

Developing a model of care for a 4-6
bedded Post Anaesthetic Recovery Unit: a
Delphi study

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Declarations

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in my name in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission in my name for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint award of this degree.

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Louise McGuire

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Abstract of Thesis

Background

Traditionally, Post Anaesthetic Recovery Units (where the immediate post-anaesthetic/procedural patient is cared for) (PARU) have been structured as an open plan room where all patients can be seen at all times. However, a new major metropolitan hospital in South Australia has been built with 154 beds divided into 4-6 perioperative bed bays which encompasses preoperative, holding bay, post-operative and discharge care for all emergency and elective surgical and procedural cases, as well as a 23-hour ward. This design is a departure from the traditional design that separates admissions, discharge, Day Surgery and PARU/PACU (Post Anaesthetic Care Unit) functionality. Initially it was thought a systematic review would be helpful in developing a model of care for this new space, however the search found no relevant literature in this area. Therefore, a research study was undertaken to develop a new model of care using insights from international experts.

This thesis presents the results of the Delphi study in the form of a manuscript submitted for publication. Following the guidelines for a thesis by publication at University of Adelaide, this thesis begins by describing the context to the study, provides additional literature and methodology, and, concludes with a description of how the research has subsequently informed practice and policy in the new hospital. The manuscript is positioned within the thesis as the methods and results sections.

The aim of this study was to establish international expert consensus regarding the problems and suggested solutions for the new major metropolitan hospital's PARU to ensure patient safety, staff satisfaction, organisational efficiency and maintenance of professional standards.

Method

A two round Delphi study to gain expert opinion using online surveys was undertaken. The Delphi methodology was chosen as there was no current published literature on this new PARU design and the Delphi allowed evidence to be derived through consensus expert opinion. A total of 36 international perioperative nursing organisations were contacted to help distribute the first round survey to 5-10 of their 'expert' members (i.e. PARU nurses with at least 4 years' experience). The survey asked them to identify the problems with the new design, suggest solutions, any potential benefits of the design. This response data was analysed, and a second questionnaire was sent out asking the same participants to rank the problems and the solutions in order of importance and ease of fixing. Using the Delphi approach, consensus was reached and solutions suggested related to the top ranked problems of the design.

Results

71 expert nurses (35% of those contacted) responded to the first Delphi round, 41 included their email address, thereby providing consent to be contacted for the second round. Of the 41 nurses emailed in the second round, 25 completed the survey (61%). The top 5 problems for patients, staff, organisation and profession, and the top three solutions for each problem offered by experts was ranked regarding importance and ease of fixing in the second round.

The highest ranked problems for the four domains were: for patients - mixing conscious and unconscious patients; for staff - the increased staff required to manage the design; for the organisation - the need to commit to adequate increased staffing; and for the profession - to promote safe staffing levels with the new design.

The highest ranked solutions suggested by experts to improve the model of care are: for patients - division of patients; for staff - increased safe skilled staffing; for the organisation - to test workflows; and for the profession - staffing models developed. Aggregated top solutions for all parties were:

increased safe skilled staffing, division of patients, staff education, ACORN (Australian College of Operating Room Nurses) standards and staff Involvement.

The evidence gained from the Delphi methodology allowed a new model of care to be developed. There is now a separation of the admission, PARU and Day Surgery patients throughout the zones. The staffing numbers have also increased to ensure patient safety and a Clinical Nurse allocated to ensure appropriate education for staff undertaking multiple specialist roles within the space.

Conclusion:

The original model of care developed for the new hospital posed significant difficulties for staff and patients. Utilising the Delphi methodology to elicit international expert opinion and identify consensus, and reviewing existing standards, has facilitated the development of a more patient centred model of care that promotes patient safety, staff satisfaction, organisational efficiency and maintenance of professional standards. Additionally this process has addressed the concerns of staff which were expressed at the design stage. The findings of this study highlight the necessity of clinician involvement in healthcare institution design, and also provide an approach for other clinicians to use to garner international expert opinion on hospital builds and models of care.

Ah, to build, to build!
That is the noblest art of all the arts.
Painting and sculpture are but images,
Are merely shadows cast by outward things
On stone or canvas, having in themselves
No separate existence. Architecture,
Existing in itself, and not in seeming
A something it is not, surpasses them
As substance shadow.

Henry Wadsworth Longfellow

(p. 25) Michel Angelo a dramatic poem (1884) Houghton, Mifflin and Company, Boston

Chapter 1 – Introduction

Background

The layout and design of Post Anaesthetic Recovery Units (PARUs) have historically been “open plan”, in the traditional Nightingale ward style which is an open room where beds are lined up on either side without partitions. This design facilitates constant visibility of all patients arriving post anaesthesia, a period requiring close observation of patients due to immediate and ongoing risk of compromise to the airway and the need to monitor other vital signs. Safe clinical care determines that any deterioration in patient status is recognised immediately to prevent significant adverse outcomes for the patient. Within PARUs, nurses often need to collect medications and equipment for their patients, which necessitates them moving away from the patient’s side. It is therefore essential that nurses are able to observe their own patients, and in many cases those allocated to other nurses, at all times without obstruction. The open plan design facilitates a wide field of vision and unimpeded transmission of audible alerts and alarms, thereby enabling rapid detection and intervention in the event of a deteriorating patient.

A new hospital design in South Australia

In November 2017, a new major metropolitan hospital was opened in South Australia with PARU design that was completely different from the traditional ‘Nightingale ward style’, that had operated across South Australia previously. The new plan arranged beds into 4- 6 bedded bays, which was a major change from an open room design that ensured minimal obstructions and the ability to view all patients at all times (Australian College of Operating Room Nurses 2014-2015).

In addition, the new design rearranged the previously separate specialty units for admissions, Day Surgery (DSU) and the PARU, into multifunctional bays. Five new zones were created in the new perioperative area, each containing a mixture of these three units. Appendix A ‘A New Major Metropolitan Hospital Perioperative Bay design’ provides a pictorial representation of the new 4-6 bedded bays and zone design. These zones stretched across the entire length of the hospital. Zone 1 and 2 (Western end, coloured red/orange in Appendix A) and 4 and 5 (Eastern end, green in Appendix A) were positioned at opposite ends of the hospital, but basically had the same function. The only difference between zones was that the Western end operated 24 hours per day, seven days per week as the emergency theatres are located in these zones, and the Eastern end is open Monday-Friday 0630-2100h. Cardiovascular interventions, and a 23 hour ward (blue in Appendix A) were also located in this new perioperative bay space in Zone 3. The total PARU bed spaces at the old hospital were approximately 54, the new hospital has 154 perioperative, multipurpose bay spaces. While acknowledging the structures are different between the old and the new hospital, the new hospital has provided more beds because it is incorporating admissions and the potential to cater for disaster management in this space.

The flow of patients through this space as proposed by the design team meant that patients would be clinically admitted to the perioperative bays in the Zone closest to the theatre required. For example: Zone 1 cardiac surgery, Zone 4 Ear Nose or Throat Surgery. They would then be taken to theatre for their surgery/procedure; and then patients would return to the same perioperative bay that they were clinically admitted to, whether they were Day Surgery Unit (DSU), Inpatients or Intensive Care Unit (ICU) patients. The flow of patients is a critical component of a model of care, which the New South Wales Agency for Clinical Innovation define as “..the way health care services are delivered” (p. 3) (Agency for Clinical Innovation 2013).

Clinician concerns

Prior to the finalisation of the new design, a number of feedback sessions were held with staff to explain the new design and seek feedback.

During the design phase workshops, clinicians, both nursing and medical staff at the hospital raised three main concerns related to: (i) the PARU design, (ii) the proposed model of care and, (iii) the resulting lack of specialisation.

PARU design

The major concern raised by clinicians was that the PARU was no longer an open plan room where all patients could be seen at once. Instead, the new design featured 154 beds positioned within 4-6 bedded bays, with the configuration of which contravened Australian Standards (Australian College of Operating Room Nurses 2014-2015). Staff were concerned that patient safety could be put at risk in the new environment due to lack of visibility of patients due to the new structure with solid walls between each small bay. Another complicating factor, particularly for nurses, was the distance from the bedside to the drug room and other essential facilities such as the dirty utility. Nurses would need to move away from the patient's side to undertake these tasks to a locked room down a corridor without visibility of the patient. This was a major deviation from the former PARU structure which enabled staff to have full view of patients when obtaining drugs, and utilising the dirty/clean utility. Staff were able to ask colleagues to watch their patient when stepping away from the bedside, with the knowledge that all staff throughout the PARU had visibility and easy access to their patient. However, this was not possible with the new design.

An additional complicating factor was that the size of the bays required beds to be placed at an angle to the wall in order to fit them all in. This potentially posed a visual obstruction for staff within the bay, as staff would have their back to the patient next to them when managing a critical patient. There was also no bench space incorporated in the design, leading to additional pillars being created to hold small amounts of stock, and electrical and gas outlets. These created further physical obstruction to visibility in the space.

Proposed model of care:

The second concern of clinicians was that the proposed model of care would have pre and post-procedure patients positioned next to each other. This meant that patients waiting for surgery would witness someone immediately post-procedure who is likely to be critically unwell, in severe pain, requiring numerous invasive interventions and/or being privy to highly confidential conversations about other patients.

Lack of specialisation

The third concern was that there would no longer be a separate clinical admission suite, transfer bay/holding bay, DSU or PARU. Therefore, staff would be required to develop skills in each of these areas in order to work skilfully as they are specialties in themselves.

Research Context

In light of the concerns raised by clinicians, and following the failure of decision makers to change the design despite protests by medical and nursing management, it became evident that research was required to ensure a workable and safe model of practice. The initial steps toward conducting a systematic review of the literature revealed that there was no published evidence of a similar design worldwide. Email contact with international experts worldwide regarding their experience of 4-6 bedded bays led to the discovery that there were no similar designs with the same scale and model of care anywhere worldwide. There were some reports of 4-6 bedded PARU units particularly

involving paediatric and obstetric patients to enable separation from the adult post-procedural patient, or an adult PARU with a one or two 4-6 bedded bays, but there was no design on the same scale with so many beds involved.

Therefore, the broad aim of this study was to garner expert opinion and reach consensus regarding a recommended model of care for multiple bed PARU bays. The recommended model of care would need to ensure patient centred care and patient safety, and would optimise the work environment for staff. Specifically, the recommended model of care would address the following four key groups: patients, staff, the organisation and the profession. The broader aims are stated in the article manuscript.

Research Question

This research addresses the question - What is the recommended model of care for multi bed PARU bays?

Significance of the study

The importance and impact of this study relates to the knowledge and evidence gained through the use of the Delphi methodology. The clinical team were able to use the evidence of experts to change the model of care provided by the hospital design team. Whereas senior clinician voices were initially ignored in the design phase, the data shared and analysed from international experts provided the necessary evidence required to enable clinicians to propose changes to the model of care. In particular, they were able to successfully argue the need for increased staffing and staff education in order to ensure safety and efficiency within the new perioperative bays at the new major metropolitan hospital. This post-research phase in which the study findings are used to inform practice and policy is described in more detail in the Discussion to the thesis (page 29).

The successful use of the Delphi methodology in this study has highlighted the potential for Delphi to have a positive impact the design of PARUs and hospital builds into the future. Information previously unavailable to assist clinicians with design is now accessible.

As this is the first hospital to have this design on this scale, the evidence gained will potentially assist professional groups in reviewing existing professional standards and expectations for the patient experience in hospitals using such a design in the future.

Thesis by Publication

This thesis by publication contains a publication that has been successfully submitted to a journal, as required by The University of Adelaide and has not been used for any other University award. The article is located after the methodology section of the thesis on page 13 and has been submitted to BMJ Quality and Safety (<https://qualitysafety.bmj.com/>) (see Appendix B). It discusses the Delphi methodology used to garner expert opinion and the results obtained from two rounds with international experts.

The thesis is structured with the following chapters: 1. Introduction, 2. Literature review, 3. Methodology, 4. the Article manuscript, 5. Implementation of the new model of care: discussion. The methods and results of the Delphi study are included within the article. Chapter 5 - Implementation of the new model of care: discussion - brings together the entire study, and highlights the significance of the work, and potential future directions. Each chapter is described in a little more detail below.

Chapter 1 Introduction

This chapter introduces the thesis and the thesis by publication structure for a Master of Clinical Science at University of Adelaide.

Chapter 2: Literature Review

This chapter reviews the literature related to the topic generally. There was very little literature directly related to 4-6 bed bays PARUs. However, there are professional standards, and a growing body of research related to health care institution design, which has been reviewed from a range of perspectives including patient safety, patient centred care, hospital efficiency and staff satisfaction. The introduction of single patient rooms is explored as an example of how decisions are made in health care design.

