randomisation process were negative; these were disregarded. Values that were not whole numbers were rounded up or down to the nearest whole. The PANSS-EC gives verbal descriptors for each level of the five agitation cues, which were used to inform the verbal descriptors for the vignettes. To illustrate, the numerical values and associated verbal descriptors for each level of the cue 'hyperactivity' are:

1. **Absent.** Definition does not apply
2. **Minimal.** Questionable pathology; may be at the upper extreme of normal limits
3. **Mild**. Tends to be slightly agitated, hypervigilant or mildly over aroused throughout the interview, but without distinct episodes of excitement or marked mood lability. Speech may be slightly pressured
4. **Moderate.** Agitation or over arousal is clearly evidence throughout the interview, affecting speech and general mobility, or episodic outbursts occur sporadically

5. **Moderate severe.** Significant hyperactivity or frequent outbursts of motor activity are observed, making it difficult for the patient to sit still for longer than several minutes at any given time

6. **Severe.** Marked excitement dominates the interview, delimits attention, and to some extent affects personal functions such as eating or sleeping

7. **Extreme.** Marked excitement seriously interferes in eating and sleeping and makes interpersonal interactions virtually impossible. Acceleration of speech and motor activity may result in incoherence and exhaustion

An example of values and associated vignette wording is shown in Table 29.

Values obtained with randomisation	PANSS-EC descriptor	Vignette 1
Hostility 3.6	**Moderate** Presents an overly hostile attitude, showing frequent irritability and direct expression of anger or resentment.	Female patient, aged 18. Diagnosis on admission is schizophrenia. She has a history of substance misuse. On assessment she appears severely hyperactive, unable to sit still and constantly pacing about. When staff try to attend to her she becomes defensive and displays a negative attitude, but will co-operate in the end. She can be hostile at times, ranging from disrespect and sarcasm to being frequently irritated, directing anger at staff. She appears very anxious all the time, constantly fearful for the safety of herself and those around. This is because of hallucinations of the imminent destruction of the locality by terrorists. Because of this she is fighting a battle, with furniture and equipment being destroyed as she tries to protect herself and others.
Impulsiveness 6	**Severe** Patient is frequently impulsive, aggressive, threatening, demanding and destructive, without any apparent consideration of consequences. Shows assaultive behaviour and may also be sexually offensive and possibly respond behaviourally to hallucinatory commands.	
Anxiety 6.1	**Severe**	

	Subjective state of almost constant fear associated with phobias, marked restlessness or numerous somatic manifestations.	
Uncooperativeness 3.8	**Moderate** Occasional outright refusal to comply with normal social demands, such as making own bed, attending scheduled programmes etc. The patient may project a hostile, defensive or negative attitude but usually can be worked with.	
Excitement/ hyperactivity 6.2	**Severe** Marked excitement dominates the interview, delimits attention, and to some extent affects personal functions such as eating or sleeping.	

Table 29 **PANSS-EC descriptors and associated vignette wording**

Gender

The role of gender in PRN medication decision making is unclear. Some studies have shown no relationship between gender and PRN administration (Fishel et al., 1994; Craig and Bracken, 1995). Geffen et al., (2002a) found that while gender did not affect the frequency of PRN medication administration, male patients received higher daily doses of antipsychotics. For this study, gender was allocated to each patient case by simple randomisation using www.random.org. Distribution of gender among local mental health inpatients was identified from Hospital Episode Statistics (2013- 2014) (NHS Digital, 2016), and showed a mean frequency

of 44% for females and 56% for males. This proportion was reflected in the patient cases.

Age

The role of patient age in decision- making about whether to administer PRN medication is also unclear. O'Reilly and Rusnak (1990) found the mean age of patients who received sedative or hypnotic medication (such as a benzodiazepine) on psychiatric wards was 37.9 years compared with a mean age of 25.1 years for those that did not. McLaren, Brown and Taylor (1990) found that patients in a regional secure unit who received PRN antipsychotics were significantly younger than those who did not (mean age of 29.5 years vs 33.1 years). Geffen et al., (2002) also found that younger patients received significantly higher doses of antipsychotics, though age had no influence on the frequency of administration.

The Adult Psychiatric Morbidity Survey (2014) (Bebbington et al., 2016) found that for psychotic disorders (including schizophrenia), in both men and women the highest prevalence was in people aged 35 to 44 years (1.0% and 0.9% respectively). They concluded, however, that age was not found to be significantly associated with psychotic disorder in the past year. Therefore for the five vignettes with a diagnosis of schizophrenia with or without drug use, age was generated randomly using randomisation from www.random.org.

Bipolar disorder (with and without drug use), is more common in younger age-groups. 3.4% of 16–24 year olds screened positive compared with 0.4% of those aged 65–74 (Marwaha, Sal and Bebbington, 2016). No- one aged 75 and over screened positive for bipolar disorder. Therefore, younger age groups (18- 19 and 20- 29) were allocated to the five vignettes concerning bipolar disorder.

Figures from the UK Dementia Update (Prince, et al., 2014) give no data for prevalence of dementia below the age of 65. However, dementia increases in prevalence with increasing age, so in the three vignettes concerning a diagnosis of dementia, one was allocated an age between 60- 69, and two an age in the range of 75+.

For no diagnosis, age was randomly generated using www.random.org and allocated sequentially to vignettes.

4.7 Design of the survey

To enable stable regression analysis, Cooksey (1996) recommends a minimum of five cases per cue, and ideally ten. For the eight selected cues, this means a minimum of forty and maximum of eighty vignettes. de Vaus (2002, p129) explains that although longer surveys are associated with reduced response rates, this distinction is not always true as for specialised populations with a relevant topic surveys can be much longer. However, taking a cautious approach suggested the shorter version, to allow busy nurses to complete the survey in the shortest time possible.

In addition, to check for reliability of judgement, ten randomly sampled cases were repeated, making a total of fifty patient cases. The survey was initially paper- based as this has also been shown to increase response rates compared with email surveys (Pit, Vo and Pyakurel, 2014).

Outcome measures were:

1. Symptom severity
2. Likelihood of giving PRN psychotropic medication
3. The medication chosen (if any) and the dose

The outcome measures of symptom severity and likelihood of giving PRN medication were to be measured using a 100mm visual analogue scale (VAS). This was chosen to avoid problems associated with the use of Likert scales. Choice of wording in Likert scales has been shown to affect responses, and the artificial division of a judgement into a discrete number of response categories may force choice to be a 'best fit' rather than a close representation, reducing sensitivity. VAS have also been shown to be easy to understand and use, and are able to detect small differences in response (McCormack, de la Horne and Sheather, 1988).

The outcome measure of which medication to be given, if any, and in what dose, represents the final decision from the judgements of symptom severity and likelihood of giving a medication. Respondents were asked to

write their preferred medication and dose. No options were given, to allow the full range of responses and therefore variability to be captured. For visual simplicity and ease of use, one vignette and the three outcome measures were contained on one side of A4 paper.

To establish if the survey was acceptable in terms of length of time it took to complete and that the vignettes did not present any unrealistic or unlikely scenarios, three qualified, practising mental health nurses were consulted. They completed the survey and agreed that the suggested length of time to complete was approximately 20 minutes, and confirmed that the vignettes were acceptable representations of patients.

4.8 Data analysis

Regression analysis was to be used to model individual nurse's decisions, as well as the relationship of the cues to the criterion. Regression analysis was selected as it has been '….shown to capture the cue weighting, consistency and predictability of decisions and so is useful in explaining why achievement is high or low with respect to the ecology of the judgment task, and why people agree or disagree in their judgments' (Cooksey, 1996). It was proposed that five lens model statistics will be calculated, providing a model of each nurse's judgement of symptom severity and of the need for PRN medication.

1. The regression model (Y) for each nurse's judgement will generate a predicted judgement ($\hat{Y}$). Re represents the amount by which the model predicts the value of the criterion.
2. Rs represents cognitive control or the consistent use and weighting of cues in the nurse's judgements.
3. Ra represents achievement, or the correlation between the nurse's judgements and the criterion.
4. Rm/G is the linearity, or the degree to which the modelled nurse's judgement captures the linear ecological component. Linearity in the lens model represents intuitive reasoning.
5. C is unmodelled knowledge, or the degree to which the model explains the nurse's judgements overall.

Using these parameters, the lens model equation (Cooksey, 1996) can be shown as:

ShapeRa = GRsRe + C $\sqrt{1- R2s}$ $\sqrt{1- R2e}$

These statistics will give measures of each nurse's judgement policies with respect to the patient scenarios, so demonstrating the existence and amount of variation of cue use and correlation with the criterion. In addition, analysis of variance will be used to compare nurses' judgements, giving an overall measure of variance.

4.9 Demographic data

Some demographic details were also collected from respondents. Empirical studies of PRN decision- making have shown a possible association between staff gender (Usher, Baker and Holmes, 2009), setting (Curtis and Capp, 2003; Usher, Baker and Holmes, 2009,) and experience (Geffen et al., 2002a) and the decision to give medication. As these associations were elicited using qualitative research methods, testing their relationship using this method, where the cues were controlled within vignettes, was important.

4.10 Sampling

Identifying potential participants

Nurses were eligible to take part if they met the following criteria:
•   Qualified mental health nurses
•   Working in acute, adult inpatient settings

Nurses were excluded from the study if they:
•   Were unqualified staff or student nurses
•   Worked in areas such as rehabilitation, that is, non-acute settings

- Worked in child or adolescent mental health services

Participants were identified via local gatekeepers, usually ward managers. Each Trust had a Matron, responsible for a number of clinical units within a Trust. Matrons were contacted first who were then able to put me in touch with ward managers. Some Trusts required access through an independent person who had no relationship with nurses on the mental health wards- this was to ensure the risk of coercion was minimised. Following this initial contact with ward managers I was able to explain the nature and aims of the study. Permission was obtained to continue and ward managers agreed to distribute the survey amongst their staff. Initially ten surveys were left with each mental health unit across two local Trusts, making fourteen units in total. Reminders to complete they survey were given to ward managers on a weekly basis. I was not allowed to contact staff members individually.

4.11 Research ethics approvals and considerations

Permission for this study was obtained from the University of York Health Sciences Research Governance Committee and the Health Research Authority (HRA). Consent was obtained from each participant.

A participant information sheet was available with each survey, which is included in Appendix 2. Consent was presumed by return of the survey.

Each paper survey was given an identification number. Included with each survey was a stamped return envelope, marked confidential, for the return of surveys. Completed surveys were kept in a locked drawer at my place of work. No one else had access to the drawer. Once completed surveys had been analysed and the study complete, they were destroyed via a confidential information shredding service.

Respondents were also asked if they would consider being part of a follow-up study, for which separate ethical approval was obtained. If participants agreed, they wrote their contact details on a dedicated page of the survey. If they did not provide contact details it was assumed that they did not wish to take part in any follow- up study. This page was kept separate from the

rest of the survey in locked filing cabinet at the researcher's place of work. Contact details were only be available to the researcher.

Results to be reported in papers, reports and newsletters would not include personally identifiable information. Data was managed in accordance with the Data Protection Act (1998), NHS Caldecott Principles (2016), Research Governance Framework for Health and Social Care (Department of Health and Social Care, 2005) and the conditions of the Health Sciences Research Governance Committee approval.

4.12 Deviations from the original survey protocol, with rationale

Following distribution of surveys to clinical areas and subsequent reminders, the response rate was very poor. In order to improve the response rate, the original survey was revised in the light of feedback from a potential participant. The participant highlighted a problem with the vignettes of patients with co-morbidity of a mental health illness plus substance misuse. Symptoms, as described in the vignettes, could indicate either withdrawal from substance use or anxiety. However, crucially, these two states would have very different treatments with different PRN medications. This made the survey impossible for the participant to complete. Additionally, results of completed surveys would be difficult to interpret due to this confounding.

As a result of the feedback, the survey was redesigned taking out any mention of co-morbid substance use from the vignettes. The revised survey was distributed to two further NHS Mental Health Trusts- one locally (sixty surveys) and one in the North of England (forty surveys). As before, I met in person with senior nurses or Matrons and explained the study. They agreed to distribute the surveys, with an explanation of the aims of the study. Of these surveys however, only two were returned.

Following a formal discussion of study progress at the University of York Thesis Advisory Panel (TAP), it was agreed that the survey was too long and so discouraging to busy mental health nurses to complete. To maximise potential completions, the survey was shortened by removing the

repeated vignettes and by reducing the number of variables, taking out gender and diagnosis. All vignettes were to be about male patients with a diagnosis of schizophrenia. To further remove sources of ambiguity, clarification about the patients in the vignettes was given as follows:

- Patients were admitted informally, that is not sectioned under the mental health act
- They have not had any PRN medication today
- Regular medication has been given on time and in appropriate doses
- Each patient has had a clear drug screening test

These amendments shortened the survey to thirty vignettes in total, plus the demographic questions.

Additionally, the survey was designed to be available electronically. Using the survey builder Qualtrics enabled the survey to be optimised for completion on mobile phones or personal computers as a web- based questionnaire. The option for the survey to be completed verbally over the phone was also included, which would entail emailing participants the vignettes just prior to the phone call. A systematic review of methods to maximise response rates (Pit et al., 2014) suggested that postal surveys are more effective than telephone or email surveys; however, based on the experience above, using a different method was attractive. Nurses who completed the survey were offered an incentive of a £10 shopping voucher if they provided their contact details. Incentives have been shown to improve response rates (Pit, Vo and Pyakurel, 2014). A copy of this final version of the survey is provided in Appendix 5.

Two further Trusts were approached, again with personal meetings with senior staff. These Trusts were located in the West and East Midlands. Once again, senior nurses expressed enthusiasm for the study, with one Trust saying they would use the results to inform developments in their nursing practice. The link to the survey was emailed to the senior nurses, who distributed it to ward managers for further dissemination to ward staff.

Each redesign of the survey was reported to the HRA.

4.12 Results of the survey

Six nurses attempted the survey, all via Qualtrics. Three nurses began the survey but did not complete any questions, so their results were discarded. Three nurses completed the entire survey. Demographic data for these three nurses is presented in Table 30. All were ward managers, as indicated by Agenda for Change (AfC) band. All three nurses worked in working- age acute adult inpatient settings. P1 and P2 were from the same Trust.

	Age	Gender	Time since qualifying as a nurse	Qualification obtained at point of registration	Time in setting	AfC Band
P1	28	F	6 years	BSc (Hons)	7 months	7
P2	42	F	32 years	Diploma	12 months	7
P3	57	M	40 years	BSc (Hons)	8 years	8

Table 30 Demographic data of nurses who completed the survey

4.14 Data analysis and results

This section presents the data obtained from the three completed surveys. Data for each vignette is tabulated, followed by analysis of within and between participant responses. The original intention was to model nurses' responses using regression analysis. However, the low response rate means the sample is not representative of mental health nurses from acute settings. The margin of error is large with very small sample sizes, so conclusions from regression analysis and analysis of variance, as proposed in the original protocol, could over- estimate differences between results. Instead, descriptive statistics have been used.

Table 31 shows the responses of the three nurses to each of the thirty vignettes in the shortened survey. The table shows the nurses' estimation of symptom severity, likelihood of giving medication, and PRN medication

as a result of assessment of patient symptom severity. Note that the VAS measurement line should have been 10cm- however it reproduced in Qualtrics as a 14cm line. The outcomes were measured as follows:

- Symptom severity ranged between 0 (symptoms not at all severe) to 14 (symptoms as severe as they can be).

- Likelihood of giving PRN psychotropic medication ranged from 0 (not at all likely) to 14 (highly likely)

- Which medication would be given, plus preferred dose.

Although the survey is reproduced in Appendix 5, for ease of interpretation a brief summary of the main attributes of agitation from each vignette is included in the first column. Also included is the mean symptom score obtained during construction of each vignette, using the five attributes of agitation from the PANSS- EC. This provides a comparison against which each participants' judgement of symptom severity can be evaluated. To reiterate, each attribute of agitation can be rated from 0 (pathology absent) to 7 (extreme). As the VAS line in Qualtrics was 14cm in length, the mean PANSS- EC score for each patient vignette was doubled to give the value shown in Table 31.

Vignette number, (patient age) Summary of attributes of agitation. (Symptom severity calculated using PANSS-EC)	Nurse 1			Nurse 2			Nurse 3		
	Symptom severity (cm)	Likelihood of giving PRN medication	Medication to be given, if any	Symptom severity	Likelihood of giving PRN medication	Medication to be given, if any	Symptom severity	Likelihood of giving PRN medication	Medication to be given, if any
V1 (19) Hallucinations Severely tense and aggressive, kicks and lashes out (10.2)	9.2	5.5		11	11	Haloperidol 5mg	7.0	8.3	Lorazepam 1mg plus Olanzapine 10mg
V2 (71) Moderate severe hyperactivity, moderate severe anxiety. Contains impulses. (9.6)	7	3		7	2.9	Lorazepam 1mg	13.8	11	Lorazepam 1mg
V3 (70) Severely hyperactive, can't sleep. (9.4)	4.6	3	Zopiclone 3.75mg at night	9.2	8.2	Hypnotics at night, lorazepam in the day	14	14	Lorazepam 1mg in the day, Zopiclone at night
V4 (31)	2.5	0		4.8	0		14	14	Lorazepam 2mg plus

	Nurse 1			Nurse 2			Nurse 3		
Vignette number, (patient age) **Summary of attributes of agitation.** **(Symptom severity calculated using PANSS-EC)**	Symptom severity (cm)	Likelihood of giving PRN medication	Medication to be given, if any	Symptom severity	Likelihood of giving PRN medication	Medication to be given, if any	Symptom severity	Likelihood of giving PRN medication	Medication to be given, if any
Obvious agitation, anxiety, hyperactive episodes **(7.7)**									Olanzapine 10mg
V5 (33) **Moderately hyperactive, complies but angrily. Shouting and swearing. Confronted staff once physically** **(9.0)**	2.5	2.8		4.7	5.5	Lorazepam 1mg	11.5	0	
V6 (62) **Severely tense, moderately hostile. Staff physically attacked.** **(9.4)**	4.7	2.9		7	5.5	Haloperidol and lorazepam	14	14	Lorazepam 1mg plus Olanzapine 10mg
V7 (61) **Becoming increasingly angry and abusive** **(6.3)**	4.7	3		4.7	2.8		11.5	0	

Vignette number, (patient age) Summary of attributes of agitation. (Symptom severity calculated using PANSS-EC)	Nurse 1			Nurse 2			Nurse 3		
	Symptom severity (cm)	Likelihood of giving PRN medication	Medication to be given, if any	Symptom severity	Likelihood of giving PRN medication	Medication to be given, if any	Symptom severity	Likelihood of giving PRN medication	Medication to be given, if any
V8 (74) Moderately poor impulse control and hyperactivity-shouts loudly at staff. Not hostile; cooperative. **(5.8)**	4.7	3		4.7	2.8	Lorazepam 1mg	11.5	0	
V9 (36) Minimal signs of agitation. **(4.7)**	0	0		0	0		9.2	0	
V10 (31) Mild agitation, cooperative. Wants medication now to calm. **(6.7)**	2.5	0		4.7	8.3	Lorazepam 1mg	9.2	0	
V11 (60) Moderately severe loss of impulse control. Abusive, threatening. Co-operative.	2.4	2.9		2.4	5.5	Lorazepam 1mg	7	0	

Vignette number, (patient age) Summary of attributes of agitation. (Symptom severity calculated using PANSS-EC)	Nurse 1			Nurse 2			Nurse 3		
	Symptom severity (cm)	Likelihood of giving PRN medication	Medication to be given, if any	Symptom severity	Likelihood of giving PRN medication	Medication to be given, if any	Symptom severity	Likelihood of giving PRN medication	Medication to be given, if any
(8.7)									
V12 (28) Moderately severe hostility manifests as frequent violence (staff assault) and destruction, anxious, uncooperative, and extremely tense. (11.4)	7	5.5	Lorazepam 1mg	11.5	8.3	Acuphase	14	14	Lorazepam 2mg plus Olanzapine 10mg
V13 (56) Extreme hostility- destructive, headbutted. Moderately poor impulse control. Somewhat uncooperative. (10.4)	2.5	2.8		13	0	PICU	14	14	Lorazepam 1mg plus Olanzapine 10mg
V14 (37) Moderate tension, moderately hyperactive.	2.9	0		4.7	5.6	Diazepam 5mg	7	0	

Vignette number, (patient age) Summary of attributes of agitation. (Symptom severity calculated using PANSS-EC)	Nurse 1			Nurse 2			Nurse 3		
	Symptom severity (cm)	Likelihood of giving PRN medication	Medication to be given, if any	Symptom severity	Likelihood of giving PRN medication	Medication to be given, if any	Symptom severity	Likelihood of giving PRN medication	Medication to be given, if any
(7.2)									
V15 (29) Frequently impulsive- repeated self-harm. Severe tension. Constant fear, panic attacks, hyperactive. (10.5)	7	2.9		9.2	8.4	Lorazepam 1mg	7	8.4	Diazepam 5mg
V16 (34) Severe hyperactivity, cannot sleep. Loss of inhibition, uncooperative. Destructive. (10.3)	7	2.9		9.2	8.3	Haloperidol 5mg	14	14	Lorazepam 1mg plus Olanzapine 5mg
V17 (59) Very tense, hyperactive, uncooperative, easily angered. Poor sleep. (9.7)	4.7	0		9.2	8.3	Haloperidol 5mg	7	5.6	Lorazepam 1mg

Vignette number, (patient age) Summary of attributes of agitation. (Symptom severity calculated using PANSS-EC)	Nurse 1			Nurse 2			Nurse 3		
	Symptom severity (cm)	Likelihood of giving PRN medication	Medication to be given, if any	Symptom severity	Likelihood of giving PRN medication	Medication to be given, if any	Symptom severity	Likelihood of giving PRN medication	Medication to be given, if any
V18 (27) **Very tense, severely hyperactive, not sleeping. Uncooperative, impulsive. Threatening to one patient.** **(10.3)**	7	0		9.2	8.3	Haloperidol 5mg plus Lorazepam	11.5	14	Diazepam 5mg
V19 (71) **Slight agitation, increasingly anxious, distressed.** **(4.9)**	4.7	0		4.7	2.9	Lorazepam	9.2	8.3	Diazepam 5mg
V20 (20) **Increasingly hyperactive, becoming angered with minimal provocation. Verbal abuse worsening.** **(8.3)**	4.7	2.9	Lorazepam 1mg	7.0	11	Lorazepam	11.5	11	Lorazepam 1mg
V21 (24)	4.7	2.9		7.0	11	Lorazepam	11.5	11	Lorazepam 1mg

Vignette number, (patient age) Summary of attributes of agitation. (Symptom severity calculated using PANSS-EC)	Nurse 1			Nurse 2			Nurse 3		
	Symptom severity (cm)	Likelihood of giving PRN medication	Medication to be given, if any	Symptom severity	Likelihood of giving PRN medication	Medication to be given, if any	Symptom severity	Likelihood of giving PRN medication	Medication to be given, if any
Pronounced tension, moderately severe hyperactivity. Uncooperative, irritable. (9.6)									
V22 (62) Mild agitation, tense, will cooperate. Moderately hostile- irritable. (5.9)	4.7	0		4.7	2.9		11.5	0	
V23 (33) Uncooperative, severe hyperactivity, mild hostility. Tension and impulsivity increasing. (9.3)	4.7	2.9		6.9	8.3	Lorazepam 1mg	9.2	0	
V24 (32)	7	2.9		9.2	8.3	Haloperidol 5mg plus lorazepam 1mg	13.7	14	Lorazepam 1mg plus Olanzapine 5mg

	Nurse 1			Nurse 2			Nurse 3		
Vignette number, (patient age) Summary of attributes of agitation. (Symptom severity calculated using PANSS-EC)	Symptom severity (cm)	Likelihood of giving PRN medication	Medication to be given, if any	Symptom severity	Likelihood of giving PRN medication	Medication to be given, if any	Symptom severity	Likelihood of giving PRN medication	Medication to be given, if any
Moderately hyperactive, poor impulse control, twice assaulted staff. Irritable and uncooperative. (9.9)									
V25 (50) Moderately tense, severely hyperactive, poor impulse control. Sexually suggestive to staff. Belligerent, highly uncooperative. (11.7)	9.2	5.6	Diazepam 5mg	11.5	14	Haloperidol 5mg plus lorazepam 1mg	13.8	14	Lorazepam 1mg plus Olanzapine 10mg
V26 (51) Quite hostile, very tense, becoming more uncooperative. Twice minor assault on other patient. (9.2)	4.7	0		9.2	8.2	Lorazepam 1mg	11.5	8.2	Lorazepam 1mg
V27 (49)	2.4	0		4.7	8.3	Lorazepam 1mg	7	0	

	Nurse 1			Nurse 2			Nurse 3		
Vignette number, (patient age) Summary of attributes of agitation. (Symptom severity calculated using PANSS-EC)	Symptom severity (cm)	Likelihood of giving PRN medication	Medication to be given, if any	Symptom severity	Likelihood of giving PRN medication	Medication to be given, if any	Symptom severity	Likelihood of giving PRN medication	Medication to be given, if any
Feels moderately tense. Low hostility. Cooperative. (7.0)									
V28 (37) Negligible/ mild signs of tension. (5.1)	2.4	0		4.7	2.9		4.7	0	
V29 (48) Severe tension, moderate to severe hyperactivity. Kicked out at staff. Occasionally uncooperative. (9.8)	0	2.9	Lorazepam 1mg	9.2	8.2	Haloperidol 5mg plus lorazepam 1mg	14	14	Lorazepam 2mg plus olanzapine 10mg
V30 (64) Mild hostility, shouting, nervous and mild to moderate tension. (4.8)	7	0		7.0	5.5	Haloperidol 5mg	9.2	0	

Table 31 Comparison of nurses' responses to the survey

4.14.1 Within- participant results

This section presents results from each participant individually. For symptom severity, as the PANSS- EC scores (Montoya et al., 2011) are based on a 7- point scale, the 14cm VAS line has been translated to PANSS- EC definitions by dividing the VAS score by two.

Participant 1 (P1)

Of the three participants, P1 assessed symptom severity the lowest for each patient vignette. P1 also consistently rated agitation symptom severity lower than the value obtained in constructing each vignette, with the exception of vignettes 19 (the same value) and 30 (participant rated higher).

For P1, mean symptom severity was 4.6, with a range of 0 to 9.2. The most frequent symptom severity scores were in the range 2.1 to 2.9 (n= 8), and 4.1 to 4.9 (n=11). Table 32 details the frequency of symptom severity scores for P1, with corresponding PANSS- EC definition.

Symptom severity score (VAS)	Frequency, n (%)	PANSS- EC definition
0	2 (6.7%)	Definition does not apply
2.1- 2.9	8 (26.7%)	Definition does not apply
4.1- 4.9	11 (36.7%)	Questionable pathology; may be at the upper extreme of normal limits
7.1- 7.9	7 (23.3%)	Mild agitation
9.1- 9.9	2 (6.7%)	Moderate agitation

Table 32 Frequency of symptom severity scores for P1

Regarding likelihood of giving medication, P1 indicated that they would not consider any medication for twelve of the patient vignettes. Fifteen of the vignettes were judged at the 2.8/ 2.9/ 3.0cm point on the VAS, indicating

the likelihood as being very low. The highest rating was for three vignettes (numbers 1, 12 and 25), with the judgement at the 5.5/ 5.6cm point along the 14cm VAS line.

P1 would give medication to only five patient vignettes- numbers 3, 12, 20, 25 and 29. Patient vignettes 12 and 25 were rated amongst the most likely that P1 would give PRN psychotropic medication to. The medications considered were Zopiclone (vignette 3) - here, the descriptor indicated the patient could not sleep due to severe hyperactivity. There was no recommendation to give a PRN medication to aid sleep to the other five vignettes that described difficult sleeping however. Lorazepam was considered for three vignettes (numbers 12, 20 and 29), while diazepam was considered for one vignette (number 25). P1 did not recommend an anti-psychotic medication for any of the patient vignettes.

Looking further at the patients who were violent towards staff, P1 would have given medication to patient 12 but not patient 13, and to patient 20 but not patient 21. Differences between these patients are that patient 12 was uncooperative, whereas patient 13 could be worked with. Patient 20 and patient 21 both received the same judgements for symptom severity and likelihood of giving medication, yet only patient 20 would be given PRN lorazepam. The vignette describes patient 20 with a higher level of hostility compared to patient 21, with violence directed outward towards staff and other patients as the patient becomes angry with minimal provocation. Patient 21, however, is verbally abusive but has not been violent.

Participant 2

The judgements of symptom severity from P2 ranged from 0 to 13, indicating absence of agitation to extreme agitation. The mean rating was 7.1, with the most frequent rating between 4.1- 4.9cm (n=10).

Compared with the values for attributes of agitation inherent in each vignette, P2 rated the symptom severity scores lower for twenty patient vignettes. Their judgement gave the same score for eight vignettes (to within 5mm), and a higher rating was found for two vignettes (numbers 13 and 30). Table 33 details the frequency of symptom severity scores for P2, with corresponding PANSS- EC definition.

Symptom severity score (VAS)	Frequency, n (%)	PANSS- EC definition
0	1 (3.3%)	Absent
2.1- 2.9	1 (3.3%)	Definition does not apply
4.1- 4.9	10 (33.3%)	Questionable pathology; may be at the upper extreme of normal limits
7.1- 7.9	6 (20%)	Mild agitation
9.1- 9.9	8 (26.7%)	Moderate agitation
11.1- 11.9	3 (10%)	Moderate severe agitation
13.1- 13.9	1 (3.3%)	Severe agitation

Table 33 Frequency of symptom severity scores for P2

Regarding likelihood of giving medication, P2 would not consider medication for three of the patient vignettes (numbers 4, 9 and 13). Patient 13 was judged to need admission to psychiatric intensive care. Notably, there was variation among patient vignettes with the same symptom severity scores. For example, of the ten patient vignettes with a symptom severity score of 4.7/ 4.8, six would have received a medication (lorazepam or diazepam). None of the patients who would receive medication had high scores on any of the five attributes of agitation. This variation is unexplained.

P2 judged that for twelve patient vignettes, the likelihood of giving medication was in the range of 8.2 to 8.4cm along the 14cm VAS line. Three vignettes were judged at 11cm (very likely to give medication): vignette 1 (patient hallucinating, lashing out, would be given haloperidol)), vignette 20 (angered with minimal provocation, would be given lorazepam), and vignette 21 (patient tense, uncooperative, irritable, would be given lorazepam). These three patient vignettes were the youngest of the thirty presented in the survey. Patient vignette 25 (patient belligerent and sexually suggestive, would be given haloperidol and lorazepam) was rated at 14cm- that is, they would definitely have received medication.

P2 would use six different medications: haloperidol (usually 5mg) for five of the vignettes, lorazepam (usually 1mg) for 13 vignettes, medication to aid sleep for one vignette, diazepam for one vignette, and haloperidol and lorazepam together for five patient vignettes. One patient vignette would receive Acuphase (zuclopenthixol). All patients who had been violent towards staff would be given a medication. More detail is available in Table 31.

Participant 3

P3, who works in a different NHS Trust to P1 and P2, judged symptom severity to be at the higher end of the scale, with a mean rating of 10.8, indicating moderate severe agitation. The most frequent judgement of symptom severity was 11.5cm (n=8), corresponding to severe agitation.

Compared with the values for attributes of agitation inherent in each patient vignette, P3 judged the symptom severity to be higher in 22 cases, lower in 4 (numbers 1, 11, 15 and 17), and the same (within 5mm) in 4 cases (numbers 14, 23, 27 and 28). Table 34 details the frequency of judgements of symptom severity for P3, with corresponding PANSS- EC definition.

Symptom severity score (VAS)	Frequency, n (%)	PANSS- EC definition
4.1- 4.9	1 (3.3%)	Questionable pathology; may be at the upper extreme of normal limits
7.1- 7.9	6 (20%)	Mild agitation
9.1- 9.9	5 (16.7%)	Moderate agitation
11.1- 11.9	8 (26.7%)	Moderate severe agitation
13.1- 13.9	3 (10%)	Severe agitation
14	7 (23.3%)	Extreme agitation

Table 34 Frequency of symptom severity scores for P3.

Regarding likelihood of giving PRN psychotropic medication, P3 would not have given medication to twelve of the patient vignettes. P3 judged the likelihood for four patient vignettes at 8.2- 8.4cm along the 14cm VAS line. Looking further at these cases, the patients' ages range from 19 to 71. The mean of all the attributes of agitation for each of these vignettes range from

2.44 (pathology questionable) to 5.2 (moderate symptoms of agitation). None of the four vignettes contains an extreme value for any of the agitation attributes. Ten of the patients had a VAS score of 14, indicating that P3 would definitely give medication in these cases. This includes all the patients who were violent towards staff.

P3 would have given six different medications: lorazepam 1mg and olanzapine 10mg (7 patient vignettes), lorazepam 1mg and Olanzapine 5mg (2 patient vignettes), lorazepam 2mg and Olanzapine 10mg (3 vignettes), lorazepam 1mg (4 vignettes), diazepam 5mg (3 vignettes), and medication to aid sleep to 1 patient vignette. Again, more detail is available in Table 31.

4.14.2 Between participant results

Between participant judgements of symptom severity, likelihood of giving medication and of the chosen medications showed clear variation as shown in Table 35. Notable is that although P3 had a higher mean for both symptom severity and likelihood of giving medications, the number of occasions of medication giving was 18 out of the thirty vignettes, lower than P2.

	Mean symptom severity	Mean likelihood of giving medications	Occasions medications given
Participant 1	4.6	2.0	5
Participant 2	7.1	6.4	25
Participant 3	10.8	7.1	18

Table 35 Between participant results: mean scores

For the outcome of symptom severity, P1 consistently rated patients' levels of agitation lower than P2 and P3, in terms of mean rating or highest rating given. P1 did not rate any patients' symptom severity higher than 9.2 (moderate agitation), whereas the highest rating from P2 and P3 was 13

(severe agitation) and 14 (extreme agitation) respectively. In addition, the rating mode for P1 and P2 was within the range 4.1- 4.9, whereas for P3, the mode was between 11.1- 11.9. P3 consistently rated symptom severity higher than P1 or P2.

Comparing the results further reveals some interesting decisions between the three participants. The patient vignettes given some of the highest symptom severity ratings were number 25, where all participants would give a PRN medication, albeit a different one. Patient 1, aggressive and hallucinating, was judged to have a symptom severity of 9.2 from P1, their highest rating. P2 rated the same patient's symptom severity as 11, while P3 rated it as 7.0. Compounding this variation, P1 would not give a medication, P2 would give a first generation antipsychotic medication alone, and P3 would give both an anti- psychotic and lorazepam.

All participants would give patient vignette 3 a PRN medication to aid sleep, whereas the three other vignettes that indicated poor sleep would not receive such a medication. Vignette 3 was the oldest patient (age 74) among those that could not sleep. Additionally, both P2 and P3 would give the patient lorazepam PRN.

All the participants would give patient vignette 12 a medication PRN. This patient showed severe hostility, had been destructive and assaulted staff, and was uncooperative. However, again, the medication given varied between the three participants- P1 would give lorazepam 1mg, P2 Acuphase (the only time this was recommended in the survey) while P3 would give lorazepam and olanzapine together. In fact, for the seven patients that had been physically violent towards staff (vignette numbers 1, 6, 12, 13, 24, 25 and 29) P2 and P3 would give both an antipsychotic and lorazepam. P1 chose to recommend medications for only patient vignettes 1, 12, 25 and 29, and in all of these cases would give only a benzodiazepine.

Patients who were destructive to property or threatening to patients or staff, but who did not became violent to staff, most often received only one medication from P2 or P3. None would receive a medication from P1.

Patients who would not receive a medication from any participant were numbers 7, 9, 22 and 28. There was some agreement about symptom

severity between participants, although P3 consistently rated this higher than P1 or P2.

Patients who showed a marked difference between participant ratings of symptom severity, likelihood of giving medication, and medication choice were patient 4 (P3 rated symptoms at 14, P2 at 4.8 and P1 at 2.5). Only P3 would give PRN medication. Patient 5 was rated differently for symptom severity by all three participants, yet P3 gave the highest rating but would not give PRN medication, while P2 gave a moderate rating for symptom severity yet would have given lorazepam.

4.13 Discussion of results

This section presents a discussion of the survey results. Taking each survey aim in turn, it begins with the amount of variation in participants' judgements of symptom severity. It continues with discussion of decisions to give PRN medication, then explores the use and weighting of cues to inform their decisions. The final section examines how the administration and findings of the survey can inform development of a revised survey.

4.15.1 Nurses' judgements of symptom severity

The first aim of the survey was to determine how much variation exists in nurses' judgements of symptom severity. The small sample notwithstanding, it is clear that there is variation in these judgements both within and between participants. For example, P1 rated patients' symptoms the lowest of all three participants, with P3 giving the highest ratings. It is worth repeating that all participants were given the same patient vignettes, focussed around males with a diagnosis of schizophrenia, who had been informally admitted to an acute mental health unit.

PRN medication is more likely to be given to patients who are aggressive (Bowers et al., 2013). However, aggressive behaviour did not consistently result in judgements of high symptom severity from all three participants, with clear differences between participants- see, for example patient

vignette 12. This suggests that the concept of symptom severity does not have a direct relationship with levels of aggression.

From the scoping review, chart review studies showed that agitation was the most common reason for administration of psychotropic medication (for example Stewart et al., 2012; Delafon et al., 2013; Haw and Wolstencraft, 2014; Martin et al., 2017). Agitation is a clinical risk factor for violence (NICE, 2005) is it can escalate into aggressive behaviour: studies showed that medication was often administered to prevent escalation of patient behaviour from verbal abusiveness to physical violence (e.g. Stewart et al., 2012). However, looking at judgements of symptom severity between the survey participants, verbally abusive behaviour did not necessarily result in a high rating for symptom severity.

One of the causes of aggressive behaviour among people with schizophrenia is psychosis. Psychosis causes a range of symptoms including hallucinations or delusions, which can result in increasing agitation and distress. This may progress to violence (Ostinelli et al., 2017). It is possible that P2 and P3 considered the aggressive or violent behaviour exhibited by some of the patient vignettes to be suggestive of psychosis. This may account for their relatively higher symptom severity ratings when compared with P1.

However, the conundrum here is why P1 did not rate these same patients with a high symptom severity score. Mental health nurses may view aggression in different ways. In a study of nurses' attitudes to patient aggression, most nurses viewed aggression as offensive or destructive. Far fewer nurses viewed aggression as communicative or protective (Jonker et al., 2008). It is possible that P1 viewed the behaviour as communicative whereas P2 and P3 viewed it as offensive.