Chapter 3: Methodology

This chapter presents the history of the Delphi methodology and its suitability as a tool for such topics in which little is currently known.

Chapter 4: Article Manuscript

The article, 'A Delphi Methodology that investigates the model of care for a 4-6 bedded Post Anaesthetic Recovery Unit' is included in this chapter. This article contains an Abstract, Introduction, Methods, Results, Discussion and References.

Chapter 5: Implementation of the new model of care: discussion

This chapter focuses on the implications for practice and policy, drawing from the results section of the article. It includes a review of the perioperative bays 12 months on, and the impact of the findings on the perioperative model of care from this Delphi research. The implications of new health care builds, and levels of staff input in design are considered and discussed. A conclusion and recommendations complete the discussion.

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Chapter 2 Literature review

As discussed in the previous chapter, a literature review was conducted to search for evidence related to the new PARU design. Key terms such as 'Recovery room', PACU, Post Anaesthetic Care Unit, PARU, Post Anaesthetic Recovery Unit, 'Post operation', Perioperative, Peri-anaesthetic were combined using the Boolean "OR" operator. North American spelling was also incorporated, for example anesthetic, anesthesia. These results were combined using an AND statement with the results of another search term related to the new hospital design and potential clinical implications: bays, pods, model of care, 'Patient safety' OR 'patient centred care'. These searches in PUBMED, CINAHL did not yield any relevant results; there was no information available discussing any similar PARU bedded bay design in the published literature.

Professional bodies standards and guidelines

There was however, significant national and international documented evidence regarding PARU design, particularly from professional bodies and standards. The Australian College of Operating Room Nurses (Australian College of Operating Room Nurses 2014-2015) discussed that a PARU should be set up as "an open room where all patients can be seen at once" (p. 3). This was supported by the Royal College of Anaesthetists *Guidelines for the Provision of Post-Operative Care* in which Point 2.4 states that the bed spaces should "allow unobstructed access for trolleys, X-Ray equipment, resuscitation carts and clinical staff. The facility should be open-plan allowing each recovery bay to be observed but with the provision of curtains for patient privacy" (p. 7) (Royal College of Anaesthetists (RCOA) 2017). The Australian and New Zealand College of Anaesthetists similarly highlight the required design features of the PARU space, stating that it should "allow staff to have an uninterrupted view of several patients at once" (p. 2) (Australian and New Zealand College of Anaesthetists (ANZCA) 2006). These position statements and standards are not necessarily evidence based, but rather are derived from consensus opinion.

The American Society of Anesthesiologists state that the PACU (Post Anesthetic Care Unit, the US term for PARU) traditional design, should offer direct line of sight the patients, and Haret et al. (2012) discuss the importance of the open ward allowing for simultaneous observation of all patients. Within this text there was a suggestion of a non-traditional design consisting of pods where the utilities drop from the ceiling to the centre of four beds, to allow immediate access to all critical patients without obstruction, instead of utilities being positioned at the head of each bed creating an obstruction as occurs with the new South Australian hospital's 4-6 bed design.

There are also clear recommended structures for ambulatory care units. The American Society of Anesthesiologists and ACORN recommend a separate stage 1 PARU, stage 2, and admissions area (Haret, Kneeland & Ho 2012; Sandrick 2003). The design for the new South Australian hospital where there is no separate Day Surgery Unit, and patients are mixed in with the emergency, inpatients and ICU patients, without a Stage 2 step down facility, contradicts this recommendation.

Much of the available literature focuses specifically on the operating room itself, rather than the whole perioperative space. However, Bang highlights two important aspects of optimal operating room design; the importance of focusing on patient's experience, particularly in pre- and post-operative areas as this is where patients experience high levels of anxiety (Bang 2004). A poor pre- and post-operative design can also impact on theatre efficiency and throughput. A design can impact both efficiency and costs (American Operating Room Nurses) (Kennedy 2014). Kennedy then makes two further recommendations regarding design: 1) during the design and build of a new facility the project should be overseen by clinicians, and 2) evidence based design should be used, with the view

to being 'cost-effective and [to] positively influence the safety, quality, and efficiency of perioperative patient care' (p. 283) (Kennedy 2014). Bang also talks about the importance to patients of a well-designed pre and post-operative area, with benefits including an efficient flow and a better patient experience (Bang 2004).

Healthcare design consultation

The importance of evidence based design is widely recognised (Sadler et al. 2011) particularly in relation to patient safety (Stiller et al. 2016), patient centred care (Zhao & Mourshed 2012), hospital efficiency (Sandrick 2003) and staff satisfaction (Birnbach et al. 2010). As there is a very limited evidence base for multiple bed bays, this part of the literature review focuses on health care design generally.

Patient Safety

Whilst there is little published literature specifically on PARU design, there is discussion about the importance of good hospital design prior to commencing building because once a hospital build is complete it is likely to be cost-prohibitive to fix structural issues that are found to impact negatively on patient care (Birnbach et al. 2010). Insufficient testing prior to building leaves hospitals and staff devising workarounds that can negatively impact on patient experience, patient safety and hospital efficiency. There is often a resulting gap between what patients need and the implementation of a solution to address that need (Birnbach et al. 2010). Hospital design and the proximity and placement of equipment also impacts on patient safety in relation to hospital acquired infection rates (Stiller et al. 2016). Joseph and Rashid report on the importance of active and latent failures (Joseph & Rashid 2007). Active failures relate to procedure not being followed, whereas latent failures relate to errors that arise due to failure of hospital design, both of which results in negative staff and patient outcomes. The impact of the relationship between the nurses and the environment they work within and the relationship with patient safety is too often underestimated.

Ensuring direct visibility of patients in wards is also important to consider in hospital design as this impacts both patient safety and efficiency (Reiling, Hughes & Murphy 2008; Stichler 2007). Reiling et.al and Stichler question why patient safety and quality of care is often not considered in hospital design despite the amount of money spent on new hospital builds or redesign. They particularly focus on design in relation to patient observation and safety in relation to ease of visibility and falls (Joseph & Rashid 2007; Reiling 2006; Stichler 2007). Reiling promotes the idea of a learning hub and specific design features to improve the visibility of all patients. (Reiling, Hughes & Murphy 2008).

Patient Centred Care

The focus on patient centred care is recognised by experts in the field to be of paramount importance when designing new health care facilities. Examples of patient centred care in hospital design are the choice of wall colours that are most soothing for patients, and noise levels that are most therapeutic for patients (Sandrick 2003).

Smykowski (2008) describe a redesign of a PACU to reduce noise levels at Memorial Sloan Kettering Cancer Centre. Patients had expressed concern related to noise within the PACU, in particular hearing health care team conversations, and experiencing limited privacy in the traditional open room design. Whilst some comparison can be made with this new South Australian hospital design, it is on a much smaller scale than the new hospital 154 bed design. The Memorial Sloan Kettering only has 5 four bedded bays for 20 beds with the sole function being PACU rather than the multi-purpose design. This PACU was also designed with sufficient space to enable patients to have visitors

in attendance and private rooms available for private conversations and assessments, which suggests that the design focused heavily on patient needs and experiences.

Zhao and Mourshed also prioritise community wellbeing and the environment in health care design (Zhao & Mourshed 2012). Just as research related to patient centred care is gaining in importance it is also strongly recommended to be utilised in new health care builds. For example; evidence shows that lights being on continuously prevents patients from having a sense of whether it is night or day, and noise regularly elevated above 85dB can lead to ICU psychosis (Joseph & Rashid 2007; Reiling, Hughes & Murphy 2008). Stichler discusses the importance of the hospital environment being a place of healing as it impacts on all aspects of the patient's wellbeing; physical, spiritual and social. This is particularly true in countries where patient choice drives the economics of health care institutions (Stichler 2007). In another example, Reiling discusses the redevelopment of a Cancer Institute in which the patient experience was at the forefront clinicians and executives' planning (Reiling, Hughes & Murphy 2008). The resulting design included large rooms, sufficient lighting and positive acoustics. In addition to patient benefits, staff also saw the benefits of increased efficiency and reduced medication errors.

Of particular relevance to the new hospital design is the concept of positive distraction measures (Sadler et al. 2011). This relates to the role of distraction in relation to healing, whether through art, music, and television which can reduce the patient's perception of pain and enhance the healing process. In relation to perioperative bays there is little distraction in this space, heightening the potential impact of a fellow patient's immediate post-operative distress.

Hospital efficiency

A group of hospitals in the United States recognised the importance of including clinician and consumer input into their hospital design and encouraged staff to actively participate in research activities to build evidence-based design in their work spaces (Sandrick 2003). Staff were involved in determining layout design relating to nursing efficiency, for example, how far does the nurse have to walk to the utility room? Mock ups were built to test and ensure that the evidence-based design achieved the stated objectives. The design was then adjusted as required to ensure it would allow optimal work flows (Sandrick 2003). This group of hospitals known as the 'Pebble Group' saw improvements in indicators of hospital health and efficiency such as a reduction in staff turnover, and nosocomial infection and an increase in patient satisfaction. This project brings hospitals together with a health design centre which undertakes research related to design with the goal of improving outcomes for patients, staff and healthcare efficiency. Institutions benefit from participating in the research as they develop relationships with other organisations all with a mutual goal of developing evidence-based health care design with a Unit within their hospital or the healthcare facility as a whole (Sandrick 2003).

For design of perioperative spaces, Kennedy discussed the importance of ensuring cost effectiveness, efficiency and quality patient care. She recommended that the design team should gather a multidisciplinary team to oversee the development of the plans and build (Kennedy 2014). Kennedy only recognised the importance of design but also suggested the development of a simulation space to allow testing of the perioperative space, therefore ensuring staff feedback regarding potential design improvements prior to the build. Torres-Landa et.al (2018) also raised the importance of simulation with perioperative design to facilitate feedback and positive changes to the design prior to build (Torres-Landa et al. 2018).

Staff satisfaction

Staff satisfaction is another area that is widely discussed in the literature in relation to hospital design. The underlying principle is that where there is staff satisfaction there is increased efficiency and reduced staff turnover. Conversely, poor design leads to staff dissatisfaction which presents as staff being fatigued in their environment, being frustrated, and reduced compliance with hospital protocols potentially leading to adverse events and staff injury (Joseph & Rashid 2007).

Sandrick (2003) described her experience of the Pebble project and the recognition that involving staff in the development of evidence-based research design increased staff satisfaction and reduced staff turnover. Similarly, involving staff in creating the design resulted in a design that works for staff and patients, which in turn increased staff satisfaction. Reiling (2006) agreed with Sandrick regarding the importance of staff involvement in the design phase and also recommended that staff be involved in simulations where rooms are mocked up to allow nurses to review the space and ensure they would suit the patient, staff, workflows and equipment.

Psychologists have also discussed how the physical environment impacts on patient safety and the performance of staff. Staff are more likely to make errors in a poorly designed health care environment, unintentional errors in design can lead to workarounds impacting on staff satisfaction.

Stichler (2007) referred to new healthcare institution design in promoting staff wellbeing, where staff needs are considered as an essential part of the new design. For example, respite spaces for staff in downtime and well-designed staff rooms where staff can socialise or spend quiet time (Stichler 2007).

Single Patient Rooms- An example of Evidence Based Health Care design?

There is a current trend to build hospital in-patient wards with single rooms, rather than the traditional 4-6 bed bays. France, Holland and Norway are moving to increased numbers of hospitals with solely single patient rooms, as are Canada and North America. (Detsky & Etchells 2008) The UK has all single rooms in 50% of its new builds (Boardman, Forbes & Buller 2007). Whilst this is a popular design, the evidence is mixed with regard the benefit for the patient and the health care budget. Cusack et al. (2019) stated that high levels of evidence for all single patient room builds is generally lacking. They highlighted the perspective of staff, patients and staff in moving to an all single room facility. Patients reported similar findings to previous articles (Boardman, Forbes & Buller 2007; Maben et al. 2016) that single rooms offered increased privacy, and maintenance of confidentiality, however patients expressed concern that they would not have easy access to staff and voiced concern over their own safety. An expectation that single rooms would improve infection control has not been demonstrated in current research (Detsky & Etchells 2008).

Staff working in single bed hospitals reported a more pleasant work environment and less cluttered work space, and likely improvement in patient flow due to not having to move patients regularly when a single room is required. However, there were significant concerns regarding the increased walking distance for staff, and that they were feeling vulnerable as they are not easily visualised by colleagues, and concerned for patient safety due to the lack of visibility of patients. For staff, single room designs also necessitate follow up education regarding how to work in the space, as there is a risk that protocols will not be followed in a new space (Maben et al. 2016).