In the management of aggression, NICE (2015) guidelines on management of short- term violence state that de-escalation is a key intervention. De-escalation encompasses various psychosocial interventions to redirect patients away from the heightened, threatening behaviour (Berring, Pedersen and Buus, 2016). The NICE (2015) guidelines emphasise establishing a close working relationship with service users, showing empathy for the service- user. All survey participants had received de-escalation training in the previous year.

However, viewing aggressive behaviour as communicative means recognising the patient's powerlessness, resulting in the aim of enhancing the therapeutic relationship (Jonker et al., 2008). Viewing aggressive behaviour as offensive results in a perception that it is hurtful, insulting, and unacceptable.

Other reasons for administration of PRN medication to patients includes to help with sleep, and manage distressing symptoms such as hallucinations or hearing voices (Usher and Luck, 2004). However, patient vignette 1 reflected a patient hallucinating- only P2 and P3 would have given medication, while the judgements of symptoms severity were 9.2 (P1), 11.0 (P2) and 7.0 (P3). The only patient who would receive a medication to aid sleep from all three participants had a symptom severity score of 4.6 (P1), 9.2 (P2) and 14 (P3).

In summary, findings from the survey suggest variation in judgements of symptom severity between the participants. This may be explained by staff perceptions of patient aggressive behaviour, with the view that aggression is communicative leading to lower symptom severity scores. A perception that aggressive, violent or destructive behaviour is offensive may lead to higher symptom severity scores. The next section discusses the survey results for administration of PRN medication.

4.15.2 Variation in nurses' decisions to give PRN psychotropic medication

The second aim of the survey study was to determine how much variation exists in nurses' decisions to give PRN psychotropic medication, individually and collectively, to treat patient agitation. The results show variation in terms of the frequency of medication giving, the medications given, and the doses. This too is consistent with previous empirical studies.

The most commonly preferred medication within the survey was lorazepam, either 1mg or 2mg. Diazepam was preferred on only five occasions. It has a longer duration of action than lorazepam and is used for short- term relief of severe anxiety (Joint Formulary Committee, 2021). However, diazepam was not used consistently for vignettes that indicated pronounced anxiety.

Benzodiazepines are the most common medication type administered in acute mental health units (for example Mullen and Drinkwater, 2011; Lindsey and Buckwalter, 2012; Stewart et al., 2012, Haw and Wolstencraft, 2014, Neumann, Faris and Klassen, 2015). Benzodiazepines have been the recommended medication for treatment of agitation or anxiety in mental health settings for some time (NICE, 2005). They have a reduced incidence of side effects when compared with other medications, such as antipsychotics, however the risk of addiction is a known problem (Joint Formulary Committee, 2021). However, doses recommended by the participants are consistent with prescribing guidelines, in that the lowest dose should be given.

P2 and P3 indicated a preference for combined benzodiazepine and antipsychotic (haloperidol or olanzapine) for a number of patient vignettes. However, current evidence for this practice is weak- there seems to be no advantage compared with using either medication alone for acute psychotic behaviour (Zaman et al., 2017), and the risk of side effects is increased (Ostinelli et al., 2017). Benzodiazepines work more quickly than anti-psychotic medications for inducement of feelings of calm, and are less likely to cause distressing side effects noted with antipsychotics (eg EPS) (Zaman et al., 2017).

However, in the light of the lack of robust evidence, treatment recommendations are therefore based on clinician experience, expert consensus or local prescribing practice. Previous research into mental health nurses' PRN medication decision- making has indicated that they will draw on situations from the past and adopt strategies that worked, while avoiding those that did not (Baker, Lovell and Harris, 2007; Usher et al., 2009).

It is likely, therefore, that P2 and P3 are drawing on previous experiences of PRN medication administration to inform their suggestions to the patient vignettes. In general, there seemed to be a hierarchy of medications recommended by P2 and P3, with the patients exhibiting the most aggressive behaviours receiving combined medication. A tentative relationship might be suggested here, in that P2 and P3 may consider the most aggressive behaviours to be indicative of worsening psychosis, hence requiring an anti-psychotic medication.

Nurses report that the aim of giving PRN medication is to calm the patient, reduce agitated behaviour or to calm inner feelings of distress (Barr, Wynaden and Heslop, 2018). For obtaining a state of tranquilisation or sleep (sedation) the relative effect of a combination of antipsychotic plus benzodiazepine, compared with the same benzodiazepine alone is RR 0.84 (95% CI 0.59 to 1.19) (Zaman et al., 2017). It is notable that P2 and P3 used the combination of medications when patient vignettes indicated heightened levels of aggression with violence directed towards staff, even if the symptom scores were not correspondingly high. This suggests a form of decision- making rationality based on perception of 'what works'.

P1, by contrast, recommended medications for only five of the patient vignettes, with benzodiazepines the preferred option. Of the three participants, P1 was younger and had been qualified for the least amount of time. The recovery model of mental health care has been influential in guiding services and care (Cleary et al., 2013) since the early years of the new century. P1 is likely to have trained and practiced whilst this model was becoming more dominant than the medical model.

The recovery- oriented model of mental health care emphasises collaborative decision- making with patients, focussing on a strengths-based approach to build resilience in the recovery journey (Cusack, Killoury and Nugent, 2017). Although use of PRN medication has been argued to be not incongruent with the recovery model (Moreblessing and Doyle, 2019), recovery-focused techniques such as de-escalation or psychosocial interventions promote self- regulation and coping, improving long- term outcomes for patients (eg as described in Slade et al., 2014).

Patients report a preference for methods other than PRN medication to help with anger or agitation (Sullivan et al., 2005). Consistent with a recovery approach, the first principle of helping agitated or aggressive patients is to identify the reason behind the behaviour before responding (Lim, Wynarden and Heslop, 2019). It is possible that P1, having trained more recently than the other participants, is more familiar with recovery-oriented techniques. Looking at the symptom severity scores, likelihood of giving medication and suggested medications, P1 appeared less likely to attribute behaviours exhibited in the patient vignettes to 'symptoms', suggesting P1 attributed the behaviours to something else.

4.15.3 Variation in decisions by nurses' use of and weighting of cues related to patient agitation

The third aim of the survey study was to determine how much variation in decisions can be explained by nurses' use of and weighting of cues related to patient agitation. Regression analysis was not used as originally planned, so a linear model of participants' decisions is not available. However, the findings and discussions above indicate that aggressive and violent behaviour was a 'red flag' for P2 and P3. For these two participants, these behaviours seemed to outweigh any others, including whether the patient in the vignette was judged to be co-operative or not.

Some patient vignettes garnered broad agreement between participants- numbers 7, 9, 22 and 28. These patient scenarios identified low levels of agitation. Participants rated symptom severity low, and were not likely to give a medication. The patients were a low risk of harm to themselves or others. Other vignettes within the three completed surveys are useful however, as some were more sensitive in picking up within and between- subject variation.

In a revised version of the survey, vignettes that are most informative at detecting variation include numbers 1, 6, 12, 13, 15, 16, 17, 18, 20 and 23. Each of these vignettes highlighted variation in symptom severity and likelihood of giving medication between the three participants, and as found in some of the chart review studies, there seemed to be little relationship between these factors and medication given. Vignette 23, for example, was rated as low symptom severity by all participants, with a low likelihood of giving medication. However, the symptoms and behaviours suggested the patient was uncooperative, severely hyperactive, mildly hostile, with increasing tension and impulsivity. It isn't obvious what factors about this patient made them less likely to have high ratings or have PRN medication recommended, when compared with other patients with similar behaviours such as vignette 5.

Vignettes to leave out of a revised survey would be those that showed the least variation in response. Where there was general agreement in symptom severity and likelihood of giving medication (vignettes 4, 7, 8, 9,

10, 11, 14, 19, 21, 22, 24, 25- 28 and 30), the vignettes are not sensitive enough to detect variation.

In essence, the construction, administration and findings from the final version of the survey constitute a pilot study. Pilot studies aim to test the feasibility of methods and procedures that are intended to be used in larger scale research (Leon, Davies and Kramer, 2011). A number of amendments would result in a more robust survey, which could result in improved response rates.

Firstly, reducing the number of vignettes would result in a shorter questionnaire therefore less of a time burden for participants. Evidence of optimum length of surveys is inconsistent (Sahlquist et al., 2011). Response rates have been found to decrease if a survey exceeds twelve pages (Dillman, 2000). Certainly the survey for this study was in excess of 30 pages; this could be seen as off-putting.

Secondly, the recruitment of participants could involve greater coverage. For this survey, staff within NHS hospitals were approached. However, data protection and research governance legislation has been argued to make recruitment difficult due to the layers between researchers and potential participants (Ewing et al., 2004). To overcome this, social media based mental health interest groups for nurses, plus personal professional contacts could be used- there is evidence that this can enhance recruitment (Topolovec- Vranic and Natarajan, 2016). In addition, snowballing can also aid recruitment (Addor et al., 2015).

Thirdly, involvement of mental health nurses to review the survey could enhance the design. Since completing the qualitative study, it has become clear that the giving of PRN psychotropic medication is contextual and depends as much on individual participant factors as much as those of patients. It is likely, therefore, that the reductive information included in the vignettes did not allow participants to answer in a way that had correspondence with what they might have done in real life. Furthermore, research that is seen as having limited relevance to participants is unlikely to be valued. Co-design of research, that involves end- users (in this case mental health nurses), can orientate questions and methods to align with their priorities as well as those of the researcher (Slattery, Saeri and Bragge, 2020).

4.15.4 Should PRN medication have been given?

The final aim of the survey was to determine the correlation between mental health nurses' use of cues and that of a panel of mental health experts, in determining whether patients should receive PRN medication.

The social judgement design had potential to explore the significant factors used as presented in the vignettes. Via the lens model calculations, the correspondence of the nurses' judgements could have been compared against a gold standard. This was the intention of the study, however based on the low response rate, a panel of experts was not convened to identify such a response. Further reflection also suggested that due to the contextual and social nature of PRN medication giving, there may not be a single, correct response about whether a medication should be given or not.

Furthermore, there have been attempts to study nurses' judgements using social judgement theory (eg Thompson et al., 2008). They highlighted that variation noted in their study could be an artefact of the method used, in that vignettes present only partial information and have limited correspondence with real life situations.

4.14 Chapter Summary

The aim of this survey was to use experimental methods to examine the nature and extent of variation in nurses' judgements, given the same information. Social judgement theory was used to develop vignettes, ensuring ecological validity. Surveys were distributed to five NHS Trusts, and design modifications had to be made to the survey in response to feedback from potential participants and the low response rate. Of the final version, three surveys were returned. These responses have been able to inform future design of a revised survey, using vignettes sensitive to variation in participants' responses. The responses show variation for certain vignettes, particularly those indicating aggressive or violent behaviour.

Chapter 5: Qualitative Think Aloud and Knowledge Audit Study

5.1 Introduction to the chapter

This chapter describes the methodology and methods used for the qualitative study presented in this thesis. The chapter begins with a reminder of the research question and aims of this study. Next, the study design is described, followed by the data collection process, concluding the chapter with approaches to data analysis.

5.2 Theoretical orientation of study 2

The decision- making models used as theoretical frameworks for this second study were the recognition- primed decision model (RPD), and hypothetico- deductive reasoning (HDM). The value of both the RPD model and hypothetico- deductive reasoning are that they suggest potential explanations for variation in mental health nurses' use of PRN psychotropic medication. Firstly, differences in experienced and less experienced nurses' knowledge structures, and consequently decision- making strategies would be expected. Secondly, as a result of those differences, variation in outcome could occur. These two considerations form the focus of this second study.

5.3 Research question and aims

The overarching question for this thesis was to investigate the factors that qualified mental health nurses use when making decisions to give PRN psychotropic medication. The survey study (Chapter 4) aimed to test whether variation existed in the decisions made by qualified mental health nurses (MHN). A number of vignettes were provided that varied in the attributes of patient agitation, mental health diagnosis, gender and age- these attributes were drawn from the literature as reasons for variation in

PRN medication giving. The initial aim of this second study was to seek possible explanations for the decision- making of MHNs identified in the survey- that is, whether they gave medication or not. However, this exploratory mixed-methods design has not been possible because of the very low response rate to the survey. Nonetheless, I believe that this qualitative study is able to stand on its own as a piece of research.

Qualitative study aims

This study aimed to answer the following research questions:

1. What are the reasoning strategies used by mental health nurses when deciding to give or withhold PRN medication?

2. What knowledge informs their decisions to give or withhold PRN medication, or consider an alternative therapeutic strategy?

3. How do differences in reasoning between experienced and less experienced mental health nurses contribute to variation in practice?

5.4 Study methodology

To summarise, the empirical research literature about how nurses make decisions to give PRN medication for agitation suggests that:

- There is variation in the medications given, doses and routes of administration

- Administration is guided by experience and decisions are often made intuitively

- The decision to give medication is influenced by a number of factors including knowing the patient, recognising patterns of behaviour, drawing on situations from the past and adopting strategies that

worked, while avoiding those that did not (Baker et al., 2006; Baker, Lovell and Harris, 2007a; Usher et al., 2009)

- Studies done to date have been useful to reveal the outcomes of decisions. The small number of qualitative studies completed have established nurses' attitudes and preferences for PRN medication in mental health settings, and the decision- making processes. One of these studies used two vignettes to explore what nurses would do in the given scenarios. However, none of the studies to date has explored the decision- making process using cognitive, decision-making methods of enquiry

Therefore, this study aims to contribute to understanding how nurses make these decisions using methods drawn from the field of decision-making.

5.5 Study design

As described on page 169, the aim of this second study was to explore in more detail the decision- making processes used by nurses when deciding whether to give PRN psychotropic medication for agitation. Though empirical literature indicates variation in medication giving, there has been little attempt to discover why this occurs, and the mechanisms behind it. There are many reasons why variation occurs within healthcare systems (Appleby et al., 2011). The focus of the current study was specifically on the decisions made by individual MHN. To understand the knowledge, reasoning and outcomes of these decision- making processes cognitive task analysis (CTA) methods were used. In broad terms, CTA methods provide a systematic way of examining decisions in order to understand them. What follows is a very brief overview of the development of CTA, provided so that the choice of CTA methods for this study can be justified.

5.5.1 Development of CTA

Contemporary CTA methods have developed from a number of different scientific fields. Alongside rejection of normative theories of decision-

making as being sufficient to explain how people make decisions in the real world, studies of how people interacted with their workplaces, systems and tasks in order to get the job done became a focus for research during the late 20th Century. This was a significantly different approach to studying decision- making in a controlled laboratory setting. Prompted by disasters like the Three Mile Island nuclear meltdown in the United States, psychologists began to study human cognition in complex, high-consequence settings (Crandall, Klein and Hoffman, 2006). At the same time, European task analysis studies highlighted that the cognitive capacities of the decision- maker were important, but also that they made decisions within the context of the larger workplace system, with its own values and goals (Crandall, Klein and Hoffman, 2006).

Studies of the workplace from the ethnographic tradition highlighted how the circumstances or context within which decisions were made were as important as any pre- prepared mental or physical plans, and that both had importance in shaping how decisions are made (Suchman, 1987). The NDM paradigm of research into decision- making also arose out of these developing traditions- as Crandall, Klein and Hoffman (2006) explain, the various scientific communities studying workplace cognition cross- fertilised each other's thinking.

However, of central importance to all of these research strands is the workplace or real- world setting (Crandall, Klein and Hoffman, 2006). Therefore, this study needed to take into account the types of decisions that MHN would make in the course of their daily activities. In addition, the study needed to be able to capture the thinking and reasoning processes of MHNs. Fieldwork in CTA can use methods such as experimental- type tasks, observation in the field, or interview- based techniques. The survey study (Chapter 4) was intended to be the experimental part of this study. For Study 2, observation on mental health wards was discussed but discounted because of the unpredictability of observing PRN medication giving, that is the need to be in the right place at the right time. Therefore, interview- based techniques using a qualitative approach were the most appropriate methods for data collection. The next sections outline the specific CTA methods used for data collection-think aloud using vignettes, and knowledge audit.

5.5.2   The think- aloud (TA) method

TA is defined as:

"The concurrent verbalisation of thoughts while performing a task."
(Ericsson and Simon, 1993.) The seminal research into the use of TA as a
method of data capture was by Ericsson and Simon in 1980.

This method has been widely used in many areas of psychology, for
example sports, education and software engineering (Guss, 2018). TA has
also been used to study expert- novice differences- the classic TA paper
examined differences in approach to mechanics problems (Chi, Feltovich
and Glaser, 1981). Chi, Feltovich and Glaser found that experts took time
to understand the problems in terms of mechanical principles, whereas the
novices used a more superficial approach. TA has also been used to study
decision- making in healthcare, for example nurses' decision- making for an
acute medical or surgical patient problem (Lamond, Crow and Chase,
1996); paediatric nurses decisions about pain management (Twycross and
Powls, 2006), and the decision- making processes of doctors diagnosing
and managing venous thromboembolism in patients with advanced cancer
(Johnson et al., 2012). The value of think aloud is that it provides 'rich
verbal data about reasoning during a problem- solving task' (Fonteyn,
Kuipers and Grobe, 1993). It enables capture of the knowledge used,
including its content, representation and organisation, and cognition (for
example attention, perception and memory) (Hassebrock and Prietula,
1992).

This method was particularly well- suited to studying mental health nurses'
decision- making for two main reasons. Firstly, a variety of research
methods have been used to study this issue to date; however, only one
(Usher, Baker and Holmes, 2010) used two vignettes in a think- aloud study
to understand whether nurses would give PRN medication. Since then,
mental health nursing has developed approaches to inpatient care such as
the Safe Wards model (Bowers, 2014) which aims to reduce conflict and
containment, reduce flashpoints and make wards safer for patients and
staff. Using TA to understand contemporary nurses' reasoning offered an
opportunity to update the research by Usher, Baker and Holmes, (2010).

Secondly, the small number of qualitative studies of MHN PRN decision-making have used semi- structured interviews to understand attitudes and decisions to giving PRN medication (for example Baker, Lovell and Harris (2007a), Usher et al., (2009), Usher, Baker and Holmes (2010)). These studies have highlighted attitudes, barriers and reasons for giving PRN medication, which is valuable. However, they have used a generic qualitative approach. For those who want to understand more about a little-researched problem, using generic qualitative methods offers a practical way forward as they can avoid becoming engaged in debates about philosophical and methodological approaches to qualitative research whilst still exploring their research question (Caelli, Ray and Mill, 2003). I argue that the aim of these studies was that:

"they simply seek to discover and understand a phenomenon, a process, or the perspectives and worldviews of the people involved" (Merriam, 1998, p. 11)

The value of using TA with vignettes as a stimulus enables the important cues perceived in decisions to be elicited, the structure and sequence of reasoning processes to be made visible, and the mental models, or relationships between cues, interpretations of the cues and care goals to be drawn. In this way, the sense that MHN make of situations that lead them to give or withhold PRN medication can be made explicit. Results will be specific to the vignettes and the within- subjects design will allow comparison of the reasoning processes used, so novice- expert differences can be made visible.

5.5.3   *Disadvantages of the think aloud method*

There are some potential disadvantages to using think aloud as a method of data collection. This section identifies key concerns, and the methods used within this study to overcome them. Concerns about the validity of verbal reports centre on two issues- non- veridicality and reactivity (Harte and Koele, 2001).

Veridicality is defined as 'coinciding with reality' (Collins Dictionary, 2016). Non- veridicality, therefore, relates to how well verbal reports differ from the

truth of someone's thought processes, as thoughts may go unreported or even be made- up. TA is based in the information- processing paradigm of decision- making. As discussed earlier, information pertinent to decisions is held either in short- term memory or, as expertise is gained, in long- term memory. Because of bounded rationality, the amount of information held in short- term memory is argued to be limited to 3- 5 items or 'chunks', eg Cowan (2010). As thoughts occur during the TA exercise, some may be held only briefly before being superseded by others (Charters, 2003). Also, only information that is heeded or noticed will go into short- term working memory.

In addition, unreporting may be of particular concern when studying the reports of experts. As their reasoning style is likely to be more intuitive than that of novices they may be unaware of the precise factors that led them to a particular decision, and therefore unable to verbalise accurately (Wilson, 1994). However, it has been argued that as experts are known to monitor their performance in order to improve, they *are* likely to be able to describe their thoughts (Ericsson and Simon, 1980).

To overcome these difficulties, a number of strategies were employed.

- Careful instructions about the TA method were given to each participant. This included a simple example to illustrate the process, such as imagining I had lost my keys then verbalised my thoughts on how I would go about finding them. Participants were also given opportunity to prepare by thinking aloud using a simple practice vignette. No participants took up this offer

- To help capture unreported data the verbal reports were reviewed with each participant at the end of each vignette (recommended by Van Someren, Barnard and Sandberg, 1994)

- Care needed to be taken to use prompts judiciously. When participants fell silent, but could be seen to be thinking, they were prompted to keep talking aloud. Also, Ericsson (2003, p15) states that prompts that ask participants to go beyond immediate recall are highly likely to be inaccurate and not representative of immediate,

internal thoughts. This includes 'why' questions, as in 'why did you choose that option?' As Ericsson argues:

"As subjects can access the end-products of their cognitive processes only during perception and memory retrieval, they cannot report why only one of several logically possible thoughts entered their attention and thus must speculate to generate answers to such questions."

Throughout the interviews, I was conscious of avoiding verbalisations of my own that would either let participants stray away from their reporting, or become leading questions. I tried to keep prompts to sounds or words of acknowledgement and encouragement, such as 'go on' or 'hmmm'. However, on occasion, I did need to ask participants to make something explicit to enable a full picture of their heeded information to emerge on data analysis. A good example is here. The participant read the vignette and began their think aloud. At the end of the first section of speech, they said this:

"She might be anxious just about being in a new environment. It might be…quite often other patients can cause a new patient to be unsettled and frightened." (PI5 L31-32)

From what the participant said, the precise cues they had used to consider the patient to be anxious or frightened were not clear. I had to ask, so I tried to phrase the question carefully by reflecting back to the participant the exact words they had used:

"So what speaks to you in that one, that makes you think that she is unsettled or frightened?"

Knowing when to ask a question was a matter of judgement. The rule I tried to follow was to not interrupt participants' thought processes. If they were verbalising well and 'on a roll' I would not interrupt them, but instead made a note of the point that needed further clarification so it could be asked later. Often, the question became irrelevant or it was answered as the interview went on. For the example cited above, however, the question needed to be asked promptly after the participant's response because of

thoughts in working memory becoming quickly superseded as the task goes on.

Reactivity concerns the potential influence of verbalisation on the way the decision is made, bearing in mind that people are known to change their behaviour when being studied, for example the Hawthorne effect. Reactivity can work in two directions- positive reactivity, whereby participants' report behaviour changes for the better, or negatively, where performance is impaired (Double and Birney, 2019).

Ericsson and Simon (1993) reviewed the literature on think aloud studies, and found that although the process can slow down thinking as participants have to take time to verbalise their thoughts, it does not change the sequence of thoughts. This finding has been confirmed in more recent studies, for example a meta-analysis of studies by Fox, Ericsson and Best (2011). They found that where participants were asked to only verbalise their current thoughts reactivity did not occur, whereas if they were asked to go beyond and explain their thinking, positive reactivity resulted. The additional thinking needed to form these explanations can result in participants finding better solutions to the problem at hand (Fox, Ericsson and Best, 2010). Returning to prompts and questions used in this TA study, they were chosen carefully to avoid the participant having to disrupt their thoughts with explanations of why they responded in a particular way.

Ericsson and Simon (1980) further recommended avoiding use of tasks that result in high cognitive load for the participants, as verbalising would be too difficult whilst working through the task. Using written text reduces cognitive load, as the participants do not have to rely on memorising scenarios and can refer back if needed. They also suggested avoiding those that are too simple, as the cognitive process would be too automatic for experts, which again would make verbalisation difficult. The pilot of the vignettes for study 1 indicated that the vignettes were not too demanding, and that there were sufficient variables within each for some thinking to be needed.

In designing the think aloud study, consideration was given to whether to ask participants to verbalise their thinking concurrently or retrospectively. Advocates of the method agree that the concurrent method is best as it prevents participants from mixing current with past knowledge (Payne, Braunstein and Carroll, 1978), or providing post- hoc justification for

decisions. Kuusela and Paul (2000) compared directly the two forms of verbal report, and concluded that concurrent reports provided significantly more information about the decision process including discussion of need, features of alternatives and comparisons made. Retrospective verbal reporting on the same task, however, revealed more statements about the final outcome. Therefore, as this study sought to explain sources of variation among mental health nurses making decisions to give PRN medication, concurrent reporting was required.

5.6 Development of vignettes for use in TA

As this qualitative study required concurrent reporting, new vignettes needed to be developed rather than recycling those used in the survey, as the original aim was to use the same participants for the survey as well as this CTA study. The development of vignettes for the survey resulted in unused cases- these were used as the basis for the vignettes for this second study.

However, for this study, an additional feature was incorporated into the vignettes. Studies of mental health nurse's decision- making suggests that agitation is the most common reason for administration of PRN medication, and within that, aggression is the feature that leads most frequently to medication administration (Bowerset al., 2013). Therefore, if it is accepted that aggression is the single factor that leads most often to PRN medication administration, holding this constant in the vignettes whilst manipulating other factors could reveal information about the decision- making process, to allow greater understanding of the critical factors involved.

Aggression is represented in the vignettes using definitions from the Positive and Negative Syndrome Scale- Excited Component (PANSS- EC) (Kay, Fiszbein and Opler, 1987). The attribute that encompasses aggression within the scale is poor impulse control, and has a range from absent (definition does not apply) to extreme (the patient exhibits homicidal, sexual assaults, repeated brutality, or self- destructive behaviour, requiring constant direct supervision or external constraints because of inability to control dangerous impulses) (Kay, Fiszbein and Opler, 1987). Patients exhibiting this extreme level are likely to be cared for in a Psychiatric

Intensive Care Unit (PICU) - as this study concerns mental health nurses from acute units who are unlikely to care for patients who are so severely ill, the level of 'moderate severe' was chosen for the vignettes: 'patient exhibits repeated impulsive episodes involving verbal abuse, destruction of property, or physical threats. There may be one or two episodes involving serious assault, for which the patient requires isolation, physical restraint or PRN sedation'.

The remaining seven factors (age, diagnosis, gender, hostility, unco-operativeness, tension, hyperactivity) were already incorporated in the vignettes. Four vignettes were chosen for this study from those already produced (but not used) to represent a range of these other seven factors, with the addition of holding poor impulse control constant at moderate severe. The vignettes are reproduced in Chapter 6.

5.7 Knowledge audit

The second CTA technique used in the study was the knowledge audit (KA). KA is a technique for studying how experts perform skilfully within their domains (Militello and Hutton, 1998). KA is described as being particularly useful for researchers new to CTA (Crandall, Klein and Hoffman, 2006) as it provides a streamlined set of structured questions that give a breadth of information about decision- making in context. This method has been tested and validated in previous research (Crandall, Klein and Hoffman, 2006), and was particularly appropriate to this study of variation in PRN administration as the questions developed were drawn from empirical studies of decision- making differences between novices and experts. It provides a valuable complement to the think aloud method as it allows nurses to draw upon their clinical experience to identify key considerations when managing patient agitation. The purpose of the KA therefore is:

> "to identify specific skills and perceptible patterns in the context of the situations in which they have occurred, and the expert's specific strategies for dealing with those situations" (Crandall, Klein and Hoffman, 2006, p89).

To do this, KA explores eight dimensions of expertise (Militello and Hutton, 1998), which are: past and future, big picture, noticing, tricks of the trade (reworded from the original to be suitable for UK nurses), improvising/ spotting opportunities, self-monitoring, anomalies and equipment difficulties. Table 36 displays the questions and their theoretical underpinnings.

Description	KA question
1 Past and future: Experts know how the situation developed and know where the situation is going (de Groot, 1946/1978; Endsley, 1995; Klein and Crandall, 1995; Klein and Hoffman, 1993).	Is there a time when you walked into the middle of a situation with an agitated patient and knew exactly how things got there and where they were headed?
2 Big picture: Experts understand the whole situation and understand how elements fit together (Endsley, 1995; Klein, 1997).	Can you give me an example of the big picture for managing patients with agitation? What are the major elements you have to know and keep track of?
3 Noticing: Experts can detect cues and see meaningful patterns (de Groot, 1946/1978; Klein & Hoffman, 1993; Shanteau, 1985).	Have you had experiences where part of a situation just "popped" out at you, where you noticed things going on that others did not catch? What is an example?
4 Tricks of the trade: Experts can combine procedures and do not waste time and resources (Klein & Hoffman, 1993).	When you do this task, are there ways of working smart or accomplishing more with less- i.e., tricks of the trade- that you have found particularly useful?
5 Improvising/opportunities: Experts can see beyond standard operating procedures and take advantage of opportunities (Dreyfus & Dreyfus, 1986; Shanteau, 1985).	Can you think of an example when you have improvised in this task or noticed an opportunity to do something better?
6 Self-monitoring: Experts are aware of their own performance and notice when performance is not what it should be and adjust to get the job done (Glaser & Chi, 1988).	Thinking about managing agitated patients, can you think of a time when you realized that you would need to change the way you were performing in order to get a job done?

7 Anomalies: Experts can spot the unusual and detect deviations from the norm (Klein & Hoffman, 1993).	Managing agitated patients, can you describe an instance where you spotted a deviation from the norm or knew something was amiss?
8 Equipment difficulties: Experts know equipment can mislead and do not implicitly trust equipment as novices might (Cannon-Bowers, Salasand Converse, 1993).	Have there been times when policies/ procedures pointed in one direction, but your own judgment told you to do something else? Or when you had to rely on experience to avoid being led astray by the policies/ procedures?

Table 36 Knowledge audit questions

Source: Adapted from "Applied Cognitive Task Analysis: A Practitioner's Toolkit for Understanding Cognitive Task Demands," by Militello and Hutton, 1998, Ergonomics, 41(11), p. 1622. Copyright 1998 by Taylor & Francis (www.tandfonline.com). Reproduced with permission from the publishers.

Because the questions are drawn from empirical work exploring expertise, knowledge types including 'perceptual skills, mental models, metacognition, declarative knowledge, analogues and typicality, and anomalies' (McAndrew and Gore, 2013, p184) are highlighted.

For the KA, each participant was asked to think about instances when they were directly involved in a decision to manage an agitated patient. This could have been a single, salient occasion, or several situations- either were suitable as KA aims to elicit examples of knowledge in each of the eight dimensions detailed above. For each question, probes were used to elicit the cognitive processes used by participants. These included questions about the cues and strategies used, how participants know what they know in particular situations, and difficulties that novices might have in the same situation. For example, this excerpt from interview 11 illustrates questioning about cues and strategies in relation to the big picture of managing agitation:

P*: "Sometimes you can just sense, you walk onto the ward and you know it's just going to keep building, keep building, until something changes, and..."* (P11 L897)

I: *"What tells you that? Can you put your finger on it?"*

P: "*Oh the tension on the ward, you look at the staff, who will be looking at you in a certain way, or the patients would be … [sentence continues]*" (P11 L903)

Later on in the interview for the same question, perceived novice- expert differences were probed:

I: *Do you think inexperienced staff or junior staff do things differently?* (P11 L915)

P*: I think so. I do think so in a certain way, that's about confidence and that's about your, as I say you've all got your own toolkit you know.*

5.8 Research methods

5.8.1 Introduction to methods used within the study

Having justified the use of think aloud and knowledge audit as suitable approaches for understanding the knowledge, thinking and reasoning of mental health nurses, this section of the chapter explains and justifies the use of the specific methods of data collection, sampling, and analysis. Excerpts from the interviews will be used to illustrate each of these stages. During the study, a reflective diary was kept to record impressions, assumptions and thoughts about how my own position as a researcher impacted on the study and the data analysis. A summary of these reflexive thoughts will be outlined. The chapter will conclude with a discussion of the trustworthiness of data collection and analysis methods.

5.8.2 Summary of data collection and analysis methods used in the study

In keeping with the overall aim of the study, which was to explore novice-expert differences as a potential explanation for variation in PRN decision-making, data were collected via the use of semi- structured interviews using

the above techniques. To reduce heterogeneity of the sample, only qualified mental health nurses from acute, inpatient settings were involved. Interviews were conducted either in the participant's workplace, or if preferred by the participant, at my workplace (a local University). Each interview was recorded using a digital recorder, and the length of the interviews ranged from 59 minutes to 1 hour 38 minutes. In- depth discussion of the processes used is presented below.

5.8.3 Sampling

This section is structured according to the framework provided by Robinson (2014) which is useful to ensure all elements of the sampling procedure are reported.

Defining the participants

The sample for the study 2 was drawn from qualified mental health nurses. The heterogeneity of the sample was balanced between work setting and experience.

Inclusion criteria

Nurses were eligible to take part if they met the following criteria:

- Qualified mental health nurses
- Working in acute, adult inpatient settings

Nurses were excluded from the study if they:

- Were unqualified staff or student nurses
- Worked in areas such as rehabilitation, that is, non-acute settings
- Worked in child or adolescent mental health services

To be able to compare novice- expert differences, staff of any number of years' experience or grade were eligible to participate in the study. The

differing levels of experience provided the heterogeneity in the sample. Unqualified staff and student nurses were excluded because although they may participate in the process of assessing for or giving PRN medication, the responsibility and accountability for the decision lies with the qualified staff. Rehabilitation settings were excluded as they care for people with long- term illness who cannot manage independently in the community (NHS Confederation, 2012). Acute settings care for the most ill patients, compulsorily or voluntarily detained. For the purposes of this study, this includes psychiatric intensive care units (PICUs)- these are small units where patients who present a grave risk to themselves or others are admitted, for stabilisation of an acutely disturbed phase of serious mental health illness (NHS Confederation, 2012). Also included were acute dementia units, where patients are admitted with serious behavioural challenges for which assessment is needed. Child and adolescent services were excluded because of their specialist nature and differences in how medications are licensed and used for young people.

5.8.4 Sample size

The question of sample size involved consideration of how many participants would be enough. Initially, I argued that the sample size need only be large enough to highlight differences between novices and experts in reasoning strategy and organisation of knowledge on any decision to give PRN psychotropic medication. Therefore, the sample could, theoretically, be as few as 2 participants- a novice and an expert. However, further thought about the aims of the research led me to revise this approach. Empirical studies of expertise agree that the high performance standard shown by experts is domain specific- that is, if they move to a less familiar domain, the standard of performance deteriorates (Thompson and Dowding, 2009a). I assumed that this would also hold true for less experienced staff. Therefore, as the vignettes represented four acute inpatients of different age, gender and diagnosis, I hypothesised that performance would depend on similarity of the vignette to patients met in the participant's own workplace. A sample of greater than two would therefore be needed.

The concept of data saturation was considered to identify an initial sample size for the study. This is a contested concept, and a full discussion is beyond the scope of this chapter. Estimating sample size in qualitative research has resulted in a variety of numbers, with and without rationale, however recent studies have attempted to research their coding and have suggested an empirically- founded number for qualitative sampling. Guest, Bunce and Johnson (2006) found that 92% of the total number of codes had been achieved after twelve interviews (out of sixty). Code definition revisions too became progressively less frequent, with most having occurred by the twelfth interview. The majority of important codes (97%) were identified early on, again by the twelfth interview. This study therefore also highlights multiple views of what saturation might mean- frequency of codes in the study, stability of code definitions, and salience of codes. An important point made by Guest, Bunce and Johnson (2006) is that their study sample was relatively homogenous, the questions were guided by a semi- structured interview guide, and the research had a narrow focus. The sample for my study was confirmed as needing to be relatively heterogeneous, as described above. However, the questions would be very similar for each participant, and in exploring the cognitive aspects of decision- making, had a relatively narrow focus.

The multiple meanings of saturation are further highlighted in two studies by Francis et al., (2010). The studies derived a priori codes for data analysis from the Theory of Planned Behaviour, however alongside data analysis the authors also measured when saturation of codes was reached. In study 1, saturation was achieved for the whole study by seventeen interviews, but each belief category achieved saturation at a different point. In study 2, saturation was achieved in one belief category but not the others after fourteen interviews, so saturation was not reached. Therefore, saturation can also apply to the study as a whole or by individual construct (Hennick, Kaiser and Marconi, 2017). The measures of saturation identified by Francis et al., (2006) were particularly relevant to my study as it too began with a deductive approach to data collection and analysis. Further nuances of saturation were outlined by Hennick, Kaiser and Marconi (2017). Using a combination of deductive and inductive data analysis coding, they found that code saturation can be achieved in as few as 9

interviews; however to understand the multiple meanings of each code, 16 to 24 interviews were needed.

Taking these studies into account, I initially proposed that more than 9 interviews would be needed to achieve meaning saturation. I originally proposed that sampling would stop, therefore, once meaning saturation has been reached in both the TA and KA sections of this study.

5.8.5 Was saturation reached?

For the both elements of this study, I am certain that theme saturation was reached as no new themes needed to be developed by the final interview. In addition, because I added to each theme by going through interviews in the order in which they were conducted, I can verify that for the theme of 'what signs might indicate', the final entry was made from P12 out of 15. This confirms that for this construct, meaning saturation was reached.

Similarly, for the theme of 'interventions', the final entry was from P10 vignette 4:

'Because I think if you move somebody to Intensive Care, you perhaps lessen the amount of PRN that you give to manage the situation.' L556

5.8.6 Sampling strategy

The sampling strategy was one of convenience. This was a pragmatic decision, taken with consideration for the contemporary demands of acute mental health services. Ideally, a purposive sample of nurses of different clinical grades would have been obtained- however, based on responses to the survey, staff availability and motivation to participate was presumed to be low. This therefore mitigated against a more purposeful sampling strategy.

In addition, gaining access to participants was mediated by gatekeepers within NHS Trusts. In setting up each study, I met with senior nurses to explain the aims and methods of the study, and followed up these meetings

with publicity flyers and more detailed information. The senior nurses then cascaded the information to ward management. From there, participants identified themselves, or were identified by ward managers to take part. This process was asked for following ethical review to ensure that as a researcher, I was not able to put undue pressure on staff to take part. Ideally I would like to have met with ward teams during team meetings, which would have meant I would be able to provide first- hand information about the study and answer any questions. However, I feel the main disadvantage of the approach I had to take was that by the time the information had cascaded down to ward staff, the key messages about the study had been lost.

To overcome some of the difficulties that I thought might lie ahead, an incentive of a £20 shopping voucher was offered, to encourage staff to take part.

5.8.7 Locating participants

As part of data collection for the first study, respondents were asked if they would be prepared to be contacted about being interviewed at a later date. At this point, agreement was for contact only and did not form consent for study 2. Five survey respondents from the original four NHS Trusts (three local in the West Midlands, one in the North of England) indicated that they would be happy to be contacted, and once HRA and local R&D approval had been gained, resulted in three interviews from the local Trusts.

In addition to this, publicity flyers were circulated to the four original NHS Trusts, and gate-keepers were contacted to spread the word and/ or ask staff if they would be happy to participate. This resulted in a further nine respondents. Two further Trusts were contacted about the study- again, after HRA and R&D approval, three more interviews were obtained, resulting in fifteen interviews in total. Table 37 summarises the number of interviews per NHS mental health Trust.

NHS Trust	Number of interviews
Trust 1 local	4
Trust 2 local	5
Trust 3 local	3
Trust 4 (Northern England)	0
Trust 5 (East Midlands)	2
Trust 6 (West Midlands)	1
Total	15

Table 37 Participants per NHS Trust

5.8.8 Characteristics of the final sample

Table 38 details the characteristics of the final sample. As part of data collection, demographic data was collected to enable analysis of novice-expert differences. In summary:

- The sample was split 40%/ 60% male/ female
- The length of time since qualifying ranged between 6 months to 32 years. The median length of time is 15 years, with a mean of 14 years 9 months
- Two of the nurses qualified with a Registered Mental Health nurse (RMN) qualification, one with a Certificate of Higher Education, four with a Diploma of Higher Education (MH nursing), two with a BSc (mental health nursing) and five with a BSc (Hons) mental health nursing
- Seven nurses were at Agenda for Change Band 5, two at Band 6 and six at Band 7
- Seven nurses worked on acute older adult units, two on an acute female unit, four nurses on a mixed gender assessment unit and two nurses on PICUs
- The time nurses had worked in their respective workplaces ranged from 6 months to 23 years. The median time is 18 months, however the mean is 4 years 11 months

- All nurses had taken part in de-escalation and behaviour management training in the past year. This included use of restraints (chemical, physical, seclusion).

Participant number	Gender	Time qualified	Qualification obtained when completed mental health nursing course	Agenda for Change band	Current type of MH unit	Time worked in this area	De-escalation techniques training in past year	Behaviour management training in past year
1	M	22 years	Diploma HE	7	Organic older adult	24 months	Y	Y
2	F	23 years	Certificate MH Nursing	7	Acute female	23 years	Y	Y
3	F	15 years	Diploma HE	6	Acute mixed gender asessment	13 months	Y	Y
4	F	6 months	BSc (Hons) MH nursing	5	Acute female	6 months	Y	Y
5	M	30 years +	Registered MH nursing qualification (pre-diploma)	6	Acute mixed gender assessment	6 years	Y	Y
6	M	7 years 5 months	BSc (Hons) MH nursing	5	Acute older adult	3 years 3 months	Y	Y
7	F	8 years	BSc MH nursing	5	Acute mixed gender assessment	3 years	Y	Y
8	F	8 months	BSc (Hons) MH nursing	5	PICU	8 months	Y	Y
9	M	8 months	BSc (Hons) MH nursing	5	Organic older adult	8 months as qualified nurse	Y	Y
10	F	20 years	Diploma HE	7	PICU	18 months	Y	Y

Participant number	Gender	Time qualified	Qualification obtained when completed mental health nursing course	Agenda for Change band	Current type of MH unit	Time worked in this area	De-escalation techniques training in past year	Behaviour management training in past year
11	F	7 years	BSc (Hons) MH nursing	7	Acute mixed gender assessment	7 months	Y	Y
12	F	31 years	Registered MH nursing qualification (pre-diploma)	7	Functional older people mixed gender	9 years	Y	Y
13	F	20 years	Diploma HE	7	Functional and organic older adult	18 months	Y	Y
14	M	12 years	BSc MH nursing	5	Functional and organic older adult	6 months	Y	Y
15	M	32 years	Registered MH nursing qualification (pre-diploma)	5	Function al and organic older adult	20 years 6 months	Y	Y

Table 38 Characteristics of sample

5.8.9 Interview conduct and transcription

Participants were given the option of having their interview in either their workplace or mine (a local university). All nurses were happy to have interview in their workplace with the exception of P1 and P6, because the interviews took place when they were on leave. We ensured that where possible a quiet, private room was used to minimise disturbances and allow the participants to feel that they need not withhold information that might be perceived as controversial or illustrative of poor practice. Notes were taken during each interview to record points of interest that I felt needed further probing to fully understand, for example what cues informed a participant's initial impression of what was going on in a vignette. The interviews took place between November 2017 and June 2019.

The interviews were recorded using a hand-held digital recorder, with the data then uploaded to a password protected computer. The file on the digital recorder was then deleted. I transcribed the first three interviews, and a professional transcription service was used for the remaining twelve interviews. Each transcription was read whilst listening to the interview recording to ensure accuracy and also to familiarise myself again with the content of the interviews. As the analysis of the interviews was not going to use discourse analytical methods it was not necessary to represent such things as word emphasis or hesitations of speech. Each transcription and audio file was then uploaded to QSR NVIVO Version 12 to facilitate data analysis, along with the demographic data collected from each participant.

5.9 Data analysis for think- aloud method

The approach used for analysing data from the think- aloud part of the study was framework analysis (Ritchie and Lewis, 2003) as detailed by Gale et al., (2013). Framework analysis was chosen for three reasons. Firstly, it does not have allegiance to either inductive or deductive coding. This was important because I anticipated that the analysis would need to go further than simple attribution of codes deductively, and an element of induction would be required. Secondly, the flexibility afforded by framework analysis also corresponded to the theoretical approach of CTA as it has not

developed out of particular philosophical approaches that shape analysis. Thirdly, framework analysis allows commonalities and differences in the data to emerge, and relationships to be explored to facilitate exploration of nurses' reasoning.

5.9.1 Stage 1 of data analysis

Initially, data was analysed according to a protocol used previously by Johnson et al., (2012), Twycross and Powls (2006) and Lamond, Crow and Chase (1996). This protocol is based on the premise that nurses' clinical reasoning is different from medical reasoning, in that nurses emphasise assessment and management of patient problems rather than make diagnoses. As such, the protocol reflected the nursing process of assessment, planning, goal setting and implementation. This initial coding framework consisted of the categories outlined in Table 39. The colours are provided as I used these to help with analysis of each participant's responses.

Decision- Making Strategy	Definition
Collect	Reading/ looking at the data, observing patient, communicating with patient or other team member
Interpret	Interpreting the data
Goal	Aim of the activity/ process
Plan	Organisation of the activity/ process to achieve a goal; deciding on nursing care needed
Evaluate	Evaluation of a treatment, plan or patient
Reason	Why the activity/ process is being done
Predict	Assessment of future state

Table 39 Initial coding framework

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Using each transcript in NVIVO, the codes above were applied to the data at sentence level. This facilitated breaking down the responses to each vignette into a sequence, which enabled me to visualise the reasoning used and the interplay between each element for each participant. Once this was done, I compiled each participant's response to a single vignette into a Word document to help compare and contrast responses and to establish commonalities and differences. I discovered that it was important to keep responses in a sequence because the context in which a sentence was used contributed to its overall meaning.

Table 40 shows an example of the completed coding for P7 vignette 3 with the colours highlighted above. Some sentences required multiple codes, eg row 4 in this example, where P7 would collect more information and also gave the reason why. This deductive process was useful as a beginning to the analysis as it clearly visually represented examples of each code.

Interview 7
So a female patient, 62 with diagnosis of dementia. She appears to be slightly reactive to stimuli, people walking past, particularly people she doesn't know. Can be stubborn at times but will usually comply easily with staff and activities.
you want to be, sensitive to walking past and maybe speak to her as you go past, make sure she knows who you are. We wear name badges and stuff so that really helps
She is pleasant to staff most of the time. However, you notice that she has become increasingly tense, looking nervous, fidgety in her locker and perspiring.
So straight away asking is something is wrong, because she has dementia, there might be something worrying her.
She might not know where she is, and that could have triggered for her to be nervous.
Her hands appear to be shaking. She is making verbal threats to staff to keep away. She has had a couple of episodes within the past 24 hours of lashing out and pinching at staff approaching her to help with activities of daily living. This has resulted in one member of staff needing first aid to the laceration on her skin.
when someone has got a diagnosis of dementia, you have got to remember they can't ... they might not remember where they are, who they are, what is going on…
…so when people are approaching her and trying to wash her, it is about giving her a bit of time with that and just make sure you are explaining every single thing that you do
because if some people have just started to approach you and trying to take your clothes off to wash you, I couldn't imagine ...

what is her normal routine…

…like to lie in…

…the first thing in the morning was the worst thing she hated…

so that you could get her a cup of tea first, and then talk to her about getting washed and dressed. Helping her pick her outfit and things and just try to involve her a bit more rather than just going in and trying to attend to her personal hygiene needs

Just keep talking to her really, really nice and calm tones. You know, open postures, non-hostile, just reassurance who you are and where she is

if we could check physical health that would be ideal. If she is willing to give us a urine sample

Just maybe a UTI, if there is a sudden change in presentation…She could be becoming delirious about something

So making sure there is nothing physical that you can treat to resolve that…

Because…she is usually quite compliant…

she has dementia, so the use of like antipsychotics isn't your first line treatment

You would have to…be careful with…benzodiazepines, just because if she was already slightly unsteady or already nervous…you could increase your risk of falls and then you could have a bigger damage on your hands…

If obviously she continues to be hostile, threatening, is she hurting anyone…

…is she running after you, you need to assess it because if she is just sat in a chair, just shouting at you every now and again, she is not hurting anyone…

If she was soiled, or you needed to do a personal hygiene as a duty of care, then you may have to look at that [medication]

It is just about picking your times really and just trying to stay calm and not present as frightening at all,

because she is already frightened about something.

So just lots of reassurance and again medication at a last point really

…use a lorazepam or a diazepam. If it was an ongoing thing and they wanted her on something regularly, you might do a 2 milligram of diazepam, maybe twice a day or something or three times a day.

But if it was just a sudden onset and a change that you don't think she needs regular medication for but, you could look at using the 0.5 of lorazepam.

…half-life being longer for diazepam.

Obviously the staff member needed first aid because she had a laceration to the skin

staff to be mindful that she has been lashing out I suppose.	
Why put yourself in harm's way, so if you could speak to her at a clear distance that you know is safe but at the same time reassuring her that she is safe…	

Table 40 Example of coding

5.9.2 Stage 2 of data analysis

The next stage was to develop an analytical framework. I began by using NVIVO to export all instances of each code into a Word document. However, this was not helpful due to the volume of data for some codes, in particular collect, plan and reason. Instead, I read and re- read the responses, above, and a more useful set of themes developed: patient signs, patient diagnoses, what the signs might indicate (hypotheses), tests or further information needed, patient symptoms, interventions, giving PRN medication, nursing values, using staff and the multi-disciplinary team, what could happen, and the origin of the information. This was an iterative process; some codes developed within this framework became redundant as they could be subsumed into overarching themes. For example, I began by separating information related to giving PRN medication from knowledge of medications but this seemed an arbitrary division so the two were combined together into a larger theme. Table 41 details the themes and definitions.

Theme	Definition
Patient signs	Any observable behaviour or presentation exhibited by the patient
Patient diagnoses	Any formal diagnostic label for mental or physical health conditions
What the signs might indicate	A working hypothesis developed to explain or interpret symptoms or behaviours
Tests or further information needed	Any information nurses expressed that would be needed to further inform their decision making
Patient symptoms	Internal feelings or states of being eg anxiety
Interventions	Any action of an individual or team to address the situation and care for the patient

Theme	Definition
Giving PRN medication	Any statement related to the when, how or what when deciding what medication to give PRN
Values	Statements made by nurses espousing a particular attitude or judgement
Using staff and the multi-disciplinary team	Any example of how staff can be used, or their skills and abilities, including the multi- disciplinary team
What could happen	Statements relating to what could happen in the future
Where does information come from	Any statement relating to sources of information or evidence to guide nursing practice

Table 41 Themes and definitions

5.9.3 Stage 3 of data analysis

The next process was to organise the data collected above to each
vignette. This final framework allowed comparison to be drawn between
participants in the study. The themes above were used to develop a
narrative for each vignette using the headings 'how did we get here' and
'what to do about it'. These two overarching categories were informed by
stages of the RPD model- understanding how the situation has come
about, and deciding on a course of action. Table 42 illustrates how the
themes above were allocated to these two sub-sections of the final
framework. The theme of 'where does information come from' seemed to
sit on its own as it related to both the other categories of the framework.

Code	Framework
Patient signs	
Patient diagnoses	How did we get here
What the signs might indicate	• Internal (to the patient) factors
Tests or further information needed	• External (to the patient) factors
Patient symptoms	
Interventions	

Code	Framework
Giving PRN medication Values Using staff and the multi-disciplinary team What could happen	What to do about it • The point at which medication becomes necessary • Medication choice
Where does information come from	

Table 42 Allocation of themes to framework

5.9.4 Stage 4 of data analysis

Once the themes had been generated, the next step was to re-organise each participant's data into a framework. This was done manually, though NVIVO was invaluable to locate and extract phrases. Each participant represented a row in the framework and each theme a column. Within NVIVO, memos and annotations were used to highlight interesting quotes or to act as a reminder to explore a theme with a different participant. Using this framework I was able to develop the narrative for each vignette, which are presented in the findings. Statements were selected for the narratives firstly on the basis of representativeness- where a number of participants had highlighted a similar aspect of the decision. Also, alternatives were included that showed difference from the majority- deviant cases. An example of Stage 4 is given here in Table 43.

	How did we get here internal	How did we get here external	What to do about it	When medication necessary	Medication choice
P1	he's verbally abusive and has punched the wall to avoid punching a		You try to get some understanding of it, try to be empathic L200	When he's no longer biddable, that's a key sign that we're getting to	Would not give

	How did we get here internal	How did we get here external	What to do about it	When medication necessary	Medication choice
	member of staff, that suggests he has control over his aggression L172			the end of negotiation	
P2	He seems to be nervous about something and we've noticed the hand tremor; can be potentially linked to medication L126	it's that authority, that not to be controlled L227	hoping he'll be able to engage in some kind of negotiation with us L142	he wasn't able to manage it and he wasn't able to identify triggers L148	I would go for a benzodiazepine… L150

Table 43 Example of stage 4 data analysis

5.9.5 Stage 5 of data analysis

To be able to compare novice and expert reasoning and establish if it had any impact on the process or outcome of decisions made, the final stage from the think aloud was to develop cognitive networks. The content and organisation of mental models are a key facet of the RPD model of explaining how experts make consistent, efficient decisions (Philips, Klein and Sieck, 2004, p300). Experts have richer, more coherent mental models that are able to see situations as a whole and which integrate the component parts (Crandall, Klein and Hoffman, 2006). Therefore, I felt it important use these concepts to establish if mental models provided a potential explanation for the decisions made in the vignettes. Within the

RPD model, mental models represent a causal understanding of how situations come about and where they are at the present (Crandall, Klein and Hoffman, 2006, p141).

In addition to mental models, the RPD framework suggests that experts are able to use mental simulation to project into the future (Crandall, Klein and Hoffman, 2006, p141). Based on repeated exposure, in this case within mental health settings, experts are able to work through likely future scenarios and envisage possible futures. This ability to form expectancies is another key facet of expertise, and combined with mental models allows sensemaking, problem detection and ultimately decision- making.

To represent the knowledge organisation of mental health nurses, cognitive networks were used to capture the information flows, linkages and dynamics of decision- making and allow a clear comparison to be made between experts and novices. Cognitive networks answer the question 'what may be going through a person's mind as he or she experiences a particular set of actions…? (Miles et al., 2014, p185).

5.8 Knowledge audit

This section explains the analytical process of the knowledge audit (KA). This proceeded in two stages. The original literature about KA (Militello and Hutton, 1998) did not give much information about how to go about analysis of the data apart from to suggest development of a cognitive demands table. The most helpful information came from McAndrew and Gore (2013) who used KA. They suggested that the cognitive demands table synthesises data from all participants and to do this they combined all participants' responses by KA category. In their final report, elements were selected on the basis of salience and frequency. The two stages here illustrate the process I used to develop the cognitive demands table.

5.10.1 Stage 1 of data analysis

Each participant's responses to their KA was organised into a table by question. NVIVO was used to help with the coding of data. This proceeded

deductively. The table included aspects of knowledge used, cues and strategies used, and actual or potential difficulties presented when managing agitated patients.

5.10.2 Stage 2 of data analysis

Once stage 1 was complete, I reorganised the data by question rather than by participant. This enabled me to see commonalities and differences. This stage was completed after the analysis for the think aloud study which was useful as I had built up an awareness of the difficult elements of managing patients with agitation, and of selecting a suitable intervention. The final cognitive demands table was organised into important aspects of managing patients, why this is difficult to novices, common errors and cues and strategies to overcome this.

5.9 Research ethics approvals and considerations

Permission for this study was obtained from the University of York Health Sciences Research Governance Committee and the Health Research Authority (Reference number 16/HRA/2893). Written consent was obtained from each participant. A participant information sheet (PIS) was distributed to each person who indicated they would take part in this study. The permission letter, consent form and PIS are available in Appendices 6, 7 and 8 respectively. After a cooling- off period of two weeks, I contacted them again to see if they were still willing to take part.

Completed consent forms were kept in a locked drawer in my office at the University of Worcester. They will be kept for a period of five years, after which they will be destroyed using the University's confidential paper shredding service. Audio recordings, transcriptions and coded data were digitally stored, and held on my password- protected computer, also at the University of Worcester, plus an external hard drive to facilitate data transfer to a personal home laptop. The hard drive and laptop were also password protected.

Participants were monitored for distress as use of the think aloud or knowledge audit had the potential to trigger memories of unpleasant experiences related to PRN medication administration. Should any participant have become distressed, the interview would have been stopped. Fortunately this did not happen.

I also indicated that if a participant gave answers that showed a clear lack of concern for patient safety, then the clinical lead for the relevant area would be informed in general terms to the clinical lead to raise awareness that there may be an issue with medication administration practice that they may want to follow up. This would have been expressed in general terms to assure anonymity.

Data will be held for five years then deleted completely from any device used. It was not anticipated that anyone external to the Universities of Worcester or York would want access to the data, and it was not be placed in any community databases, archives or repositories.

Results reported in papers, reports and newsletters will not include personally identifiable information. Data will be managed in accordance with the Data Protection Act (1998), NHS Caldecott Principles, Research Governance Framework for Health and Social Care (2005) and the conditions of the Health Sciences Research Governance Committee approval.

5.10   Reflexivity

Analysis of qualitative data requires the researcher to be aware of the impact of their own values and perspectives on the process of data collection and analysis. Reflexivity is a hallmark of quality in qualitative research. The view of reflexivity that I used is exemplified by this quote:

> '…the process of a continual internal dialogue and critical self-evaluation of researcher's positionality as well as active acknowledgement and explicit recognition that this position may affect the research process and outcome.' (Berger, 2015, p220)

To me, the process of reflexivity began before the interviews took place and centred around the expression of power through verbal and non- verbal communication. Mental health nurses do not wear uniforms, and having had plenty of experience through my role as a nurse educator, I was aware of the kind of clothing that MHN wore. When attending interviews I made sure to dress down to try to emulate MHN dress code. During interviews I rarely revealed that I am a nurse lecturer as I have found in other areas of life that this can alter how people interact. I did not want the participants to feel that I could be evaluating their knowledge or performance. I only revealed that I am a nurse on two occasions, and in each instance this was because the participant was trying to explain about observations. For adult nurses like me, observations mean temperature, pulse, blood pressure. For mental health nurses it generally means observation of the patient's demeanour, symptoms and well- being, and is part of risk assessment. It seemed appropriate to divulge to avoid the participant having to explain the basis and need for conducting any observations which would have wasted time. Also, I was reasonably certain that with these participants, revealing something about myself could strengthen rapport and make for a richer interview.

Furthermore, during interviews I tried to remain neutral by controlling my body language and modulating the tone of my voice. This was tested in interview eight, which was on an inner city psychiatric intensive care unit. The only space available was the unit office which was cramped and tiny. Outside the office patients were shouting, doors were banging and staff were communicating loudly with each other to be heard over the noise. I confess I was quite scared and hurried the interview along to get it over with as quickly as possible.

In addition to this, I also reflected on each interview to see if I could have done anything differently. The first interview felt incomplete- I hadn't probed certain points thoroughly enough. As the interviews progressed, I made sure to return to the aims of this study. This was helpful to remind me of the information I needed, and the best way of achieving this.

During data analysis, it was hard initially to separate my knowledge of general adult nursing and its goals and aims. Mental health nursing is significantly influenced by the recovery model, which aims to help people

with mental health illness to reach their full potential through learning coping strategies and other personalised interventions. Complete recovery from mental illness is not the aim as for some people this will not happen. I found that the ability of some of the more experienced nurses to tolerate a significant amount of abuse or hostility from patients alien to my own method of nursing. If these things happened in general nursing settings there would be a huge amount of upheaval, and security and the police would certainly be involved. I had to put this aside and in reading around mental health and recovery, was able to reconcile the personal use of self in mental health nursing as a buffer and therapy for patients. The other aspect of reflexivity was in realising that the RPD model only allows description of decision- making. My studies did not aim to establish if an intervention or medication was the right or wrong choice. To some extent I feel that this is impossible because mental health nursing is embedded in social interaction. Through completing this study, I have been able to see that the role of the self in mental health nursing is vital, and this, of course, is shaped by many factors including people's personality, prior experience and the context within which decisions are made.

5.11   Chapter summary

This chapter has provided the methods for the second study for this thesis. Cognitive task analysis methods were used, that is, the think aloud method and knowledge audit. Fifteen participants took part in the study. Framework analysis was used to analyse the data from the think aloud study, and cognitive networks were developed from a five nurses of varying degrees of experience and expertise in order to show reasoning strategies. A synthesis of knowledge audits was also conducted, to produce a cognitive demands table.

Chapter 6: Findings from the Think Aloud Study

6.1 Introduction to the chapter

The following chapter describes the findings of the think aloud section of this study. It begins with an overview table showing all participants for all vignettes if they would have given PRN medication. This offers some context for the findings that follow. The findings are presented by vignette, showing comparison between participants in terms of 'how did we get here', 'what are we going to do about it' and medication choice. Each vignette is reproduced first to aid understanding. A brief summary is given at the end of each vignette, and the chapter concludes with an overall summary of these findings. It can be seen that variation does exist in whether a medication would be given, the medication chosen and the dose that would be given. The least variation in PRN medication giving was for vignette two, a lady with dementia, while the greatest variation was vignette four, a male with schizophrenia.

A Note on Labelling

Participants will be labelled P1, P2 and so on.

Excerpts from interviews will be labelled by participant, then line. So for example, P2 L151 relates to participant 2, line 151 in the transcription of the interview.

6.2 Overview of PRN medication giving by participant and vignette

Table 44 shows at a glance how each participant responded to each vignette. Participants are ordered by Agenda for Change band plus length of experience. This is a crude ordering however, as it does not include time in current clinical area. Experience in current domain is a known factor influencing expertise. In addition, this table presumes that a Band 5 who has been qualified for 32 years has less experience than a Band 7 with a similar number of post- qualifying years. Nonetheless, Table 39 shows that

in general, the most experienced nurses were more likely to give PRN medication than the least experienced.

Participant	Vignette 1	Vignette 2	Vignette 3	Vignette 4	Total
P12	?	X	X	X	0
P2	✓	?	X	✓	2
P1	?	X	X	?	0
P10	✓	?	✓	?	2
P13	?	✓	X	✓	2
P11	?	?	X	?	0
P5	X	X	X	X	0
P3	?	?	X	?	0
P15	?	X	X	✓	1
P14	?	X	?	✓	1
P7	X	X	X	?	0
P6	X	X	?	?	0
P8	X	X	X	✓	1
P9	X	?	?	?	0
P4	X	?	X	?	0

Table 44 PRN psychotropic medication giving by vignette.

Key to Symbols

Symbol	Meaning
✓	Would definitely give PRN psychotropic medication
?	Would offer or consider it as part of overall therapeutic strategy or if behaviour escalated to a higher risk of harm
X	Would not give

As stated above, expertise is known to be dependent not only on experience but is also domain specific. That is, experts lose their ability to

function effortlessly once out of their familiar domain. To test if domain could be a factor in PRN medication decisions, the participants were reordered according to the length of time they worked in a clinical setting commensurate with that in which the patient in vignette 1 might be encountered (Table 40). Participants from P2 to P4 worked in female or mixed gender acute units. P10 and P8 worked in psychiatric intensive care units. P15 to P14 worked in older adult settings. It is hard to draw any conclusions from this- only regression analysis would show if this was indeed a significant factor.

Participant	Vignette 1
P2	✓
P5	X
P7	X
P3	?
P11	?
P4	X
P10	✓
P8	X
P15	?
P12	?
P6	X
P1	?
P13	?
P9	X
P14	?

Table 45 Medication giving by length of time in clinical setting

The rest of the chapter proceeds to explore each vignette in turn.

6.3.1 Responses to vignette 1

The vignette presented to participants was as follows:

Female patient, aged 31. No formal diagnosis of a mental health illness was available on admission.

On initial assessment she appeared hyperactive to the point where she found it difficult to sit still for longer than a few minutes at a time. Frequent outbursts of excessive shuffling, hand- wringing and moving about were observed. She was also unco-operative with staff and appeared to have a serious attitude problem. However in the past hour she has become increasingly hostile, showing frequent irritability and freely expressing anger about being in the unit. She becomes verbally abusive to staff and other patients, making threats that she will 'smack someone soon'. She appears moderately tense, and she is sweating noticeably and fidgeting when sitting and standing.

In response to Vignette 1, there is surprisingly little variation in whether participants would give medication, or the dose or route they would choose (Table 46). Most participants would avoid giving PRN psychotropic medication if possible. The majority of nurses would only give PRN medication if the behaviour of the patient escalated and she became a threat to her own safety, or the risk of violence to other patients or staff become real possibility. If they had to select a medication to give, the nurses all opted for oral lorazepam, somewhere between 0.5mg to 2mg. The dose was the main source of medication variation in this scenario. The exceptions to this were P2, who would give PRN lorazepam straight away, and P10, P12 and P15, who would encourage the patient to take PRN medication to calm them. For these four nurses, the goal of taking the medication would be to enable the patient to engage with staff, so they could discover what was behind the behaviour.

Participant number	Medication Choice
1	Would not give straight away for agitation, or at all if possible Negotiation and distraction first If escalated to physical violence would give 1/2mg lorazepam or 2mg diazepam orally
2	Would give straight away Lorazepam 1mg orally Once calm, 1-2-1
3	Would not give straight away 1-2-1, low stimulus environment If behaviour escalated and all else failed would consider lorazepam orally
4	Would not give at all if possible 1-2-1 in big space Would consider lorazepam orally if safety at risk
5	Would not give at all unless violence imminent
6	Would not give

Participant number	Medication Choice
	Engage with patient first, 1-2-1 If all else failed, lorazepam 1mg orally
7	Would not give Engage with patient, 1-2-1 If all else failed, lorazepam 1mg to maintain safety orally
8	Would not give Engage with patient, 1-2-1 If all else failed, lorazepam 1-2mg to maintain safety orally
9	Would not give Engage with patient, 1-2-1 If behaviour escalated and safety a concern, lorazepam 0.5- 1mg orally
10	Would consider benzodiazepine early on as part of therapeutic process Engage with patient, 1-2-1 If behaviour escalated and safety a concern, lorazepam 0.5- 1mg orally

Participant number	Medication Choice
11	Would not give Engage with patient, 1-2-1, low- stimulus If behaviour escalated to more hostility and violence, offer lorazepam 1mg orally
12	Would not give straight away but could offer PRN as part of therapeutic strategy. Engage with patient, 1-2-1. If behaviour escalated to more hostility and violence, lorazepam 1-2mg orally
13	Would not give straight away unless behaviour escalated Engage with patient, 1-2-1 If behaviour escalated, lorazepam 0.5- 1mg orally
14	Would offer as part of therapeutic process Engage with patient, 1-2-1 If behaviour escalated, lorazepam 0.5- 1mg orally
15	Would not give as first- line but could encourage patient to take it as part of therapeutic process. Engage with patient, 1-2-1

Participant number	Medication Choice
	Lorazepam 1- 2mg orally

Table 46 Responses to vignette 1

6.3.2 How did we get here?

The limited variation in outcome belies the routes by which the nurses took to arrive at the decision. When looking at the vignette at the start of the think aloud, some, but not all nurses highlighted different attributes of the patient. For example, P1 and P11 focussed first on the behaviours displayed by the patient:

'…her hostility, irritability, anger, verbal abuse…' P1, L11

'…she is irritable, she is pacing, shuffling, hand-wringing, becoming quite verbally abusive. Potentially that could be in relation to her being in hospital, because it said that she is expressing anger about being in the unit.' P11, L33

However, all nurses quickly formed hypotheses to try to explain the patient's behaviour.

External factors

Nurses made it clear that the patient's behaviours could be due to external factors, rather than illness. P2 indicated that:

'So it's not always linked directly to a disturbed mental state, it may be linked to the circumstances…' P2 L84

Method of admission

P1 hypothesised that the patient would most likely have been sectioned, given the behaviours they were displaying.

'…this patient would be likely to be subject, you would have thought, to be detained under Section 2 of the Mental Health Act, to be assessed, by to have her needs like properly assessed on by services…' P1 L8

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P4 and P15 speculated that she may have been picked up by the police, which can be traumatic:

'Generally with people like this they have come through a 136, so that is never fun because the Police have been involved.' P4 L15

'…possibly picked-up by the police, or has a team gone, gone sectioned the lady, and brought her in under… she's bound to be hostile, she's bound to be, not wanting to be here so I can understand, understand that…' P15 L65

Unfamiliar environment

P2, P3, P5, P6, P8, P10, P12, P14 and P15 considered that the unfamiliar environment could very well be an explanation for the behaviours. In particular, the cues of anger, hostility indicated this possibility, alongside the information in the vignette that the 'anger was being freely expressed about being on the unit'. P5 summed this up:

'You know usually with a situation like this, experience tells me that she's in a new environment, she has got no formal diagnosis of mental illness that we know of anyway, so we don't know her possibly. She might be anxious just about being in a new environment.   It might be…quite often other patients can cause a new patient to be unsettled and frightened.' P5 L28

P15 added:

'…it's maybe her first admission at 31. So you know she doesn't, she may not have been in a psychiatric hospital before, she's frightened you know, perhaps it's family issues at home, where there are children to look after, she of age of children isn't she, she could be upset that she's left her children or her husband…' P15 L82

In addition to the unfamiliarity of the environment and the inevitable fight or flight response, the high-stimulus nature of acute mental health wards was also highlighted. Wards can be busy, hot, crowded, noisy:

'Often people can get over stimulated when they get bought in onto the ward, and if there's a lot of other patients, the lighting and all of that.' P12 L25

Three nurses highlighted that in fact, often patients feel out of control because they have been subsumed into a system, and they may not understand why they have been brought to hospital or what is going to happen.

'We get very blasé, I think at times, because we are so used to the environments, we are so used to the system, that somebody who is very new to the system, it is very un-client provoking, it is very ... they could feel out of control because the system takes over, the processes take over and people do end up feeling quite out of control and it could be that.' P10 L60

'You come into a place like this and there are automatic restrictions just being here, just by the institution boundaries you know so at home you can go in your fridge anytime you want…' P5 L45

'Or whether she is just being angry because she was misled. We had a lady recently who was almost, well felt like she was here under false pretences and so making sure that she was clear about the information, about entering the ward and what was the rationale and reason for coming onto the unit.' P7 L52

'I would probably want to understand from her point of view, if she really understood why she was there, and what we were there to do. And if that's possible have a chat with her about why she was brought in…' P9 L32

Three of the nurses explicitly mentioned how the symptoms suggested that the patient wasn't coping.

'The things that spring out to me when I read it is the first things that come to my mind and the first thing I consider is there's no formal diagnosis, she's hyperactive, there's outbursts of shuffling, handwringing, moving around which indicates that she's not coping.' P2 L30

'Because you can often work out what their coping strategies are. So if screaming and shouting and pacing, that can be a coping… it's not a particularly good one, but it can be a coping strategy and that can last for about 3 minutes and then she is fine.' P4 L119

'…so it could be in relation to her, how she is feeling, she is not able to express herself.' P11 L44

Internal factors

All of the nurses agreed that the patient was showing signs of anxiety and distress. They came to this conclusion based on the circumstances but also the behaviours, in particular the sweating, fidgeting and tension.

'They are definitely, definitely anxious because they have been giving all the signs and symptoms of anxiety – appears moderately tense, sweating noticeably, fidgety when sitting and standing…' P3 L119

However, some of these behaviours could also indicate other things:

'I'd definitely would also say, you saying she's sweating, fidgeting, no previous history, I'd definitely be considering physical health, and asking if we could take some physical observations from her, just to rule out whether she's got any temperature, whether she's got any UTI's, whether there's anything you, with any sepsis any of those sorts of things that's adding to her behaviour.' P12 L31

Illicit drug taking and subsequent withdrawal was also proposed by nine nurses (P1, P3, P6, P7, P9, P11, P12, P13, P15) as a potential explanation for sweating, fidgeting and hostility, for example:

'Well obviously with alcohol withdrawal sweating and fidgeting, but em, sweating and fidgeting could be em, someone who's actually withdrawing from crack possibly.' P1 L21

'So this maybe…this maybe a short lived reaction to an illicit substance potentially that is going to be short term. It could you know with some the legal highs that we have seen...' P6 L364

'……that drug but you know 30 minutes can be quite clear you know…' P6 L372

'…the drug that was there or whatever was going on has gone away.' P6 L407

Other drug- related possibilities included:

'We need to see depending on the time of the day she has come in; she might have missed some medication that usually does help calm her.' P7 L64

'Legal or illegal but actually hand-wringing and the shuffling, sort of ties with dyskinesia from anti-psychotics maybe.' P6 L156

Due to the hyperactivity and 'attitude problem', four nurses (P3, P6, P11, P13) suggested that bipolar disorder might be a possibility.

'The initial assessment she appeared hyperactive to the point where she found it difficult to sit still for longer than a few minutes at a time. OK. So potentially this lady may have a hypomania but there is not enough evidence to substantiate that claim at the minute, but she is obviously distressed in some way.' P6 L69

'But if there was no evidence of that [drug taking], I guess I would probably be thinking about bi-polar potentially.' P11 L41

'So first of all, I thought hyperactive so she could be, you know have a bipolar disorder, she finds it difficult to sit still, hand-wringing and moving, so that make me think there's some anxiety there as well.' P13 L19

Nurses also verbalised how they would be assessing whether the patient's behaviours were due to serious mental health illness which might cause

hallucinations or paranoia as a result of psychosis. The reason for this assessment would be to establish if the patient had mental capacity, which would determine which avenue of treatment to choose.

'If she's hallucinating or if she's- you know- she has psychosis etc she may well feel that the members of staff are there to hurt her or otherwise.' P9, L53

'What I am doing is looking for her mental capacity to engage, and to focus, and to have a conversation of some meaningful purpose while she is here.' P5 L26

'Sometimes you know to see if I can…if you know is this a clinical thing, you know is there something beyond her control. Can she switch it off?' P5 L217

However, as the scenario was written, there seemed to be the feeling that no more serious illness was involved and that the behaviour was more likely a reaction to the situation the patient found themselves in.

'…the anxiety that the person appears to be expressing, and it's like anxiety and there's no sense of more serious mental illness in the description.' P1 L165

6.3.3 What to do about it?

All of the nurses would, in some way, try to work with the patient to find out what was behind the anger and hostility. The vignette indicates that the patient is freely expressing anger about being on the unit, and this piece of information acted as both a direction for further assessment but also a starting point for deciding on what interventions to carry out. After all,

'We would try to explore first why is this hostility coming in and if she is being hostile now, but she must have agreed to have come into hospital at some point, so where has it stemmed from really.' P7 L78

Assessment itself was part of a dynamic process- it did not happen once but happened throughout responses to the vignette. For the nurses that would not give PRN medication if it could be avoided, their approach involved gathering as much information as possible first (as indicated by the extracts above) about the patient whilst paying careful attention to how this was done. For example, P3, who has been qualified for 15 years, and has worked on an acute mixed gender assessment ward for 13 months suggested that:

'I'm looking at someone who is agitated who is showing some anxiety…'
P3, L15

P3 would:

'The first thing I would want to know is why is she feeling so agitated? Is it the environment she is in? Is it the people within that environment? What normally works for them? Is it the first time they've felt like this? If they have before how did they manage to come out of it? What kind of things, coping strategies, destractive [sic] techniques that they have utilised in the past?'
P3 L16

Building a rapport with the patient was seen as a key strategy, both as a therapeutic strategy to help calm them, but also to be able to assess them further. P5 is an experienced nurse with 30+ years of post- qualifying practice, and who has worked on a mixed gender assessment ward for 6 years.

'What would you do first of all is speak to this lady and try to develop some kind of rapport with her and doing that explain my purpose, what I am here for, and try to make some connection with her really to understand what is causing her distress. That's key unless I actually see how she reacts to my responses and my explanations. What I am doing is looking for her mental capacity to engage, and to focus, and to have a conversation of some meaningful purpose while she is here.' P5 L22

Similarly, P10, with 20 years post- qualifying experience, would:

'So it would be a lot of 1-2-1 time, trying to work out where the anger has come from, whether it is around something we can change. If it is something that can be altered, that can be changed.' P10 L27

Key to doing this was to be very careful about approach, tone of voice, space. This was to avoid stimulating the patient further, or to allow them to express themselves. One nurse stated that:

'So I think you have kind of got to let this go to some degree, because as humans we express how we are feeling, sometimes in our physical self; so the wringing of the hands and pacing and things like that, and sometimes we just need to let that happen. Because if you intervene too early, it can make those things more difficult, because they haven't got that release.' P11 L135

'Because it would give her the room that she needs to do those things that she is maybe using to get rid of her frustrations, so especially that she is pacing quite a lot, shuffling, hand-wringing.' P4 L33

'The first thing would not be medication it would be one-to-one, a low stimulus environment. Do you smoke? There are so many things. Do you smoke? Do you want to cup of tea? Let's go outside for some fresh air. Let's go outside where the patient feels non-threatened in a very informal kind of way.' P3 L20

'I would probably get a female carer involved, one that has got good communication skills.' P14 L130

'Is it something particular, is she normally outdoors, so we could go into a garden, a confidential garden to discuss this, just so she is a bit more cooler, or larger spaces if it is too crowded, or a bigger room, so we could look at that. If she is making threats to smack someone, it might be easy just to move a couple of the other patients out of the way, so that less people are at risk of harm.' P7 L59

Four (P10, P12, P14 and P15) of the nurses would consider giving PRN as part of the therapeutic strategy, in order to calm the patient first which would enable more detailed information gathering, as exemplified by this quote:

'I would think at this level, I would maybe offering her... you know, very subtlety does she want something to calm her down, almost as a therapeutic, thing rather than a punitive thing.' P14 L127

Offering PRN medication would be done carefully, without imposing on the patient. Whether the patient was formally or informally detained made a difference to the approach that could be taken.