From an organisational perspective there is a significant cost surrounding the build, and a larger footprint for less beds, and the potential for increased cost in staffing the space (Boardman, Forbes & Buller 2007). In North America the 100% single patient room design is popular with patients and affects their choice of health insurer, which therefore impacts on the design used by healthcare

providers. From a health economics perspective, this can result in the single bed hospitals being favoured; never the less contradictory evidence about patient, staff and organisation outcomes call into question the growing trend of single bed rooms. Further, the input of clinicians into new designs such as single bed hospitals, is not clear.

The question should be why is there such a shift to a single bed design when there is little high-level evidence to support it (Boardman, Forbes & Buller 2007)? Whilst the trend in healthcare is to build single patient room healthcare institutions the evidence that a 100% single patient room facility is better for the patient, staff and organisation is not clear. This calls into question whether hospital design or architectural innovation is being given greater weight than input from clinicians regarding usability and patient safety.

Chapter 3 Methodology

The methods used in the current study are presented in the article manuscript (p.16). Ethics approval was granted by the University of Adelaide Human Research Ethics Committee (See Appendix C). This chapter will focus on the Delphi methodology.

Delphi Methodology

The 'Delphi' name originates from Delphi in Greece, a place of historic significance which was recognised as an oracle, a place where important decisions were made in the classical world (Hasson, Keeney & McKenna 2000).

The Delphi methodology was originally developed by the RAND Corporation in the 1950s to forecast new information technology development (Hasson, Keeney & McKenna 2000; Robert, Harlock & Williams 2014). The RAND corporation sought expert opinion through the Delphi to increase their knowledge of the number of bombs required to reduce weapons depot' (Dalkey & Helmer 1963). Dalkey and Helmer's seminal paper described the possible inaccuracy of making group decisions around a table, where people's opinions are influenced by others around them. Therefore the Delphi was developed to gain the opinion of a group of experts without the influence of others' opinions, with the belief that this will lead to increased accuracy from participants (Dalkey & Helmer 1963). An additional perceived advantage of the use of successive rounds in the Delphi is that participants are given additional time to consider their original beliefs in lieu of the opinions gained in the previous rounds, so they have the ability to consider their responses and respond after the benefit of a period of deliberation.

From this initial introduction of the Delphi in the 1950s, this methodology has gained popularity particularly in the field of health research, business, defence, transport, engineering and education. The Delphi is used in these industries for the following reasons; there is insufficient research on a topic to answer a proposed question, where the researcher is seeking consensus, to confirm opinion from numerous often geographically isolated professional groups, and lastly to educate a group of people on a topic (Hasson, Keeney & McKenna 2000).

Junger et al. (2017) discuss that the Delphi technique relates to the method, the Delphi study describes the use of the Delphi technique to explore knowledge in a field there is no current evidence and the Delphi survey uses the survey to garner expert opinion using a number of rounds.

Skulmoski, Hartmann and Krahn (Skulmoski, Hartman & Krahn 2007) recommend the following 11 steps for the Delphi process:

The 11 steps are:

1. Developing the research question.
2. Planning the research design.
3. Choosing the sample noting four requirements of participants: that they have knowledge and experience, capacity and willingness, time to participate and effective communication skills.
4. Developing the round one questionnaire; initially develop broad open- ended questions while ensuring participants have a clear understanding of what the question is.

5. Piloting the questions and adjusting them to ensure there is comprehension of the survey questions.
6. Distributing the questionnaire.
7. Data is analysed from the first round and the round two questionnaires are then sent out with reconfigured questions.
8. Analysing Round 2 responses.
9. Developing round 3 questionnaire.
10. Analysis of Round 3 questionnaire results.
11. The data is analysed, verified, and the research results documented.

Rounds may continue to be held until consensus is reached by the participants.

Whilst this is one form of the Delphi, there are many differing forms of Delphi being used, which has been used as a criticism of the methodology (Keeney, Hasson & McKenna 2001). The one essential component of all Delphi methodologies used is the aim to reach consensus amongst experts where there is little evidence available on a topic, that the experts remain anonymous, that it contains more than one round.

Criticism of the Delphi Methodology

There has been criticism related to the Delphi in that there is no evidence of reliability and validity (Keeney, Hasson & McKenna 2001). Keeney et al. suggests that if the same information was given to different groups of people that alternate opinions may be received.

Validity may be an issue when the group are not expert in relation to the study area, or where they are too close to the study area, therefore creating bias (Hasson, Keeney & McKenna 2000; Keeney, Hasson & McKenna 2001). The Delphi is not considered to take the place of rigorous evidence, however it is a good substitute where other research does not exist (Howell et al. 2016).

There is also criticism around what constitutes consensus. If participants' opinions are changed in relation to their colleagues, is this then a true reflection of their opinion? However, others see this as an advantage as the review of others' opinion with the advantage of time for reflection, ensures consensus is reached (Hasson, Keeney & McKenna 2000).

Although it is accepted that there are variations in the Delphi methodology, it is also recognised that departing from the standard method increases the risks to a study's validity. The Delphi is a flexible methodology, however, it is recommended that where the order of the steps is varied that further rounds will be required to ensure consensus is reached (Skulmoski, Hartman & Krahn 2007). There is also some evidence that some Delphi studies change their selection criteria between rounds, therefore preventing true consensus findings, consistency is therefore essential (Boulkedid et al. 2011).

Selecting the Delphi methodology

As suggested by Keeney et al. (2001) the Delphi methodology is suited to research questions in which there is little prior knowledge documented. The opinions of experts in the field could be used to reach a consensus to inform a model of care for the new PARU design. The participants were

international and within Australia, so there was potential bias if participants had with intricate knowledge of the design.

A two round Delphi survey (See Appendix D and Appendix E) was proposed. Although three rounds are often recommended, due to the time constraints of a Master program a shorter study was required. Therefore, unlike Skulmoski *et al.* this Delphi study was a 9 step process by removing the final round that involves two steps.

Chapter 4 Article Manuscript

A Delphi Methodology that investigates the model of care for a 4-6 bedded Post Anaesthetic Recovery Unit.

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Ethics approval

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Statement of Authorship

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Principal Author

Name of Principal Author (Candidate)	Louise McGuire		
Contribution to the Paper	Designed the two Delphi surveys, recruited participants, collected and analysed the data, wrote the first draft of the manuscript, acted as corresponding author.		
Overall percentage (%)	70%		
Certification:	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature and is not subject to any obligations or contractual agreements with a third party that would constrain its inclusion in this thesis. I am the primary author of this paper.		
Signature		Date	11/4/19

Co-Author Contributions

By signing the Statement of Authorship, each author certifies that:

- i. the candidate's stated contribution to the publication is accurate (as detailed above);
- ii. permission is granted for the candidate to include the publication in the thesis; and
- iii. the sum of all co-author contributions is equal to 100% less the candidate's stated contribution.

Name of Co-Author	Tim Schultz		
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Name of Co-Author	Janet Kelly		
Contribution to the Paper	Supervised the study design, helped with the analysis of the survey responses, reviewed and edited versions of the manuscript.		
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ABSTRACT

Background

Recovery units are typically open plan rooms where all patients can be seen at all times. A new hospital in South Australia has 154 4-6 bed perioperative bays for all emergency and elective surgical and procedural cases. We conducted a Delphi study to investigate care delivery in this new design.

Objective

The objective was to establish expert consensus regarding problems, benefits and suggested solutions for the new design across four domains: patient safety, staff satisfaction, organisational efficiency and maintenance of professional standards.

Method

A two round Delphi study involved 71 recovery unit nurses from 13 countries. Round 1 questionnaire asked experts to identify problems, solutions and any potential benefits of the new design. Responses were analysed and a second questionnaire asked participants to rank the problems and the solutions in order of importance and ease of fixing.

Results

The highest ranked problem for patients was mixing conscious and unconscious patients. Increased safe skilled staffing levels was highest ranked for staff, organisation and the profession. The highest ranked solutions to improve the model of care were: division of patients (patients), increased safe skilled staffing (staff), test workflows (organisation), and develop staffing models (profession). The most commonly reported solutions aggregated across all domains were: increased safe skilled staffing, division of patients and staff education.

Conclusion

Despite identifying a number of risks due to problems with the new PARU design, this Delphi study has also identified a number of risk mitigation strategies, such as increased safe skilled staffing and division of patients. Implementing these strategies successfully should allow for a safer environment for both patients and staff.

INTRODUCTION

Post Anaesthetic Recovery Units (PARUs), or Post Anaesthetic Care Units (PACUs), are traditionally open rooms allowing patients to be seen at all times by nursing staff to optimise patient safety.¹ In Australia, this open plan design is promoted by both the Australian College of Operating Room Nurses (ACORN) and the Australian and New Zealand College of Anaesthetists, which states “the layout of bed spaces should allow staff to have an uninterrupted view of several patients at once” (p1).² Internationally both the Royal College of Anaesthetists³ and the American Society of Anaesthesiologists⁴ also promote open plan rooms.

In Day Surgery Units (DSUs) patients are admitted and discharged on the same day, with separate stage 1 (initial recovery phase) and stage 2 (transition to discharge home) recovery spaces.⁴ which prevents patients having the distressing experience of watching other patients wake from their procedure. In addition, theatre suites (which include both DSU and inpatient procedures) are also

usually designed with a separate admissions space for elective day of surgery admissions and a holding bay for inpatients awaiting surgery.⁵

A new major metropolitan hospital has recently been built in Adelaide, South Australia with a design that reflects architectural innovation rather than traditional PARU design. Instead of an open plan room where all patients can be seen post-procedurally, there are 154 beds divided into five zones of 4-6 bed bays with floor to ceiling solid walls between each bay. This new PARU space included the admission and discharge functionality for inpatient and DSU patients. Patients would be: (i) admitted to the zone closest to the technical suite (theatre/procedural room) booked for their procedure, (ii) return to that bed after their procedure, and (iii) return to the ward or be discharged home from that position. There would no longer be a holding bay, admissions area, separate PARU, or DSU.

When the new design was announced, PARU nurses and anaesthetic medical staff expressed concern about the lack of line of sight to all patients and the risks to patient safety and patient experiences, such as pre-surgery patients awaiting surgery next to a post-operative patient. Nurses were also concerned about losing specialist skills in this environment and having to undertake untrained roles, such as PARU nurses caring for Intensive Care Unit patients. Additionally, as the new PARU design had not been used previously within Australia, a new model of care would be required to meet ACORN Standards and address inefficiencies.

A search of the international literature identified no comparable published research on multiple bed recovery bays. Therefore, the aim of this study was to garner expert opinion and reach consensus regarding a recommended model of care for multiple bed recovery bays. The recommended model of care would need to ensure patient centred care and patient safety and optimise the work environment for staff. Specifically, the recommended model of care should address the following key objectives relevant to each of four groups:

- Patient: ensure a good patient experience, a high standard of patient centred care and patient safety.
- Staff: ensure staff feel supported in this new PARU design.
- Organisation: ensure efficiency and effectiveness of care for the organisation related to workforce and risk management.
- Profession: develop a model of care for PARUs with this design.

METHODS

Delphi technique

The Delphi technique was chosen to address the aim of the study being “well suited as a research instrument when there is incomplete knowledge about a problem or phenomenon...”(p1).⁶⁻⁸ Traditionally, the Delphi method uses a number of rounds to gain expert opinion on the research question. More recently, it is recommended that two or three rounds is sufficient.^{9 10} Skulmoski, Hartman and Krahn describe 11 steps for a three round Delphi. In the present study, a two round Delphi was used, comprising nine steps.⁶ Two steps were removed as only two rounds were included in this Masters study.

Questionnaire development and administration:

A questionnaire was developed by the candidate and supervisors and subsequently piloted with six expert Registered Nurses (with more than 4 years' PARU experience), minimal feedback was received, small amendments were made following feedback. Both Delphi rounds were distributed using Survey Monkey (Survey Monkey Inc, San Mateo California, www.surveymonkey.com).

Round 1:

Thirty-six international organisations were identified through an internet search of professional anaesthetic and recovery organisations. The 13 participating organisations were then invited by email to send the round 1 questionnaire to 5-10 expert PACU nurses (4 plus years' experience) from within their organisation. The questionnaire included an email attachment and video explanation (https://www.youtube.com/watch?v=b-XqRH_UfWQ&feature=youtu.be) of the new design. Open-ended questions encouraged participants to generate ideas for each of the four domains (patient, staff, organisation, profession) and identify potential *problems*, *solutions* and *benefits* of the new design. The round 1 questionnaire was distributed to 130 identified experts in May 2016. Reminders were sent after 30 days. Participants provided their email address if they were interested in the second round of the Delphi study.