'OK. So at the minute there is no legal right for me to compulsory administer a medication to the young lady.' P6 L105

'So she is agitated, we need to assess whether (1) she is willing to stay and (2) if not, if she is asking to leave and then we would have to look at detainment that way.' P7 L57

This was important because:

'Then if this anger and irritability does continue, offer her something, maybe something like a benzodiazepine just to help settle her slightly so that she is able to speak to the doctor and have a better chance of staying here informally, rather than presenting as chaotic and hostile and potentially being detained under the Act, then so. Trying to be least restrictive with her staying on the ward, but ensuring that she is in agreement really.' P7 L66

Throughout the responses to the scenario, each stage of the assessment suggested an accompanying action. To a greater or lesser extent, the nurses used a 'try it and see' approach, working through options one at a time. This approach is exemplified by P6, who said that:

'So I have used the staff, I have used the family potentially to gain information even if it is a telephone call about what is going on. I have tried to engage with them about different medications. If she is actively trying to leave the ward and there is not a Doctor around, which is unlikely, I have only used in once in my career the section 54 where you hold someone for 6 hours so they can be assessed by a Doctor. I probably be asking a Doctor to come and make an assessment about whether this lady should be detained under the Mental Health Act and it probably sounds like potentially if she has come this far into services that a Section 2 might be applicable, so we can assess the mental health and it also gives us the ability to treat without consent. So sort of going down the scale of things, so we have used the family, we looked at the medications and this lady is still refusing to take the medication in any format and now if we got Section 2, which is probably going take some time and there is a good chance that things are going have changed for this lady in that time.' P6 L115.

Although the majority of nurses would either not give a medication if at all possible, or would consider medication as part of the overall therapeutic strategy, P2 did not hesitate in offering medication as first line treatment. P2 argued that:

'Well obviously for me, the first thing when I read that the first thing I'm looking at is the fact that we've got no diagnosis of a mental health illness that was available to us on admission so that makes the service user somewhat of an unknown entity. So I'm looking at the behaviour, I'm looking at the attitude, I'm looking at the ability of staff to be able to engage with the service user, and whether engagement is going to be possible. It appears from the scenario I've been given that it sounds to me that the patient very quickly is reaching a point of agitation that potentially could become unmanageable very fast. Ideally what I'd be looking at is use of medication, I definitely would be using medication on this occasion, taking into account the fact that she's been quite uncooperative, that there's definite attitude, that there's definite evidence of hostility, there's irritability and there's anger, it's highly unlikely that verbal de-escalation and verbal redirection would be completely successful on its own without some form of medication.' P2 L5

P2 is a nurse with 23 years of post- qualifying experience, and has spent those 23 years on an acute female ward. This vignette was representative of the type of patients seen regularly on the unit.

6.3.4 The point at which medication becomes necessary

For all of the nurses, the potential for escalation to actual violence represented the tipping point at which they would give medication. As explained, exactly when this was differed between nurses. For P2, above, given the symptoms and behaviour of the patient, they expected that the risk of escalation was imminent. Their main priority was to protect other patients, staff and the patient herself. Looking forward in time, P2 L14 predicted that

'…it's highly unlikely that verbal de-escalation and verbal redirection would be completely successful on its own without some form of medication.'

For nurses that would give PRN medication as part of an overall strategy and nurses that would avoid medication if at all possible, the escalation to specific threats of violence, directed to particular people for example, became the point at which de-escalation was considered to be not working so medication would be needed. P14, who works on an older organic ward said that:

'So you know, if she is like, 'I am not staying, I am going to punch you, I'm going, no matter what you do', you know, that then really is the next level, isn't it? You have got a duty of care to your staff; you know and the other patients.' P14 L170

Even P5, who would not want to give medication said:

'Maybe the last [thing I would] think of. If I felt confident that I had explored every option possible, and this lady had no mental capacity, there was no conscious control of what she was doing that couldn't be fixed with

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understanding and putting it right, and her behaviour was escalating to the point where something had to be done then I would probably consider that then.' P5 L225

6.3.5 Factors influencing choice of medication

As indicated, all of the nurses would opt for lorazepam as the first choice, given orally, before the situation escalated too far which would require rapid tranquilisation. Because of this, establishing the patient's detention status under the Mental Health Act was of primary concern. Considerations about dose of medication included the patient's age, weight, presence of any physical conditions such as respiratory illness, whether they had any regular medications from another source (eg GP), allergies, whether they had had lorazepam before, and the potential balance between calming the patient and knocking them out. In general, lorazepam was felt to be a good choice because it is short- acting.

'I don't know what she's taken before so we'd probably always go down with a smaller amount rather, you know they often would say if it's lorazepam, that they might use you know they will say 1 to 2 mg, but if you don't know somebody sensitive or naive to it then you'd always go with the smallest amount and see how it worked, rather than say just give them 2mg because she's really agitated.' P12 L53

'Also we have to consider a lot of our patients have been drug users, so 1mg of lorazepam if they're used to injecting themselves with all heaps of stuff, isn't really going to touch the sides, is it really?' P8 L182

6.3.6 Summary of responses to vignette 1

For vignette 1, where a female patient with no formal diagnosis is exhibiting anger, agitation and hostile behaviour, all nurses agreed that the patient was showing signs of distress and anxiety, probably related to being admitted to the ward. All nurses would take time for an assessment to establish why the patient was so angry, and moving to a lower stimulus

environment was considered important. Nine of the nurses would avoid giving PRN psychotropic medication for this patient unless her behaviour escalated and violence was imminent or directed at specific people. One nurse felt that this situation would run out of control very quickly so would intervene with PRN medication as the first line of treatment. The remaining five nurses would offer medication as part of their overall strategy to calm the patient. For all nurses, the ability to build a rapport with the patent and engage with them was central to their decision- making. Also of importance was the legal status of the patient, ie whether they were formally detained or not. The use of medication in this situation was primarily to allow engagement to take place and to find out what was causing the patient's behaviour. The only medication considered for this patient was lorazepam orally, although the dose varied between 0.5- 2mg.

6.4.1 Responses to vignette 2

The second vignette presented to participants stated:

This male patient is 19 years old and has a diagnosis of bipolar disorder. His main issue on assessment is aggression. He is verbally abusive and has already punched the wall. He seems to be nervous about something and you notice a fine hand tremor. He is usually overtly hostile to staff and is clearly frequently irritable, angry and resentful. Despite this he will co-operate with requests to move to an area of the unit for the safety of others.

As shown in Table 47, the medications given to this patient showed greater variation than vignette 1.

- Three nurses specified lorazepam in different doses: no dose specified, 1mg or 2mg.
- One nurse specified diazepam, no dose given
- One nurse indicated a benzodiazepine but didn't specify which one
- Three nurses specified anti-psychotic medication- one indicated olanzapine, two specified quetiapine, one suggested haloperidol. No doses given.

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- Three nurses suggested medication such as promethazine or trihexyphenidyl for hand tremor. No doses given.
- Seven of the nurses would have preferred to not give medication at all

Participant number	Medication Choice
1	Would not give medication unless violence escalated Engage with patient
2	Would not give straight away Would offer to patient during 1-2-1 Lorazepam 2mg orally
3	Would not give straight away Engage with patient 1-2-1 Would consider olanzapine or quetiapine if behaviour escalated and safety a concern
4	Would not give straight away Engage with patient 1-2-1 Would consider a medication after de-escalation Procyclidine or trihexyphenidyl for hand tremor
5	Would not give at all
6	Would not give at all

Participant number	Medication Choice
7	Would not give at all
8	Would rather not give at all Would offer to patient as part of engaging with patient, 1-2-1 Procyclidine for hand tremor
9	Would not give straight away Engage with patient, 1-2-1 If behaviour escalated and safety a concern, benzodiazepine Anti- psychotic for aggression if psychosis present
10	Would not give straight away Engage with patient, 1-2-1, low stimulus If behaviour due to illness/ mania, consider haloperidol or quetiapine
11	Would not give straight away Engage with patient, 1-2-1, low stimulus If behaviour continued or escalated to more hostility and violence, lorazepam orally

Participant number	Medication Choice
	Assess hand tremor, procyclidine if side effect of antipsychotic
12	Would not want to give PRN Engage with patient, 1-2-1, low stimulus Would offer PRN but only if behaviour escalated to more hostility and violence
13	Would offer early on to help patient settle and prevent further injury to self Lorazepam 1mg Engage with patient
14	Would not give Engage with patient, 1-2-1, low stimulus If behaviour escalated, diazepam
15	Would not give Engage with patient, 1-2-1, low stimulus

Table 47 Responses to vignette 2

6.4.2 How did we get here?

As with vignette 1, nurses for vignette 2 had a range of potential explanations for the presentation of the young man. The key difference here was the presence of a diagnosis, which enabled some nurses to frame the behaviours within the context of the illness, as summarised by P1 and P2:

'…yes, he's overtly hostile to staff and appears angry and resentful, that's classic, that's classic within the diagnosis and again has function for the person…'   P1 L190

'…so that forms part of the things I'd be looking at, you know, young man, age of nineteen, known to services, with a diagnosis, the bipolar disorder which is a mood disorder which allows, which results in the patient being very changeable…' P2 L233

P7 L207 went on to explain that:

'Like I say, he is 19, he has got bipolar, so he has got a major mental health disorder already. He might have been brought in against his will. He might have been brought in by the police, he might have been brought in without an idea of why he needs to be. He might be grandiose in his presentation believing that he doesn't need to be here.'

In relation to mood, P9 indicated specifically that:

'That, that doesn't look necessarily, with bipolar, I'd need to understand as well where it was in the kind of if it was like bipolar, whether it was rapid re-cycling, rapid cycle that he's on as like the ups and the downs of the disease were quite frequent and as to where he's at with that.' P9 L233

As might be expected, the presence of the bipolar diagnosis significantly reduced the number of potential hypotheses for the presentation.

External factors

Very few external factors were suggested. The vignette stated that the patient seems to be nervous about something, which led to speculation that:

'Like I say with the first issue could have been something that could have been resolved, by a phone call or he says he seems nervous about something, it might be some upcoming meeting, or he might just need reassurance but obviously he's acting out his way to show that.' P8 L258

'We don't know if he's just gotten a phone call from his girlfriend who's dumped him, you know in terms of social cycle makeup and cycle social kind of interaction with other people. What impacts on the outside?' P9 L252

'…if he's if he's been on the ward for a, for a while then maybe be a well be a reason as to why he is… perhaps something agitated him, something upset him…' P15 L195

'Does he want someone with him, he is only 19, he might live with parents still. They might not be here.' P7 L193

P2 L 226 suggested that:

'Well historically we know that young men of a certain age group have this… I don't know if it's social, if it's psychosocial or…it's that authority, that not to be controlled, that not to be told what, who, why and when, want to be able to do what they want to do when they want to do it, whenever they want to do it, em, and there's a resentment quite often from young males, a resentment from labels, from being diagnosed, carrying labels and being seen as a label, em, there's still a lot of that, there's still a lot of stigma, but we do know from when you risk assess that potentially, young males have a higher incidence of aggression.'

Internal factors

Most of the nurses felt that the presentation of this patient- in particular the wall punching- suggested internal distress at something and that the behaviours represented him trying to get something across. This was viewed in slightly different ways. For example, P1 L181 viewed the behaviours as functional:

'…because the behaviour has a function, and the behaviour has an intimidatory function- I want something off you so I'm going to show you what I can do by punching the wall rather than punching you, so there's function in it, but it's like a poor choice.'

P3 L185, by contrast viewed the behaviour as a coping mechanism and a sign of frustration.

'Because to me, punching the wall is a coping mechanism and that is a maladaptive kind of coping mechanism…'

The particular cause of these manifestations of agitation and frustration was generally linked to either the bipolar illness or the hand tremor, or both. Here are two examples of the reasoning behind the hypothesis of the hand tremor:

'It could be that if he just started to tremor and his arms are feeling all stiff he doesn't know what's going on...' P8 L328

'…he could be frightened. mentions the fine hand-tremor so possibly he's noticed this tremor or perhaps he, feels as if he is poorly, or anything that something wrong with him, perhaps that he hasn't noticed before.' P15 L198

The hand tremor was linked to medication by nine nurses, with four discussing lithium toxicity in particular.

'OK so there is a good chance if he is 19 he has got bipolar he is on lithium, and there is a chance that if he has got a fine hand tremor he is toxic with

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lithium. So I don't know if a blood test has been done, but that is what I would hope for to look at the lithium level, so that is just a thought on that.' P6 L428

'Or is it potentially a side-effect of the medication that he is on.' P11 L228

As with vignette 1, taking illicit or other substances such as energy drinks was also considered a possibility with this young man for three of the nurses. P9 L230 suggested that it would be a good idea to check if the patient had recently had any ward leave:

'Cos if he's got any leave and he's gone out, I mean we've had cases where I was working as a student, where one individual was on one of the other wards…and her mum used to come in and take them out to lunch, and they'd come back trashed.'

Whether or not the patient was on any regular medication and if they had taken it (or taken too much) was also an area for enquiry.

6.4.3 What to do about it?

All of the nurses agreed that engaging with the patient, taking them to a lower stimulus environment and trying to establish exactly what was behind the presentation was their first choice of action. The key difference from vignette 1 was the co-operation shown by the patient in vignette 2. All of the nurses felt that this gave them a window of opportunity to enable this to happen. In addition, the fact that he chose to punch the wall rather than staff indicated that his hostility was not a threat at this particular time.

'I wouldn't give...just because someone is I wouldn't just give PRN medication because someone is hostile. Some people are normally hostile; that's how they know how to communicate.' P3 L178

'But this young man is actually choosing to hurt walls instead of people, so in terms of risk I think that in my mind, it reduces things, but I am yet to find

it because although he is angry, and he is aggressive he is not going out to harm people at the minute lets carry on.' P6 L423

'He is the sort of guy I would hand over, this is a guy, watch out he is very aggressive, he is challenging, he does punch, watch out, however ... it is almost like but, if you take him to the corner and have a chat and give him a cup of coffee, he will talk about his days of, you know, supporting Liverpool or whatever, do you know what I mean.' P15 L282

This window of opportunity was the reason why seven of the nurses would prefer not give psychotropic medication PRN as the first line of treatment. Even though the patient presented as hostile and noisy, the fact that he was co-operative reduced the potential risk and enabled a course of action based on finding out what the cause of the hostility was, with ensuring that he continued to be co-operative. To carry out the continuing assessment, the nurses would engage with the patient, as exemplified by P5. The engagement would include listening to the patient or allowing them to express their frustrations in a safe space:

' Move him to some place quiet and sit with him, talk to him, make him feel listened to and he got his…you know a lot of this. I have done some things like this guy before, when it's not been very well received but I have said to somebody irritable, just take your mattress up come with me, because they just want punch somebody, they punch the wall, I say come with me, come in your room take your mattress off your bed, and punch it.' P5 L414

Cognisant of the potential risk however, the nurses also recommended ensuring that the young man was kept away from other patients somehow, either by clearing other patients out of the way or taking him to his room or other space away from people. This would also have the benefit of lowering the stimuli in the environment. As with vignette 1, the tipping point for PRN medication for agitation was escalation of the threats to violence directed at people. This would indicate that the patient no longer had control over their actions. P2 and P8 explain:

…'but if that conversation went in the opposite direction and he wasn't able to manage it and he wasn't able to identify triggers, he couldn't see patterns then potentially we might be looking at PRN medication…' P2 L148

'Because he's already moved away to a different area of the ward so he's not presenting as a definite concern we'd just have to just see. Obviously if he then, if he then refused you know to stay in that area, come out and continued with this hostility to staff and others, we'd have to sort of make the PRN more of a definite he's got to have something, didn't want it to be escalate to a risk…' P8 L251

Being vigilant for changes in the patient and their presentation was important for the continued maintenance of safety for everyone involved. The situation could change quickly because of the mood component of bipolar disorder:

'…young man, age of nineteen, known to services, with a diagnosis, the bipolar disorder which is a mood disorder which allows, which results in the patient being very changeable, and potentially can be quite risky especially if there is an overt element of hostility and he is irritable, em, got the ability to change on a penny, quite quickly, so it would lead the team to be being watchful, mindful and hypervigilant, always waiting, expecting because we know that potentially he can turn quite quick, without very much warning, and we could quite quickly go from a PRN situation to a rapid tranquilisation situation…' P2 L240

The only nurse who would have given PRN medication (lorazepam) early on for agitation was nurse 13, who would have used it to prevent the patient injuring himself further by continuing to hit the wall.

6.4.4 Factors influencing choice of medication

For five of the nurses, a benzodiazepine was their preferred medication option. Lorazepam was the most popular because of its short acting effect.

'…and then again for the first line I would go for a benzodiazepine…

HF: Like lorazepam again?

P2: Yes, lorazepam again for quick action, em, diazepam would be an option, it takes much longer to have an effect and it's in the system for longer, em sharp bursts I would probably go for lorazepam.

HF: And is there a dose that you would have in mind for this?

P2: As he's 19 years old with a history of bipolar and looking at the level of anger he's displaying I'd probably be looking at 2mg straight off.' P2 L148

P14 suggested diazepam:

'You know, he might be the one ... he might be at the level where, you know, he needs diazepam for like short term agitation, you know. As I explained diazepam is, you probably know this, it is more like exam nerves, do you know what I mean, it won't knock you out long term, but it is nice to take that edge off you, you know.' P14 L372

However, some nurses felt that an antipsychotic would be preferable because of the potential addictive nature of benzodiazepines:

'To me, I don't like using benzodiazepines as much, because benzodiazepines they are addictive and if...we get patients who get a buzz from getting lorazepam. We get patients refusing other medication, asking for a blue tablet – that's lorazepam, because it gives them a buzz. But olanzapine at a lower dose is quite a good treatment for anxiety and agitation. Although it's an antipsychotic we have effectively treated patients on a PRN basis with olanzapine, quetiapine, on lower doses. We are not

treating psychosis here, we are treating the agitation and with him, he's got bipolar, it will lower his mood as well.' P3 L191

Nurses seemed to agree that there was no hint of psychosis. Again, for P9 addiction was a concern here.

'Well there's no hint at the moment of any kind anti-psychosis as such, I'd probably consider again benzodiazepine of some sort, and it may well mean rather than just a PRN you might discuss with him and his care co-ordinator, his consultant whether or not that could be something he has, on a regular basis, bearing in mind that they are very addictive you only want to kind of introduce something that's going to cause more problems for him.' P9 L319

P10 felt that in the context of bipolar disorder, the patient could be exhibiting mania, in which case:

'…this is in the context of being manic and being related to that, actually we need to get something in him to start to bringing him down. Which we would be looking at haloperidol or, depending on what he has been treated with before. I think the one we use mainly for bi-polar is quetiapine, and if that has been successful before then you can certainly use that PRN.' P10 L368

For the hand tremor, procyclidine was the primary choice.

'He can't do what he normally does, because he has got this hand tremor, I would be like OK I will look at that as something else, a potentially an aggravating factor, so I notice his hand tremor, 'OK lets go talk about it. Is this a problem'? And then see if we can get some procyclidine or trihexyphenidyl but I don't know what the short term …' P4 L595

6.4.5 Summary of responses to vignette 2

For this 19 year- old man with a known diagnosis of bipolar disorder, nurses framed their responses around two main factors- the diagnosis and the fact he is currently co-operative. The diagnosis enabled the symptoms

to be contextualised and the more experienced nurses stated that the symptoms were classic for the diagnosis. The hand tremor also featured in their reasoning about the cause of the agitation, in that the patient could be aware that something was wrong or be feeling poorly, most likely due to side effects of lithium frequently prescribed for bipolar disorder. Despite the hostility and evident anger, the co-operation of the patient gave a window of opportunity for the nurses to engage with the patient and conduct a more thorough assessment of the reasons for his presentation. Interventions centred on ensuring the patient was in a low-stimulus environment and that he was able to express his frustration if he could do so safely. Most nurses would not have used PRN medication unless the patient became less co-operative and presented an increased risk to others or themselves. Benzodiazepines were the most favoured medication to help calm the patient. Antipsychotics were also recommended if signs of psychosis were seen, and two nurses argued that some patients get a buzz from benzodiazepines, so would give an atypical antipsychotic to help with the patient's mood as the first line of treatment. Procyclidine was also recommended by some nurses to treat the hand tremor, which was felt to be a side effect of lithium toxicity.

6.5.1 Responses to vignette 3

The vignette presented to participants was as follows:

Female patient, aged 62 with a diagnosis of dementia. She appears to be slightly reactive to stimuli such as people walking past, particularly people she doesn't know. She can be stubborn at times but will usually comply easily with staff and activities. She is pleasant to staff most of the time. However, you notice that she has become increasingly tense, looking nervous, fidgeting in her locker and perspiring. Her hands appear to be shaking and she is making verbal threats to staff to 'keep away'. She has had a couple of episodes within the past 24 hours of lashing out and pinching at staff approaching her to help with activities of daily living. This has resulted in one member of staff needing first aid to the laceration on her skin.

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There is a small amount of variability for the patient with dementia, as shown in Table 48. The majority of nurses (ten) would not give PRN medication for agitation to this patient. Three nurses would prefer not to give any medication but would consider it to reduce patient distress. Two of the nurses would give medication: pre-emptively if agitation increased at certain times of day, or as a part of their initial response to reduce nerves and tension. Three nurses discussed medications that were not psychotropic but that would help with symptoms of physical ailments. All three of these nurses worked in acute older adult inpatient settings.

Participant number	Medication Choice
1	Would not give PRN psychotropic medication
2	Would not give PRN psychotropic medication
3	Would not give PRN psychotropic medication
4	Would prefer not give Engage with patient 1-2-1, low stimulus environment If had to give, lorazepam 0.5mg
5	Would not give PRN psychotropic medication
6	Would only give PRN psychotropic medication once or twice whilst waiting for test results Engage with patient, low stimulus Consider laxative, antibiotic lorazepam 0.5mg
7	Would not give PRN psychotropic medication
8	Would not give PRN psychotropic medication
9	Would not give straight away

Participant number	Medication Choice
	Might consider regular risperidone or a benzodiazepine to take edge of behaviour Codeine for pain, antibiotics for UTI
10	Would reduce nerves and tension with a benzodiazepine
11	Would not give PRN psychotropic medication
12	Would not give PRN psychotropic medication
13	Would not give PRN psychotropic medication
14	Would give PRN medication pre-emptively if agitated behaviour at certain times of day Diazepam low dose Consider analgesia, laxative
15	Would not give PRN psychotropic medication

Table 48 Responses to vignette 3

6.5.2 How did we get here?

Internal factors

With only one exception (P10), all nurses agreed that they would be looking for a physical cause of this lady's symptoms. P10 had not worked with people with dementia for many years and did not feel able to suggest anything here. The key information that led to this hypothesis was the rapid change in her presentation over the past 24 hours, which suggested that it was less likely to be due to a deterioration in cognition due to the dementia. This hypothesis was shared among nurses who work on older adult units and those that did not or never had. At the time of the interview, P13 worked on an older adult unit.

'She could have urinary tract infection, she could have, she could be constipated, it could be something that's worsening her dementia, you know worsening of the dementia, but it seems to have come on bit suddenly.' P13 L240

P2 has never worked on an older adult unit:

'Hands appear to be shaking, she's making verbal threats to staff, em, what's causing the shaking, is that anger, is that agitation or is that something else, is there something physical?' P2 L277

'Em, first thing pops into my head is she potentially toxic, have we got chest infection, have we got a urine infection that might be impacting on the mental state and causing more confusion and disorientation, so I would probably be looking at exploring some more of the physicalities, exploring why she's behaving in such a different way…' P2 L302

P11 represented the clarity of a physical cause by suggesting that:

'But then it also is screaming out at me maybe she has got an infection, and what if there is something physical going on, which could have resulted in her decline. Something as simple as a UTI can cause people to become more confused, fidgety, aggressive.' P11 L250

The range of potential physical causes of the lady's presentation included pain, urinary tract infection, chest infection, pressure area damage, recent fall causing bone fractures or neurological problems or constipation, leading to delirium or a toxic confusional state.

External factors

As well as infection, the perspiring and fidgeting also suggested anxiety to P1, P3, P9, P12, P13, P14 and P15, possibly caused by the environment the patient was in or that she was lost or worried about something. For example, being in a busy, high- stimulus ward was considered to be unhelpful to the patient, leading to her being frightened.

'…stimulus is a big thing for people that you know got some sort sensory perception deficit, or you know if there's too much light going on, or it's getting a bit too dim, you know or there's too much noise going on or the TV's on, somebody else is shouting, you know to hear… to be on a dementia ward and hear somebody shouting constantly, you have to be there and not be able to understand why that's happening…' P12 L434

The vignette described the patient shouting 'keep away' and lashing out when staff approached her to help with activities of daily living. P1, P2, P3, P7, P8, P9, P12 and P15 identified three possibilities related to this hypothesis, as represented by these quotes:

'I think the activity of daily living if they've gone to give her a wash or dress her it might be just sort of intimidating.' P8 L386

'And is it a particular member of staff, because we do know that quite often people with a diagnosis of dementia can focus on one person and that can be a link to someone that reminds them of someone from the past, so is it one particular nurse causing a problem because it's a recollection thing…' P2 L309

'So she's looking at the best way possibly that she can actually cope with the situation is to lash out because perhaps she's frightened, she doesn't

know where she is, she doesn't recognise anybody, so I would tread a little carefully I think probably…' P15 L357

The idea that the behaviours shown by the patient are because they are the only way for her to express herself was picked up particularly by nurses P1, P7, P9.

The other hypothesis, identified by nurses P12 and P14, was that some people with dementia exhibit certain behaviours at particular times of day, for example 'sundowning', when medication such as analgesia could be wearing off, or related to life history events such as the anniversary of a loved one's death.

6.5.3 What to do about it?

All of the nurses would explore potential causes for the rapid change in behaviour, and as indicated, the majority would not give PRN psychotropic medication at all until they knew more. Interventions followed on from hypotheses, for example:

'I guess if it was physical, I would be doing obviously development screenings and things like that and maybe asking the doctor to do bloods, things like that, the physical side of things and again if it was a decline in her dementia, getting her reassessed by a medic and looking at how we can do things. I think it sounds like she has got quite a lot of stimulus around her, so maybe putting her in a more … maybe a single room, if that's available, or maybe we are moving some things so that she hasn't got so much to kind of contend with…' P11 L315

P1, who has two years' experience of caring for older adults with organic mental health problems, stated that:

'And until that came along, I would be changing the care plans to actually support this lady in a way that she…so when people are doing her personal care for example, instead of having her lashing out at people you could say

'can you just hold this towel for me?', 'here's a flannel, can you just wash your face for me?' so her hand then is occupied with personal care, and she would have some understanding of what she was doing and she was attending to her needs.' P1 L277

This approach, of altering the environment and how interactions with people occurred, was the mainstay of interventions whilst waiting for any test results to come back. Moving the patient to somewhere lower stimulus away from communal areas was a common intervention, suggested by P3, P4, P5, P6, P7, P11, P15. Using staff on the unit was also considered, to find someone the patient had some rapport with- P2, P3, P4, P5, P7, P8, P10, P11, P13, P15, as exemplified by this quote:

'She wants staff to keep away, there may well be a HCA, a cleaner, a nurse, who she has a better rapport with, who she would trust.' P4 L699

Involvement of the patient in activities was common intervention too, with the aims of giving the lady some understanding in what was happening to her, or to give her some purpose with activities that she liked doing. P12, a nurse with nine years' experience on a functional older people's unit, summed this up:

'I think we try to do a bit a life map about preferences, what somebody likes, what helps when they become agitated, so what would the normally do, do they got to listen to certain classical music, have we got that available at that time? Can we distract them and say, 'oh we have got you a tape, shall we go and put that on for you?' P12 L393

6.5.4 Factors influencing choice of medication

As indicated, most nurses would not give PRN psychotropic medications. The main reasons were that without knowing why the lady's condition had deteriorated, the risks of giving benzodiazepines were too great. Medication could increase her risk of falls or mask symptoms that could be valuable in

trying to establish what was going on. The potential for her to harm others was considered too. As P7 summarised:

'You would have to just be careful with risks for use of benzos, benzodiazepines, just because if she was already slightly unsteady or already nervous and you were to give something on top, you could increase your risk of falls and then you could have a bigger damage on your hands really. So it is just about reassurance I think at the start. If obviously she continues to be hostile, threatening, is she hurting anyone? I mean is she running after you, you know you need to assess it because if she is just sat in a chair, just shouting at you every now and again, she is not hurting anyone.' P7 L347

The circumstances under which medication would be considered included if the patient seemed to exhibit anxiety at particular times of day. In this case, medication could be given pre-emptively. P9, P12 and P14 suggested this- all of these nurses work on functional older adult units. Diazepam was felt to be better than lorazepam because it has a slower onset of action.

'No, either, start off with diazepam if it's, you know, maybe to settle her, maybe there is a certain time of the day that she becomes hyper-agitated, maybe it is the old diurnal variation, or sundowning, do you know what I mean, early evening. Yes, I think at that level, you know, you would probably be looking at diazepam, probably if that is not working, then moving up to like 0.5mg, and that is almost after you have extinguished everything else.' P14 L425

Other medications would be given according to any physical cause found, for example laxatives, analgesia. Checking the effectiveness of current medications, and reviewing any PRN analgesics was also suggested, prescribed regularly rather than PRN.

6.5.5 Summary of responses to vignette 3

For this lady, the nurses agreed that PRN psychotropic medication would not be a first- line treatment. Taking into account the diagnosis of dementia, her age and consequent risks of falls or over- sedation, medication would be avoided if at all possible. The exceptions were if she exhibited behaviours at particular times of day for which pre-emptive psychotropic medication would be considered. Further assessment of the causes of her relatively rapid deterioration in presentation were recommended, focussing on physical causes, and any PRN medication would be given according to what was identified. In the meantime, changing the way care was given to this lady were the key interventions, including moving to a lower stimulus environment, promoting understanding of what was happening to her by involvement with personal care activities, and liaising with family to establish her likes and dislikes.

6.6.1 Responses to vignette 4

The vignette presented to participants is as follows:

A 44 year- old man with a diagnosis of schizophrenia appears to be slightly hyperactive as you talk to him- his speech is slightly faster than normal. He shifts about in his seat and makes comments such as 'I'm fine' when you try to talk to him about his admission. There is an attitude of resentment and he is sarcastic in his responses. He reacts suddenly and badly to something you say and becomes verbally abusive. He has had repeated instances since admission of loud verbal abuse and threats of physical violence to staff, and destroying ward furniture.

Table 49 shows some variation with the medication choices for this patient.

- Twelve nurses would prefer not to give PRN psychotropic medication, but if they had to it would be for increased risk of harm to others, or to help the patient if they were distressed
- One nurse would not give PRN medication at all
- Three nurses would give PRN medication sooner rather than later because of the risk of violence

- Four nurses would choose a benzodiazepine, with lorazepam being the most frequently offered
- Six nurses would choose an anti-psychotic medication, with haloperidol the most popular choice. Two nurses would consider quetiapine and two would consider olanzapine. Two specified an antipsychotic but not a particular medication
- Two nurses would consider either a benzodiazepine or an antipsychotic medication.

Participant number	Medication choice
1	Would prefer not give PRN psychotropic medication unless level of patient distress high
2	Would try to engage patient and redirect thinking Offer PRN medication to help calm lorazepam 2mg
3	Would try to engage patient, prefer not to give if can de-escalate Haloperidol 5-10mg, quetiapine 25- 100mg, olanzapine 5- 10mg.
4	Would prefer not give if can build a rapport Considered lorazepam, haloperidol, aripiprazole
5	Would not give PRN psychotropic medication
6	Would not give unless patient increases risk to self or others Consider antipsychotic, look at what patient is already on. Most likely give olanzapine or haloperidol
7	Would not give PRN psychotropic medication if patient can be de-escalated Antipsychotic if rapid tranquilisation needed
8	Would give PRN psychotropic medication if patient presented increased risk to others or self

Participant number	Medication choice
	Would offer it Lorazepam but may also add antipsychotic depending on presentation. Haloperidol or olanzapine, depending on what is on regularly.
9	Would not give straight away Consider benzodiazepine if risk to self or others escalated
10	Would consider an antipsychotic PRN depending on cause of agitation and risk to self and others
11	Would not give PRN psychotropic medication initially Would consider PRN haloperidol as symptoms may be due to psychosis, if risk to self or others worsened
12	Would not give PRN psychotropic medication Might consider if level of intimidation increases
13	Would consider PRN lorazepam
14	Would consider PRN lorazepam sooner rather than later due to history of violent behaviour
15	Would consider PRN haloperidol 5-10mg sooner rather than later due to history of violent behaviour. Chosen because of schizophrenia diagnosis.

Table 49 Responses to vignette 4

6.6.2 How did we get here?

Internal factors

In general, nurses agreed that this patient's presentation was as a result of frustration, probably as a result of being admitted to a mental health unit. The diagnosis and patient's age was important here, as nurses established that the patient would more than likely be known to services and have been an in-patient before. P6 summed this up:

'So he is potentially concealing some of the symptoms that he has, which isn't uncommon especially. So he is a 44 year old man there is a good chance he had schizophrenia, or he has had a diagnosis of schizophrenia for many years and some people, also patients know, that maybe if they conceal their symptoms they are less likely to be detained under the Mental Health Act. They are less likely to be given medications, anti-psychotic medications for schizophrenia, which are potentially going sedate them and then make them feel groggy. So he is saying 'I'm fine' when you try to talk to him about his admission.' P6 L789

Alternatively, P1 suggested that the behaviour was a way for the patient to get PRN medication:

'So, what do you want, and are there ways of trying to get to that- there probably are because, verbal abuse, threats of violence and destruction of ward furniture are like red rags to a bull, aren't they? And, if you wanted to be given PRN medication, there you go, that's the way to go about it!' P1 L329

Some nurses felt that this patient's medication history would be worth exploring further, either because they had been taking recreational drugs or because they had not been taking their regular medication. Their medication may need a review because of the length of time the patient may have been taking their medication.

'Maybe I would like to mention they have been taking drugs because that's one thing that we always ask on admission. Have you been drinking? Have you been taking drugs? And we are met with this kind of response. We are

met all the time with that sort of response and the ones that make threats, when we have done the drugs screen it indicates they have been taking drugs.' P3 L383

'It indicates that he's not taken his medication probably, or he hasn't been, it's not, it's not always that it might just be because you know, like anything if he, he's 44 year old and he might have been diagnosed with schizophrenia or psychosis element of disease 20, 30 years ago, and he may well be becoming intolerant to certain, certain amount of tolerance you can build up to levels of an anti-psychotic.' P9 L509

Some nurses felt that the presentation could be due to a deterioration in his mental health, which would also need further investigation.

'But you wouldn't usually get the unreasonable presentation with someone with schizophrenia.' P7 L435

'Well, it says he's got a diagnosis of schizophrenia, but it could be his actual diagnosis could be schizoaffective disorder, so it's schizophrenic illness with a mood component, but if he's only being treated for the schizophrenia and he's not being dealt with by the consultant and nothing around the mood component then it means that the affect's not being dealt with and that potentially could be very problematic for him.' P2 L454

'…find out if he was experiencing any voices, hallucinations, or anything like that.' P11 L535

'…to me it would be, is this symptomology, is this part of him being very, very acutely unwell…' P10 L549

6.6.3 What to do about it?

The management of the patient in vignette 4 would depend on two key factors: the risk of violence and harm to others, and whether the presentation was judged to be due to psychosis. Firstly though, most nurses agreed that they would apologise for the thing they said that had caused the patient to react in the first place, as indicated by P7:

'Obviously if there is something that he wasn't keen on what I said, then I would apologise for that and then if it was safe for me to continue the conversation I would.' P7 L440

An alternative strategy would be to disengage and involve another member of staff, as suggested by P8. P8 worked on a psychiatric intensive care unit and was used to patients presenting like this.

'But I would move, if it was another staff member I would move them, because they are not gonna be, me or them are not gonna be able to resolve the situation if we are the ones that have made him this agitated. So I'd get someone else to sort of talk to him…' P8 L480

In recognising that the patient may well be known to services, some nurses suggested that finding out what had worked for the patient before would be useful.

'Look at his care plan to see if there's any … if he has detailed what works at that time.' P11 L541

The main concern of nurses was the potential for this patient to cause harm. As a fully grown man it was generally felt that he could be a serious risk. Smashing up furniture was felt to be dangerous as it the wreckage could be used as a weapon as suggested by P7.

'The main thing that would concern me would be the destroying of ward furniture, because obviously there's a risk there potential weapons if he's making threats of violence and if he's destroying things.' P8 L467

Helping the patient redirect their behaviour into something more productive was suggested by P2, while some nurses suggested a lower stimulus environment, either by moving the patient or everyone else. Talking to the patient and establishing on a 1-2-1 basis was indicated by most of the

nurses, and letting him lead the conversation was felt to be valuable in order to reduce his frustration.

6.6.4 Factors influencing choice of medication

There was significant variation in whether nurses would use medication or not. If they opted to, their choice depended on several factors. The likelihood of a deterioration in the patient's mental health given the diagnosis causing psychosis was one reason why some nurses recommended an anti-psychotic medication:

'I think if things did progress I would probably be looking at the haloperidol side of things, because I feel as if something is going on for him. So it wouldn't necessarily be about calming him, it would be about trying to reduce his stress internally, so reducing the voices, or sort of trying to enable him to kind of think a bit clearer, to enable him to engage a bit more.' P11 L543

'So an antipsychotic would be the first choice for me. For someone who has got a diagnosis of schizophrenia, he is less likely to be neuroleptic naive so we will be talking about haloperidol 5 to 10 mg. I would get something like olanzapine 5 to 10 mg; I would look at something like quatiapine between 25 and 100 mg.' P3 L419

In choosing an anti-psychotic medication, a further consideration for a few nurses was that as well as treating the agitation, the medication would be treating his illness too:

'So if I give them the antipsychotic it is treating their illness and agitation at the same time.' P3 L430

However, it would be important not to mix medications, so knowing what the patient's regular medication should be was key. Consulting with the doctors was recommended to be able to understand the best approach, given the patient's treatment plan.

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'…you don't really want to mix your psychotropics up and if you do you got to obviously look it up. For some of them it is OK, some of them not so OK, but it might be the case that this person has to be swapped from anti-psychotic to anti-psychotic because as I have sort of mentioned not all drugs are available in all forms.' P6 L920

However, some nurses would have opted for a benzodiazepine/ lorazepam.

'if he's like the way he is now then he's probably not going to be able to engage with me, so what we would be encouraging is medication, again I probably would be encouraging a benzodiazepine, I probably would go for lorazepam and I probably would go for 2mg, cos he has diagnosed illness, there's a history, so I would encourage 2mg lorazepam, take some time out, relax, chill allow it to work and when he's ready I'll re-engage again…' P2 L442

Some nurses would consider both an antipsychotic and a benzodiazepine:

'There's no point calming him down, if he's still experiencing, it might calm him but if he's still experiencing a psychosis, better to just give him both together…' P8 L600.

6.6.5 Summary of responses to vignette 4

This vignette showed the greatest variation in terms of what medication would be offered. The choice revolved around the perceived risk of escalating verbal abuse and violence from a man with presumed strength to inflict harm. Nurses who felt this was imminent would give PRN psychotropic medication sooner rather than later, citing a duty of care to protect others. Choices of medication for this patient included different anti-psychotics, with some nurses giving them for potential psychosis. Giving a PRN dose of this type of medication would also work to de-escalate the presentation and reduce the patient's distress. However, some nurses showed knowledge of avoiding high- dose anti-psychotic medication or polypharmacy by establishing what, if any, medications the patient usually takes. In addition, whether or not the patient was taking their regular

medication was considered important. Other nurses, however, would have chosen a benzodiazepine as it was the first- line treatment specified within local policy, or because they felt there was no evidence of psychosis. The difference in medication choice could therefore be partly as a result of low-fidelity simulation using written vignettes.

6.7 Summary of chapter

The description given per vignette, above, represents a synthesis of responses from all of the participants. I felt this was important in order to show any variation in PRN medications given from the sample of participants as a whole. The responses to the vignettes do suggest variation in whether or not medication would be given, what medication would be chosen, and dose. A synthesis of all the responses shows that rather than experience or expertise, the most important factors influencing nurses' decisions were:

- Risk of potential escalation of presentation to cause harm to people
- Ability of the patient to be co-operative and for staff to be able to engage with them
- The personal abilities of staff to engage with confrontational patients- this was related to experience
- Diagnosis, which gives nurses some expectations about potential hypotheses explaining the patient's presentation. However, this did not give the whole picture so nurses would take time to establish any underlying causes
- Knowing the patient and their patterns of behaviour

The next section looks in more detail at differences between novices and experts as a possible reason for the observed differences in PRN medication giving.

Chapter 7: Findings. Differences between Novices and Experts

7.1 Introduction to the chapter

This section builds on the findings presented in the previous chapter, to consider the decision- making of novices and experts.

The section proceeds by presenting cognitive network maps for five of the participants, selected on the basis of experience and expertise. Examining the decision- making of individuals will allow key factors to be viewed in sequence, highlighting the flow of cognitive activities and critical decision- points (Crandall, Klein and Hoffman, 2006). Each cognitive map is accompanied by a narrative to explain the networks and key decision- making factors including cues noticed, hypotheses generated, key decision points and interventions. The penultimate section presents results of the KA in the form of a cognitive demands table. The chapter concludes with an overall summary and discussion of key findings of both the think aloud and KA elements of the study.

7.2 Overview of findings from the think- aloud study

One of the aims of this study was to establish what knowledge nurses use when making decisions to give PRN medication. Findings from the think- aloud part of this study suggest that nurses have knowledge of:

- Salient patient symptoms and signs and their relationship to diagnoses
- What, in the context of diagnoses and other patient information, the signs and symptoms might suggest. In this study, these were categorised as hypotheses about internal and external patient- related factors
- Further information needed in order to make an accurate assessment of the patient. This information could be in the form of tests, questions about former or current health, observation of the

patient in response to questions or in the ward environment or detention status

- Interventions to help the patient and the situation, including use of interpersonal skills, and de-escalation techniques including distraction and negotiation
- Knowledge of medication and when, how or what to give, and when to avoid
- The contribution and attributes of team- work, and the impact on patients.

7.3 Individual decision- making: cognitive networks

However, so far, individual differences in decision- making, specifically the impact of expertise, have not been considered. Establishing if someone is an expert is not easy. Philips, Klein and Sieck (2004, p299) state that when they study experts they ask 'who is the person who knows it all?' This option was not available, so a pragmatic method of deciding who the experts are was used.

Using experience as a proxy for expertise is common (Thompson and Dowding, 2009, p84). For each participant, length of time from qualifying as a nurse was used. In addition, although controversial (Ericsson and Pool, 2016), the notion that 10 000 hours of practice is needed to develop mastery was included. Therefore, if a nurse had worked in their current clinical area for at least 53 weeks- using a standard NHS contract to calculate- they were considered to have had enough time to develop mastery of their role. In addition to these two indicators, Agenda for Change band was also used, with the most senior nurses being assumed to have the most expertise in their field. In categorising participants this way, a comparison of the organisation of knowledge was possible.

Each cognitive network focusses on patient vignette 1- the 31 year- old female, informally detained. At the beginning of each narrative a summary of the participant is provided, providing context for the decisions represented. Participants are presented with the most experienced nurse

first, with the last participant having the both least experience since qualifying and within the specific clinical domain.

7.3.1   Cognitive network of P2 vignette 1 (Figure 4)

The first network is that of P2, a Band 7 nurse who had been qualified for 23 years. P2 had worked within acute female working- age adult wards since qualifying. P2 was chosen as they represented significant experience both since qualifying and within clinical setting where patient vignette 1 would be admitted to. Additionally P2 held a senior role within their ward. This participant would definitely have given a PRN benzodiazepine to the patient.

The decision- making of P2 about whether to give PRN psychotropic medication is rooted in two processes that allow sense to be made of the situation: HOW DID WE GET HERE and MENTAL SIMULATION. 'How did we get here' begins with noticing salient patient symptoms and attributing meaning to them. For P2, the two clusters of symptoms suggested the patient was NOT COPING and was AGITATED.

'The things that spring out to me when I read it is the first things that come to my mind and the first thing I consider is there's no formal diagnosis, she's hyperactive, there's outbursts of shuffling, handwringing, moving around which indicates that she's not coping.' P2 L30

The patient's DIAGNOSIS was considered- the patient did not have a diagnosis, which led to further conclusions that fed into the overall picture. The vignette stated that the patient was freely expressing anger about being on the unit. P2 felt that this anger may well have been appropriate, as if there was no diagnosis the patient was unlikely to have been in acute mental health care before.

'I'm looking at is the fact that we've got no diagnosis of a mental health illness that was available to us on admission so that makes the service user somewhat of an unknown entity.' P2 L5

The stage of 'MENTAL SIMULATION' integrated the information gathered above with expectancies to establish what could happen. These

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represented key questions about which the decision to give medication would turn. Included were questions about 'WHETHER THE PATIENT COULD ENGAGE' with attempts to calm them using verbal de-escalation through redirection or distraction. The meaning of the symptom clusters to P2 suggested that this was highly unlikely.

'…it's highly unlikely that verbal de-escalation and verbal redirection would be completely successful on its own without some form of medication.' P2 L14

Cognitive Network P2 Vignette 1

Symptoms and behaviours given in scenario

Verbal abuse, threats, irritability, unco-operative, hostility, anger, hyperactive, pacing, hand- wringing, attitude problem, tense, sweating

Symptoms noticed

Expressing anger

Clearly angry

Verbally abusive and threatening

Unco-operative

Symptoms noticed

Hyperactive

Shuffling

Hand- wringing

Moving around

Previous presentation to secondary services?

Diagnosis- helps with roughly what to expect

How did we get here? Mental model

Unknown entity- no diagnosis

Meaning: Agitated

Meaning: Not coping

Formal/ informal detention

Symptoms- may be first time presented them like this

Can staff engage?

Assess risk of harm to self or others

Key decision points Mental simulation

Verbal de-escalation or redirection. Will it work?

Will patient accept medications?

for staff: to adapt and ge behaviour so can ge therapeutically

Goal for patient: calm down and engage with staff

Interventions

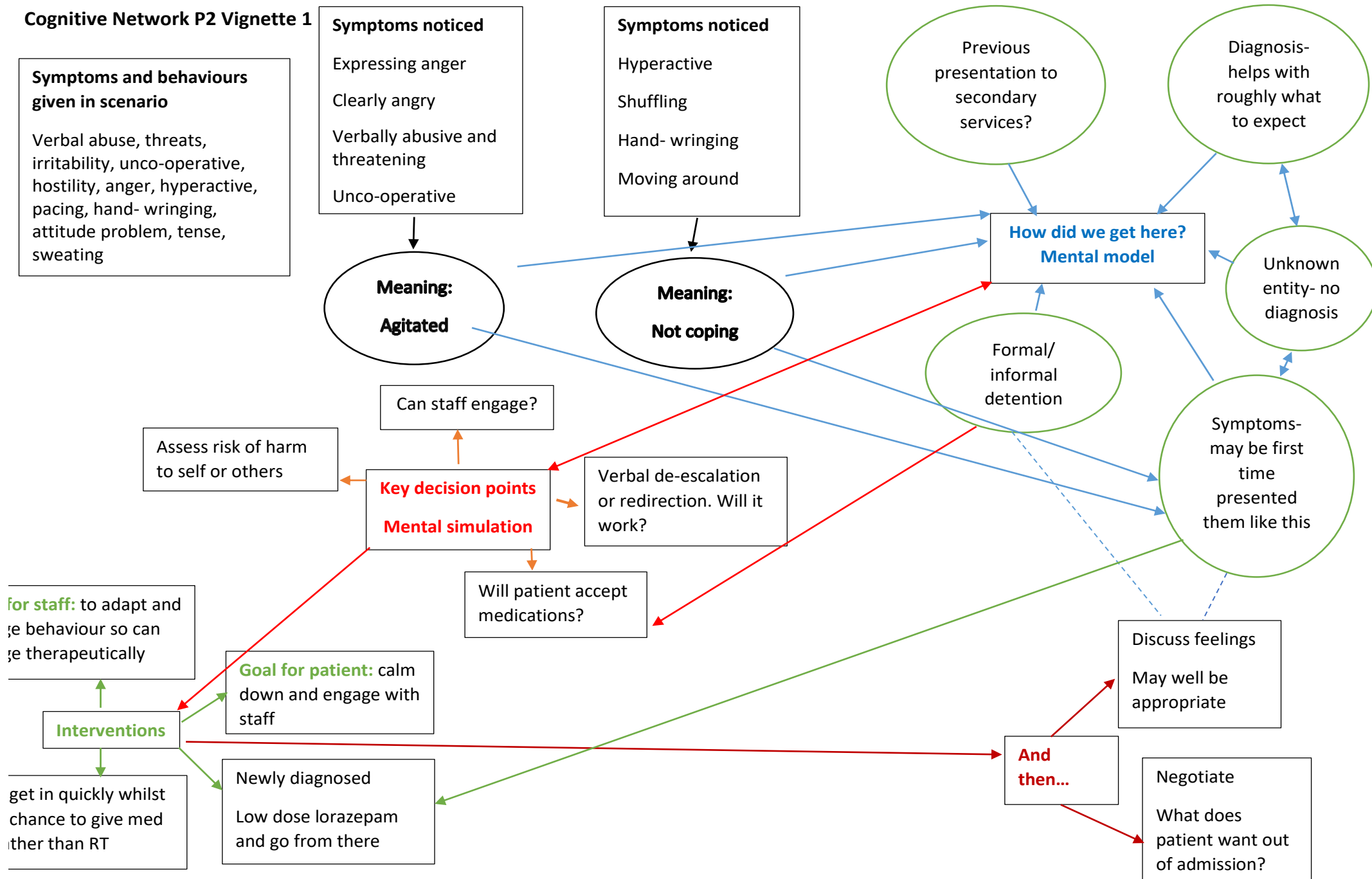get in quickly whilst chance to give med ther than RT

Newly diagnosed

Low dose lorazepam and go from there

And then…

Discuss feelings

May well be appropriate

Negotiate

What does patient want out of admission?

The ABILITY OF THE STAFF- that is, their skills and abilities to engage with the patient were a key consideration.

'…I'm looking at the ability of staff to be able to engage with the service user, and whether engagement is going to be possible.' P2 L8

The patient's DETENTION STATUS was important as if they were informally detained they could refuse to take any medication offered. Being formally detained meant nurses could encourage the patient to take a PRN medication more assertively. At this point, because of the patient's anger and hostility, P2 felt that the window of opportunity for giving PRN medication by negotiation was closing rapidly and should this carry on, rapid tranquilisation could be necessary but this would not be possible if the patient was informally detained.

'Once I'm at a point where there is no engagement and conversation, and discussion and negotiation isn't possible then that takes us into a different realm and that's not PRN.' P2 L23

The RISK OF HARM to the patient or others was therefore high- P2 could envisage this patient getting out of control very quickly and smacking someone or being smacked herself, leaving staff in a difficult position. This was to be avoided if at all possible.

*'I can see someone getting a smack, definitely, she's made threats that she will smack someone, she's obviously clearly showing that she's hyperactive, she's got the shuffling, she's got the hand- wringing, she's got the constant movement, there's the uncooperation, there's the hostility, she's expressing her anger, she's clearly angry and she's telling us that she's angry, she's been very verbally abusive and she's making threats. Once we reach that stage we know that, **through experience**, that if we don't deal with someone at this stage, and this is allowed to continue without appropriate action being taken, and interventions happening quite likely what will happen is she follow up on her threats and someone will have a smack.'* P2 L39

The goal of INTERVENTION with a PRN medication was to get in quickly, change the patient's behaviour and allow them to be able to engage with staff therapeutically.

'So at this stage, because she's unknown to services without a mental health diagnosis I would be looking at immediately at benzodiazepines, as the first line, and I would probably be looking at offering some lorazepam and encouraging her to engage with us, and have the lorazepam as a form of PRN would begin to allow us to be able to engage with her.' P2 L15

The lack of diagnosis suggested that the patient may not have had psychotropic medication before, so a low dose of lorazepam was recommended to start with. Once the patient was calm, constructive work could be done to negotiate what the patient wanted from the admission and provide reassurance and information.

'That would be followed then by one- to- one engagement and a conversation with the patient to discuss the thoughts and feelings behind the irritability, hostility and the anger, cos those may well be appropriate.' P2 L74

7.3.2   Cognitive network of P4 vignette 1 (Figure 5)

P4 worked on the same acute, female unit as P2. However, P4 had been qualified for six months and worked in the same unit since then. P4 was a Band 5 nurse. This participant would have avoided giving PRN medication unless absolutely necessary, preferring to use de-escalation techniques first.

The decision- making of P4 about whether to give PRN psychotropic medication was rooted in HOW DID WE GET HERE and the INTERVENTION of giving medication as a last resort. 'How did we get here' began with the patient's symptom clusters which suggested ANXIETY or AGITATION.

'OK, so this lady she is clearly quite agitated, she has only just come onto the ward, by the looks of it, so she has been through quite an ordeal as it is.' P4 L10
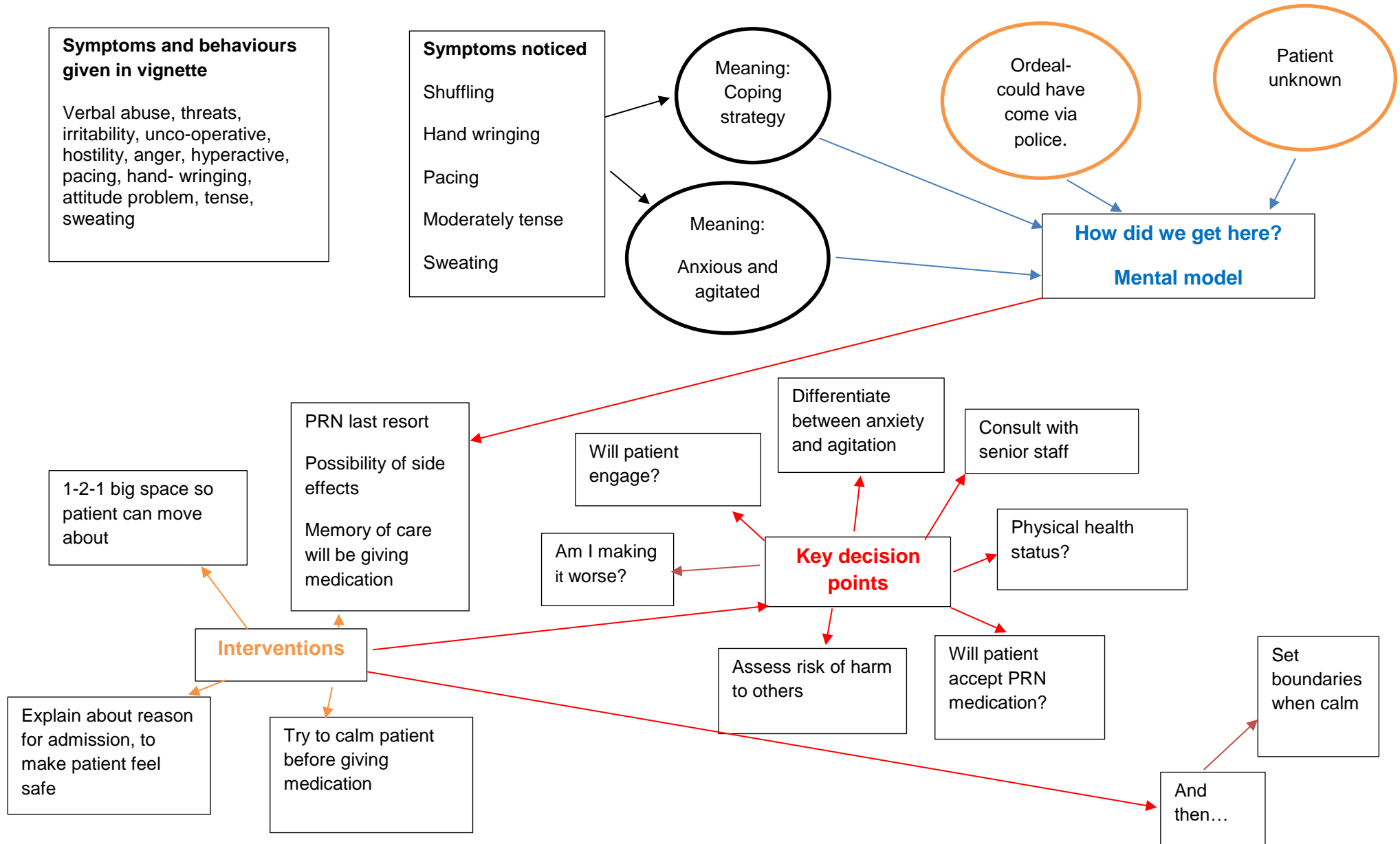
P4 also felt that the symptoms could be a COPING STRATEGY for the patient. P4 thought the patient may have come in via the police, perhaps with a section 136 which allows them to take people to a place of safety, and that this could be an ordeal.

'Generally with people like this they have come through a 136, so that is never fun because the police have been involved.' P4 L15

The INTERVENTION by P4 would be to give medication as a LAST RESORT, because of the possibility of side effects and the patient's last memory of care before falling asleep being of staff giving medication. A big space would have been preferable to give the patient room to pace, and P4 would try to engage the patient with 1-2-1 TIME, both to find out what was behind the behaviours but also to reassure the patient.

'So I would use that space, that 1-2-1 to say like 'this is what happened, this is why you have come to the ward, that she is safe and the likelihood outcome of her being on the ward. So, it doesn't actually say if she was brought in on a Section, or anything, but say if she was bought in on a Section 2, I would like 'you could be here for 28 days, just to see how you get on. See if we can get something to help you with any of the issues that you are having'. So I would start off with the 1-2-1.' P4 L48

Cognitive Network P4 Vignette 1

Symptoms and behaviours given in vignette

Verbal abuse, threats, irritability, unco-operative, hostility, anger, hyperactive, pacing, hand- wringing, attitude problem, tense, sweating

Symptoms noticed

Shuffling

Hand wringing

Pacing

Moderately tense

Sweating

Meaning: Coping strategy

Meaning: Anxious and agitated

Ordeal- could have come via police.

Patient unknown

How did we get here?

Mental model

PRN last resort

Possibility of side effects

Memory of care will be giving medication

1-2-1 big space so patient can move about

Will patient engage?

Differentiate between anxiety and agitation

Consult with senior staff

Am I making it worse?

Key decision points

Physical health status?

Interventions

Assess risk of harm to others

Will patient accept PRN medication?

Explain about reason for admission, to make patient feel safe

Try to calm patient before giving medication

And then…

Set boundaries when calm

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The overall goal here was to try to CALM THE PATIENT before considering medication. During the 1-2-1 time, DECISION POINTS for P4 would be identified by assessing if the patient was ABLE TO ENGAGE and whether this intervention was MAKING THINGS WORSE.

'So, say if I was asking her some questions, like 'do you understand why you are here? Do you want to sit down and have a chat? You don't have to sit down; you can walk and have a chat'. If she wasn't happy to do that, didn't really want to talk… what do I do next? I would…' P4 L62

'If she was just frustrated and just shouting at me, and it wasn't a productive conversation, if anything I was saying was just winding her up more…' P4 L78

P4 would try to distinguish between the two because anxiety could be amenable to reassurance whereas agitation less so.

Yeah, because I think that agitation can build into something a bit more than the anxiety straight away. I am not saying the anxiety wouldn't build, but like I said when I was going through it, it's like I would hold for that 1-2-1 and I suppose that 1-2-1 would determine what is going on here and is this pacing and hammering to do with anxiety or is this to do with agitation. So I suppose that is where I differentiate and then go, like what are my options, am I improving it or am I making it worse? P4 L224

If the RISK OF HARM to others became a possibility, P4 would try to establish if the patient WOULD TAKE MEDICATION.

'Yeah, so if they wouldn't take it and I wasn't getting any further with any calming down and I felt that she was at risk, other patients were at risk.' P4 L242

Establishing her PHYSICAL HEALTH STATUS was important, for example to rule out respiratory conditions as a side effect of certain medications is respiratory depression. P4 would consult with senior staff to help make the decision. Once the patient was calm, some negotiation of boundaries could take place, in order to help the patient manage if the same presentation occurred again.

'And set some boundaries for when she is on the wards. Like 'OK so we can't have that sort of behaviour on the ward. If you feel like you are getting to that point, we need to talk about it. So

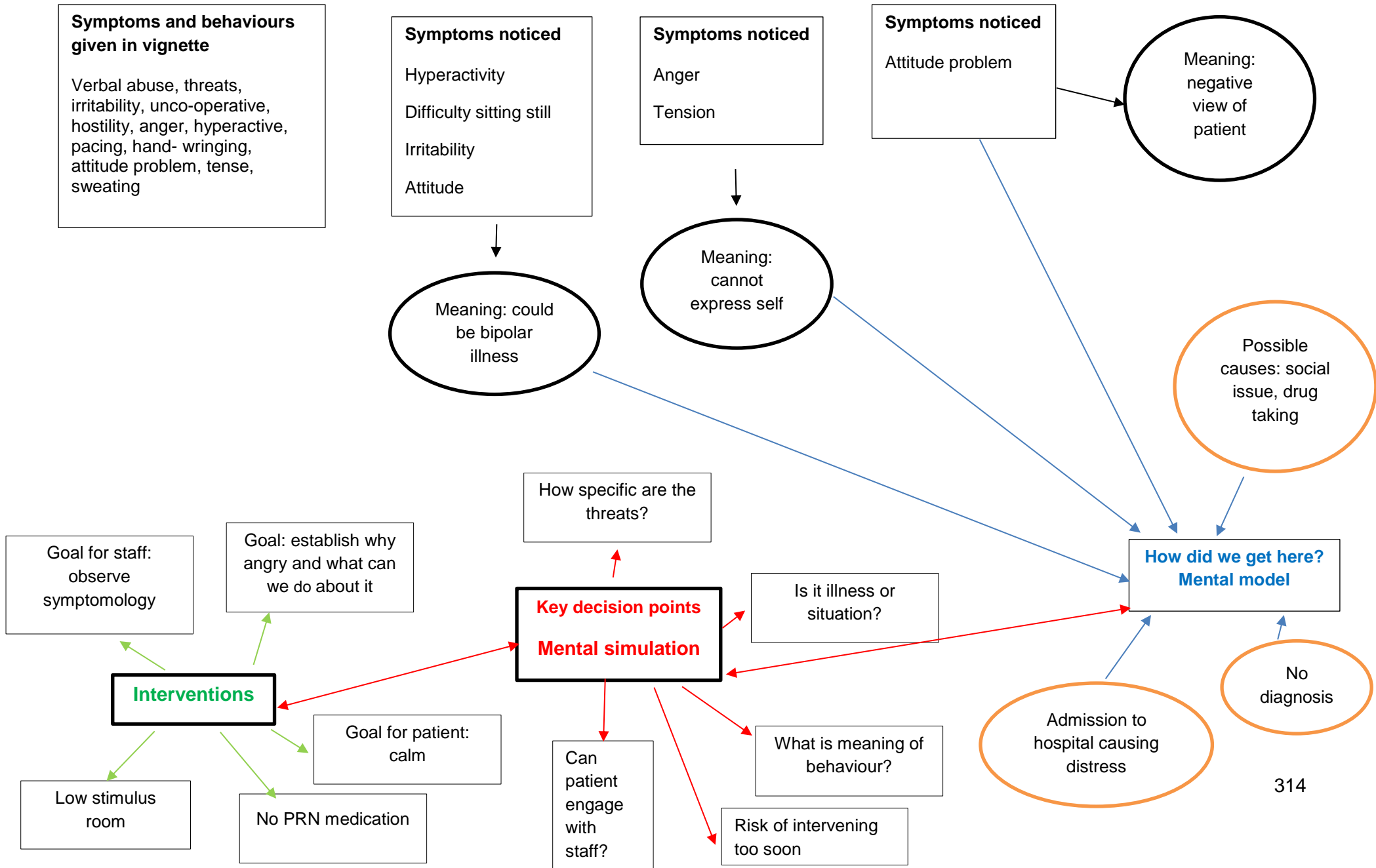*we don't have to give you some lorazepam, so you can get calm, because of the client using it'.'*
P4 L370

7.3.3   *Cognitive network of P11 vignette 1 (Figure 6)*

To further test the theory that expertise could be a factor in decision- making, the cognitive network of P11 was considered. P11 had been qualified for seven years, had significant time since qualification, worked at Band 7, but had less than 10 000 hours of experience in their current clinical area- an acute mixed gender assessment unit. For vignette 1, P11 would not have given PRN medication to the patient. The narrative to accompany this nurse's cognitive network follows.

The decision- making of P11 about WHETHER TO GIVE PRN PSYCHOTROPIC MEDICATION is rooted in two processes that allow sense to be made of the situation: HOW DID WE GET HERE and MENTAL SIMULATION. 'How did we get here' began with noticing salient patient symptoms and attributing meaning to them. For P11, three clusters of symptoms suggested the patient COULD NOT EXPRESS THEMSELVES or they could have undiagnosed BIPOLAR ILLNESS. The vignette description of the patient having an ATTITUDE PROBLEM disturbed P11:

Cognitive Network P11 Vignette 1

Symptoms and behaviours given in vignette

Verbal abuse, threats, irritability, unco-operative, hostility, anger, hyperactive, pacing, hand- wringing, attitude problem, tense, sweating

Symptoms noticed

Hyperactivity

Difficulty sitting still

Irritability

Attitude

Symptoms noticed

Anger

Tension

Symptoms noticed

Attitude problem

Meaning: negative view of patient

Meaning: could be bipolar illness

Meaning: cannot express self

Possible causes: social issue, drug taking

How specific are the threats?

Goal for staff: observe symptomology

Goal: establish why angry and what can we do about it

Key decision points

Mental simulation

Is it illness or situation?

How did we get here? Mental model

Interventions

Goal for patient: calm

Can patient engage with staff?

What is meaning of behaviour?

Admission to hospital causing distress

No diagnosis

Low stimulus room

No PRN medication

Risk of intervening too soon

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'OK, firstly it was a bit uncomfortable reading, particularly the bit that says that she has an attitude problem….because I think negative language bothers me. So that bothered me, and I think it kind of, for me, it I can see how this patient would be viewed and would be viewed quite negatively by some staff, because of the way it is written, if that was all I had to go on.' P11 L25

'How did we get here' also included whether the patient had TAKEN DRUGS, if it was a SOCIAL ISSUE or, most likely, that the patient was DISTRESSED at being in hospital.

'Potentially that could be in relation to her being in hospital, because it said that she is expressing anger about being in the unit.' P11 L35

'She doesn't have a diagnosis so maybe it could be related to… I would be thinking about what it may be related to, it may be drugs, may there be a social issue, things like that…' P11 L39

'It says that she is moderately tense, again that could be in relation to the anger, so it could be in relation to her, how she is feeling, she is not able to express herself.' P11 L42

The KEY DECISION POINTS appear to have been arrived at through mental simulation. The risk of violence was assessed by how specific the THREATS were. In relation to the threats made by the patient, P11 demonstrates the ability to 'go beyond' the information given in the vignette to establish possible futures for the patient and to build up a story not only about why they might be presenting the way they are, but also what was likely to happen. This expectancy was be based on experience, and seems to be an example of pattern recognition.

'She is making threats to smack somebody but hasn't actively tried to harm anybody as of yet, so I wouldn't assume that she is going to be physically aggressive, because we haven't got any indication that she has been previously.' P11 L36

'But when it [threats of violence] is generalised, nine times of ten, they don't, they don't do what they have said they are going to do.' P11 L155

P11 felt that the presentation of the patient in vignette 1 was due to the circumstances rather than any underlying mental health illness, so the key decision point here was ILLNESS OR SITUATION:

*'Definitely I think that is **kind of learnt behaviour** [participant's own behaviour] I think, and often I find that there is actually a reasoning behind why people who act in the way that they are*

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acting. Sometimes there is an underlying element of the illness, but I think initially it is probably because of something, it is in response to something, rather than just a characteristic of their illness I guess.' P11 L113

P11 also drew on experience to suggest that there was a risk in INTERVENING too early. Patients, like all people, get wound up in response to events and so trying to intervene at the height of the outburst ran the risk of making things worse.

'Because if you intervene too early, it can make those things more difficult, because they haven't got that release.' P11 L138

The primary intervention chosen by P11 was to take the patient to a LOW- STIMULUS environment and chat with them 1-2-1. The GOALS of care for P11 were to establish what was making the patient angry and if anything could be done about it, for example some time off the ward, a walk or signposting her to services if the anger was because of an unresolved social issue.

'She is obviously angry about being here, can I do something to get her out, get her some time off the ward, to alleviate that.' P11 L123

PRN medication would be considered if the patient's behaviour ESCALATED in seriousness and the threats became targeted to someone or if the pacing became more physical and the patient started charging around.

'I think the thing for me would be if she continued to make more direct, sort of individual threats. So if she said, 'I am going to smack you', probably I would think about medication at that point. But I think because she has generalised it, she hasn't made specific, she has not targeted a person and she hasn't actually done anything, so we are assuming that she may, but she hasn't.' P11 L146

Choice of medication was related to the lack of diagnosis and the need to calm the patient a little, reduce the threats and allow the patient to be able to engage with staff. P11 would offer the medication to the patient for them to consider if it would help, rather than impose it upon the patient.

'No but given that she has not got a diagnosis, I would probably look at lorazepam for the short-acting, kind of quick, kind of just to reduce the symptoms, to not eradicate them but just get them to a point where she might be able to engage with me a bit better.' P11 L176

'Yeah so probably yeah like 1mg of lorazepam or something, just for a quick intervention really.' P11 L194

The nurses considered so far had experience within the kind of unit that the patient in vignette one may have been admitted to. To test the influence of general experience in mental health nursing P15 is examined next.

7.3.4 Cognitive network of P15 vignette 1 (Figure 7)

P15 had been qualified for 32 years and had worked on their current clinical unit- a functional and older organic unit- for almost 21 years. They would not have given PRN psychotropic medication straight away, but would have considered it as part of an overall therapeutic strategy. Here is the narrative to accompany their cognitive network.

The decision- making of P15 about WHETHER TO GIVE PRN PSYCHOTROPIC MEDICATION was rooted in HOW DID WE GET HERE and the intervention of trying to ENGAGE with her. 'How did we get here' began with the lack of formal diagnosis, but the fact the patient was a working- age adult suggested to P15 that they may have come in through assessment by the Crisis Team, possibly via A&E.

'…so she's a working age adult, the likelihood she's come through the crisis team, so you would imagine that they, she's come through A & E possibly, so she would have had a physical, just to check that she's OK, really physically, nothing really illicit substances or anything like that…' P15 L23
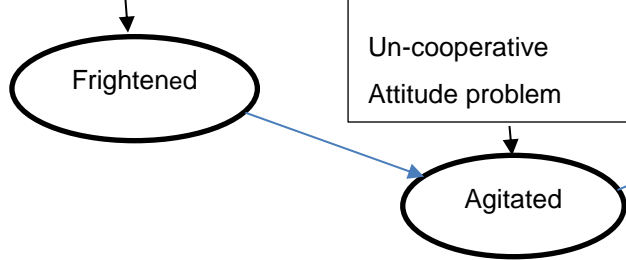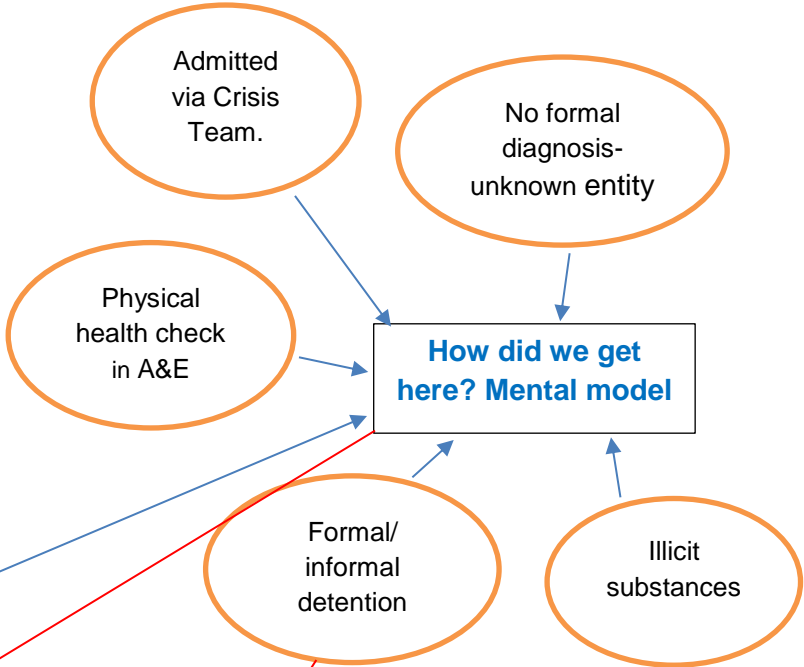
The patient would probably have had health checks to rule out any physical cause of their symptoms, including checking for any drug use. P15 suggested also that the patient could be frightened as a result of their admission to hospital.

Cognitive Network P15 Vignette 1

Symptoms and behaviours given in vignette

Verbal abuse, threats, irritability, unco-operative, hostility, anger, hyperactive, pacing, hand- wringing, attitude problem, tense, sweating

Symptoms noticed

Frequent hand-wringing

Moving

Restless

Symptoms noticed

Excessive shuffling
Hand-wringing

Moving

Restlessness

Un-cooperative
Attitude problem

Frightened

Agitated

Admitted via Crisis Team.

No formal diagnosis-unknown entity

Physical health check in A&E

How did we get here? Mental model

Formal/ informal detention

Illicit substances

Try to engage patient using different members of staff

Key decision points

Mood

Agitation level

Leave to settle for a while

If will take medication offer lorazepam 1mg

Interventions

Would patient take PRN medication?

General attitude to the unit

Low stimulus

Leave to settle

And then…

Keep within eyesight to observe

"Frequent hand-wringing and moving' so she's either a, she could be quite frightened, she could be, she's obviously quite agitated, and quite restless.' P15 L44

P15 would try to ENGAGE the patient to understand what the problem was, and would offer PRN medication to help her settle.

'I'd try to engage her first, try and understand what the problem is really, whether or not she's happy to be here. It's fine, if she's not which sounds as if this is the case, then whether or not she be conducive to some sort of medication that may help her just, just settle a little bit, just so that we can get you know, make her little bit more open and a bit more engaging.' P15 L79

P15 speculated about why the patient could be frightened:

'…she probably is frightened and she probably is afraid of hospital, and never been in hospital before, she hasn't got no formal of diagnosis mental health issue, it's maybe her first admission at 31. So you know…she may not have been in a psychiatric hospital before, she's frightened you know, perhaps it's family issues at home, where there are children to look after, she of age of children isn't she, she could be upset that she's left her children or her husband, or so, I would try and engage, I would probably encourage PRN.' P15 L90

To engage with the patient, P15 would try different members of staff if needed:

'I would try to engage with her, try to engage as best we can, and if I wasn't, if, if I couldn't then the members of staff, try various other members of staff, whether or not she'd be to check with her she'd be… it might just be males she doesn't like or it could be females, she might respond better to males than females, younger, older.' P15 L40

Whether or not the patient came in formally or informally, or via the police was felt to be important:

'…the fact that if she's agreed to come to the unit, then obviously she's a little bit more open then what perhaps she's actually presenting as. So perhaps if we sat…once you can …get her engaged, she may be a little bit more sort of, rather than perhaps possibly picked-up by the police, or has a team gone, gone sectioned the lady, and brought her in under… she's bound to be hostile, she's bound to be, not wanting to be here so I can understand, understand that.

Perhaps, that's why she could be increasingly hostile, showing frequently irritability, she frequently express anger about been, anger about been in the unit'. Well that would probably go along with what I've just said...' P15 L62

P15 recommended lorazepam at a low dose:

'I don't know this lady obviously, so you'd be looking at probably some sort of lorazepam really possibly.' P15 L102

'…probably a milligram to start off with, cos we don't we don't know her physical history, we don't know her mental history, we don't know she may, she may well have taken something…' P15 L110

Following these interventions, P15 would leave the patient to see if she could settle in a low stimulus environment so as not to aggravate her further. Keeping her within eyesight was recommended so that observations of her mood, agitation level and general attitude to being on the ward could be monitored unobtrusively.

The final cognitive network is from a nurse (P9) who had been qualified for 8 months, and had 8 months post- qualifying experience on an organic older adult ward. Depending on their placement allocation whilst a student nurse, P9 may or may not have had experience with the type of patients illustrated in vignette 1. They would not have given PRN medication to the patient described in the vignette. Here is the narrative to accompany the cognitive network of P9.