Content analysis of the text responses for problems, solutions, and benefits in relation to patients, staff, organisation, profession was conducted, and the number of responses for each were counted.¹¹ The five most commonly reported problems and three most commonly reported solutions were defined and included in the round two questionnaire.

Round 2:

Participants were asked to:

1. rank the problems using a 5-point Likert scale with 1 being the least likely to occur and 5 being the most likely.
2. rank the suggested solutions (as either 'low' or 'high' for the: (i) importance of fixing and (ii) ease of implementing.

Unlike round 1, benefits were not included in round 2.

The round 2 questionnaire was again piloted by South Australian colleagues and finalised using their feedback. It was sent out in March 2017 to 41 consenting participants from round 1. Three reminder emails were sent during a 3-month period to maximise participation.

The number of respondents rating the importance of a solution as high was then used to score the solutions from 3 (most important) to 1 (least important). The ease of implementation rating was used to separate cases of a tie in the rating of the importance of a solution. For example; for the problem of conscious/unconscious mix there was a tie for importance of implementation of solutions: education of patients and division of patients at 92% (See Table 2a). We then looked at the highest score for ease of implementation which

was 64% for education of patients, and 60% for division of patients. Therefore, education of patients was ranked as number one.

Within our framework the same solution could be implemented for different problems and across different domains; it was therefore possible to calculate the solution with the highest utility (i.e. the most frequently reported solution, with the highest importance and ease of implementation). The sum of the ranks of solutions across all problems was calculated as a measure of utility of the solutions. For example, division of patients scored 7 points (from the patient domain), 4 points (from the staff domain), and 0 points from either the organisation or profession domains, totalling 11 points (Table 3). This was the second highest ranked aggregate solution.

Ethics approval:

Ethics approval was granted from Adelaide University Human Research Ethics Committee, approval number: H-2016-003.

RESULTS

Response rates

In round 1, 36% (13 of 36) of international organisations responded to the initial researcher email. A total of 130 emails were then sent by 13 organisations to their members, with 71 respondents (response rate of 55%). In round 2, there were 26 responses from 41 respondents who had provided their email address in round 1 (response rate of 63%).

Table 1: Demographic Data of Survey Participants

Variable	Values	Responses (n)	Percentage (%)
1. Years of Experience PARU / PACU	4 - 5 years	9	11.4
	6 - 10 years	19	24.0
	11 - 15 years	14	17.7
	16 - 20 years	15	19.0
	20 Plus years	22	27.9
2. Country of Origin	Australia	26	32.9
	Canada	14	17.7
	USA	10	12.7
	Netherlands	7	8.9
	Ireland	5	6.3
	UK, Finland, NZ and other	10	21.5
	3. Gender	Female	71
	Male	8	10.0
	other	0	0.0
4. What is your role in the PARU / PACU?	Clinical	48	60.8
	Management	14	17.7
	Education	9	11.4
	Research	1	1.3
	Other	7	8.8
5. Which organisation contacted you?			
<i>International Collaboration of Peri Anaesthesia</i>	ICPAN	14	17.7
<i>South Australian Peri-operative Nurses Association</i>	SAPNA	12	15.2
<i>Organisation not specified</i>	OTHER	12	15.2
<i>American Society of Peri Anaesthesia</i>	ASPAN	9	11.4
<i>National Association of Peri Anaesthesia Nurses of Canada</i>	NAPANc	8	10.1
<i>Netherlands Peri Anaesthetic Association</i>	BRV	7	8.9
<i>Operating Room Nurses Association of Western Australia</i>	ORNA	5	6.3
<i>Irish Anaesthetic and Recovery Nurses Association</i>	IARNA	5	6.3
<i>Australian College of Operating Room Nurses</i>	ACORN	2	2.5
<i>Northern Territory Perioperative Nurses Association</i>	NTPNA	1	1.3
<i>Michigan Association of Peri Anaesthesia Nurses</i>	MAPAN	1	1.3
<i>Perioperative Nurses College</i>	PNC	2	2.5
<i>European Operating Room Nurses Association</i>	EORNA	1	1.3
6. Are you working for a hospital that is:	Public	56	71.0
	Private	19	24.0
	Other	4	5.0
7. How many beds does your hospital have?	0-100	10	12.7
	100-200	11	13.9
	200-300	13	16.4
	300-500	15	19.0
	500+	30	38.0
8. Does your hospital have an Intensive Care Unit?	Yes	70	89.0
	No	9	11.0
9. Have you had experience working in a 4-6 bed bay PARU / PACU?	Yes	20	25.6
	No	59	74.4

Demographic information

Demographics were collected from round 1 participants only. Nearly half of the participants (46.9%) had at least 15 years' experience and included representatives from Australia (32%), Canada (18%), and the USA (13%) (Table 1). 90% of the participants were female, 60% worked in the clinical field, 12 organisations were represented (with one unspecified) and 70% of participants worked within the public hospital sector with 38% having more than 500 beds (Table 1).

Survey results

Results are presented in Tables 2a- 2d in patient, staff, organisation and profession domains. Each table presents the top 5 problems and top 3 solutions (from round 1) and the rating of solution importance and ease of implementation (from round 2). The solution score is based on importance and, in cases of tied importance, ease of implementation considered.

Patient Domain

The highest ranked problem for patients in round 2 was the mix of conscious and unconscious patients (Table 2a). The solutions, ranked from most important to least important, were: education of patients, division of patients and creation of an admissions space. Division of patients was also included as a possible solution to two other patient problems, including patient privacy and patient safety.

Staff Domain

The highest ranked problem for staff in round 2 was the need for increased safe skilled staffing (Table 2b). The solutions, ranked from most important to least important were: increased safe skilled staffing, creation of admission space and division of patients. Commitment to increased safe skilled staffing was also mentioned in two other problems in this domain, including patient acuity and unit co-ordination.

Organisation Domain

The highest ranked problem for the organisation domain was increased safe skilled staffing (Table 2c). The solutions were: commitment to ACORN Standards, effective management and increased safe skilled staffing. Commitment to ACORN standards was seen to be an easier solution than effective management. Increased safe skilled staffing was also suggested as a solution for burnout and patient flow problems.

Profession Domain

The highest ranked problem for the professional domain was increased safe skilled staffing level (Table 2d). The solutions of new staffing models and professionalism were ranked equally highest at 92%. New staffing models was ranked higher for ease of implementation.

Table 2a Summary of problems identified in Round 1 and solutions from round 2 for the 'Patient' domain

Problem	Problem ranking			Solution	Importance		Ease of implementation		Solution score
	% most likely	% least likely	Rank		Low n (%)	High n (%)	Low n (%)	High n (%)	
1. Conscious/Unconscious mix: Putting patients together who are pre and post-operative.	48	20	1 st	Education of patients	2(8)	23(92)	9(36)	16(64)	3
				Division of patients	2(8)	23(92)	10(40)	15(60)	2
				Admission area	7(28)	18(72)	15(60)	10(40)	1
2. Family in Attendance: Involve the family in the patients care as appropriate.	16	32	=2nd	Involve family	6(24)	19(76)	13(52)	12(48)	3
				Staff Education	7(28)	18(72)	11(44)	14(56)	2
				Primary nursing	14(56)	11(44)	15(60)	10(40)	1
3. Patient Privacy: Open bays with only a curtain as a potential divider, therefore information given preoperatively whilst waiting for surgery and post operatively whilst waiting for discharge or transfer may be overheard by other patients and family members.	16	16	=2nd	Staff Education	24(4)	24(96)	11(44)	14(56)	3
				Division of patients	2(8)	23(92)	14(56)	11(44)	2
				Environment	16(64)	9(36)	9(36)	16(64)	1
4. Patient Safety: In the 4-6 bedded bays patients will require experienced nursing staff to be within the bay at all times to ensure their safety. There is also the potential for patients to feel abandoned as they wait for surgery, as staff members priorities shift to post -operative critically unwell patients. Will staff remain to oversee the preoperative patient?	12	12	4th	Division of patients	2(8)	23(92)	12(48)	13(52)	3
				Increased safe skilled staffing	2(8)	23(92)	20(80)	5(20)	2
				Primary Nursing	12(48)	13(52)	18(72)	7(28)	1
5. Patient Isolation: Related to the likelihood of nurses being required to move to the other end of the zone to care for the post-operative patient leaving the preoperative patient alone and without family.	8	20	5th	Shorter waiting time	2(8)	23(92)	18(72)	7(28)	3
				Increased safe skilled staffing	4(16)	21(84)	19(76)	6(24)	2
				Involve family	5(20)	20(80)	11(44)	14(56)	1

Table 2b Summary of problems identified in Round 1 and solutions from round 2 for the 'Staff' domain

Problem	Problem ranking			Solution	Importance		Ease of implementation		Solution score
	% most likely	% least likely	Rank		Low n (%)	High n (%)	Low n (%)	High n (%)	
1. Increased safe skilled staffing: Concern regarding lack of visibility of patients, due to the 4-6 bedded bays where it is not possible to view all patients at one time, therefore requiring increased staffing. Respondents also felt that to manage the competing priorities and patient population increased staff would be required across each zone.	28	4	1st	Increased safe skilled staffing	0(0)	25(100)	17(68)	8(32)	3
				Admission space	1(4)	24(96)	10(40)	15(60)	2
				Division of patients	2(8)	23(92)	20(80)	5(20)	1
2. Patient Mix: Concern regarding the mixture of preoperative (admission and holding area) and postoperative patients in the same space and their competing but not necessarily similar needs	24	28	2nd	Effective patient flow	0(0)	25(100)	19(76)	6(24)	3
				Division of patients	2(8)	23(92)	16(64)	9(36)	2
				Staff rotation	6(24)	19(76)	13(52)	12(48)	1
3. Conflicting Roles: Relates to staff having a preoperative (admissions and holding bay functionality) and a post-operative role, and difficulty regarding their priority in caring for these patients. This also relates to staff having trained and chosen a particular patient focus e.g. post-operative care, now being required to admit, discharge and care for a patient who may be more complex than they currently care for.	20	28	=3rd	Staff education	0(0)	25(100)	12(48)	13(52)	3
				Task identification	1(4)	24(96)	15(60)	10(40)	2
				Division of patients	2(8)	23(92)	16(64)	9(36)	1
4. Patient Acuity: It will be essential to provide experienced staff into the 4-6 bedded bays at all times as the patients are otherwise not easily visible. The question will be who takes priority when patient needs are significantly different, e.g. post-operative patients require 1:1 often and have immediate needs that need to be met otherwise their patient safety is at risk, however the preoperative patient also has needs to be met that they also consider urgent. There are also staff without the high level of skill these patients require.	20	8	=3rd	Increased safe skilled staffing	0(0)	25(100)	20(80)	5(20)	3
				Staff support	1(4)	24(96)	20(80)	5(20)	2
				Staff rotation	5(20)	20(80)	14(56)	11(44)	1
5. Unit Co-ordination: Awareness of workflows, staff skill-mix and bed status.	8%	32%	5th	Staff involvement	0(0)	25(100)	7(28)	18(72)	3
				Increased safe skilled staffing	0(0)	25(100)	18(72)	7(28)	2
				Effective patient flow	0(0)	25(100)	18(72)	7(28)	2

Table 2c Summary of problems identified in Round 1 and solutions from round 2 for the 'Organisation' domain

Problem	Problem ranking			Solution	Importance		Ease of implementation		
	% most likely	% least likely	Rank		Low n (%)	High n (%)	Low n (%)	High n (%)	Solution score
1. Increased safe skilled staffing level: see above definition (Table 2b)	32	12	1st	Commit to ACORN	0(0)	25(100)	9(36)	16(64)	3
				Effective management	0(0)	25(100)	13(52)	12(48)	2
				Increased safe skilled staffing	1(4)	24(96)	17(68)	8(32)	1
2. Unit Design: One space will allow the movement of resources to where workload demands.	20	28	2nd	Clear processes	0(0)	25(100)	12(48)	13(52)	3
				Efficient use of resources	5(20)	20(80)	18(72)	7(28)	2
3. Bed Block: Concern regarding multiple admissions taking up perioperative spaces potentially preventing patients being able to come out of theatre when their surgery is complete	20	8	3rd	Test workflows	0(0)	25(100)	11(44)	14(56)	3
				Effective patient flow	0(0)	25(100)	18(75)	6(25)	2
				Appropriate planning	1(4)	24(96)	14(56)	11(44)	1
4. Burnout: Concern regarding increased demand on staff to be expert in multiple areas where they are not currently. Risk also where staff are not educated properly in the new work flows and new equipment within the space.	16	36	4th	Listen to staff	0(0)	25(100)	6(25)	18(75)	3
				Increased safe skilled staffing	0(0)	25(100)	17(68)	8(32)	2
				Staff rotation	5(20)	20(80)	9(12)	16(64)	1
5. Patient Flow: Concern regarding potential blockages within the perioperative bays due to the lack of dedicated admissions, holding bay and discharge space within a traditional Recovery space.	12	16	5th	Test workflows	0(0)	25(100)	10(40)	15(60)	3
				Staff Education	0(0)	25(100)	10(40)	15(60)	3
				Increased safe skilled staffing	1(4)	25(96)	12(48)	13(52)	2