7.3.5   Cognitive network of P9 vignette 1 (Figure 8)

The decision- making of P9 about whether to give PRN psychotropic medication was rooted in HOW DID WE GET HERE and the intervention of finding out WHAT IS GOING ON to cause the patient's presentation. 'How did we get here' began with noticing that the patient had no formal diagnosis:

'…she's been no formal diagnosis and I'd want to have little bit more in depth look at her notes as to why she's been brought into the ward.' P9 L21

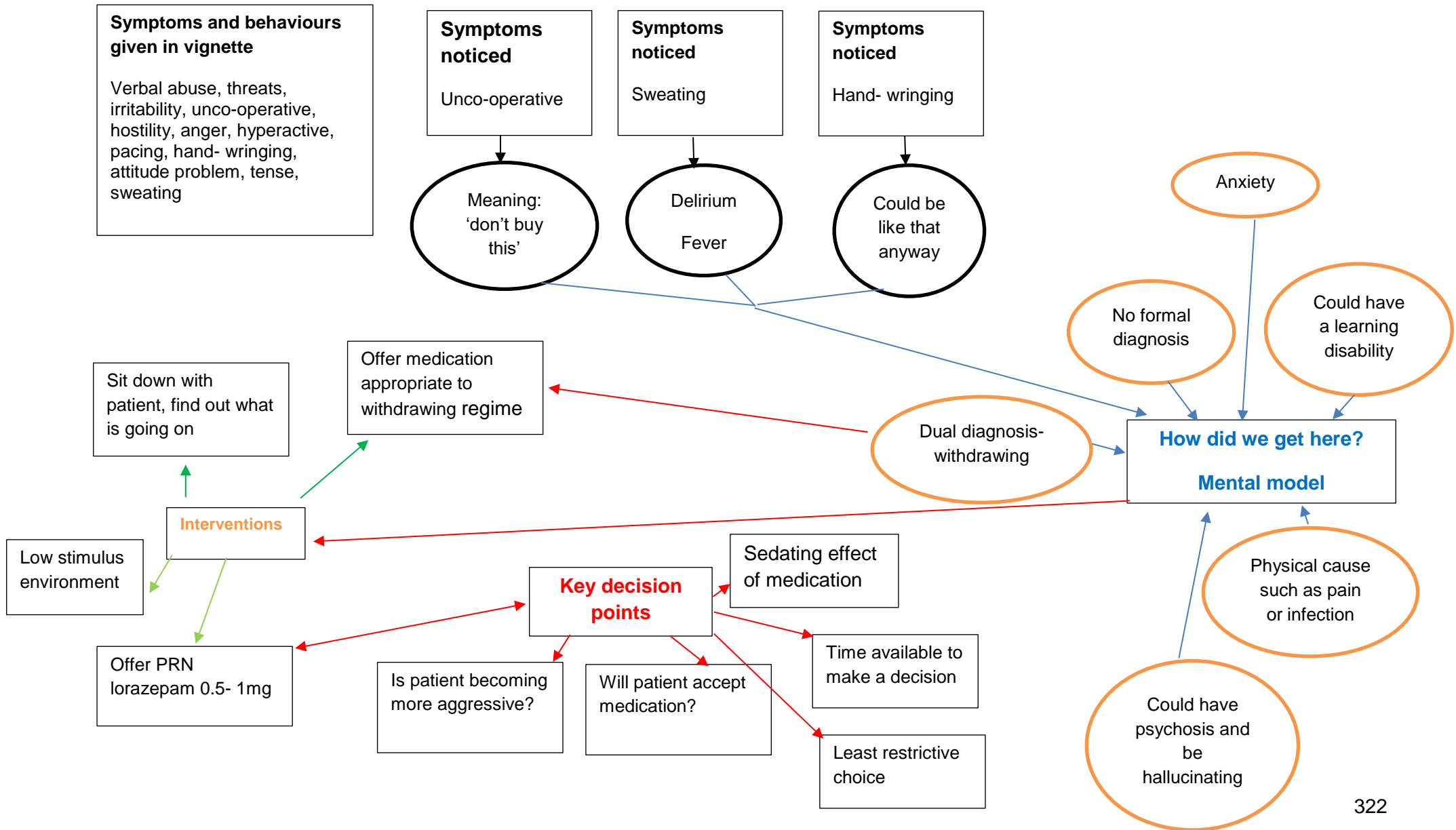P9 was unimpressed by the statement that the patient was unco-operative:

'This kind of thing about un-cooperative with staff I don't buy.' P9 L23

The first line of care for P9 is to sit down with the patient and establish what is happening with them. P9 considered if the patient had any learning disabilities, which might indicate they were in pain but could not express it.

'I would want to sit down and just try and, firstly, kind of establish what was going through her mind, it may well be you know, it may well be a number of different things we don't know if she has got any learning disabilities or anything like that before she walks on the …we don't know why she's there.' P9 L23

If the patient's agitation escalated, P9 would try to identify if the patient knew why they were in hospital. The overall aim for P9 was to enable the patient to see that the staff were not going to harm her and that they were there to help. This would be helpful too if the patient were hallucinating due to psychosis.

Cognitive Network P9 Vignette 1

Symptoms and behaviours given in vignette

Verbal abuse, threats, irritability, unco-operative, hostility, anger, hyperactive, pacing, hand- wringing, attitude problem, tense, sweating

Symptoms noticed

Unco-operative

Symptoms noticed

Sweating

Symptoms noticed

Hand- wringing

Meaning: 'don't buy this'

Delirium

Fever

Could be like that anyway

Anxiety

No formal diagnosis

Could have a learning disability

Offer medication appropriate to withdrawing regime

Sit down with patient, find out what is going on

Dual diagnosis- withdrawing

How did we get here?

Mental model

Interventions

Low stimulus environment

Physical cause such as pain or infection

Key decision points

Sedating effect of medication

Offer PRN lorazepam 0.5- 1mg

Is patient becoming more aggressive?

Will patient accept medication?

Time available to make a decision

Least restrictive choice

Could have psychosis and be hallucinating

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'But if it was to escalate in terms of the threats etc, and I would probably want to understand from her point of view, if she really understood why she was there, and what we were there to do. And if that's possible have a chat with her about why she was brought in, if this is normal behaviour for her. And actually if she would like something to help her anxiety, then I would be quite happy to give her something providing it's prescribed for her.' P9 L31

P9 also considered that the patient may have dual diagnosis:

'Also, if she's got something like dual diagnosis, where she has a substance misuse issue or she's alcoholic issue.' P9 L57

Overall, the symptoms displayed by the patient needed much more assessment to find out what was behind them. P9 explained that in themselves the symptoms don't mean anything, but that uncovering the cause was one of the main goals. Drawing upon their current experience in an older persons unit, P9 stated that the physical assessment of the patient would be a priority- as well as pain they may have an infection, a heart problem or be developing sepsis and they could quickly deteriorate.

'…the symptoms in themselves, don't necessarily mean anything. And that's the one thing as well with the client group that I work with, with dementia, you can see that right-away. Often what is perceived to be aggressive behaviour isn't someone may have a problem with pain, so if we can establish that.' P9 L69

The range of interventions considered by P9 included moving to a LOWER STIMULUS environment and involving the family. However, P9 would consider offering PRN lorazepam to the patient during the chat if they would accept it. If the patient became MORE AGGRESSIVE the approach taken would be the least restrictive one possible. The medication choice for P9 was lorazepam at a low dose, for example 0.5- 1mg, mainly because the patient was undiagnosed and may not have had such medication before. Avoiding over- sedation was a key attribute of medication and dosage for P9.

'if their behaviours became aggressive and it was unsafe to both them and other patients and staff, that you may well have to take a probably more, more restrictive approach to it.' P9 L108

'You might have to, you might have to, the least restrictive method possible but also something that's not going to sedate someone, because really at the end of the day if you are going to

sedate someone, where they can't function you're not actually going to ever really get to the root of the cause of what the issue is.' P9 L135

A difficulty identified by P9 was the issue of time. This wasn't identified by other nurses in response to this vignette.

'…you've not often got that time to be able to do that, you've not got the luxury so you have to make a split decision about how safe you want to keep the ward, and how safe you want to keep the staff and other patients.' P9 L128

7.4 Findings from the knowledge audit- cognitive demands

The final section in this chapter presents results from a synthesis of individual knowledge audits into a cognitive demands table (Table 50).

The table provides a generic overview of the most frequently mentioned cognitive elements of decision- making about whether to give PRN medication. Each cognitive element represents an individual task that would form part of a mental health nurses' practice. These elements provide real- world, domain- contextualised examples of expert nursing actions, and have been reproduced more or less verbatim. The knowledge audit (KA) includes why this element is difficult, errors that novices might make, and cues and strategies for successful completion of the element.

The knowledge elicitation process of the KA interviews is designed to progressively deepen understanding of how experts carry out tasks (Gore, Banks and McDowall, 2018). It is deliberately descriptive, being derived from the reports of practitioners. However, the information represents how expert practitioners detect problems and identify leverage points. Leverage points are opportunities presented within a situation that expert practitioners are able to turn into courses of action (Crandall, Klein and Hoffman, 2006). The value of this is that it can be used to escalate novices' learning and improve performance through enhancing sense- making and speeding up decision- making (Crandall, Klein and Hoffman, 2006). This will be explored further in the discussion section.

Cognitive element	Why difficult?	Common errors	Cues and strategies used
Preventing escalation of agitated patient's behaviour	Knowing how to see if patient will co-operate. Missing the signs. Knowing when to back off and give patient space. Not being the person that knows the most about this patient so don't know what this person is capable of. Health care assistants, who have been working for years have very set views can pressurise junior nurses Using medication punitively which represents an undesirable consequence to the patient's actions. Not seeing de-escalation as a consequence. Pressurising junior nurses If you have never had someone shouting and screaming at you and presenting as hostile it can be extremely scary Novices petrified Processing, weighing up all the information quickly enough to be able to decide what to do Knowing when to ask for help or let someone else take over Knowing how to manage emotions	Escalating situation without realising it- through body language Going about it the wrong way… coming over as aggressive, abrupt and quite controlling Too many people involved instead of having one person following patient, with other team members at a distance Not prioritising the right cues from the patient eg intention and direction of violent behaviour- was there intent to harm? Using words that mean 'you can't, everything I do will be punitive' red rag to a bull Not communicating with team during de-escalation- can't always presume that everyone knows what is going on Having male staff around 'just in case' makes patient more agitated If don't show confidence, or if show weakness (fear, shaking, sweating) patients pick up on it and play it Being able to tell patient behaviour is not acceptable without it appearing as personal criticism	Will patient cooperate with nurses. Have we got a way in? If patient known to service, will know roughly what to expect. If patient new to service, will have expectancies from working diagnosis. Seeing the patient, making eye contact. Looking at body posture, looking at behaviours. How long has patient been on ward, are they known or new to the team, has the patient got rapport with them. Is there someone [staff] who has a better relationship with the patient? Removing team from situation. New person patient can offload to without ramifications. Someone who will listen. Take to lower stimulus environment. Don't go over to a patient that doesn't particularly get on well with me Male staff responding to male patients can escalate the situation Have courage to challenge patient on actions, encourage patient to reflect

Cognitive element	Why difficult?	Common errors	Cues and strategies used
		Not realising they might be causing patient behaviour, not because they are doing anything wrong… it's just that patients don't like men, they don't like young men, or they don't like young women…	Empathy with patient's situation- they can't get out

Building relationships. Being honest as well as caring. Working with patients. Engendering trust so we believe them and they believe us [so negative outcomes of restraint and seclusion less likely].

Using observations of patient to assess risk of violence- does patient look like a drug user, alcoholic, so more likely to be violent

Framing responses differently- giving options for activities to do together, today.

Reducing potential for conflict by using activity to divert patient's focus away from 'no' response (eg wanting to leave ward).

Never give up- try one thing, then another- trial and error |
| Pre-empting problems for patients before they manifest | If don't know the person, don't know premorbid personality, what makes them tick

If patient genuinely unwell choice and options for them limited which can increase frustration

Patient's bigger picture- if they are expecting a fight you won't get anywhere | Novices often sense something is not right but not sure what to say or do. Leave it until it's too late.

Knowing patient and when everything about them tells you things are not right and are becoming unsafe but not responding proactively

Inexperienced staff will hold off and hold off | Is patient putting self in vulnerable position (eg female grabbing male patients)

Assess patient- not sleeping, eating, distress, not aggressive but very agitated

Is patient out of touch with reality

Use medication to take advantage of side effects- such as |

Cognitive element	Why difficult?	Common errors	Cues and strategies used
	with it, until it goes to restraints Medics do assessment so nurses' assessments not as good as they could be. Only find out about patient from medics assessment. Nurses want different information eg about likes and dislikes, home, hopes and dreams to individualise care. Patient may score low risk of violence based on having no previous history, but they are extremely violent now. Conversely, patient may have history of violence giving high score, but is not violent now. Tools misrepresent risk.	giving medication until it is too late. Reluctant to offer PRN and see what happens Lack confidence, don't know what to say for the best, after incident left to pick up pieces which adds to stress, so even more stressed when it happens next time. Not using observations to inform interventions/ actions. Not being proactive. Not being confident enough to engage with patient in own room- knowing that personal alarm can be used to summon help Not doing things with patient rather than for them eg making a cup of tea Limited understanding of medication and reason for use	olanzapine to stimulate appetite. Also a mood stabiliser Give patient PRN to help them with their distress Be aware of cautions eg neuroleptic naivety Being familiar with patient- having nursed them before Knowing the pattern of their behaviour from pre- admission If the first observed behaviours match the expected pattern then the future will play out as predicted Using that knowledge to put in place proactive measures- eg giving medication, ringing PICU Identify early in admission about what makes them agitated, what helps when they are, what can staff/ they do to help when it happens? People often become anxious before agitation, so need to get better at spotting anxiety Using knowledge of the patient to spot what is normal/ abnormal behaviour for them. Eg has patient been in bedroom for more time than usual over the past few days. Team being consistent with giving PRN

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Cognitive element	Why difficult?	Common errors	Cues and strategies used
			medication. Avoiding mixed messages to patient, which could cause confusion and agitation 'it's not gonna necessarily be on the assessment tool that if it's a Jamaican man he's gonna get on better with a Jamaican staff'
Uncovering why this person is acting in the way that are	Individual responses to medications eg Caribbean people more sensitive to certain medications Having enough experience to spot rarely seen events eg oculogyric crisis. Very serious, need to act quickly with procyclidine. Assuming mental illness is cause of signs, symptoms and behaviour rather than something else eg side effects of medications Patient lacking capacity so can't tell you what is going on	Overlooking physical causes for increased agitation Putting an episode of agitation down to mental health diagnosis only Not being aware of difference between patients' external and internal signs of agitation or distress. Only acting on outward signs.	Make sure staff gets on with the patient if possible Consider patient may be taking a psychoactive substance, legal or illegal, or may be withdrawing Symptoms coming back because they haven't taken their medication Balance risk of what they are about to do with potential risk of medication to health Assess for physical cause- often overlooked Listen to what patients don't say- non verbal leakage eg jiggling leg indicating agitation
Knowing the point at which to give medication	Difficult for…newly qualified Band 5s to go against what is written in front of them, because you have to have a certain amount of confidence that actually if you do something different and it doesn't work out, you can stand in front of somebody 'that these are the reasons	Might be more willing to use PRN with working age adults as potential for risk to themselves, others, greater Giving PRN medication prophylactically for behaviour repeated over several days at same time of day (eg).	If patient ranting and shouting in the courtyard but not posing a risk to themselves or anyone, different than if someone was being physically intimidating Could they cause themselves harm, could they cause other

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Cognitive element	Why difficult?	Common errors	Cues and strategies used
	I did it' and actually the reasons for doing it were justifiable	Indication not clear on med chart. Staff should talk to Dr to get written up as regular med. Relying on policies and not being flexible, eg not giving meds at 9.05 if prescribed for 8.00 [policy states can have an hour either way from prescribed time]. Policy drives care rather than supports care. Not understanding action of medications eg over what period of time they work, or not understanding consequences of not giving meds. Treating giving meds as a task to be completed rather than as a therapy. Giving PRN med without assessing patient first Give patients PRN medication cos it's an easier quieter life on the ward Not able to use knowledge of patient within context of risk assessment.	patients harm, and staff harm Know when last physical/ verbal violence was. Know the patient. Risk assessment includes gender and age, it would be about employment status, finance, secure accommodation, relationships. Young men more at risk of being violent. Be least restrictive if patient is willing to co-operate Knowing what patients respond well to….documented in their notes Safety is always paramount Be prepared to change approach at last minute Understanding action of the medication. Observing patient for actions of medication and giving/ withholding further meds based on those observations. Knowing how to use regular and PRN medication to support patient and treat symptoms. Taking personal responsibility for decisions rather than deferring to someone else eg consultant Working in patient's best interests to withhold meds eg to

Cognitive element	Why difficult?	Common errors	Cues and strategies used
			develop coping strategies
			Need to personalise the risk assessment to patient.
			it is that balance...if you have got somebody who is hugely manic…hasn't slept for three days, is over stimulated…me talking to them is not going to make any difference. It is just going to stimulate them more, and more, naturally, get some PRN into them, get them to sleep

Table 50 Cognitive demands table.

7.5 Chapter summary

Chapter 7 has presented the findings from the think aloud study and knowledge audit. Using vignettes, nurses' responses to agitated patient were elicited. Findings from the think aloud study have been presented in two ways- as a synthesis of nurses' responses to each of the four patient vignettes, and as cognitive networks of five participants. This was done to explore similarities and differences in expert and novice reasoning in relation to giving PRN psychotropic medication.

Findings from the think aloud study suggest variation in whether or not mental health nurses would give PRN medication. Some nurses would give medication straight away, usually to help calm the patient. This would enable the patient to then engage with staff therapeutically, allowing discussion and problem- solving to identify the cause of the agitation. Most participants would prefer not to give medication immediately, but would see how the situation unfolded. This included assessing the patient by collecting and evaluating information about internal and external factors that could be causing the agitated behaviour. The most common medications selected were most commonly benzodiazepines. For patients where psychosis could be a reason for the agitation, some nurses included an antipsychotic medication.

The individual cognitive networks aimed to explore the effect of experience and expertise in the clinical domain on decision- making and outcome. Using the same patient vignette, the networks illustrated the factors that each of the five participants used in their decisions, and importantly, the sequencing of factors. Participants clustered symptoms presented in the vignette, and attributed meaning to them- the patient was coping/ not coping, stressed or tense. They were concerned about patient and staff safety and the ability of the patient to engage with staff. Participants with the most experience in the clinical domain were able to mentally simulate possible futures, which influenced their decision. By contrast, participants with the least experience suggested actions but their response was reactive, rather than proactive.

Finally, the knowledge audit presented a synthesis of expert knowledge and skill, highlighting the cognitive demands of making a decision about using PRN psychotropic medication for agitation. Preventing escalation of patient behaviour, pre-empting situations, establishing why patients were acting as they were, and knowing when to give PRN medication were the crucial elements of skilful management of agitated patients.

Chapter 8. Discussion of Findings of the Qualitative and Survey Studies

8.1 Introduction to the chapter

The discussion section critically reflects on the findings of the survey and qualitative studies. To structure the discussion, the aims of the qualitative study will be taken in turn, and arguments will be considered in the light of empirical studies of decision- making, and use of PRN medications as identified in the scoping review. The chapter concludes with an overall summary.

8.2 What are the reasoning strategies used by mental health nurses when deciding to give or withhold PRN medication?

The RPD model of decision- making (Klein, 1998) was used in this study as a theoretical framework with which to evaluate MHN reasoning strategies. The RPD model was developed as a result of fieldwork with experts and provides a description of how experts make decisions. As indicated in Chapter 2, the RPD model has three variations, the use of which in decision-making depends on how familiar or typical a situation is.

In each version of the model, the action taken is shaped by situation recognition, dependent on three factors: relevant cues, expectancies and plausible goals. The difference between each version is shaped by anomalies in the situation as experienced by the decision- maker. Encountering unexpected information causes the decision- maker to revise their approach by running mental simulations to establish what will work. Once a satisfactory course of action has been identified, they will search no further.

The RPD model shows correspondence with how nurses in this study made decisions. Certainly, for some of the more experienced nurses their sequences of statements in relation to each vignette were surprisingly short. They appeared to recognise situations immediately, as evidenced by statements such as 'that's classic for the diagnosis'.

In addition, experienced nurses made statements indicating that they knew straight away what they were going to do in response to particular vignettes- especially those representing the kinds of patients they saw in their current clinical areas. This approach suggests intuitive decision- making, whereby similarity of the vignette to patterns stored in long- term memory evoked a learnt response to the situation.

Previous studies of nurses PRN decision- making have found that nurses reported using intuitive methods of decision- making, based on recognising patterns of behaviour, knowing the patient and using strategies that they knew worked (Stewart et al., 2012), while avoiding those that did not (Baker, Lovell and Harris, 2007; Usher et al., 2009). These studies were based on semi- structured interviews with MHN, establishing the attitudes, barriers and facilitators to PRN medication use. The contribution of this study is that for the first time, there is empirical evidence of intuitive decision- making, based on cognitive analytical methods.

More recent theories of decision- making suggest dual- process thinking, characterised by different properties (Payne and Bettman, 2004). System 1 thinking is akin to intuition: rapid, associative, occurs below the level of consciousness, is contextualised, and results in feelings of certitude (Kahneman, 2011). Examining some of the decisions, particularly those of the more experienced participants in the study, suggests System 1 thinking was present. Rapidity of decision- making was noted for decisions that involved both giving a medication PRN or not.

Furthermore, when looking at the information presented in the patient vignettes in the think- aloud, the speed with which participants suggested their course of action indicated that they did not deliberate about what to do. This corresponds to the most basic iteration of the RPD model of decision- making. The associative nature of System 1 thinking meant that the scenario conjured up by the information in the vignette triggered a memory or set of memories of caring for patients in similar situations. This would then cause a cascade of brain activation, with the arousal stimulated by the scenario evoking an autonomic response (Kahneman, 2011). In fact, this emotional response was evidenced by one participant saying that the vignette presented caused the hairs on their arms to stand on end.

In addition, participants were not just looking at patient symptoms and signs. As evidenced by inclusion of concern for patient and staff safety, in parallel with looking behind the behaviour to establish its origin, experienced participants showed ability to integrate components of the situations suggested in the vignettes into a whole. They were able, then, to recommend an efficient course of action designed to minimise risk of harm whilst simultaneously maximising opportunity for therapeutic interaction with the patient.

An important difference between participants in use of PRN psychotropic medication was whether they would use it to straight away to calm a patient and help them engage with therapeutic interventions, or if they would try de-escalation techniques first, keeping PRN medication as a reserve intervention. This did not seem to be dependent on expereince or expertise, although the least experienced were less likely to give medication straight away.

The RPD model offers a prediction that nurses do not spend time evaluating options, and again, for all participants, even the less experienced ones, they did not weigh up the advantages, disadvantages and utility of each available option. Satisficing, or stopping a search for options when the first acceptable one is reached, is a known feature of decision- making in real situations, particularly under time- pressure (Payne and Bettman, 2004, p127).

Instead, where a course of action was not immediately clear, participants used a serial 'if-then' approach, going through a sequence of responses from the least restrictive to the most restrictive, depending on the vignette in question. This was reliant on collecting information about the patient through assessment, and corresponds to the second iteration of the RPD model, where the decision- maker needs to generate an accurate assessment of the situation. Baker, Lovell and Harris (2007) identified that some nurses would take time to assess patients to decide on the best strategy to manage agitation, with which this study concurs.

In fact, all participants in this study would take time to assess the patients. The nursing assessment was highlighted in the knowledge audit, where participants identified that taking time to work out what was underlying the patient's presentation was vital. Not attributing the presentation to only mental illness was key, as nurses stated that exploring physical causes or the circumstances of the patient was essential. Returning to System 1 and System 2 thinking, this search for information represents the effortful, considered approach to decision- making characterising System 2 cognition (Kahneman, 2011), or hypothetico- deductive reasoning. It is a commonly used decision- making strategy of both experts and novices (Schwartz and Elstein, 2008).

Hypothetico- deductive reasoning is a method by which likely explanations for situations are generated. It began with attending to cues (symptoms, diagnosis and circumstances) presented in the vignettes, then forming potential explanations for the patient's presentation. The most experienced nurses appeared to cluster groups of cues together, which suggested states of being of the patient. The novice nurses showed a reduced ability to cluster cues together into patterns of meaning. Furthermore, although the number of hypotheses generated did not seem to differ significantly between experienced and less experienced nurses, the correspondence between the hypotheses and the patient was different. .

The participant with the least experience, both in terms of length of time since qualifying plus time spent in a clinical area similar to the vignette patient generated the most hypotheses, as detailed in their cognitive- network. However, some of the hypotheses appeared to be speculation rather than being grounded in the information gained from the vignette. This phenomenon has been found by Corcoran (1986), where novice nurses were opportunistic in their approach to problem solving. This was explained to be due to the lack of organising

principle for cues, resulting from a limited mental model. Furthermore, the most novice nurses in this study used backwards reasoning whereby they first formed a hypothesis then scanned the patient information for evidence confirming it. When none was available, they did not revise their opinion. Twycross, Finley and Latimer (2013) also found this type of reasoning in a study of nurses' approach to pain management.

The implications of these decision-making styles for mental health practice are that variation in use of PRN psychotropic medication is almost inevitable. Intuitive decisions, made using System 1 thinking processes, involve simplifying mechanisms, or heuristics. These are rules for action that have three main qualities (Gigerenzer, 2004, p63). Firstly, heuristics exploit evolved capacities. That is, learnt cognitive processes, or recognition of a typical situation, honed over time, result in a simple decision- making process. Whether or not a patient can engage with staff or if they are likely to cause harm, are simple, fast reasoning strategies. However, the nature of engagement depends on the social capabilities of the people involved. Expert evidence from the knowledge audit suggests that dealing with agitated, aggressive patients is scary and takes a certain amount of confidence to do well. Previous studies of intuition in nursing have also noted the lack of confidence novice nurse have when faced with intuitive feelings (Kosowski and Roberts, 2003).

A second feature of heuristics (Gigerenzer, 2004) is that they exploit the environment in which they are used, or are ecologically rational. If it is accepted that vignette responses offer insight into the decision- making factors and processes of participants, elicitation of nurses' 'past and future' and 'big picture' provides a window into how they are likely to manage an agitated patient in real- life. Nurses appear to have a toolkit of strategies for helping patients with agitation, but which they use and in what order seems to depend their overall assessment of the situation at hand. Evidence from the survey shows that for many of the patient vignettes, a PRN medication was indicated. However, the likelihood of giving a medication was often low. This suggests options, such as distraction, negotiation or other de-escalation techniques.

Initiatives such as de-escalation training are mandatory for mental health nurses within the National Health Service (NHS). Using psychosocial techniques, the aim is to reduce conflict and prevent escalation of aggression to violence. However, a systematic review of de-escalation training (Price et al., 2015) suggests that evidence for effectiveness of these programmes is weak, with inconsistent effects on incidence of aggression, rate of injuries or attribution of blame to particular patient groups.

Furthermore, the review identified that there was little evidence to suggest that staff attitudes to aggression and violence were altered through de-escalation training. The central argument within this thesis is that decisions are rational, not because they conform to an external

measure of optimum decision- making, but because they make sense within the setting they are used. This is ecological rationality. Therefore, the use of PRN benzodiazepines and antipsychotic medication can be argued to be a rational response to patient aggression and violence, and its precursor, agitation.

A cognitive approach to de-escalation training could involve examining participants' 'big picture' and 'past and future' elements. Essentially heuristic processes, these elements of situation assessment allow nurses to quickly summarise what is happening in a given scenario. This is intuitive or System 1 thinking. For experienced nurses, reinforcement, through repeated exposure and feedback from actions, establishes if a strategy for managing agitation, aggression or violence is effective, based on recognition. Hence the finding that some nurses use PRN medication more readily than others. They have seen it work, whereas de-escalation appears to be inconsistent in effectiveness.

Retuning to de-escalation training, the traditional approach of practice and feedback does not guarantee improved performance (Philips, Klein and Sieck, 2004). The systematic review () identified that staff wanted training relevant to their own clinical settings, with role play or live demonstrations. This implies practice and feedback. However, this technique can oversimplify the learning need (Philips, Klein and Sieck, 2004). Cognitive feedback uses information about connections between elements in the environment, perceptions of the participant, and relations between these two. This approach has been found to improve performance by emphasising the 'how' rather than the 'what' of a situation.

The third feature of heuristics is that they are different from decision- making methods that rely on optimisation (Gigerenzer, 2004). As stated, evidence from the think- aloud and cognitive networks showed that participants did not aim for the most optimal decision, but their decisions aimed for the good enough, given the circumstances.

8.3 What knowledge informs their decisions to give or withhold PRN medication, or consider an alternative therapeutic strategy?

In general, the nurses in this study showed knowledge of a variety of concepts and domains, including internal and external factors relating to patient presentation, what tests or further information would be needed to help assessment, potential interventions, when, how and why to give PRN psychotropic or other medication. Two key points emerge from the findings of this study.

Firstly, much of the empirical research identified in the scoping review highlighted that agitation was the most common reason for giving PRN psychotropic medication, although it was treated in some instances but not others. The management of agitation in mental health patients has resulted in a significant body of empirical work. Agitation is a known 'red flag' for development to aggression (Citrome, 2014) and the negative outcomes of aggression are numerous, including physical and psychological harm and increased costs to services (Price et al., 2018, p198). Furthermore, as indicated in the background chapter, the management of agitation was considered to be a 'staggering challenge' (Schliefer, 2011, p91). Additionally, there seemed to be no relationship between PRN medication given and patient signs or symptoms, or diagnosis (Walker, 1991; Geffen et al., 2002a; Philip et al., 2008; Stein- Parbury et al., 2008; Dean, McDermott and Marshall, 2006; Martin et al., 2010; Swart, Siman and Stewart, 2011). This study makes a contribution to identifying why this might be the case.

Participants did use patient diagnosis when making their decisions, as it gave them a sense of what to expect- particularly the most experienced nurses. Firstly, the least variation was seen in the vignette of the older lady with dementia. Most nurses would not have given PRN medication to this lady unless she was in state of severe distress or whilst waiting for results of tests. All nurses would have assessed the lady further, with physical causes for the rapid deterioration deemed the most likely explanation. The diagnosis here was a vital element of their decision-making, alongside the risk of the lady to cause harm. The favoured medication, if it were to be used at all, was lorazepam.

The vignette with the greatest variation was for the middle- aged man with a diagnosis of schizophrenia. There was clear variation in medications selected, with suggestions of different anti-psychotic medication and benzodiazepines. The selection appeared to depend primarily on the diagnosis, which suggested to nurses that the patient's illness may be deteriorating. Using an anti-psychotic was justified because it would address potential psychosis as well as act to calm the patient down. Some nurses would have used lorazepam as this was the first line treatment in their Trust.

However, what became clear throughout this study is that factors that were equally important were the ability of the patient and staff to engage with each other, plus the risk of harm to others. Nurses were reluctant to view patients as diagnoses, and were more interested in finding out the message behind the behaviour. This is entirely in keeping with current recommendations for mental health settings, where the emphasis is on engagement and therapeutic management of the patient, using person-centred care and values- based approaches (NICE, 2011b).

A second aspect of knowledge used relates to the medications themselves. Studies have shown that nurses appear to have limited knowledge and understanding of the medications they routinely administer (eg Mayo and Duncan, 2004; Tang et al., 2007). A very recent study into mental health nurses' knowledge of antipsychotic medication side effects (Begum et al., 2020) also found knowledge was limited but that the extent of knowledge was related to length of experience.

The nurses in this study showed differing levels of knowledge too. Experienced nurses were able to verbalise knowledge of avoiding polypharmacy, particularly in relation to antipsychotic medication. Studies included in the scoping review found that lorazepam was the most frequently prescribed and administered medication in mental health settings, but the second most frequently used medication varied widely (Walker, 1991; Fishel et al., 1994; Craig and Bracken, 1995; McKenzie et al., 1999; Geffen et al., 2002a; Curtis and Capp, 2003; , 2007; Neumann, Faris and Klassen, 2015). This study has not found this to be the case, with use of lorazepam the most commonly recommended medication but the next most popular was limited to selected antipsychotics or anticholinergic medication for side effects.

The risks of polypharmacy and high doses of psychotropic medications are now well known and NICE (2014) recommend only one antipsychotic should be prescribed unless for very short periods. In addition, lorazepam should be the first- line medication for treatment of agitation (eg NICE 2015). The views of experts elicited in the knowledge audit suggests that novices struggle with PRN medication as they do not understand the action of medications, for example over what period of time they work, or conversely, the consequences of withholding medications.

This study does highlight some variation in medications that would be given, particularly for the male vignettes. The variance appeared to be based around the patients having serious mental health disorders, that is bipolar and schizophrenia. Some nurses would use lorazepam, whilst a range of anti-psychotic medications were suggested on the basis that antipsychotics would ultimately treat any psychosis, but more importantly act to calm the patient in the short term. Previous studies (Geffen et al., 2002b; Martin et al., 2017, Moreblessing and Doyle, 2019) indicate that MHN feel underprepared and lacking in medication knowledge, to know when to administer PRN medication. Although, as stated earlier, current guidance on anti-psychotic medication aims to reduce poly-pharmacy and high- dose administration, the use of anti-psychotic medication was a feature of participants' decision- making in this study.

However, viewed through a decision-making lens, this study adds a different perspective. The RPD model suggests that when deciding what to do, people do not deliberate and will do what they know to work. Knowledge, in a decision- making context, does not solely mean declarative knowledge- in this case, facts about medications. Knowledge also represents how the decision-

maker functions within their environment, and is a product of adaptation to that environment (Gigerenzer, 2004).

The implications of this are that, given the prescriptions for PRN medications with which MHN must work, medications are selected on the basis of their efficacy given the patient situation at hand. Rationales given for choice of antipsychotic medications, rather than benzodiazepines, related to a presumed presence of psychosis which could explain behaviour in the patient vignettes. However, again, not all participants would have recommended an antipsychotic. 'What works' therefore, appears to be related to individual participants' perspectives and capabilities for action in response to the behaviours described in the vignettes. Further evidence from the knowledge audit suggests that knowledge includes confidence with de-escalation techniques, how to spot an escalating situation, when best to intervene, and importantly, how this is managed within teams.

Furthermore, nurses showed knowledge of current thinking around best practice in use of medications. In an echo of the work of Henry and Foureur (2007), this thesis suggests that whilst variation does exist in nurses' giving of PRN medication, certainly the most experienced nurses do have adequate working knowledge of the medications they administer. Many nurses are now independent prescribers and some nurses from this study indicated that they were. Therefore, knowledge of medications is likely to be better than studies suggest.

Some caution should be exercised here though. This study was not designed to test nurses' knowledge of medication. In addition, the low fidelity of the vignettes to real life patients could have induced the variation, as nurses were not able to establish if the patient had symptoms of psychosis.

8.4 How do differences in reasoning between experienced and less experienced mental health nurses contribute to variation in practice?

This section explores the responses of five participants with differing levels of expertise to the same vignette. Using the five cognitive networks presented in Chapter 6, this section will highlight that the more experienced nurses were able to integrate information about different aspects of the presented vignette into an overall strategy when deciding about giving PRN medication. In this section, decision- making factors will be organised into key macro-cognitive processes that describe how people function in real- world settings (Crandall, Klein and Hoffman, 2006): perceptual ability and use of cues, mental models and identification of leverage points. The chapter concludes with an exploration of coherence between individual participants'

knowledge audit and their cognitive network. This will reveal the consistency of their decision-making strategies.

Before proceeding, a recap of the participants' demographic details follows:

- P2 was an experienced Band 7 nurse with 23 years post- qualifying experience. All post-qualifying years were on female acute units. Would give PRN medication immediately
- P4 was a novice qualified nurse with 6 months post- qualifying experience, all of which were spent on the same ward as P2- an acute female unit. Would not have given medication unless absolutely had to
- P11 was an experienced Band 7 nurse with 7 years post- qualifying experience but only 7 months experience in their current clinical area- a mixed gender assessment ward. Would not have given PRN medication.
- P15 had been qualified for 32 years, and had worked on their current unit- functional older adult, for almost 21 years. Would not have given PRN straight away, but would consider it as part of an overall strategy.
- P9, qualified for 8 months, worked on older organic adult unit since qualifying.

8.4.1 Perceptual ability and the use of cues

Studies of expert decision- making show that experts have well developed perceptual skills when compared with novices (Klein, 1993). The cognitive networks of the five participants highlighted cues they felt were relevant to their decisions and what, if anything, these cues meant.

P2 and P11 were the most senior nurses. They clustered cues of patient signs and agitated behaviour together. For P2, angry, abusive, threatening and unco-operative behaviour suggested agitation, while hyperactivity, shuffling, hand- wringing and moving around suggested the patient in the vignette was not coping with the situation they found themselves in.

P11 noted hyperactivity, difficulty sitting still, irritability and attitude suggesting the patient may have bipolar illness, while anger and tension indicated that the patient could not express themselves. P15 had been qualified the longest, but was not as senior as P2 or P11. P15 noted frequent hand- wringing, moving and restlessness, suggesting the patient

was frightened. Shuffling, hand wringing, moving, restlessness, uncooperative behaviour and an attitude problem denoted agitation to P15.

In contrast, the participants with the least experience noted signs and behaviours, but these were not subdivided to different meanings, or, they were interpreted singly. P4 noted shuffling, hand wringing, pacing, moderate tension (these words as written in the vignette) and sweating. Together, these behaviours and signs suggested the patient was not coping, and was anxious and agitated. P9 noted behaviour singly- uncooperative, sweating-delirium, fever, hand wringing.

Focussing attention on cues presented in the environment is argued to be dependent on the cognitive abilities of the decision- maker (Payne and Bettman, 2004). This is not to say that the least experienced participants were lacking in ability. Rather, repeated exposure to patients lead to the most experienced having rich mental representations of the features of agitated behaviour. They were also able to detect and group behaviours and signs that suggested states other than agitation. Their perception, therefore, was more nuanced than that of the least experienced participants.

Expert evidence from the knowledge audit suggests that novices have difficulty noticing several factors related to agitated patients. Expert participants felt that the one of the cognitive elements most difficult for novices was preventing escalation of patients' behaviour. This, they argued, was difficult because novices miss the signs. Certainly the experienced nurses in this study were able to highlight specific examples of what to look out for in patients including withdrawing to their room, non- verbal leakage, or subtle changes in voice. In common with other studies into mental health nursing (Usher et al., 2009) and nursing decision- making in general (eg Rashotte, et al., 2011) this relied to a great extent on knowing the patient. Novices were also felt to be less able to use observations to inform interventions or actions. Furthermore, expert participants were able to identify prototypical patterns of patient behaviour, indicating that if the first observed behaviours match an expected pattern, then the future will play out as they predict.