Table 2d Summary of problems identified in Round 1 and solutions from round 2 for the 'Profession' domain

Problem	Problem ranking			Solution	Importance		Ease of implementation		
	% most likely	% least likely	Rank		Low n (%)	High n (%)	Low n (%)	High n (%)	Solution score
1. Increased safe skilled staffing level see above definition in Table 2b	40%	12%	1st	Staffing models	2(8)	23(92)	19(70)	6(30)	3
				Professionalism	2(8)	23(92)	19(75)	6(25)	2
2. Staff Morale: The risk is that staff who have not chosen to care for high acuity patients or perform admissions and discharges will have reduced satisfaction. Staff not included in the planning of the new space and who receive insufficient education are likely to experience reduced morale.	16	4	=2nd	New research	2(20.83)	19(79.17)	16(66.67)	8(33.33)	1
				Professionalism	2(8.33)	22(91.67)	19(79.17)	5(20.83)	3
				Staff Morale Research	3(12.5)	21(87.5)	17(70.83)	7(29.17)	2
3. Role Conflict: Specialty skills are at risk of being disintegrated.	16	20	=2nd	ACORN standards	6(25)	18(75)	16(66.67)	8(33.33)	1
				Communication model	0(0)	24(100)	11(45.83)	13(54.17)	3
				Staffing models	1(4.17)	23(95.83)	15(62.5)	9(37.5)	2
4. Standard Alteration: Many professional organisations talk of the 'open room where all patients can be seen at all times' standards will likely require changing.	12	40	4th	ACORN standards	3(12)	22(88)	17	8(33.33)	1
				Pt Centred Care	0(0)	25(100)	17(70.83)	7(29.17)	2
				Guideline development	1(4)	24(96)	50%	50%	1
5. Burnout: Concern regarding increased demand on staff to be expert in multiple areas where they are not currently. Risk also where staff are not educated properly in the new work flows and new equipment within the space.	16	24	5th	Listen to staff	0(0)	24(100)	6(25)	18(75)	3
				Increased Safe skilled staffing	0(0)	24(100)	16(66.67)	8(33.33)	2
				Staff rotation	5(20.83)	19(75.7)	9(37.3)	15(62.3)	1

Aggregated utility scores for solutions

Table 3 presents solutions ranked from highest to lowest in terms of utility with definitions. The top three total utility scores were for increased safe skilled staffing, division of patients and staff education.

Table 3: Ranked solutions aggregated across the four domains, including definitions in italics

Solution	Number
Increased safe skilled staffing <i>Concern regarding lack of visibility of patients, due to the 4-6 bedded bays where it is not possible to view all patients at one time, therefore requiring increased staffing. Respondents also felt that to manage the competing priorities and patient population increased staff would be required across each zone.</i>	19
Division of patients <i>Divide patients to like need, e.g preoperative patients together therefore patients feel more comfortable and staff allocation is appropriate.</i>	11
Staff Education <i>Educate staff regarding workflows and potential issues patients may experience in the perioperative bays to prevent issues that may arise.</i>	11
ACORN standards Ensure standards are understood and adhered to.	9
Staff Involvement/Listen Involving staff will enable them to have a voice as we develop workflows and ownership of the new space.	9
Effective patient flow development of effective processes in patient flow throughout the perioperative bays and within the hospital preventing bed block	7
Test workflows prior to moving to ensure effective	6
Professionalism Encompassing new practise methodologies, models of care and research whilst maintaining all aspects of professionalism	5
Staff Rotation rotate staff so able to use across the space as skills and knowledge develop	4
Involve family involve the family in the patients care as appropriate	4
Staff Models the development of new models for the profession.	4

DISCUSSION

The aim of this study was to garner expert opinion regarding the recommended model of care for multiple bed PARU bays to ensure patient centred care and patient safety and to create a positive, efficient and supportive work environment for staff. While PARU Units have traditionally been designed as open rooms where all patients can be seen at once, modern hospital builds may deviate from this standard in the interests of architectural innovation of design. This study used the Delphi technique to identify problems and solutions with the new design.

Safety in innovative design

This study has identified a tension between patient safety principles and innovation in architectural design. There is a growing body of research related to hospital design and patient safety that clearly highlights the importance of effective clinical consultation and use of simulation prior to design completion¹². Prior to this study, local PARU clinical staff input was excluded in the development and planning phase of this bedded bay design. Simulation only occurred once the hospital was built. Therefore, staff input and feedback about patient safety did not result in changes to the design.¹³ Safety was recognised as a potential issue with the new design by the international experts in both rounds of the Delphi. All four domains (patient, staff, organisation, professional) highlighted the importance of increased safe skilled staffing for the new hospital design, indicating that the new design created a need for more nurses to be employed within the PARU to ensure patient safety.

Model of care

Experts emphasised that a functional model of care must differ from that suggested by the original design. The architectural proposal included mixing pre and post-procedural patients, however international experts reported this to be the highest ranked problem for patients (Table 2a). The solution offered was to divide conscious and unconscious patients (the second highest ranked solution). Experts also recognised that this division of patients would also assist staff in caring for patients safely (Table 2b).¹³ Once again, the need to increase skilled staffing levels was identified to enable organisations and professions to meet standards of care (Table 2c and Table 2d).

Ensuring patient privacy when co-locating pre- and post-procedural patients was also highlighted as a priority (Table 2a).¹⁴ A bay design does not provide the opportunity for confidentiality in patient assessment pre-operatively. Having family accompanying the patient is often beneficial, however when pre- and post-procedural patients are co-located, maintaining confidentiality is challenging. In addition, the pre- and post-procedure mix has the potential for isolating patients before their procedure, as staff will often be required to prioritise post-operative patients.

Implications of the new design

Within the new design, staff are required to work across multiple specialties. Experts identified that this would require additional staffing and staff education, to ensure staff satisfaction and patient safety.¹⁵ The Delphi informed model of care suggests the need for increasing safe skilled staffing and staff education were solutions offered in patient, staff and organisation domains. They also identified that increasing staffing would be the least easy to implement (Table 2c), presumably due to the costs involved.

LIMITATIONS

Two rounds of questionnaires were conducted. Due to the open-ended nature of responses in round one, there was some interpretation by the research team of the results. There may have been oversimplification of statements in this categorisation process. The research team went back to individual comments to attempt to clarify meaning.

It has been identified that the Delphi method may have issues around reliability and validity, that if the same survey is given to different groups of people, different results may occur (Keeney, Hasson & McKenna 2000).

RECOMMENDATIONS

As the study progressed, early results have been used to inform staff in possible ways of working with this new PARU design. Follow-up research should be conducted in the same PARU unit in 2 years' time to determine which solutions were adopted, and how effective they have been. Following up with staff, the organisation and profession is required to gauge the impact of this design. Future architectural design in healthcare should incorporate end-user input, simulation and existing standards.

CONCLUSION

This study sought expert opinion using the Delphi methodology when no directly relevant literature existed.⁹ The model of care proposed by the architectural design team for the perioperative bays at a new hospital was not previously experienced or documented by PARU experts internationally. The Delphi study elicited problems and solutions to mitigate potential risk. Overall, the concerns raised by international experts were also previously raised by staff in the initial consultation period at this hospital. Future healthcare designs must enable and ensure that clinicians play an integral role in the development of a new health facility.¹⁵ Innovation in design should not be at the cost of patient safety, staff satisfaction, organisational efficiency and professional standards.

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Chapter 5: Implementation of the new model of care: discussion

This chapter discusses how the results of the Delphi study were utilised by and the implications for practice, drawing from the results section of the article. It includes a review of the perioperative bays 12 months on, and the impact of the findings on the perioperative model of care from this Delphi research. The implications of new health care builds, and levels of staff input in design are considered and discussed in relation to the introduction of single patient rooms as an example of how decisions are made in health care design.

As part of the author's role as Nurse Unit Manager for the hospital's PARU, the emerging and final results of this research (as presented in the article) were presented to the hospital's executive team. This chapter will focus on how care delivery in the PARU has adapted to the new design by incorporating the results of the research in the 12 months since the hospital opened. First the revised model of care will be described, then the changes to staffing numbers required, the implications for practice, implications for the profession and the organisational response.

Model of Care

Models of care are based on best practice for a particular group of patients/people. Developing and reviewing models of care should involve collaboration with all of the stakeholders, especially clinicians, as they are instrumental in leading the changes required (Boardman, Forbes & Buller 2007).

Delphi informed model of care

Whilst the physical building design was unable to be changed, the Delphi provided a mechanism to generate feedback from expert clinicians and reach consensus on how the model of care could be changed to ensure safe and effective care delivery. It was clear that international experts had similar concerns to the clinicians within the hospital; the congruence of these concerns assisted in opening the discussion for proposed changes to the model of care.

The results from the Delphi and proposed changes to the model of care were reported to the hospital executive, which enabled discussions about the concerns of hospital clinicians and international experts to be combined. Whereas previously the model of care was regarded by executive as non-negotiable because it was developed in association with the design, senior managers could now see the potential issues within the space and the need to address these.

Changes to proposed model of care: (1) Zones

One of the first elements of the model of care to be modified was the division of patients pre- and post-operatively. The first clinician visit to the hospital before it opened reinforced the previously cited clinician concerns and Delphi findings. From a staffing perspective it was also clear that efficiency would be problematic in cases of nursing staff: patient ratios of 1:1 (one nurse caring for one patient), 1:2 (one nurse caring for two patients), and 1:4 (one nurse caring for 4 patients), depending on the needs of the patient during their perioperative journey (Australian College of Operating Room Nurses 2014-2015). For example, as the patient awaits theatre the ratio is 1:4, but immediately post-procedure it is 1:1. Therefore, each zone needed to be either pre-operative or post-operative and the holding bay and DSU stage two (transition to home) needed to be created within the space. These proposed changes to the model of care were discussed in meetings with executive, theatre management, and medical staff. There were initial thoughts that the distance between zones may be too great to travel; however, with the evidence gained through this research a trial of the changed model of care was proposed. This trial has since become a permanent model

of care (see Box 1 for the components of the model of care that was trialled). (See Appendix A for pictorial description of the perioperative bays zone 1 to zone 5)

Box 1

The perioperative bays model of care, trialled in 2019:

- i) a separate admissions/holding bay space (Zone 1 & 5)
- ii) a post-operative PARU (Zones 2 & 4)
- iii) a designated stage 2 space (with availability subject to overcapacity from unplaced overnight stay patients) (Renton 2019)
- iv) Zone 3 remains an independent cardiac unit, as does the gastrointestinal & bronchoscopy unit in zone 5a.

The modified zones are described below in Box 2.

Box 2

Modified zones:

Zone 1 has become the preoperative zone, where patients are admitted electively, a holding bay has been created for inpatients waiting preoperatively.

Zone 2 has become the post-procedural space where visibility was slightly better than zone 1 although there does remain many barriers, which is where the staffing model becomes essential for

A stage 2- day surgery space has been created at one end of Zone 2 with limited success due patients without a ward bed staying overnight occupying this area.

Zone 3 is cardiology and the 23-hour ward.

Zone 4 has become the post-procedural space, with a designated stage 2 for day surgery patients.

Zone 5 has become the preoperative space.

Changes to proposed model of care: (2) Staffing Numbers

The need for increased safe skilled staffing identified by the experts as a potential problem was widely recognised as a requirement within the new hospital perioperative bays. In the transition to the new hospital, the same staffing levels were planned in the new PARU and the initial directive given from the executive was that there would not be an increase in staffing in the new hospital as the same workload was being undertaken. However, after some months in the new hospital it was clear to executive that the change in design would have an impact on staffing numbers and composition.

A number of the design principles of the new hospital reduced the capacity of nurses to oversee patients in the PARU. For example; the presence of walls between bays, and the location of the drugs of dependence room, clean utility and dirty utility rooms which are out of the line of sight of the patients were recognised as significant risks to patient safety. Expert advice from the Delphi regarding the need for increased staffing in the perioperative bays was confirmed with the occurrence of early 'near misses', which expedited the need to increase staffing to ensure safe patient care. Increased staffing would enable staff to get drugs, pans etc without leaving the patient's bedside.

The individual zone design was complicated by the geographical isolation of both post-operative areas. Zones 1/2 and 4/5 were separated by zone 3 which is the Cardiovascular Investigation area and the 23-hour ward. The distance between the two areas is approximately 900 metres. Zones 1/2 and 4/5 are undertaking the same roles, the only difference between the two is that zones 1/2 are open 24 hours, 7 days a week and manage the emergency workload, and zones 4/5 are closed each night at 2130 and are closed on weekends. This design makes effective and efficient utilisation of staff difficult within this space due to geographical isolation.

The combination of international expert opinion gained from this study, ACORN standards (Australian College of Operating Room Nurses 2014-2015) and early experiences in the new space resulted in a business case for additional staff being put forward to executive. Ultimately, this resulted in the approval of 29 new full time equivalent (FTE) staff divided across perioperative bays zones 1/2, and 4/5.

Changes to proposed model of care: (3) Staff Education

As identified in the results section of the article, staff education was one of the top three solutions across domains by the experts, and this was most definitely a priority during the transition to the new hospital. The Delphi identified that the lack of specialisation of staff roles would be a problem in the new design, and that staff, would need to be capable of multiple roles. The evidence from the Delphi assisted in attaining an extra Clinical Nurse Educator within the perioperative space, as the complexity of the role was recognised.

Persistent Problems with the revised model of care

Although the Delphi has informed changes to the model of care which has resulted in noticeable improvements in this space, there remains issues relating to patient experience and efficiency.

Patient experience

Patients are unable to have visitors present in the perioperative bays as they wait preoperatively due to the lack of admission rooms or private spaces. Visitors are also unable to wait with patients as they await discharge in stage 2 DSU due to the lack of separation from zone 1.

Efficiency

In addition to the increased requirement for staffing, there has been the additional cost of efficiency.

Where previously there was one designated space for admissions, Day Surgery, Recovery, holding bay, these areas are divided into two without the weight of expertise in both areas. In zone 2 the lack of a regular space to care for stage 2 DSU space interferes with efficiency. Additionally, there is a reluctance of staff to take more than one patient at a time due to fear for patient safety with the remaining physical visual obstructions. As discussed earlier the geographical isolation of zone 1/2 and zone 4/5 creates inefficiencies with the difficulty in moving staff to each area when required. In

addition to this is the need to move patients from zone 4/5 to 1/2 after 2100 hours as zone 4/5 closes.

Implications for the Profession

The design of the new hospital disregards the professional body's (i.e. ACORN) standards which challenges the authority of such organisations, and has the potential to question their relevance. It is a point of reflection for ACORN that they were ignored in the development of this hospital. Where then does the professional body stand if their standards are ignored, what, if any, are the consequences, and what are the implications for other standards, such as staff: patient ratios. Strengthening international collaboration on such standards may enhance their utility in practice. On the other hand, the mounting evidence for the importance of clinician input in the design of healthcare facilities should reassure professional organisations (Birnbach et al. 2010; Burtson & Stichler 2010; Sandrick 2003). The evidence of problems occurring in hospitals in which clinician input into design is lacking should be utilised to ensure future clinician input in design.

Implications for Hospital Design

There is a growing body of research related to the importance of clinician involvement in hospital design related to patient safety, efficiency, patient satisfaction, staff satisfaction and retention.

There is evidence in the literature regarding the importance of clinical consultation and simulation for new healthcare institution builds (Reiling, Hughes & Murphy 2008). It is important then that architectural firms and health care executive value clinical consultation and the input of health; professionals who work directly with patients/clients to ensure a safe, high quality and efficient healthcare facility. As demonstrated in this study, poor design can result in increased cost, risk to patient safety and the patient experience.

Since the opening of the new hospital, the South Australian media have regularly reported that failures in design have led to inefficiencies, bed block, and created a potential risk to patient safety. The local newspaper (Crouch 2018) reported that the Australasian College of Emergency Medicine (ACEM) were concerned regarding the design flaws of the new Emergency Department. The concern was that the new hospital design was negatively impacting on efficiency and patient safety within the hospital and the cost-prohibitive opportunity to change this.

Another newspaper article reported that the Australian Nursing and Midwifery Council (ANMF) were concerned that nurses were under stress within the new space and unable to deliver effective patient care due to the design flaws of the hospital. In this article the President of the AMA (Australian Medical Association) also discussed inefficiencies related to poor design (Crouch 2018).

It remains to be seen whether the public relations problem resulting from this hospital design will be an impetus for other new hospitals to more meaningfully engage with clinicians during this design phase.

Implications from Research

Further research should take place in the new hospital within 12 months to look at whether the workflows suggested by international experts have assisted in our four domains of the patient, staff, organisation and profession. The next research project would need to include key stakeholders including clinicians, patients and executive.

Conclusion and Recommendations

The original model of care developed for the new hospital posed significant difficulties for staff and patients. Utilising the Delphi methodology to elicit international expert opinion and identify consensus, and reviewing existing standards, has facilitated the development of a more patient centred model of care that promotes patient safety, staff satisfaction, organisational efficiency and maintenance of professional standards. Additionally, this process has addressed the concerns of staff which were expressed at the design stage. The findings of this study highlight the necessity of clinician involvement in healthcare institution design, and also provide an approach for other clinicians to use to garner international expert opinion on hospital builds and models of care.

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Appendix B - BMJ Quality and Safety Acceptance for Manuscript Review

14-Mar-2019

Dear Ms. McGuire:

Your manuscript entitled "A Delphi Methodology that investigates the model of care for a 4-6 bedded Post Anaesthetic Recovery Unit." has been successfully submitted online and is presently being given full consideration for publication in BMJ Quality & Safety.

Your manuscript ID is bmjqs-2019-009519.

Please mention the above manuscript ID in all future correspondence or when calling the office for questions. If there are any changes in your street address or e-mail address, please log in to ScholarOne Manuscripts at <https://mc.manuscriptcentral.com/bmjqs> and edit your user information as appropriate.

Please check that all author names are correctly entered as this will be the name displayed in any PubMed search.

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Any individuals listed as co-authors on this manuscript are copied into this submission confirmation email. If you believe that you have received this email in error, please contact the Editorial Office.

Thank you for submitting your manuscript to BMJ Quality & Safety.

Respectfully,

Dr. Kaveh G. Shojania, MD
Editor-In-Chief
BMJ Quality & Safety

Appendix C - Human Research Ethics approval:



RESEARCH BRANCH
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CRICOS Provider Number 00123M

11 January 2016

Dr T Schultz
School of Nursing

Dear Dr Schultz

ETHICS APPROVAL No: H-2016-003

PROJECT TITLE: **Model of care for a multibed bay Post Anaesthetic Recovery
Unit in a major South Australian metropolitan hospital**

The ethics application for the above project has been reviewed by the Low Risk Human Research Ethics Review Group (Faculty of Health Sciences) and is deemed to meet the requirements of the *National Statement on Ethical Conduct in Human Research (2007)* involving no more than low risk for research participants. You are authorised to commence your research on **11 Jan 2016**.

Ethics approval is granted for three years and is subject to satisfactory annual reporting. The form titled *Annual Report on Project Status* is to be used when reporting annual progress and project completion and can be downloaded at <http://www.adelaide.edu.au/ethics/human/guidelines/reporting>. Prior to expiry, ethics approval may be extended for a further period.

Participants in the study are to be given a copy of the Information Sheet and the signed Consent Form to retain. It is also a condition of approval that you **immediately report** anything which might warrant review of ethical approval including:

- serious or unexpected adverse effects on participants,
- previously unforeseen events which might affect continued ethical acceptability of the project,
- proposed changes to the protocol; and
- the project is discontinued before the expected date of completion.

Please refer to the following ethics approval document for any additional conditions that may apply to this project.

Yours sincerely,

Amy Lehmann
Human Research Ethics Officer
Office of Research Ethics, Compliance and Integrity



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Project Title: Model of care for a multibed bay Post Anaesthetic Recovery Unit in a major South Australian metropolitan hospital

The University of Adelaide Human Research Ethics Committee
Low Risk Human Research Ethics Review Group (Faculty of Health Sciences)

ETHICS APPROVAL No: H-2016-003 **App. No.:** 0000021245

APPROVED for the period: 11 Jan 2016 to 31 Jan 2019

Thank you for your responses dated 29.12.2015 and 11.01.2016 to the matters raised.

It is noted this study includes Louise McGuire, Masters of Clinical Science student.

Amy Lehmann
Human Research Ethics Officer
Office of Research Ethics, Compliance and Integrity

Appendix D

Model of Care Questionnaire for 4-6 bedded bay Post Anaesthetic Recovery Unit (PARU)

Model of Care Questionnaire for 4-6 bedded bay PARU

Thank you for participating in this survey. The following page will give you all the information you will need regarding my research, I ask that you first watch my video through the link provided below to fully understand the design of the new PARU/PACU we are moving to in the near future.

Thank you so much for taking part in my research.

Louise

Click on this link to watch the introductory video
[Model of Care PARU Intro Video](#)

Or copy and paste this link into your browser
https://youtu.be/b-XqRH_UfWQ

Model of Care Questionnaire for 4-6 bedded bay Post Anaesthetic Recovery Unit (PARU)

Participant Information

PARTICIPANT INFORMATION SHEET

PROJECT TITLE: What is the most effective model of care for a 180 bed PARU (Post Anaesthetic Recovery Unit)/PACU divided into 4-6 bedded bays?

HUMAN RESEARCH ETHICS COMMITTEE APPROVAL NUMBER : H-2016-003[JK1]

PRINCIPAL INVESTIGATOR: Dr Tim Schultz

Student Researcher: Louise McGuire (GDip A&R, GCert AOD, BN)

Dear Participant,

You are invited to participate in the research project described below.

What is the project about? The aim of this project is to garner expert opinion regarding the recommended model of care for multiple bed Recovery bays to ensure patient safety and patient centred care and create a positive, efficient and supported work environment for staff.

The objectives relate to three parties:

- Patient: To develop a model of care that ensures good patient experience and a high standard of patient centred care.
- Organisation: To ensure efficiency and effectiveness of care for the organisation related to workforce and risk management.
- Profession: To develop a sound model of care to be used as a resource for PARU's (Post Anaesthetic Recovery Unit's) worldwide.

Who is undertaking the project?

This project is being conducted by Louise McGuire.

This research will form the basis for the degree of Masters of Clinical Science at the University of Adelaide in South Australia under the supervision of Tim Schultz and Janet Kelly.

Why am I being invited to participate ?

You are being invited as you are considered an expert in the speciality of PARU nursing.

What will I be asked to do?

You will be asked to complete two online surveys 3 months apart. The questions relate to the design for the new hospital with 4-6 bedded Perioperative bays (Recovery/PACU) (180 beds in total). I am seeking your expert opinion related to possible problems, solutions and benefits to this new model of care, which is likely to be replicated internationally. You have the opportunity to be instrumental in ensuring a safe and efficient model of care for this new Recovery/PACU design which varies significantly from the open room we are familiar with.

How much time will the project take?

The surveys will take 20 minutes each.

Are there any risks associated with participating in this project?

There are no foreseeable risks in this project. If you have any concerns please feel free to contact me immediately as per the contact information on the survey.

What are the benefits of the research project?

The research may result in the development of an effective model of care for the multi-bed bay Recovery Unit, as this design that appears to be increasing in popularity. The resulting model has significant implications for patient safety, organisational efficiency, staff satisfaction and professional standard development.

Can I withdraw from the project?

Participation in this project is completely voluntary. Even if you agree to participate, you can withdraw from the study at any time.

What will happen to my information?

The information and project records will be confidentially stored. Only my supervisors and I will have access to the returned surveys and results. The findings will be presented in my Master's thesis and I will look to publish in relevant professional journals. The information you share will not be able to be identifiable to you individually, there may be discussion related to different countries, whether there are similarities in private or public hospitals, but individual information won't be identifiable.

Who do I contact if I have questions about the project?

You are welcome to contact myself or my supervisors at any time with any concerns.

My email is: louise.mcguire@adelaide.edu.au, phone number +6182224846

My supervisor's contacts are as follows:

Dr. Tim Schultz Research Fellow (supervisor) is Tim.Shultz@adelaide.edu.au or +6183130558

Dr. Janet Kelly Research Fellow (supervisor) is Janet.Kelly@adelaide.edu.au or +6183130558

What if I have a complaint or any concerns?

The study has been approved by the Human Research Ethics Committee at the University of Adelaide (approval number H-2016-003). If you have questions or problems associated with the practical aspects of your participation in the project, or wish to raise a concern or complaint about the project, then you should consult the Principal Investigator Louise McGuire. Contact the Human Research Ethics Committee's Secretariat on phone +61 8 8313 6028 or by email to hrec@adelaide.edu.au. If you wish to speak with an independent person regarding concerns or a complaint, the University's policy on research involving human participants, or your rights as a participant. Any complaint or concern will be treated in confidence and fully investigated. You will be informed of the outcome.