However, what also emerged from studying the selection of cues and their meanings to participants was the potential effect of domain knowledge. Both P9 and P15 worked on older adult organic or functional units where they cared mainly for people with dementia. The choice of terms used to categorise cues and their meanings would be commonly used within dementia care, for example 'frightened' or 'delirium'. Of course, the patient in the vignette could have been both of these, although delirium is less likely given the age of the patient. However, a primary cause of change in mental state for people with dementia is delirium (NICE, 2021).

The effort needed to pick out important cues from the vignette represents a cognitive cost in terms of attention and processing. Mental effort is felt as uncomfortable, with the result that people will avoid it (Shenhav et al., 2017). The expert participants had the ability to recognise complex patterns of information without expending mental energy. This is a feature of expert decision- making (Phillips, Klein and Sieck, 2004). The findings of this study suggest that experience, both generally and within a domain, influences how cues are perceived. This is plausible, via the mechanism of repeated exposure to a situation. In part then, perception and attribution of cues to patient states could explain some of the observed variance in whether PRN medication would be given or not, and the type of medication chosen.

8.4.2 Mental models

 Mental models are simplified knowledge structures or representations of how things work (Phillips, Klein and Sieck, 2004). This includes the dynamics of a given situation, and mental models are described as being how sense is made of a situation. The cognitive networks of the five participants reveal some similarities and differences between novices and experienced staff. The mental model of 'how did we get here' represented an understanding of factors internal and external to the patient that led to their current situation.

Four of the participants (P2, P11, P15, P9) explicitly considered diagnosis in their mental model- the patient in the vignette was of unknown diagnosis. This meant the patient was an unknown entity- evidence from the cognitive demands in the knowledge audit concurs that knowing a diagnosis provides expectancies. This gives participants a broad idea of what to expect in terms of features of mental illness such as presence of psychosis or grandiose behaviour. It also allows them to separate behaviours and, crucially, ascertain whether they are likely to arise from other causes, for example poor coping strategies, fear or loss of control. The knowledge audit provides further evidence for this decision- making strategy, as expert participants suggested that novices lack discriminatory skills and too readily attribute behaviours to mental illness.

Decision- making research shows that experts have richer mental models than novices (Phillips, Klein and Sieck, 2004). This includes the ability to mentally project into the future to see how a situation might play out. The future is represented in the cognitive networks as key decision points. P2 used four key decision points to form future possibilities using mental simulation. There was interplay between these key considerations and the factors identified in 'how did we get here'. Given all these factors, P2 felt that the situation ran the risk of running

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out of control. P2 very quickly formed this future possibility through having seen this type of situation many times:

> *'Once we reach that stage we know that, through experience, that if we don't deal with someone at this stage, and this is allowed to continue without appropriate action being taken, and interventions happening quite likely what will happen is she follow up on her threats and someone will have a smack.'* P2 L43

In fact, P2 was sure of their decision very early on in the think aloud, which suggests system 1 or intuitive processing. This is consistent with the first iteration of the RPD model, whereby the situation was recognised as typical, and a course of action was immediately apparent:

> *'Totally, just reading the first two lines, maybe the first three lines I'd already made in my head my mind up in terms of what we would be offering and why…'* P2 L62

By contrast, the least experienced nurses, P4 and P9, did not mentally simulate possible futures. For example, P4 did not want to give medication but opted to go for discussion and de-escalation of the patient with one- to- one time. During this time, P4 would assess the patient as indicated by 'decision points' on the cognitive network. Notable was the difference between novices and experienced participants here. The most experienced participants, in the decision- making sequence from the think aloud, integrated 'how did we get here' with 'key decision points'. Key decision points represented information that they wanted to obtain *prior* to making a decision about whether to give PRN medication or not.

In contrast, the least experienced participants used key decision points as considerations to bear in mind *during* the chosen intervention of engaging with the patient in a one- to- one situation. What is clear is that these participants were not able to go much beyond the information given in the scenario to imagine possible futures. This is consistent with other research into novice- expert decision- making, for example Lipschitz and Shaul (1997, p297). In their study of naval crews, both novices and experts conducted a situation assessment, but novices focussed on mostly on their own actions and reacted to display screens. Experts took time to assess the situation more thoroughly, imagining different possibilities or explanations for the scenario. This is consistent with novices and experts in this study of PRN medication.

Furthermore, experts are able to see things that novices overlook, or cannot see (Shanteau, 1985). In responding to the patient vignette, the most experienced participants asked

whether the patient would be able to engage with staff. This was asked before deciding on any interventions. The novices, by contrast, intervened then asked questions later. Expert evidence from the knowledge audit suggested that novice mental health nurses often do not intervene with PRN medication soon enough, with the consequence that the situation progresses to a point where it is unrecoverable. The patient becomes severely agitated or violent. This reduces the confidence of the novice in dealing with a similar situation in future, to the detriment of all involved.

Mental health nursing on acute wards is done in teams of nurses and other healthcare professionals. Assessing and helping a patient with agitation is done over time, with the consequence that staff members may come and go. The routines of the ward need to be maintained, and other situations may be occurring that require staff attention. Nurses perceive acute mental health wards as 'hectic, demanding and chaotic' (Duxbury et al., 2010). Evidence from the cognitive networks of the most experienced participants (P2, P11 and P15) suggests that they acknowledged the presence of other nurses in their assessment of the situation. In some form, they asked whether the patient would engage with other staff or if staff were able to de-escalate the situation. By contrast, the least experienced nurses focussed only on their own actions.

Evidence from the knowledge audit lends further credence to the role of team- working in working with agitated patients. Expert participants suggested that common errors made in the context of teams included too many people following the patient, rather than one person having responsibility with others at a distance. Communication was valued, as in the heat of a situation, it cannot be presumed that all team members know what's going on. Trying different staff was a strategy for successful engagement with the patient because patients may have prior traumatic experiences with males, or dislike young women.

The role and value of teamwork in decision- making about PRN psychotropic medication has not been studied in detail to date. However, a study of assessment and management of pain in patients with dementia found that this activity is distributed across time and individuals (Dowding et al., ND). The organisational climate or culture influenced both healthcare professional and patient behaviour. In aiming to explain the management of aggressive and violent behaviour, nurses did not believe that their interactions with patients were a cause of patient aggression (Duxbury, 2002). Since then, opinions appear to have changed, with nurses in the knowledge audit recognising that how they interact with patients was indeed a contributory factor to successful management of agitation and avoidance of escalation to more extreme behaviour. PRN decision- making in teams is worthy of further study.

8.4.3 Leverage points

Another reasoning strategy used by experienced nurses involved the ability to identify leverage points. These are a feature of macro-cognition as identified by Klein and Wolf (1998). Leverage points are opportunities that present themselves in a situation, and as experts have well-developed perceptual abilities, they are able to spot such leverage points. Leverage points here are exemplified as valuable cues and strategies within the knowledge audit: 'Will the patient co-operate with nurses? Have we got a way in?' Evidence from this study can be seen in the cognitive networks of the most experienced nurses. They were able to combine the past and future into an overall sense of the problem. However, they also had key decision points such as 'can we engage with the patient?' and 'what is the immediate risk of harm?' about which a decision would turn. This adds new information to the study of MHN PRN decision- making.

8.5 Using the knowledge audit to review nurses' responses

One feature of the analysis above is that it does not explain the differences to where the nurses' attention was initially directed. As stated in previous chapters, attention is a scarce resource and real world decision makers are selective in what information is attended to and how it is used. The knowledge audit (KA) collected data from participants about their ability to know how a situation has developed and where it could be heading, plus the 'big picture' for the task- that is, the most important elements to keep track of. These two sections of the KA for P2, the most experienced participant in relation to the patient vignette, are reproduced in Table 51.

Cognitive component	Cues and strategies
Past and future	
Understanding likely outcome- will patient take PRN medication and calm, resolve problem, or if not and rapid tranquilisation required. **Will patient cooperate with nurses. Have we got a way in?**	If patient known to service, will know roughly what to expect. If patient new to service, will have expectancies from working diagnosis. Seeing the patient, making eye contact. Looking at body posture, looking at behaviours. How long has patient been on ward, are they known or new to the team, has the patient got rapport with them. Is there someone [staff] who has a better relationship with the patient?
Big picture	
Safety of patient, other patients, staff and the unit. Dignity- how much recall the patient will have, especially if actions completely out of character.	Information from home crisis team on risk of violence at point of admission. Risk of violence screening on admission. History of violence- recent or historical. Using this knowledge to prepare team for what they are getting.

Table 51 KA for P2

Examining this KA shows that in 'past and future' P2 highlighted the importance of the patient's engagement and co-operation to understanding how situations develop and where they could head. This is consistent with P2's key decision points in their cognitive network. In addition, the 'big picture' for the task includes safety as a key concern. Again, consistent with the cognitive network for P2, this was represented as one of the key decision points.

Similarly, for P11, there is correspondence between their KA and initial observations and subsequent responses to the patient vignette illustrated in their cognitive network (Table 52). P11 stated that they would consider whether to intervene as one of their key decision points, knowing that patients need to express their frustrations. Furthermore, the 'big picture' from the KA of P11 suggests that the most important aspect of a decision to give PRN medication is to establish why the patient is feeling like they are feeling. Again, this is consistent with their approach to the patient vignette.

Cognitive component	Cues and strategies
Past and Future	
Knowing when and how to intervene with a patient when they are smashing something up (but not hurting staff)	Had experienced similar situation before and had handled it well Knowing patient- had hurt staff in past but tended to take it out on furniture/ walls; burst of aggression then calmed quickly afterwards Timing- do not intervene when patient in middle of smashing something up, as long as not hurting anybody. Let them get it out of system Consider staff- would male patient react better to female? Have courage to challenge patient on actions, encourage patient to reflect Patient knew he had scared staff Empathy with patient's situation- they can't get out
Big picture	
Why is patient feeling like they are feeling?	Feelings, social aspects, physical health What has just gone on eg visits Pinpoint a trigger Identify early in admission about what makes them agitated, what helps when they are, what can staff/ they do to help when it happens? Maintain dignity and safety Low stimulus environment, quiet, no people around Nurses don't always have to intervene- may be natural to get agitated. Let it happen, and for patients to come to ask for help.

Table 52 KA for P11

For P4, one of the least experienced participants, the past and future element from their KA was to establish when a situation is building with a patient, therefore heightening the risk of harm (Table 53). The cognitive network for P4 showed that they would take a reactive approach to the patient and during their recommended intervention would assess if the patient was becoming more agitated. However, for P4, the 'big picture' represents an important consideration but is only a small component of the overall picture when managing patients with agitation. This is important because P4 would not have given PRN medication to any of the patients illustrated in the vignettes. In another part of their KA about self- monitoring, P4 identified that they hold off for too long when thinking about giving PRN medication with the consequence that situations sometimes got out of control. In previous studies of PRN decision-making (for example Barr, Wynaden and Heslop, 2017; Moreblessing and Doyle, 2019), less experienced nurses are felt to be more likely to administer PRN psychotropic medication. Findings from this study suggest the opposite.

Cognitive component	Cues and strategies
Past and future	
Seeing when a situation is building	Expected behaviour for diagnosis eg elation with bipolar illness Boundaries aren't working- patient behaving (speaking) in way that is not acceptable Knowing triggers for a patient eg not liking a member of staff Instruct to go back to bedroom and calm down If that doesn't work, can give PRN lorazepam
Big picture	
How dependent patients are becoming on PRN medication PRN for managing agitation not as a long- term coping mechanism	Should be prescribed regular medication eg antipsychotics, mood stabilisers Use mindfulness, go for a walk Group work with psychologist to learn coping strategies, if patient well enough Are these techniques being used by patient, and/ or suggested by staff? Looking at goals of admission and making sure patient has coping strategies to prevent readmission

Table 53 KA of P4

Finally, the KA from P9 also seems to offer a prediction as to how they would respond to vignette 1 (Table 54). Examining their cognitive network shows that P9 relied on their experience with older adults in formulating a strategy- however, although not wrong, the emphasis on establishing a physical cause for the presentation is key for older adults but arguably less so for working age adults. The past and future element for P9 also draws on physical causes. The 'big picture' for P9 echoes their key decision points of using the least restrictive strategy. However, the big picture element of risk of harm did not appear in their cognitive network. The decisions of experts are argued to be more consistent than those of novices because of their ability to consider underlying principles rather than isolated components (Chi et al, 1981). This KA could be illustrative of that.

Cognitive component	Cues and strategies
Past and future	
..because I've known someone's had a fall and their behaviour is odd... It's often connected to pain	you know for them it's uncharacteristic for the way they are, regardless of whether they have dementia or otherwise Check med chart for PRN codeine not PRN to treat anxiety as they may be in pain Have they had a fall about the day before
Big picture	
Could they cause themselves harm, could they cause other patients harm, and staff harm Safety is always paramount	Is anything I'm going to do, decisions I make, are they going to be of risk to the individual patient themselves Might be more willing to use PRN with working age adults as potential for risk to themselves, others is greater [use] the least restrictive form of method of managing that situation Balance risk of what they are about to do with potential risk of medication to health

Table 54 KA of P9

8.6 Summary of comparison of KA with cognitive networks

The journey through the preceding chapters appears to suggest some unexpected factors that influence whether nurses would give PRN medication. Comparison of responses by vignette illustrated that variation does indeed seem to exist, not only in medication giving but also type of medication and dose. However, as evidenced in Chapter 6, Table 45, simply examining the

decisions of novices and experts did not seem to offer much explanation for the observed differences in outcome.

This chapter developed the analysis by examining five nurses with a differing experience and expertise in relation to one single vignette. The resulting cognitive networks revealed important differences in initial cues noticed, interpretation of the cues into meaning and storybuilding of 'how did we get here'. Importantly, the more experienced nurses appeared able to project into the future, relying on experience of previous similar experiences to imagine possible outcomes. Dependent on where they saw the situation heading, they would or would not give PRN medication. This suggests ability to pre-empt situations and prevent possible escalation.

Returning to Table 45, the nurses most likely to give medication were the most experienced. Furthermore, it is known that attention is a scarce resource and decision- makers must direct it selectively. The examination of knowledge audits suggests a varying coherence between each participant's perception of the 'past and future' and 'big picture' and their cognitive networks.

The KA of the most experienced nurses had closest correspondence with their cognitive network. The KA of the least experienced nurses demonstrated that their ability to see the situation described by the vignette as a whole was limited, as they focussed on specific elements that made up only a small part of an overall consideration of whether to give medication. The coherence and correspondence of the KA could therefore be viewed as being able to predict key concerns for each participant, and so their likely response to each vignette.

However, there are important methodological limitations that mean caution needs to be exercised with this interpretation. These will be considered in the final section.

8.7 Strengths and limitations of the thesis

One of the contributions of these empirical studies is to further understanding of how mental health nurses make decisions when dealing with agitated patients. The RPD model, used as a theoretical framework for the think aloud and KA elements, is rooted in field studies of how experts make decisions in their working environment. Although experience does not necessarily lead to expertise, for this study experience was used as a proxy for expertise. The scoping review revealed that only one study about PRN medication giving had a theoretical underpinning derived from cognitive psychology (DiGiulio and Crow, 1997), and the use of naturalistic decision- making theory has had very limited use in studying nursing decision-making generally. The benefit of using the RPD model as a theoretical framework alongside

cognitive task analytic methods has allowed insights into the processes that experienced and less experienced nurses' use, plus the development of knowledge to enable them to manage the care of agitated patients. However, as with any empirical study, conclusions need to be interpreted with any limitations in mind. As indicated previously, this study was intended to be a mixed- methods study. This would have strengthened the explanatory power by comparing results from the survey and regression analysis with participants' responses to the qualitative interview. Unfortunately this was not possible due to the poor response rate to the survey.

As a result, the think aloud and knowledge audit was based on a small convenience sample. Conclusions therefore can only be tentative, however they do suggest areas for further study. It is possible that the participants, being a convenience sample, were more or less likely to use particular strategies. I do not know what non- participants would have done. The RPD model provided a framework for understanding how individual nurses' decisions could be made. However, the variation of the model used has limitations in that it does not take account how teams make decisions. This is important in nursing because even though individual cognition appears to be a factor, the distributed nature of nurses' work across teams needs to be taken into account. It is worth noting at this point that the descriptive framework of the RPD model and outputs from CTA methods do not presume that the nursing actions elicited are best practice. This could be the focus of a further study.

The cognitive task analysis methods also have important limitations. Despite the efforts to ensure construct validity of the vignettes, they are by nature reductive and static representations of people. The responses of the participants to each vignette could be shaped by the data collection methods- in verbalising a sequence of actions, subsequent responses may be shaped by earlier ones. In addition, verbalisation must be done in a linear fashion but that might not represent the temporal arrangement of nursing actions were the situation to be in real life, and it is impossible to know if the nurses" responses to the vignettes would in fact mirror real life. Ordering effects of the presentation of the vignettes must also be considered- for each participant the vignettes were presented in the same order. This may also have resulted in fatigue, with the final vignette not garnering as full a response as earlier ones.

However, despite these limitations, the study does have significant strengths. This is the first time that novice- expert differences have been studied in relation to PRN medication giving. Taking a theoretically driven approach has allowed for specific cognitive factors to be identified, contributing to both the body of knowledge of nurses' reasoning, but also to mental health knowledge. Furthermore, the use of CTA methods, previously developed and tested, enhance the study's credibility.

8.8 Study implications

8.8.1 Implications for practice and education

The study has several implications for nursing practice. Firstly, although reports of mental health nurses' PRN medication practices show overuse of restrictive practices, this study has not found this to be the case. The discrepancy between my study findings and others suggests a gap. This could be due to the methodological limitations of this study. However, harnessing the reasoning of expert nurses shows how the concepts and knowledge of medications, de-escalation techniques, risk assessment and team work can be combined to manage an agitated patient. This holistic view integrates these factors. The value of expert nurses' reasoning is that it does not follow steps as set out in policies or textbooks. In fact, during this study I have looked at a variety of textbooks on mental health nursing and PRN medication giving is only covered in superficial detail. Deciding on an intervention to manage agitated patients is complex, limited by a range of factors including the individual nurses but also situational factors. Training programmes exist to facilitate patient- centred approaches to de-escalation skills- this study emphasises the need for these to be more widely used.

Furthermore, this study has implications for other areas of practice where PRN medication is given. Mental health nursing emphasises values- based practice, and power relations between staff and patients are changing from a custodial model to an engagement model. Recently, use of PRN medication for people with learning disabilities has become an important concern, with reports and tools to begin to address this (eg NHS England, 2020). Knowledge audits of learning disability nurses could reveal important decision- making features, therefore informing future staff development.

Lastly, the exposure and involvement of student nurses in pre-empting and managing patient agitation is vital. It is likely that student nurses are kept away from risky patients- for good reason. However, if they are to develop the skills needed to be safe and effective when qualified, exposure would be better happening earlier in a supportive environment where learning from experts can take place. Student nurses do have training in management of aggression already, however the subtle signs available before events escalate are of key importance. Cognitive task analytical methods, in eliciting the knowledge of experts, also has the potential to accelerate learning by emphasising all the skills needed to deal with a situation effectively, rather than components.

8.8.2 Implications for research

As identified above, the intersection of nurses' knowledge lies between medications, risk assessment, de-escalation skills and teamwork. The outputs of CTA methods can be used to develop training materials grounded in expert knowledge, which would benefit novice nurses during the pre- registration nursing course and beyond. Research into the development of such resources and the impact on student nurses' confidence and capability could be tested, preferably using experimental methods.

More generally for PRN medication, there are many clinical settings and patient groups that have been so far under- researched, for example adult nurses' use of psychotropic medications, or the use of medications by paramedic staff.

Research into the knowledge of managing patient agitation across teams would be useful. This applies to any clinical setting, particularly inpatient settings. This, to my knowledge, has not been studied in settings other than mental health or learning disability.

The evidence for use and effectiveness of PRN medication in mental health- indeed most- settings, is limited. As highlighted in the literature review, the most recent systematic review examining this was from 2015. Further testing of commonly used medications should take place, in order to provide a more robust evidence- base for medication choice.

Chapter 9: Conclusions

This final chapter will conclude the thesis.

From the scoping review, chart review studies showed that a significant proportion of patients in mental health settings received PRN psychotropic medication, yet there appeared to be little relationship to signs, symptoms or diagnosis. Medications used varied significantly. Qualitative studies developed knowledge and understanding of the process of how nurses decide to give PRN medication. However, there was a dearth of theoretically informed research, underpinned specifically by cognitive decision- making theories.

The survey study used standardised vignettes to evaluate nurses' decision- making about symptom severity, likelihood of giving medication and preferred PRN medication to help agitated patients. Response rate was poor. However, the survey showed variation between participants in their ratings of symptom severity, likelihood of giving medication and also the medications selected. Data from the responses, plus feedback from participants and supervisors will enable the survey to be revised.

The qualitative study used cognitive task analysis methods to identify decision- making processes. Again, variation was apparent in PRN medication use. Experienced nurses used recognition- primed decision- making strategies for familiar patients, leading to rapid decisions. Novice nurses were unable to consider the big picture for helping agitated patients. The cognitive demands for novices mean they often leave giving PRN medication until it is too late. An audit of expert knowledge reveals that novices miss verbal and non- verbal signs, and lack confidence in dealing with aggressive patients, suggesting a need for improved education of student mental health nurses.

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APPENDIX 1 Search strategy and results

Medline Search

Search	Results
1. Pain, Post- operative/ or Mental Disorders/ or Middle Aged/ or PRN.mp or Pain/ or Aged/ or Adult (the term 'PRN' mapped to these subject headings)	234733
2. Middle Aged/ or Drug Prescriptions/ or Aged/ or Pain, Postoperative or pro re nata.mp (the term 'pro re nata' mapped to these subject headings)	54534
3. Hypoglycaemic Agents/ or Adult/ or Analgesics, Opioid or as needed.mp or Middle Aged/ or Aged	502463
4. Adult/ or Analgesics, opioid/ or 'as needed'.mp or Middle Aged/ or Aged (the term 'as needed' mapped to these subject headings)	6709810
5. 'as required.mp	771648
6. PRN.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier]	1426
7. 1 and 6	1426
8. 2 and 6	281
9. 3 and 6	293
10. 4 and 6	167
11. 5 and 6	1426
12. 7 and 8 and 9 and 10 and 11	19
13. from 12 keep 2, 3, 12, 14	4
14. pro re nata.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier]	1426
15. from 14 keep 5, 46-47, 59, 64-66, 71, 75, 92, 100, 101, 108, 116, 131, 144, 159, 229, 230, 255, 259, 272	22

Table 2: Medline search strategy

In addition, a second search of Medline was done using a different strategy (Table 3). This resulted in an additional 6 articles for inclusion in the review.

1. "pro re nata". ti, ab	367
2. prn. ti, ab	1413
3. (administer$ or prescrib$ or give$ or take$ or "medication regimen$") adj2 (needed or required or indicated or "on demand")). ti, ab	3835
4. 1 or 2 or 3	5370
5. ad.fs.	1301482
6. 4 and 5	1201
7. Limit 6 to (English language and humans and yr="2014- current")	236
8. From 7 keep 173	1

Table 3: Medline second search strategy

Embase, Psychinfo, Social Policy and Practice via OVID

1. "pro re nata". ti, ab	681
2. prn. ti, ab	2487
3. (administer$ or prescrib$ or give$ or take$ or "medication regimen$") adj2 (needed or required or indicated or "on demand")). ti, ab	5925
4. 1 or 2 or 3	8628
5. ad.fs.	271489
6. 4 and 5	290
7. Remove duplicates from 6	283
8. Limit 7 to human [limit not valid in Social Policy and Practice; records were retained]	253
9. From 8 to yr="2024-current"	46
10. From 9 keep 4, 13, 15, 38	4

CINAHL Search

1. TI "on demand" AND TI medication*	233
2. TI "as required" AND TI medication*	3792
3. TI "as needed" AND medication*	5833
4. S1 or S2 or S3 or S4	275
5. AB "prn"	323
6.	
7. AB "pro re nata"	101
8.	
9. Keep folder	22

Table 4: CINAHL search strategy

Web of Knowledge

Title=("pro re nata") OR Title=(prn) OR Title=((administer$ or prescrib$ or give$ or	172

take$ or medication regimen$) adj2 (needed or required or indicated or "on demand"))	

Boolean operators were used to combine search results. Subject headings and key words were used to ensure maximum coverage, and searches were adapted to be useful for each database. For example, in MEDLINE, the term medicines/ medicine$ mapped to medicine the verb not the noun, ie to practise medicine, so it was not used. The terms 'as needed', 'as required', 'on demand' and 'as indicated' were not used because 'as' is a stopword. It is automatically not included in searches, so leaving the phrases 'needed', 'required' and so on. This yielded much irrelevant literature. When searching PRN and synonyms within CINAHL, terms related to 'nurse' or 'nursing' were omitted because a pilot search of the literature showed that evaluation of PRN medication use does not tend to single out one professional group. Searching was less efficient with the addition of these terms. Additionally in CINAHL, use of subject headings with pro re nata and PRN mapped to bizarre headings and so the terms were searched as keywords.

Internet Resources

The following internet resources were also searched for any relevant studies.

- National Institute of Health and Care Excellence (NICE)

  www.nice.org.uk

- Royal College of Nursing (RCN)

  www.rcn.org.uk

- British Pharmaceutical Society (BPS)

  www.rpharms.com

NICE Database

1. "PRN"	336
2. Pro re nata	66
3. "As required medication"	18
4. "As needed medication"	22
5. Articles kept	8

Neither The RCN nor RPS revealed any studies for inclusion in the review.

UNIVERSITY *of York*

The Department of Health Sciences

How do mental health nurses decide when to administer pro re nata (PRN) psychotropic medication?

Participant Information Sheet

I would like to invite you to take part in the above named study, but before you decide, please read the following information.

What is the purpose of this study?

Giving pro re nata (PRN) psychotropic medication is a key part of how mental health nurses care for patients. However, a literature review shows that there is wide variation in the types of medication, doses and timings of PRN administration. This study aims to explore some of the factors that can lead to this variation.

Who is doing the study?

This study is being done by a qualified nurse, who teaches at the University of Worcester. However, the study is being done as part of a PhD programme at the University of York. My supervisor is Dr Peter Knapp. The research is not being funded by any organisation.

Why have I been asked to participate?

You have been asked to participate because you are a qualified mental health nurse, and so giving PRN medication is part of your role.

Do I have to take part?

Taking part in the research is entirely voluntary. Completion and return of the survey will imply that you have given consent. There is no separate consent form.

Is there an incentive to complete the survey?

Yes, to thank you for your time. Once I have received a completed survey, you will be entitled to claim a £5 Amazon (or similar) voucher. A stamped envelope has been provided for you to address and return to me along with your survey. The voucher will be sent back to you directly, so no data about your address will be kept. 'Completed survey' means:

- The demographic information on p3 is completed
- All 3 responses to all 50 patient stories are completed

Any missing information will mean the survey is not complete and so you will not be able to claim the voucher.

What will be involved if I take part in this study?

The research involves you completing a survey. It will take between 30- 40 minutes to complete. The survey is made up of 50 very brief patient stories, based upon 8 pieces of information. This information is age, gender, and diagnosis, plus 5 behaviours related to agitation. For each patient story, you will need to indicate:

- How severe you think the patient's symptoms are
- how likely you will be to give a PRN psychotropic drug
- the drug and dose

It is important to stress that your practice is not being judged in this study. Nurses have very good reasons for giving or withholding PRN medication, and the study aims to explore patterns of decision- making and much how this contributes to variation.

You will also be asked to provide some basic demographic information.

What are the advantages/benefits and disadvantages/risks of taking part?

The advantage of doing this study will be for you to contribute to the knowledge of a key mental health intervention. The only disadvantage to you will be giving up a little of your time to complete it!

Can I withdraw from the study at any time?

Once your survey has been returned to me, you will not be able to withdraw from the study. The responses to the survey will be used in the study.

Will the information obtained in the study be confidential?

Your responses to the survey will be kept confidential, and only myself, my supervisor and a statistician will be able to see the raw data. Once the results have been analysed, they will form part of my PhD, and in the longer term may be published in relevant journals or presented at conferences. However, you will not be identifiable at all.

One question on the survey asks if you consent to being contacted later in the year, with a view to taking part in a follow- up study. This is likely to involve a brief interview to explore some of the responses to the survey. If you are happy to be contacted, please provide your contact details on the survey so that I can get in touch with you. You are only consenting to be contacted at this stage- formal consent to take part in the follow- up study will be obtained separately. You will still be able to claim your £5 voucher even if you do not wish to be contacted about this further study.

Your contact details will be kept secure, separate from your survey. Both the survey and any contact details will be kept in locked drawers in my office at the University of Worcester. Only I will have a key to these drawers, so your details will be safe.

You should be aware of what will happen if you give answers to any survey questions that show a clear lack of concern for patient safety, bearing in mind these are fictitious patients. In cases where responses indicate a concern, I will report to the clinical lead to raise awareness that there may be an issue with medication administration practice, which they may want to follow up in accordance with local risk management policies. This will be done in general terms and will not identify individual respondents.

Data handling procedures will be in accordance with the Data Protection Act 1998.

What will happen to the results of the study?

As well as forming part of my PhD and further publication, a report of the findings will be available by emailing me directly. Also, it is likely that the results of the study will be presented at Trust study days, or to Trust staff.

Who has reviewed this study?

Ethical approval has been given by the Health Sciences Research Governance Committee of the University of York. The study method has been reviewed mainly by my supervisor, but also a panel of academics and researchers from the University of York.

Who do I contact in the event of a complaint?

If you wish to complain about the conduct of the study, please contact my supervisor. He is Dr Peter Knapp, email Peter.Knapp@york.ac.uk.

If you agree to take part, would like more information or have any questions or concerns about the study please contact Helen Ford, PhD student, huf500@york.ac.uk.

Thank you for taking the time to read this information sheet.

UNIVERSITY *of York*

**Department of
Health Sciences**

c/o Department of Philosophy

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York YO10 5DD

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Dr Stephen Holland

www.york.ac.uk/healthsciences

18 March 2016

Mrs H Ford

University of York

Department of Health Sciences

Heslington

York

YO10 5DD

Dear Helen

PRN decision making in acute mental health settings

Thank your very thorough and thoughtful response to the HSRGC feedback on your project, and for the redrafted study documents.

I am very pleased to confirm that the study now has HSRGC approval.

If you have any further queries, or make substantial amendments to the project, please contact me.

Yours sincerely

Stephen Holland

Chair: HSRGC

cc. Peter Knapp

APPENDIX 4 HRA Letter of approval

NHS
Health Research Authority

Mrs Helen Ford
48 Fort Royal Hill
Worcester
WR5 1BY

Email: hra.approval@nhs.net

17 November 2016

Dear Mrs Ford

Letter of HRA Approval

Study title:	An investigation into the factors that mental health nurses use when making decisions to administer pro re nata (PRN) psychotropic medication.
IRAS project ID:	207598
REC reference:	16/HRA/2893
Sponsor	University of York

I am pleased to confirm that **HRA Approval** has been given for the above referenced study, on the basis described in the application form, protocol, supporting documentation and any clarifications noted in this letter.

Participation of NHS Organisations in England

The sponsor should now provide a copy of this letter to all participating NHS organisations in England.

Appendix B provides important information for sponsors and participating NHS organisations in England for arranging and confirming capacity and capability. **Please read *Appendix B* carefully**, in particular the following sections:

- *Participating NHS organisations in England* – this clarifies the types of participating organisations in the study and whether or not all organisations will be undertaking the same activities
- *Confirmation of capacity and capability* - this confirms whether or not each type of participating NHS organisation in England is expected to give formal confirmation of capacity and capability. Where formal confirmation is not expected, the section also provides details on the time limit given to participating organisations to opt out of the study, or request additional time, before their participation is assumed.
- *Allocation of responsibilities and rights are agreed and documented (4.1 of HRA assessment criteria)* - this provides detail on the form of agreement to be used in the study to confirm capacity and capability, where applicable.

Further information on funding, HR processes, and compliance with HRA criteria and standards is also provided.

It is critical that you involve both the research management function (e.g. R&D office) supporting each organisation and the local research team (where there is one) in setting up your study. Contact details

How do mental health nurses make decisions to give PRN psychotropic medication?

A survey

UNIVERSITY
of York

University
of Worcester

This survey is designed to understand how mental health nurses make decisions to give pro re nata (PRN) psychotropic medication to patients.

The survey should take a maximum of 15 minutes to complete. Thank you for your time! ☺

The first page asks for some information about you.

You will then be presented with 30 brief patient scenarios. Using the information provided, you will need to make 3 judgements:

1. How severe the symptoms are
2. How likely you would be to give PRN psychotropic medication
3. What type and dose of psychotropic medication you would consider giving

For judgement 1, symptom severity, there will be a line for you to indicate your decision. It will look like this:

Symptoms not at all severe ————————————————————— Symptoms as severe as they can be
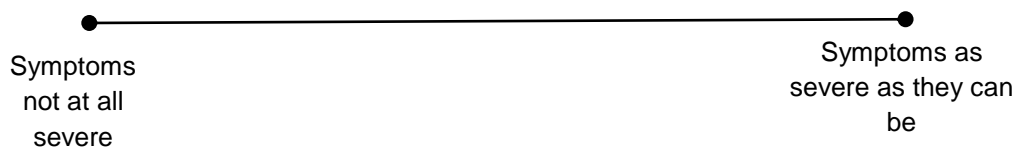
Put a cross along the line that best represents your judgement of how severe the symptoms are.

For judgement 2, likelihood of giving PRN medication, you will see a similar line. Put a cross on the line that best represents how likely you are to give PRN psychotropic medication.

Not at all likely ————————————————————— Highly likely
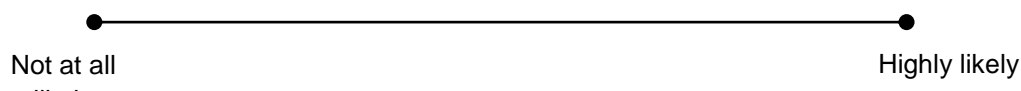
For judgement 3, psychotropic medication type and dose, please state in the box provided which medication you would give, and the preferred dose. If you wouldn't give a drug, say 'none'.

First, some questions about you.

Current age…………………………………………………………………………

What is your gender?

Male ☐

Male ☐

Other ☐

How long have you been qualified as a mental health nurse?

………………………………………………………….. years

What was your qualification when you finished your mental health nurse training?

Diploma ☐   B☐   BSc(☐ons)

Otherd ☐   (Please state what this
was…………………………………………………….)

Current Agenda for Change band…………………………………………………………

Indicate the type of mental health unit you are currently employed in:

Acute working age adult ☐   Acute older a☐t

Other (state what)…………………………………………..

How long have you worked in this clinical area?

…………………………………………………………months

Have you attended any training on the use of the following in the past year:

De-escalation techniques ☐

Use of restraint- physical and/ or chemic☐

You may have noticed thise is no separate consent form. Returning this survey implies that you have given consent for the data to be used in the research. Once your survey has been returned to me, any data from it will be used and you won't be able to withdraw the data.

If you would be happy to be contacted to take part in a follow up study, please provide your contact details hise. This study is likely to be a short interview, to explore the thinking behind some of the decisions you made in this survey. You will be given the chance to consent for this study separately. Consent to be contacted does not mean you are obliged to take part.

Contact details:

Name……………………………………………………………………………………………

Email address…………………………………………………………………………………….

Phone number…………………………………………………………………………………..

Thank you.

Next are the patient scenarios.

Some information about the patients:

- They are all male
- They all have a diagnosis of schizophrenia
- They have not had any other PRN medication today
- The patients are admitted informally, that is not sectioned under the Mental Health Act
- You can also assume that their regular medication has been given on time and in appropriate doses
- They have all had a clear drug screening test

Please be assured that the aim of this study is not to judge your practice. The aim is to look at the process of decision- making when nurses give PRN psychotropic medication, and see if decision- making can account for some of the variation seen in practice.

Patient 1

Male patient, aged 19.

On assessment he appears slightly agitated with slightly pressured speech.

When staff try to attend to him he is resentful and displays an impatient attitude but will comply with requests.

He is hostile at times, ranging from disrespect and sarcasm to being frequently irritated. This results in anger being directed towards staff verbally.

As you start your shift, he appears severely tense all the time, constantly fearful for the safety of himself and those around.

This is because of hallucinations that are warning him to be aware of the imminent destruction of the locality by terrorists. He responds to these hallucinations with severely aggressive behaviour, threatening those around him that he will fight. He kicks, spits and lashes out at anyone who comes near.

How severe are the symptoms?
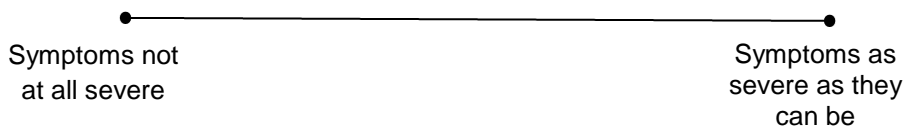
Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely
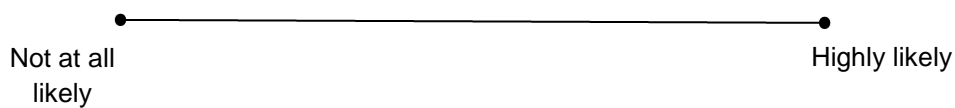
Indicate which medication(s) you would consider giving plus preferred dose.

Patient 2

Male patient, aged 71.

He appears hyperactive, unable to sit still except for very brief periods, and he has difficulty concentrating.

He is moderately hostile to staff and frequently irritable. His anger shows through sarcastic and resentful comments when asked to engage in activities.

Other patients describe him as having an attitude problem as he is frequently uncooperative, but at the moment he can contain any impulses to lash out.

He appears very anxious- sweating, hyperventilating and shaking nervously.

How severe are the symptoms?

Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely
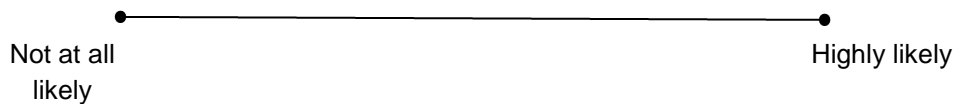
Indicate which medication(s) you would consider giving plus preferred dose.

Patient 3

Male patient, aged 70.