If I want to participate, what do I do?

Your completion of the online survey(<https://www.surveymonkey.com/r/ModelsofCare>) will be confirmation that you are providing consent to be involved in the study.

Thank you.

Yours sincerely,

Louise McGuire

Dr Tim Schultz

Dr Janet Kelly

Demographic data

The new major metropolitan South Australian hospital's Post Anaesthetic Recovery Unit (PARU) (PACU/PARU) has 180 perioperative bays (pre and post operative bays) with 40 technical suites (theatres). There is no admission or holding bay where patients have gone historically preoperatively, they will be taken directly to the Perioperative bay to be admitted if they arrive on the day of surgery or to wait for surgery if they are an inpatient. These patients will be procedural, surgical, day surgery and inpatient surgical patients.

* 1. Have you viewed the explanatory You Tube video?

- Yes
- No

* 2. How many years experience have you had as a PARU/PACU/Recovery Nurse?

- 4-5
- 6-10
- 11-15
- 16-20
- 20+

* 3. Which country are you from?

* 4. What is your gender?

- Female
- Male
- Other (please specify)

* 5. What is your role within the PARU/PACU?

- Clinical
- Management
- Education
- Research
- Other (please specify)

* 6. Which organisation contacted you?

* 7. Are you working in a hospital that is

- Public
- Private
- Other (please specify)

* 8. How many beds does your hospital have?

- 0-100
- 100-200
- 200-300
- 300-500
- 500+

* 9. What population of patients are cared for in your PARU?

- Adults only
- Adults plus paediatric
- Day Surgery only
- Inpatient plus Day Surgery
- Inpatient only

* 10. Does your hospital have an Intensive Care Unit?

- Yes
- No

Experience with 4-6 bed PARU bays

The new South Australian major metropolitan public hospital's Post Anaesthetic Recovery Unit (PARU) (PACU) has 180 perioperative bays (pre and post operative bays) with 40 technical suites (theatres). There is no admission area or holding bay where patients have gone historically preoperatively, they will be taken directly to the Perioperative bay to be admitted if they arrive on the day of surgery or to wait for surgery if they are an inpatient. These patients will be procedural and surgical; both day surgery and inpatient.

* 11. Have you had experience working in a 4-6 bed bay PARU/PACU?

- Yes
- No

Other (please specify)

12. If you have had experience working in this design what do you see as the benefits of this design?

13. If you have had experience working in this design what concerns do you have if any?

Model of Care Questionnaire for 4-6 bedded bay Post Anaesthetic Recovery Unit (PARU)

This section relates to what you think could be **PROBLEMATIC** with this design.

The new South Australian major metropolitan Post Anaesthetic Recovery Unit (PARU) (PACU) has 180 perioperative bays (pre and post operative bays) with 40 technical suites (theatres). There is no admission area or holding bay where patients have gone historically preoperatively, they will be taken directly to the Perioperative bay to be admitted if they arrive on the day of surgery or to wait for surgery if they are an inpatient. These patients are procedural, day surgery and inpatient surgical patients.

* 14. From your perspective what do you think could be **PROBLEMATIC** with this design for the Patient?

Problem 1

Problem 2

Problem 3

* 15. From your perspective what do you think could be **PROBLEMATIC** with this design for the Staff?

Problem 1

Problem 2

Problem 3

* 16. From your perspective what do you think could be **PROBLEMATIC** with this design for the Organisation?

Problem 1

Problem 2

Problem 3

* 17. From your perspective what do you think could be **PROBLEMATIC** with this design for the Profession?

Problem 1

Problem 2

Problem 3

This section relates to what you think are possible SOLUTIONS to this design?

The new South Australian major metropolitan Post Anaesthetic Recovery Unit (PARU) (PACU) has 180 perioperative bays (pre and post operative bays) with 40 technical suites (theatres). There is no admission area or holding bay where patients have gone historically preoperatively, they will be taken directly to the Perioperative bay to be admitted if they arrive on the day of surgery or to wait for surgery if they are an inpatient. Patients within the space will be procedural and surgical both day surgery and inpatient .

* 18. What then are the potential **SOLUTIONS** to these problems for the **Patient**?

Solution 1:

Solution 2:

Solution 3:

* 19. What then are the potential **SOLUTIONS** to these problems for the **Staff**?

Solution 1:

Solution 2:

Solution 3:

* 20. What then are the potential **SOLUTIONS** to these problems for the **Organisation**?

Solution 1:

Solution 2:

Solution 3:

* 21. What then are the potential **SOLUTIONS** to these problems for the **Profession**?

Solution 1:

Solution 2:

Solution 3:

Possible benefits to the design

The new South Australian major metropolitan Post Anaesthetic Recovery Unit (PARU) (PACU) has 180 perioperative bays (pre and post operative bays) with 40 technical suites (theatres). There is no admission area or holding bay where patients have gone historically preoperatively, they will be taken directly to the Perioperative bay to be admitted if they arrive on the day of surgery or to wait for surgery if they are an inpatient. These patients will be both procedural and surgical both day and inpatient surgical patients.

* 22. What do you believe to be the potential benefits to this design?

Potential benefit 1

Potential benefit 2

Potential benefit 3

* 23. Anything else you would like to add?

1

2

3

* 24. Thank you kindly for your feedback I will collate the data and send out a refined questionnaire developed with your input. Could you please fill out your email address so I can forward the next questionnaire to you directly?

Email Address

Welcome to My Survey

Hi all,

Welcome back.....thank you so much for your response to my first round questionnaire. The answers have been extremely valuable as we get ever closer to our move to the new major metropolitan hospital in South Australia.

For your recollection there are 4-6 bedded peri-operative bays in the new major South Australian hospital. The perioperative bays encompasses admissions of patients, holding bay for preoperative patients, post-operative care of the patient and discharge of the patient to the ward or home. There are 180 peri-operative beds in 5 zones across one floor, which will house surgical and procedural cases (cardiovascular intervention, radiology, bronchoscopy, ECT and gastrointestinal) where the inpatient, day of surgery and day surgery patient will be cared for. For the post-procedural/surgical patient the design of the Unit differs significantly from the current design standards of an open room where all patients can be seen at all times.

The second questionnaire aims to confirm the responses received in the first round, and to prioritise possible solutions. We invite you to rate the suggestions according to their importance and ease of fixing. This questionnaire should take you about 20 minutes.

Thank you again for your time and professional advice which will assist us to problem solve as we move into a new hospital with a significantly different design. Your input will make a positive difference to patient safety and nurse satisfaction.

Thank you

Louise McGuire
email:finnjoe@bigpond.com

Model of Care - Problem ranking

This part of the stage 2 questionnaire asks you to rank the problems identified from the first round questionnaire. I have divided this section into problems related to the patients, staff, organisation and the profession's perspective.

* 1. Rank the following **problems** for **patients** from greatest likelihood of occurring to least likelihood of occurring in the new hospital design. 1 being the least likely to 5 being most likely.

Conscious / unconscious mix
Putting patients together who are pre and post-operative.

Family in attendance. *Difficulty in having family members in a space that is preoperative and postoperative from a confidentiality perspective, however patients often wish their family members to stay with them while they wait for surgery.*

Patient safety.
The 4-6 bedded bays means that patients will require experienced nursing staff to be within the bay at all times to ensure their safety. There is also the potential for patients to feel abandoned as they wait for surgery.

.Privacy
Open bays with only a curtain as a potential divider, therefore information given preoperatively whilst waiting for surgery and post operatively whilst waiting for discharge or transfer may be overheard by other patients and family members

Isolation.
Again related to the likelihood of nurses being required to move to the other end of the zone to care for the post-operative patient leaving the preoperative patient alone and without family.

* 2. Rank the following **problems** for **staff** from greatest likelihood of occurring to least likelihood of occurring in the new hospital design? 1 being the least likely, 5 being the most likely.

Conflicting roles: *Relates to staff having a preoperative (admissions and holding bay functionality) and a post-operative role, and difficulty regarding their priority in caring for these patients and lack of choice in role change.*

Unit Co-ordination: *Discussion related to the competing priorities and staffing requirements and complexity of patient flow throughout the Unit which would make co-ordination of the zones more complex than they are currently.*

Increased staffing requirements: *Concern regarding lack of visibility of patients, due to the 4-6 bedded bays where it is not possible to view all patients at one time, therefore requiring increased staffing.*

Patient mix: *Concern regarding the mixture of preoperative (admission and holding area) and postoperative patients in the same space and their competing but not necessarily similar needs.*

Patient acuity: *It will be essential to provide experienced staff into the 4-6 bedded bays at all times as the patients are otherwise not easily visible. The question will be who takes priority when patient needs are significantly different.*

* 3. Rank the following **problems** related to the **organisation** from greatest likelihood of occurring to least likelihood of occurring in the new hospital design. 1 being the least likely, 5 being the most likely.

Unit design: *The unit design will create problems as it no longer has an admissions area, holding bay, dedicated recovery space or discharge area. The unit design is also potentially problematic because of the visibility and patient safety risk.*

Commitment to adequate staffing: *The belief that to manage this space an increase in staffing is required, without this there will be difficulty in meeting the needs of patients and therefore staff.*

Bed block: *Concern regarding multiple admissions taking up perioperative spaces potentially preventing patients being able to come out of theatre when their surgery is complete*

Patient flow: *Concern regarding potential blockages within the perioperative bays due to the lack of dedicated admissions, holding bay and discharge space within a traditional Recovery space.*

Burnout: *Concern regarding increased demand on staff to be expert in multiple areas where they are not currently. Risk also where staff are not educated properly in the new work flows and new equipment within the space.*

* 4. Rank the following **problems** for the **profession** from greatest likelihood of occurring to least likelihood of occurring in the new hospital design. 1 being the least likely, 5 being the most likely.

Safe staffing levels: As above it is expected increased staffing will be required in this space due to the expansion of roles and lack of visibility of patients.

Staff morale: The risk is that staff who have not chosen to care for high acuity patients or perform admissions and discharges will have reduced satisfaction. Staff without sufficient education regarding the new space at risk of low morale.

Role conflict: Specialty skills are at risk of being disintegrated

Standard alteration: Many professional organisations talk of the 'open room where all patients can be seen at all times' standards will likely require changing.



Burnout: Concern regarding increased demand on staff to be expert in multiple areas where they are not currently. Risk also where staff are not educated properly in the new work flows and new equipment within the space.

Solutions to problems; importance of fixing/ease of fixing related to **conscious/unconscious mix**.

Now that you have ranked the problems identified in the first survey, the next step is look at the potential solutions from two perspectives; importance of fixing and ease of fixing. *Importance of fixing* relates to how important the issue is to fix for the patient, e.g MOST important (high), LEAST important (low). *Ease of fixing* relates to how simple it would be to fix this problem with the solution suggested, e.g EASIEST (high), MOST DIFFICULT (low). We have chosen the top 3 responses (e.g.the potential solutions given the most frequently in the first questionnaire) for the potential solutions related to each potential problem.

* 5. Please rate the importance of the solutions described below for the **patient** for the problem of **conscious/unconscious mix**, i.e: *locating patients together who are pre and post-operative*.

	Importance	Ease
Division of patients: divide patients to like need, e.g preoperative patients together therefore patients feel more comfortable and staff allocation is appropriate	<input type="text"/>	<input type="text"/>
Education of patients; educate patients pre-operatively to the perioperative bay environment so they know what to expect; e.g family members can only stay while you are being admitted.	<input type="text"/>	<input type="text"/>
Admission area: One space for preoperative patients	<input type="text"/>	<input type="text"/>

Solutions to problems; importance of fixing/ease of fixing for **family in attendance**.

* 6. Please rate the following solution to problems for **patients** in terms of the importance and ease of fixing the potential problem of **family in attendance** (*Difficulty in having family members in a space that is preoperative and postoperative from a confidentiality perspective, however patients often wish their family members to stay with them while they wait for surgery*).

	Importance	Ease
Family:involve the family in the patients care as appropriate.	<input type="text"/>	<input type="text"/>
Staff Education:educate staff regarding workflows and potential issues patients may experience in the perioperative bays and the potential benefit to having family members present where appropriate.	<input type="text"/>	<input type="text"/>
Primary nursing: nurses allocated for a particular group of patients who follow them through from admission to discharge.	<input type="text"/>	<input type="text"/>

Solutions to problems; importance of fixing/ease of fixing **the issue of patient safety.**

* 7. Please rate the following solution to problems for **patients** in terms of the importance and ease of fixing the potential problem of **patient safety** (*The 4-6 bedded bays means that patients will require experienced nursing staff to be within the bay at all times to ensure their safety. There is also the potential for patients to feel abandoned as they wait for surgery, as staff members priorities shift to post-operative critically unwell patients*).

	Importance	Ease
Division of patients: divide patients to like need, e.g preoperative patients together therefore patients feel more comfortable and staff allocation is appropriate.	<input type="text"/>	<input type="text"/>
Primary nursing: nurses allocated for a particular group of patients who follow them through from admission to discharge.	<input type="text"/>	<input type="text"/>
Increased staffing: increased number of staff to meet the needs of the patients in the perioperative bays with the change in design of the unit and expansion of the role	<input type="text"/>	<input type="text"/>

Solutions to problems; importance of fixing/ease of fixing the issue of **privacy**.

* 8. Please rate the following solution to problems for **patients** in terms of the importance and ease of fixing the potential problem of **privacy** (*Open bays with only a curtain as a potential divider, therefore information given pre-operatively whilst waiting for surgery and post-operatively whilst waiting for discharge or transfer may be overheard by other patients and family members*).

	Importance	Ease
Division of patients: divide patients to like need, e.g preoperative patients together therefore patients feel more comfortable and staff allocation is appropriate.	<input type="text"/>	<input type="text"/>
Environment: 4-6 bed bays may provide greater privacy than an open room	<input type="text"/>	<input type="text"/>
Staff Education: educate staff regarding workflows and potential issues patients may experience in the perioperative bays to prevent issues that may arise.	<input type="text"/>	<input type="text"/>

Solutions to problems; importance of fixing/ease of fixing the issue of **patient isolation**.

* 9. Please rate the following solution to problems for **patients** in terms of the importance and ease of fixing the potential problem of **isolation** (related to the likelihood of nurses being required to move to the other end of the zone to care for the post-operative patient leaving the preoperative patient alone and without family).

	Importance	Ease
Increased number of staff to meet the needs of the patients in the peri-operative bays with the change in design of the unit and expansion of the role.	<input type="text"/>	<input type="text"/>
Family: involve the family in the patients care as appropriate.	<input type="text"/>	<input type="text"/>
Shorter waiting times: focus on ensuring patients don't wait for longer than necessary for their surgery through minimal changes to the order of theatre lists.	<input type="text"/>	<input type="text"/>

Solutions to problems; importance of fixing/ease of fixing issues of **conflicting roles for staff**.

* 10. Please rate the following solution to problems for **staff** in terms of the importance and ease of fixing the potential problem of **conflicting roles** (relates to staff having a preoperative (admissions and holding bay functionality) and a post-operative role, and difficulty regarding their priority in caring for these patients. This also relates to staff having trained and chosen a particular patient focus e.g post-operative care, now being required to admit, discharge and care for a patient who may be more complex than they currently care for).

	Importance	Ease
Task identification : Identify essential tasks and ensure staff feel competent in the delivery of these.	<input type="text"/>	<input type="text"/>
Staff education: Ensure staff are trained in new workflows, equipment and clinical care for the new environment.	<input type="text"/>	<input type="text"/>
Division of patients: Division of patients regarding acuity and psychological need	<input type="text"/>	<input type="text"/>

Solutions to problems; importance of fixing/ease of fixing issues around **patient acuity for staff.**

* 11. Please rate the following solution to problems for **staff** in terms of the importance and ease of fixing the potential problem of **patient acuity** (It will be essential to provide experienced staff into the 4-6 bedded bays at all times as the patients are otherwise not easily visible. The question will be who takes priority when patient needs are significantly different, e.g post-operative patients require 1:1 often and have immediate needs that need to be met otherwise their patient safety is at risk, however the preoperative patient also has needs to be met that they also consider urgent. There are also staff without the high level of skill these patients require (both pre and post-operatively).

	Importance	Ease
Safe skilled staffing: Appropriate level of skill and experience for patient mix and acuity	<input type="text"/>	<input type="text"/>
Staff support; support from management and educators in new workflows, equipment and clinical demand.	<input type="text"/>	<input type="text"/>
Staff rotation; to increase skill level in all areas	<input type="text"/>	<input type="text"/>

Solutions to problems; importance of fixing/ease of fixing issues of **unit co-ordination for staff.**

* 12. Please rate the following solution to problems for **staff** in terms of the importance and ease of fixing the potential problem of **unit co-ordination** (*discussion related to the competing priorities and staffing requirements and complexity of patient flow throughout the Unit which would make co-ordination of the zones more complex than they are currently*).

	Importance	Ease
Safe skilled staffing: Appropriate level of skill and experience for patient mix and acuity.	<input type="text"/>	<input type="text"/>
Effective patient flow: development of effective processes in patient flow throughout the perioperative bays and within the hospital preventing bed block.	<input type="text"/>	<input type="text"/>
Staff involvement: Involving staff will enable them to have a voice as we develop workflows and ownership of the new space	<input type="text"/>	<input type="text"/>

Solutions to problems; importance of fixing/ease of fixing **issue of patient mix for staff.**

* 13. Please rate the following solution to problems for **staff** in terms of the importance and ease of fixing the potential problem of **patient mix** (*concern regarding the mixture of preoperative (admission and holding area) and postoperative patients in the same space and their competing but not necessarily similar needs*).

	Importance	Ease
Division of patients: Division of patients regarding acuity and psychological need.	<input type="text"/>	<input type="text"/>
Effective patient flow development of effective processes in patient flow throughout the perioperative bays and within the hospital preventing bed block.	<input type="text"/>	<input type="text"/>
Staff rotation to increase skill level in all areas	<input type="text"/>	<input type="text"/>

Solutions to problems; importance of fixing/ease of fixing issues of increased staffing requirements

* 14. Please rate the following solution to problems for **staff** in terms of the importance and ease of fixing the potential problem of **increased staffing requirement** (*Concern regarding lack of visibility of patients, due to the 4-6 bedded bays where it is not possible to view all patients at one time, therefore requiring increased staffing. Respondents also felt that to manage the competing priorities and patient population increased staff would be required across each zone*).

	Importance	Ease
Safe skilled staffing: Appropriate level of skill and experience for patient mix and acuity..	<input type="text"/>	<input type="text"/>
Division of patients: Division of patients regarding acuity and psychological need	<input type="text"/>	<input type="text"/>
Creation of an admissions space: One space for preoperative patients therefore allowing for use of 1:4 ratios where preoperative and postoperative spaces are divided.	<input type="text"/>	<input type="text"/>

Solutions to problems; importance of fixing/ease of issues of **unit design for the organisation**

* 15. Please rate the following solution to problems for **the organisation** in terms of the importance and ease of fixing the potential problem of **unit design** (*the unit design will create problems as it no longer has an admissions area, holding bay, dedicated recovery space or discharge area. The unit design is also potentially problematic from a patient safety perspective with the 4-6 bedded bays and the resultant lack of visibility*)(*only 2 suggested solutions for this problem.*)

	Importance	Ease
Clear processes: ensure consistency of practise and high standards of care.	<input type="text"/>	<input type="text"/>
Efficient use of resources: Staff in one area to draw from, no separate admissions/discharge spaces, purchase of like equipment and stock across the space. Flex up and down	<input type="text"/>	<input type="text"/>

Solutions to problems; importance of fixing/ease of fixing issues of **commitment to adequate staffing**

* 16. Please rate the following solution to problems for the organisation in terms of the importance and ease of fixing the potential problem of **commitment to adequate staffing** (the belief that to manage this space an increase in staffing is required, without this there will be difficulty in meeting the needs of patients and therefore staff).

	Importance	Ease
Safe staffing levels: As above it is expected increased staffing will be required in this space due to the expansion of roles and lack of visibility of patients.	<input type="text"/>	<input type="text"/>
Effective management: safe staffing, listen to staff, education of staff, support staff.	<input type="text"/>	<input type="text"/>
Commit to ACORN (Australian College of Operating Room Nurses) standards: ensure staff levels and ratios are maintained.	<input type="text"/>	<input type="text"/>

Solutions to problems; importance of fixing/ease of fixing issues of bed block

- * 17. Please rate the following solution to problems for **the organisation** in terms of the importance and ease of fixing the potential problem of **bed block** (*Concern regarding multiple admissions taking up perioperative spaces potentially preventing patients being able to come out of theatre when their surgery is complete*).

	Importance	Ease
Effective patient flow: ensure flow in and out of Unit to ensure maximum efficiency and ensure theatre time well utilised.	<input type="text"/>	<input type="text"/>
Appropriate planning: staffing and skill mix related to procedural lists and emergency workload	<input type="text"/>	<input type="text"/>
Test workflows: prior to moving to ensure effective	<input type="text"/>	<input type="text"/>

Solutions to problems; importance of fixing/ease of issues of **patient flow for the organisation**

* 18. Please rate the following solution to problems for **the organisation** in terms of the importance and ease of fixing the potential problem of **patient flow** (*Concern regarding potential blockages within the perioperative bays due to the lack of dedicated admissions, holding bay and discharge space within a traditional Recovery space*).

	Importance	Ease
Test workflows: prior to moving to ensure effective	<input type="text"/>	<input type="text"/>
Staff education: to ensure all staff are aware of new work flows and practises	<input type="text"/>	<input type="text"/>
Appropriate planning: staffing and skill mix related to procedural lists and emergency workload	<input type="text"/>	<input type="text"/>

Solutions to problems; importance of fixing/ease of fixing issues of burnout for the organisation

* 19. Please rate the following solution to problems for **the organisation** in terms of the importance and ease of fixing the potential problem of **burnout** (*concern regarding increased demand on staff to be expert in multiple areas where they are not currently. Risk also where staff are not educated properly in the new work flows and new equipment within the space*).

	Importance	Ease
Safe staffing and skill mix: Importance of ensuring safe staffing levels and skill mix to prevent incidents from occurring	<input type="text"/>	<input type="text"/>
Listen to staff: regarding their concerns and ideas to ensure they take ownership of the new space	<input type="text"/>	<input type="text"/>
Staff rotation: rotate staff so able to use across the space as skills and knowledge develop.	<input type="text"/>	<input type="text"/>

Solutions to problems; importance of fixing/ease of fixing **safe staffing for the profession**

* 20. Please rate the following solution to problems for the **profession** in terms of the importance and ease of fixing the potential problem **of safe staffing** (*it is expected increased staffing will be required in this space due to the expansion of roles and lack of visibility of patients*).

	Importance	Ease
Staffing models: the development of new models for the profession	<input type="text"/>	<input type="text"/>
Research: the potential for new research in this new Recovery design.	<input type="text"/>	<input type="text"/>
Professionalism: Encompassing new practise methodologies, models of care and research whilst maintaining all aspects of professionalism.	<input type="text"/>	<input type="text"/>

Solutions to problems; importance of fixing/ease of fixing **staff morale for the profession.**

* 21. Please rate the following solution to problems for **the profession** in terms of the importance and ease of fixing the potential problem of **staff morale** (*The risk is that staff who have not chosen to care for high acuity patients or perform admissions and discharges will have reduced satisfaction. Staff not included in the planning of the new space and who receive insufficient education are likely to experience reduced morale*).

	Importance	Ease
Staffing models: the development of new models for the profession	<input type="text"/>	<input type="text"/>
Professionalism: Encompassing new practise methodologies, models of care and research whilst maintaining all aspects of professionalism.	<input type="text"/>	<input type="text"/>
Research: the potential for new research in this new Recovery design	<input type="text"/>	<input type="text"/>

Solutions to problems; importance of fixing/ease the issues of **role conflict for the profession**

* 22. Please rate the following solution to problems **for the profession** in terms of the importance and ease of fixing the potential problem of **role conflict: (*Specialty skills are at risk of being disintegrated*)**.

	Importance	Ease
Staffing models: the development of new models for the profession	<input type="text"/>	<input type="text"/>
ACORN standards: ensure standards are understood and adhered to	<input type="text"/>	<input type="text"/>
Communication model development: development of a communication model which works in this expansive area	<input type="text"/>	<input type="text"/>

Solutions to problems; importance of fixing/ease of fixing **standard alteration for the profession**

* 23. Please rate the following solution to problems for **the profession** in terms of the importance and ease of fixing the potential problem of **standard alteration** (*Many professional organisations talk of the 'open room where all patients can be seen at all times' standards will likely require changing*).

	Importance	Ease
Guideline development: to ensure relevance of guidelines and standards in a changing perioperative environment.	<input type="text"/>	<input type="text"/>
Focus on pt centred care: ensure the new design does not interfere with this	<input type="text"/>	<input type="text"/>
ACORN standards: ensure standards are understood and adhered to	<input type="text"/>	<input type="text"/>

Thank you!

Thank you for your generosity in completing the stage 2 questionnaire your feedback is sincerely appreciated! I hope to have this research published so I will keep you informed regarding the findings...again thank you, and Happy New Year!

Louise :)