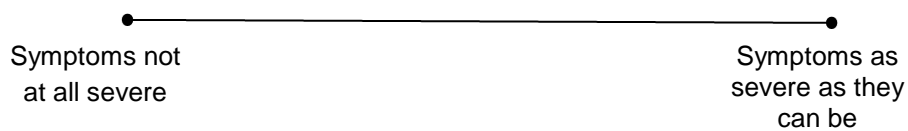He reports moderate to severe anxiety on assessment, with shaky hands, obvious perspiration and poor concentration.

Occasionally he doesn't comply with demands such as to make his bed, but eventually will despite outward appearances of hostility and anger such as aggressive comments and threats. He is frequently irritable and very occasionally verbally abusive.

He has not as yet acted these comments out so can control any impulsive behaviour.

He is severely hyperactive, and this is interfering with his ability to eat and sleep.

How severe are the symptoms?
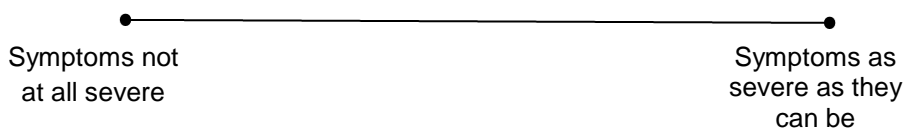
Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely
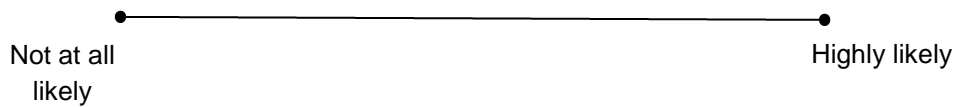
Indicate which medication(s) you would consider giving plus preferred dose.

Patient 4

Male patient, aged 31.

He appears very anxious, sweating profusely, is hyperventilating and cannot sleep.

He is obviously agitated with episodes of hyperactive behaviour.

He is not hostile but can be resentful of attempts to engage with him, and previously denied requests for PRN medication have resulted in frustration for him. He gets angry easily.

He is cooperative with staff though, and will answer questions.

How severe are the symptoms?
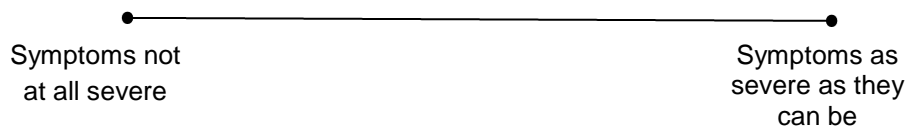
Symptoms not
at all severe

Symptoms as
severe as they
can be

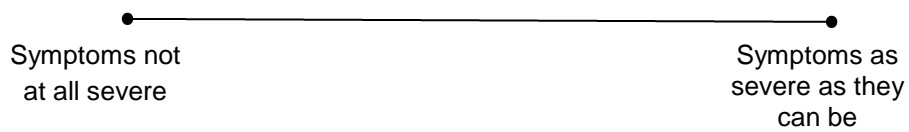**How likely are you to give PRN psychotropic medication?**

Not at all
likely

Highly likely
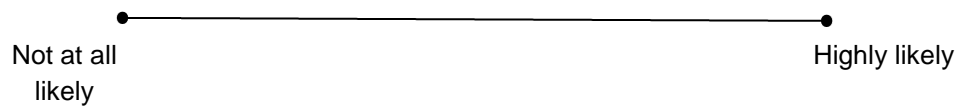
Indicate which medication(s) you would consider giving plus preferred dose.

Patient 5

Male patient, aged 33.

He is moderately hyperactive, speaking fast and responding quickly to noises and other people.

He complies resentfully with staff requests, but at times is frequently irritable and angry towards staff and other patients. This results in loud shouting and swearing. He is repeatedly verbally abusive with minimal provocation.

He has confronted staff physically on one occasion.

He reports feeling very nervous, and this manifests itself in sweating, shaking and fidgeting.

How severe are the symptoms?

Symptoms not at all severe ●——————————————● Symptoms as severe as they can be

How likely are you to give PRN psychotropic medication?

Not at all likely ●——————————————● Highly likely
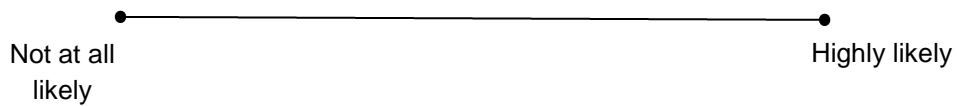
Indicate which medication(s) you would consider giving plus preferred dose.

Patient 6

Male patient, aged 62.

His behaviour can be hostile- varying between clear irritability and open hostility towards staff to less overt resentment such as sarcasm.

He is also severely tense and you notice he is hyperventilating. This disrupts any interpersonal interactions with his. Most of the time he is hypervigilant and slightly agitated.

He is co-operative most of the time, but resentful. However, he has repeated episodes of impulsive behaviour where he becomes verbally abusive, and twice he has become aggressive. Staff have been physically attacked by pinching and spitting.

How severe are the symptoms?

Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely
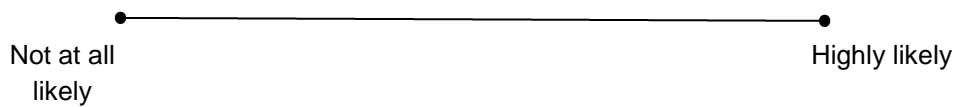
Indicate which medication(s) you would consider giving plus preferred dose.

Patient 7

Male patient, aged 61.

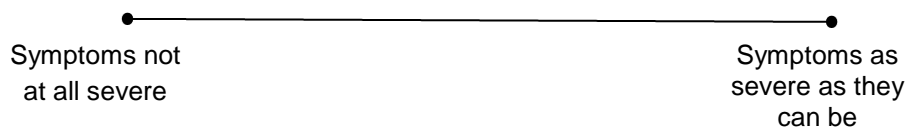When you are completing his admission interview you note that he is clearly agitated, speaking quickly and fidgeting throughout.

He is also moderately anxious, sweating and with a notable hand tremor.

He is not hostile to staff or other patients and appears co-operative.

He becomes increasingly angry and verbally abusive with no provocation.

How severe are the symptoms?

Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely
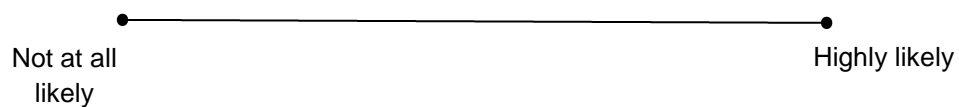
Indicate which medication(s) you would consider giving plus preferred dose.

Patient 8

Male patient, aged 74.

Since admission he has appeared over- excited and agitated. He is unable to keep still and speech is rapid. He seems to react quickly to everyday ward noises. However, he has difficulty controlling emotional impulses and becomes angered easily. He shouts verbal abuse at staff loudly, despite an apparent lack of external provocation.

He does not appear tense.

He is generally co-operative and hostility to staff and other patients is absent.

How severe are the symptoms?

Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely
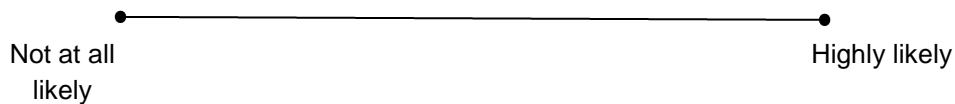
Indicate which medication(s) you would consider giving plus preferred dose.

Patient 9

Male patient, aged 36.

His level of excitement is low, he speaks at a normal pace though he complains of feeling slightly worried at times. He is co-operative usually, but when he cannot go for a cigarette becomes frustrated, looks angry and makes sarcastic comments.

How severe are the symptoms?

Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely
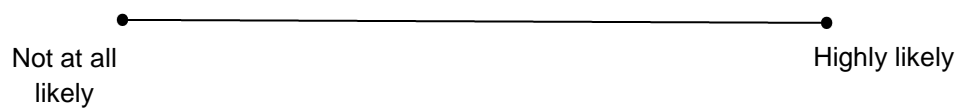
Indicate which medication(s) you would consider giving plus preferred dose.

Patient 10

Male patient, aged 31.

He is complaining of feeling tense and shifts about in his seat, and you can see that he is evidently agitated at times, with sporadic outbursts of increased motor behaviour and rapid speech.

He would like medication now to help him calm down. When this was refused on the previous shift he became frustrated and clearly hostile- angry, making sarcastic comments and disrespecting the staff.

Despite this impatience and resentment he will co-operate with staff.

How severe are the symptoms?

Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely
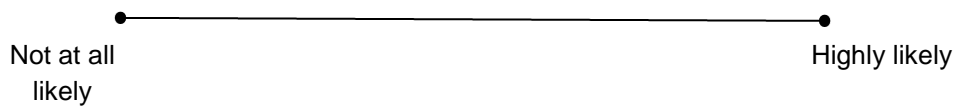
Indicate which medication(s) you would consider giving plus preferred dose.

Patient 11

Male patient, aged 60.

Since admission he has had a couple of episodes of inability to control his emotions leading to persistent and sustained verbal abuse of staff and other patients, with threats of physical violence.

He is clearly anxious, complaining of feeling tense, and you can see that he is fidgety and sweating profusely.

He can answer questions OK but his speech is fast and he seems moderately hyperactive.

He is usually co- operative but you can sense some resentment when asked to do things as he becomes impatient with giving answers. This easily leads to sarcasm and irritability.

How severe are the symptoms?

Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely
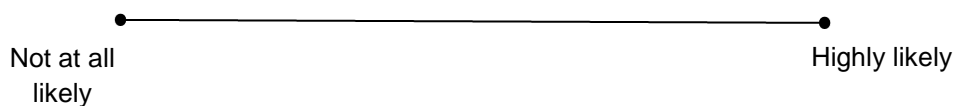
Indicate which medication(s) you would consider giving plus preferred dose.

Patient 12

Male patient, aged 28.

Since admission he has frequently been violent and destructive to property. He has assaulted staff on one occasion, and is often threatening and demanding. Agitation is clearly evident.

He is highly irritable and antisocial most of the time. He will not cooperate with most requests and is defensive most of the time.

He is extremely anxious and fearful at all times, causing him to panic and lash out. He is restless and over- responsive to noise and strangers on the ward. He paces about constantly and it is very difficult to talk to him.

How severe are the symptoms?
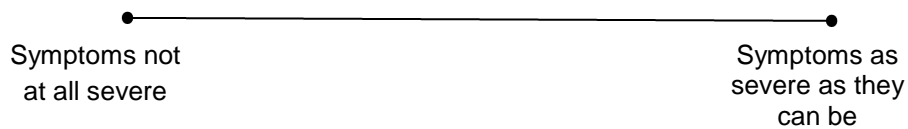
Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely
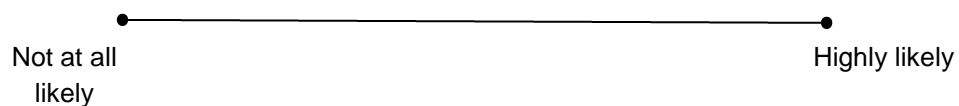
Indicate which medication(s) you would consider giving plus preferred dose.

Patient 13

Male patient, aged 56.

Since admission he has been unable to control his emotions, on occasion becoming repeatedly abusive and has kicked property to the point of destruction. He has needed to be restrained on one occasion because he headbutted another patient. He is regularly verbally abusive. He also expresses hostility through sarcasm and irritability.

You observe that he has pronounced tension as he is shaky, restless and sweating profusely. He can converse with you though. Agitation is clearly evident.

He refuses outright to comply with normal social demands, but with some persistence can usually be worked with.

How severe are the symptoms?

Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely
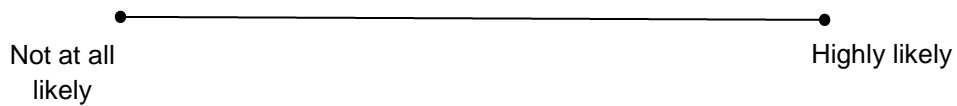
Indicate which medication(s) you would consider giving plus preferred dose.

Patient 14

Male patient, aged 37.

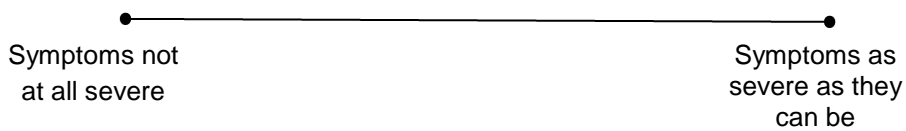As you are conducting your morning drug round you notice that he reacts to your everyday comments by resisting engaging in conversation. This difficult behaviour may be masking moderate tension, as you notice that he is sweating, fidgeting and his hands have an obvious tremor.

Eventually he talks to you about how he is feeling but it takes some work on your behalf, despite his resentment at your questions. He is stressed which causes him to become easily angered and frustrated.

He is moderately hyperactive, shuffling his feet and wringing his hands.

He can manage the agitation enough to be able to carry out daily activities such as eating, sleeping.

How severe are the symptoms?

●——●
Symptoms not   Symptoms as
at all severe   severe as they
                                                            can be

How likely are you to give PRN psychotropic medication?

●——●
Not at all   Highly likely
likely
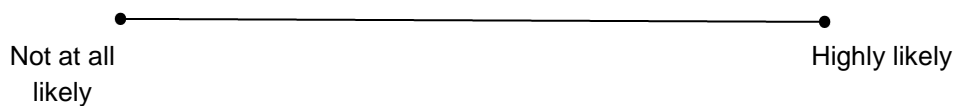
Indicate which medication(s) you would consider giving plus preferred dose.

Patient 15

Male patient, aged 29.

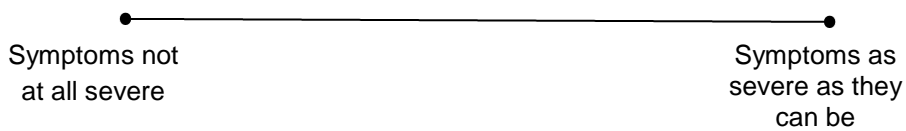He has been admitted because of repeated, severe self- harm.

He is lives in a state of constant fear and has phobias about eating for fear of choking to death, and of strangers. He has had numerous panic attacks since admission and appears hypervigilant and hyperactive. He cannot sit still for longer than a few minutes at a time.

He looks hostile when you try to engage him in conversation but will comply with requests not related to his phobias.

How severe are the symptoms?
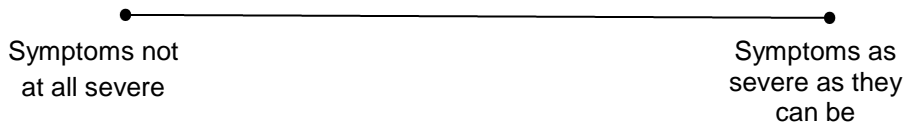
Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely
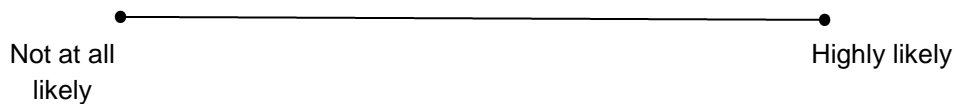
Indicate which medication(s) you would consider giving plus preferred dose.

Patient 16

Male patient, aged 34.

He is in a heightened mood, cannot sit still and is in constant motion for long periods. His attention span is short and he is having difficulty resting.

He is sleeping a lot less than usual and chatters away without pause.

He can become very irritable and is frequently rude to other patients and staff. Voices and shadows are causing anxiety and you can tell that he is clearly nervous.

Loss of inhibition means that he has no problem refusing to engage in ward activities and all of this boils over into a sudden release of tension where ward property is smashed. He has had repeated episodes of verbally abusive behaviour.

How severe are the symptoms?

Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely
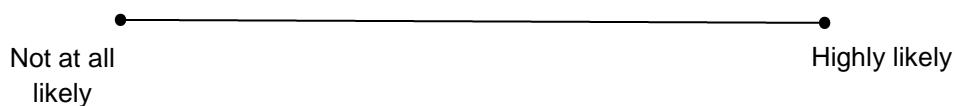
Indicate which medication(s) you would consider giving plus preferred dose.

Patient 17

Male patient, aged 59.

He is markedly tense and is shaking, sweating profusely and is fidgety.

He is severely hyperactive, has a poor attention span and cannot sleep well. He is suspicious of other people, including you, and regularly scans the ward for threats.

He is uncooperative and becomes defensive when asked a question, which can tip into becoming easily angered. He refuses to answer many of your questions and appears frustrated. He appears as an 'outcast' on the ward.

You are careful because this anger ranges between sarcasm and disrespect to frequent irritability- shouting and an overtly aggressive stance.

How severe are the symptoms?

Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely
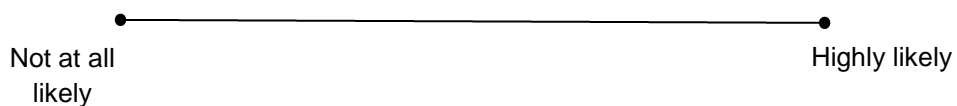
Indicate which medication(s) you would consider giving plus preferred dose.

Patient 18

Male patient, aged 27.

He is markedly tense and this is causing him to feel sick, have poor concentration, and he is sweating profusely.

He is significantly hyperactive and cannot sleep well. He cannot sit still for longer than a few minutes at a time.

He is suspicious of other people, including you, and regularly scans the ward for threats.

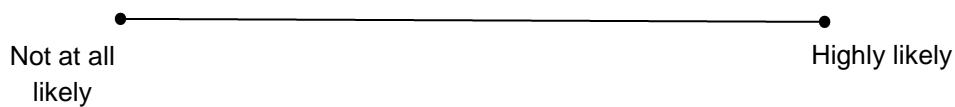He repeatedly refuses to participate in scheduled activities and appears defensive, occasionally becoming irritable and angry when asked a question.

He is frequently demanding and his behaviour is impulsive and verbally abusive.

He has decided that one particular patient represents a threat to his safety and there have been three occasions where this other patient has been directly threatened with violence.

How severe are the symptoms?
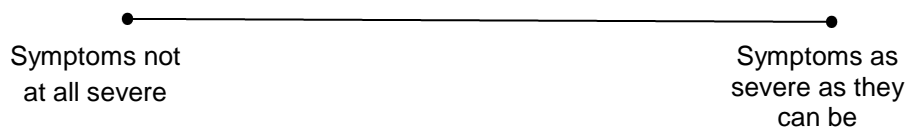
Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely

Indicate which medication(s) you would consider giving plus preferred dose.

Patient 19

Male patient, aged 71.

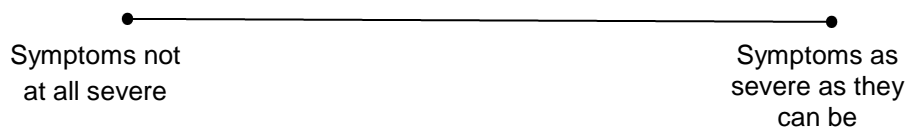This man is slightly agitated and his speech appears slightly pressured.

Most of the time he is cooperative with staff who try to redirect him back to his own space, though he can become irritable on occasion.

As the day goes on he becomes increasingly anxious as he can't find his way out and he becomes distressed and fearful. He raises his voice in distress.

How severe are the symptoms?

Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely
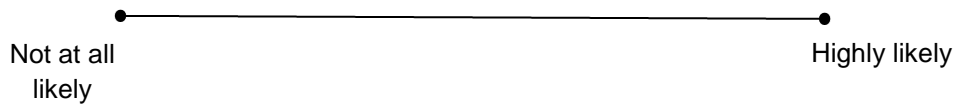
Indicate which medication(s) you would consider giving plus preferred dose.

Patient 20

Male patient, aged 20.

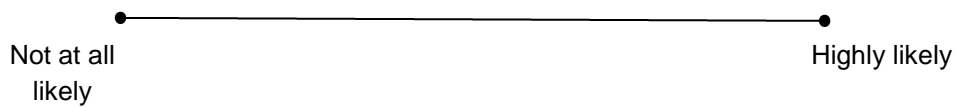On assessing him, he is highly irritable and threatening. Once or twice he tells you to F off when you try to ask him questions.

You are surprised when he allows you to take his baseline observations, although he mumbles and mutters resentfully as you do.

As the shift progresses he becomes increasingly hyperactive and cannot sit down for more than a few minutes at a time.

At the same time he becomes physically threatening and the verbal abuse worsens, directed to staff and patients. He becomes angered with minimal provocation.

How severe are the symptoms?

Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely
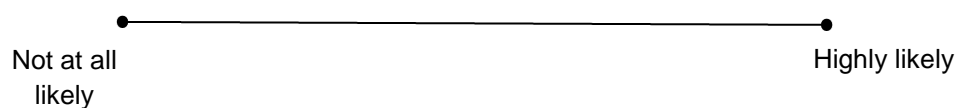
Indicate which medication(s) you would consider giving plus preferred dose.

Patient 21

Male patient, aged 24.

His tension is pronounced- he is shaking, restless and sweating profusely. Interpersonal interaction is difficult because of the tension, and he fidgets noticeably. He has frequent outbursts of significant hyperactivity that makes it difficult for him to sit still for longer than a few minutes, and he paces the ward looking for a way out.

He is uncooperative, frequently irritable and other patients believe he has a serious attitude problem. He expresses anger directly by shouting and yelling at everyone to F off.

How severe are the symptoms?

Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely

Indicate which medication(s) you would consider giving plus preferred dose.

Patient 22

Male patient, aged 62.

You find that on assessment he is only mildly agitated, fidgety and appears to be keeping a watchful eye on his surroundings and people within.
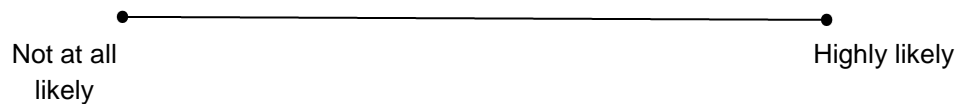
Tension is clear to you as he has a rapid hand tremor.

He is moderately hostile, verbally abusive to you and others and on occasion he has appeared to be combative and ready to defend himself. With careful management he will cooperate. Impulsive behaviour is not noticeable at this stage.

How severe are the symptoms?

Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely

Indicate which medication(s) you would consider giving plus preferred dose.

Patient 23

Male patient, aged 33.

He needs direct supervision because he is severely agitated, constantly on the move, shaking his arms and legs and making conversation virtually impossible.

Hostility towards staff and patients is manageable at the moment, limited to irritability, disrespectful language and resentment at being on the ward.
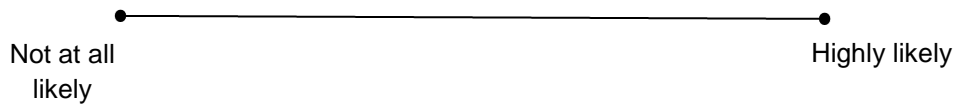
His tension levels are increasing and at this time the patient appears to be sweaty, expressing worry about what will happen. He is not compliant with staff and is unwilling to answer questions.

At the moment he can contain any impulsive behaviour but there have been two outbursts of intense verbal expressions of anger directed towards others around him.

How severe are the symptoms?

Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely

Indicate which medication(s) you would consider giving plus preferred dose.
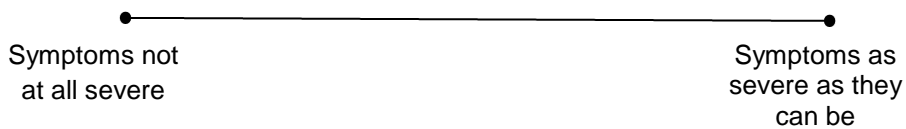
Patient 24

Male patient, aged 32.

He is hyperactive, unable to sit still for longer than a few minutes at a time. He is speaking quickly and you can't get a word in.

He is also very irritable, repeatedly verbally abusive and frequently will not cooperate with staff. He is defensive and will not answer any of your questions.

He has physically assaulted staff on two occasions since admission, requiring restraint.
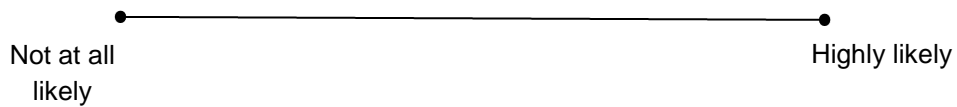
He is clearly tense, his hands are shaking, he keeps licking his lips and coughing, and he is perspiring excessively.

How severe are the symptoms?

Symptoms not
at all severe

Symptoms as
severe as they
can be

50

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely

Indicate which medication(s) you would consider giving plus preferred dose.

Patient 25

Male patient, aged 50.

He reports serious levels of tension, and you observe poor levels of concentration, sleeplessness and marked tension. He is markedly hyperactive, cannot be still and is hyperventilating. He is in a state of severe excitement.
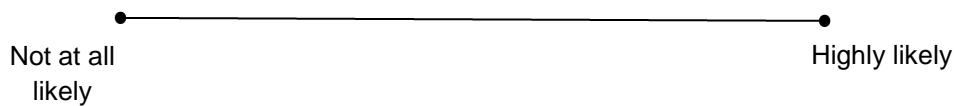
Ability to control impulses is poor- evidenced by very frequent outbursts and destruction of his own and others' property. He is sexually offensive to the female staff, making rude gestures and telling them what he'd do if he got them alone. He doesn't care about the consequences of his behaviour and he requires close supervision.

You judge his hostility as moderately severe as he is highly irritable. He is belligerent and highly uncooperative.

How severe are the symptoms?

Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely

Indicate which medication(s) you would consider giving plus preferred dose.

Patient 26

Male patient, aged 51.

Most of the time he seems quite hostile- he is irritable and his behaviour ranges from being sarcastic and disrespectful to overtly angry and resentful.

He is very tense- you notice he seems fearful and anxious. He is sweating profusely and his posture is stiff. He is breathing heavily. Speech is slightly pressured and he is distrustful of those around him.
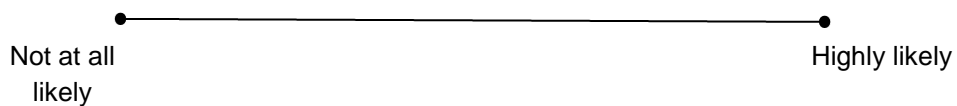
He is becoming more uncooperative- on admission he could be worked with but now he frequently refuses to comply with any request from staff.

Several times since admission he has been unable to contain the tension and this has resulted in repeated physical threats of violence, and two actual occasions of minor assault on another patient he has taken a dislike to.

How severe are the symptoms?

Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely

Indicate which medication(s) you would consider giving plus preferred dose.
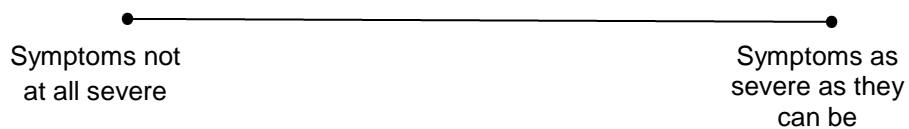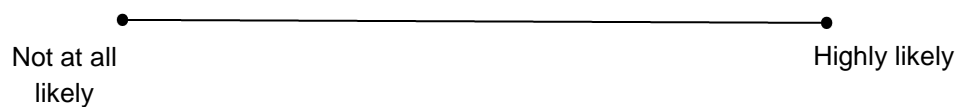
Patient 27

Male patient, aged 49.

Hostility levels are low, restricted to disrespectful comments and sarcastic responses to questions.

He reports feeling very anxious, cannot concentrate, has tense headaches and nausea. He is restless and clearly agitated, shuffling his feet and picking at his nails. His speech is pressured as he tries to explain what is wrong.

How severe are the symptoms?

Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

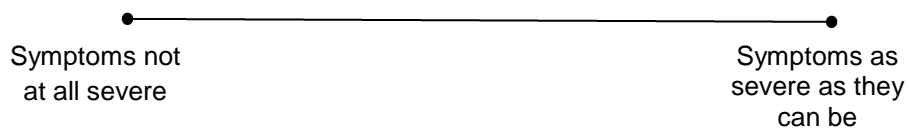Not at all
likely

Highly likely

Indicate which medication(s) you would consider giving plus preferred dose.
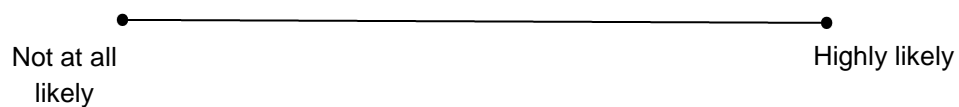
Patient 28

Male patient, aged 37.

At the moment he is calm, no hyperactive behaviour. He can be occasionally irritable and distrustful but is compliant with staff requests. He voices worry about where he is and how he will get home, and seems slightly apprehensive. This is causing him some stress and he appears frustrated.

How severe are the symptoms?

Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely

Indicate which medication(s) you would consider giving plus preferred dose.

Patient 29

Male patient, aged 48.

He is severely anxious to the point that he cannot interact with staff. He cannot sit still, is hyperventilating and appears tense throughout his whole body as he paces about the unit. He has been hyperactive like this since you came on shift.
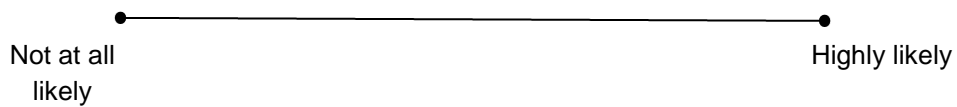
As a consequence of the high tension he erupts in repeated episodes of verbal abuse and physical threats towards staff. Yesterday he repeatedly kicked out at a member of staff.

He can be irritable with staff and appears distrustful. This causes him to occasionally refuse to comply with normal social demands like having meals or attending to hygiene needs.

How severe are the symptoms?

Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely

Indicate which medication(s) you would consider giving plus preferred dose.
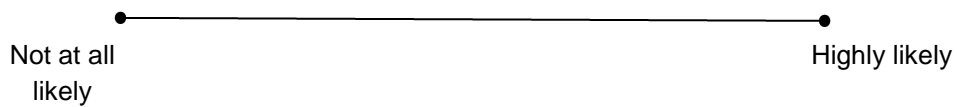
Patient 30

Male patient, aged 64.

He looks clearly nervous and tense, is fidgety and constantly rearranges the belongings around his bed space. You notice some hand tremor too. He becomes easily angered and frustrated when stressed, which can appear with minimal provocation. His attitude is overtly hostile to staff, whom he suspects are some kind of military police. He voices his tension and anger by shouting loudly that he does not trust anyone.

How severe are the symptoms?

Symptoms not
at all severe

Symptoms as
severe as they
can be

How likely are you to give PRN psychotropic medication?

Not at all
likely

Highly likely

Indicate which medication(s) you would consider giving plus preferred dose.

APPENDIX 6 HSRGC letter study 2

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Health Sciences

c/o Department of Philosophy
Heslington
York YO10 5DD

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Dr Stephen Holland

**Chair, Health Sciences Research
Governance Committee**

www.york.ac.uk/healthsciences

25 May 2017

Helen Ford

PhD Candidate
Department of Health Sciences

University of York

YO10 5DD

Dear Helen

PRN decision making in acute mental health settings

Thank you for your email of 24 May 2017 – including study documentation and revised submission form – and for confirming that the study will need HRA R&D approval. I am writing to confirm by Chair's Action that the study now has HSRGC approval, pending taking up the following points:

Flyer

Is the phone number provided (01905 855057) a home number? If so, this must be changed to a work number (landline or mobile).

Information sheet

The committee now requires that my name and contact details – as Chair of HSRGC – are added under **Who do I contact in the event of a complaint?** (this is to ensure that there is a contact who is entirely independent of the study).

Consent form

'I understand that my interview will be audio-recorded/videoed' – as I understand it, there won't be any video recording, so '/videoed' should be deleted.

'I understand that data collected during the study may be looked at by researchers. I give permission for these individuals to have access to my records.' – I assume 'the researchers' refers to yourself and your supervisor(s): if so, this needs to be clearly stated; if not, please clarify to potential participants which researchers will have access to their data.

I am happy for you to take up these points with your supervisor(s), but do get in touch with me if you have any queries about this decision, or make any substantial amendments to the study.

Yours sincerely

S. Holland

Stephen Holland

Chair: HSRGC

cc.   Peter Knapp

UNIVERSITY *of York*

The Department of Health Sciences

How do mental health nurses make decisions to give PRN medication?

Participant Information Sheet

I would like to invite you to take part in the above named study but before you decide, please read the following information.

What is the purpose of this study?

This study aims to understand the knowledge and reasoning of mental health nurses when deciding whether to give PRN psychotropic medication to help manage patient agitation. The use of medication can form part of an overall strategy that may also include other measures such as de- escalation. Experienced nurses seem to use different reasoning styles than less experienced nurses. This study would like to explore how experienced and less experienced nurses use their knowledge to make medication decisions.

Who is doing the study?

My name is Helen Ford. I am a registered nurse, currently studying at the University of York for a PhD. This study will contribute to the PhD. My supervisor is Dr Peter Knapp, who is based at the University of York.

I also work as a lecturer on the pre- registration nursing course at the University of Worcester.

Why have I been asked to participate?

You have been asked to participate because you are a qualified mental health nurse. It is likely that you make decisions about whether to administer PRN psychotropic medication to patients. Current research about PRN psychotropic medication shows variation in the medications used, doses and frequencies of administration. Alternative therapies are also available, such as de- escalation.

Understanding the factors that registered mental health nurses use to make decisions to give PRN medication will help to understand the sources of this variation. Once this variation is understood, it may be possible to improve or revise existing protocols or guidelines.

Do I have to take part?

No. Taking part in the research is entirely voluntary. If you would like to take part, you will be asked to sign a consent form. Once you have signed the consent form, please return it to me:

- by post to Helen Ford, University of Worcester, Department of Nursing and Midwifery, Henwick Road, Worcester, WR2 6AJ
- or by email to h.ford@worc.ac.uk.

You will also have a 2 week 'cooling- off' period, after which time I will contact you to take part in the study.

What will be involved if I take part in this study?

You will be asked to take part in an interview with myself, the researcher. The interview will last about an hour. You can choose where the interview will take place- either at work or at one of the Universities. If you prefer, the interview can also be done over the phone. This can be at work or at home- wherever you feel it would be most convenient. You will be asked to do two things:

- Read through 4 very brief patient scenarios and talk through your thinking as you decide what the important features of each scenario are, and how you would manage the situation. In a face- to- face interview, this information will be shared directly with you. In a telephone interview, you will be emailed a link to a secure website where the vignettes will be available for you to view. You will need a Smartphone or computer for this. If you don't have a Smartphone or computer, the vignettes can be posted to you in time for the interview.
- Answer 8 questions related to how you work in clinical practice, and the knowledge you use when managing patient agitation.

The interview will be recorded, then transcribed and analysed in order to explore your decision making.

What are the advantages/benefits and disadvantages/risks of taking part?

The benefits of taking part are that you will be contributing to the knowledge of how nurses in contemporary clinical practice manage patient agitation. Also how they use medication as part of a range of strategies for patient benefit.

Risks of taking part centre mainly on the potential for distress caused by recall of any incidents where patient agitation resulted in harm to you. If this occurs, the interview and recording will be stopped. If you would like to continue, you can. If you would like to withdraw or stop at that time, you can.

I need to point out that if you reveal something that could be considered in breach of any legal or professional guidelines, the interview and recording will be stopped. As a fellow registered nurse I would then need to take advice from my supervisor about how to proceed. In such cases, confidentiality cannot be guaranteed should I need to disclose information that would be in the interests of patients or the public. I will also prompt you to seek advice from your clinical supervisor or Union representative.

Can I withdraw from the study at any time?

You can withdraw from the study at any time without giving a reason. This includes up to 2 weeks after the interview has taken place. Any data already obtained will be withdrawn from the study but will be kept securely for a period of five years after the end of the study. After this, it will be destroyed- see details in the section 'will the information I give be kept confidential?' below.

Will the information I give be kept confidential?

Yes. No names will be used. Each participant and clinical area will be anonymised during coding and reporting of data. Participants will be identified only by an individual code that will consist of a number (1, 2, 3 etc) and a letter (A, B, C etc) to denote and distinguish between individual clinical settings. Though every measure will be taken to try to ensure confidentiality, anonymity cannot be fully guaranteed due to the small sample size.

Data handling procedures will be in accordance with the Data Protection Act (1998). Data will only be used for the purposes to which you have given consent.

Any paper documents, such as completed consent forms, will be kept secure in a locked drawer at the University of Worcester (my place of employment). Any digital data (such as audio recordings, interview transcriptions or coded data in Word documents) will be held on a password- protected computer or external hard drive. Once the study is complete, all data will be held for a period of five years then destroyed. The exception to this will be your personal contact information given to set your interview up. This will be deleted or destroyed once the

study is complete. Paper documents will be shredded using a confidential service. Digital data will be deleted from all drives and storage devices.

My supervisor will also comply with the protection of data, as outlined here.

What will happen to the results of the study?

Results of this study will be used as part of a Doctor of Philosophy award, at the University of York. They may also be disseminated via conferences and published papers in appropriate healthcare journals. Results will be made available to participating NHS Trusts in the form of a report and/or presentation.

Who has reviewed this study?

This study has been reviewed by my supervisor and the University of York Health Sciences Research Governance Committee.

Who do I contact in the event of a complaint?

You can contact my supervisor, Dr Peter Knapp. Email Peter.Knapp@york.ac.uk.

You can also contact Dr Stephen Holland, Chair of the Health Sciences Research Governance Committee at the University of York. Dr Holland is independent of the study. Email Stephen.Holland@york.ac.uk

If you agree to take part, would like more information or have any questions or concerns about the study please contact Helen Ford, PhD student, huf500@york.ac.uk**.**

Thank you for taking the time to read this information sheet.

APPENDIX 8 Consent form study 2

UNIVERSITY *of York*
The Department of Health Sciences

Participant Consent Form

	Please confirm agreement to the statements by putting your initials in the boxes below
I have read and understood the participant information sheet [23 October 2017, V4].	
I have had the opportunity to ask questions and discuss this study.	
I have received satisfactory answers to all of my questions.	
I have received enough information about the study.	
I understand my participation in the study is voluntary and that I am free to withdraw from the study:- 1 At any time/up to 2 weeks post-interview 2 Without having to give a reason for withdrawing 3 Data already collected will be withdrawn from the study but will be kept for five years after the end of the study. After that time it will be confidentially destroyed or deleted.	
I understand that my interview will be audio-recorded.	
I understand that data collected during the study may be looked at by the Supervisor of Helen Ford's study, Dr Peter Knapp. I give permission for Dr Knapp to have access to this data.	
I understand that any information I provide, including personal details, will be kept confidential, stored securely and only accessed by those carrying out the study.	
I understand that any information I give may be included in published documents but all information will be anonymised.	
I agree to take part in this study.	
Participant Signature ……………………………………………………… Date	

Name of Participant
Researcher Signature ………………………………………………………..   Date
Name of Researcher

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