

**Evaluating the effect of clinical  
dashboards designed to measure and  
improve the quality of nursing care  
and patient safety, in a mental health  
setting.**

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**A dissertation submitted to University of Dublin, in partial fulfilment of the requirements for the degree of Master of Science in Health Informatics.**

**2017**

**Author Declaration** I declare that the work described in this dissertation is, except where otherwise stated, entirely my own work, and has not been submitted as an exercise for a degree at this or any other university.

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**Ethics Declaration I declare that the work described in this dissertation has been carried out in full compliance with the ethical research requirements of the School of Computer Science and Statistics and the Study Hospital.**

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## **Abstract**

This research addresses how data is collected and used by nursing staff to make decisions about care and the impact this can have on quality of care and patient safety.

The purpose of this research was to study how clinical dashboards are used by nursing staff in a community mental health care setting and the effect this has on nursing staff adherence to guidelines and evidence based practice. A literature review was carried out to identify key factors, themes and constraints of clinical dashboards.

The researcher used a mixture of both quantitative and qualitative research methods for this study as Healthcare is very complex and a mixed research method may help with this complexity.

The study established that clinical dashboards can prove to be a valuable tool in giving feedback to nursing staff about whether they are meeting expected guidelines and evidence based practice which in turn helps to ensure nursing staff are delivering high quality and safe patient care.

## **Keywords**

**Clinical Dashboards, Quality Care Metrics, Nursing, Quality of Care, Patient Safety**

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### ABBREVIATIONS

Heart of England Foundation Trust (HEFT)

Irish Association of Directors of Nursing and Midwifery (IADNAM)

Test Your Care – TYC

Quality Care Metrics – QC-M

Electronic Patient Record – EPR

Nursing and Midwifery Board Ireland – NMBI

Collaborative Alliance for Nursing Outcomes - CALNOC

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### Glossary of Terms

Term	Definition
<b>Quality Improvement</b>	A systematic data-guided activity designed to bring about improvements in organizational processes or products. In the present context, this refers to improvements in the delivery of services in particular settings.(Klassen et al, 2010)
<b>Quality or performance indicator</b>	An explicitly defined and measurable item that can be used to evaluate and monitor the status of organizational or system processes or performance (Klassen et al, 2010)
<b>Evidenced Based Practice</b>	Evidence based practice is the integration of best research evidence with clinical expertise and patient values in order to improve healthcare outcomes.
<b>Quality Care-Metrics</b>	Quality care-metrics are a measure of the quality of nursing and midwifery clinical care processes, in healthcare settings in Ireland, aligned to evidence based standards and agreed through national consensus. (HSE, 2015)
<b>Quality Care-Metric Data Collectors</b>	Quality care-metric data collectors are individuals within the organisation who are responsible for collecting data and data entry on a monthly basis to the Test Your Care system (HSE, 2015)
<b>Clinical dashboard</b>	Provides a visual display of quality or productivity indicators to individual clinicians to They may provide data at the level of the patient, at the level of the healthcare or may allow the user to move between viewing information at both of these levels. It is usually designed to be contained on one screen to make it easy to view.
<b>Traffic Light Rating System</b>	Using colour coding to impart information to users in the format of a traffic light approach where green indicates that indicator is on target or exceeding target and there is no action to take, amber indicates performance is slightly below target and red indicates that there is significant underperformance and action is required (eHealth, 2016)
<b>Horizontal Integration</b>	The ability to exploit multiple data sources as they are one. (Malyuta 2013).

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# 1. Introduction

## 1.1 Introduction to Dissertation

The main aim of health care organisations nationally and internationally is the delivery of care that is patient centred, safe and of high quality. Nursing staff make up over 40% of the HSE workforce, it is therefore important acknowledge they are at the centre of the health care system delivering clinical care around the clock and therefore they contribute greatly to the delivery of safe patient care and care that is high quality (NCNM, 2009)

Measuring the degree to which nurses are adhering to care processes has an important role in assuring, sustaining and improving the safety and quality of care delivered to patient and clients. The importance of measuring the quality of care has also been highlighted by the Health Information and Quality Authority (HIQA) as crucial they stated “Unless we actually measure the quality and safety of care, we cannot determine if improvements are being made” (HIQA, 2013)

However in the past measuring clinical care and outcomes have proved to be very complex and not nursing specific this is due to a lack of nursing specific measurements. Anecdotal evidence is often used by nurses as an indicator of concerns in relation to care delivery this type of evidence can be subjective and unreliable, feedback in a systematic way to the individual nurse or organisation would be more reliable and more objective however is currently not always available. There is a now a need for nursing leadership that is strong and visible at all levels in order to increase nursing contribution to high quality care, to demonstrate the impact of nursing care within health services, and to provide robust assurance of the quality and safety of nursing care. Measurement can help capture the impact and effect of nursing and midwifery (eHealth Ireland, 2016).

In order to carry out robust reliable measurement of clinical care that will ensure high quality and safe patient care, key metrics and outcomes need to be established. It is then necessary to build a mechanism for practically measuring and then tracking outcomes. While outcomes can be qualitative, they need to be measured and tracked in

a quantitative manner. This can be a challenge for health care services and requires effective data collection, data consolidation, data visualisation and management structures to review and act on the metrics measured (North West London Whole Systems Integrated Care, 2015). Robert and Cornwell (2012) also discuss the need for measurement and outline the requirement to implement a national architecture system for measuring quality in order to enable a consistent, robust and standardised approach to quality measurement for nurses.

With the increasing adoption of technology within the health services more and more are implementing clinical dashboards into practice as a way of measuring and improving care. Clinical Dashboards are a tool that have been adapted from the business sector, they were originally developed as a business intelligence tool. Dashboards were used to capture and consolidate information on key performance targets across a business organisation into a visual display as a way of informing operational decision making (Pauwels, 2009). Clinical dashboards entered the healthcare arena in the early 1990s to support healthcare executives in measuring their operational and financial performance (Albanese 2010). Over the years they have evolved and health care organisations such as the HSE and the NHS are now supporting the use of dashboards to include patient-oriented, national regulatory, safety, staff, financial outcomes and nursing dashboards. The key characteristics of clinical dashboards are, firstly they provide a summary of data on performance measured against metrics and secondly the use of data visualisation techniques to provide feedback to individuals, health care teams, managers and patients. (Dowding et al, 2014). This information can benefit nursing staff and healthcare services as Clarke et al (2013) states a defining characteristic of high performing teams is their willingness to measure their performance and use this information to make continuous improvements.



## 1.2 Purpose, Aims and Objectives of the Study

Having a set purpose, and set aims and objectives will act as a guide for the researcher to plan the overall research project in a logical and coherent way.

### 1.2.1 Purpose

This dissertation is focusing on clinical dashboards used primarily by nurses in a mental health setting as a way to collect data on patient safety and quality of care which is not currently routinely measured. Measuring through the use of a dashboard has its strengths and weaknesses and this dissertation aims to evaluate how effective these dashboards are in a mental health setting at improving patient safety and quality of care.

The purpose of the study is to evaluate if the use of clinical dashboards as a tool to collect data in a standardised way and provide visual feedback has an impact on nurses delivering care. The clinical dashboard should increase adherence to care interventions that are standardised, based on best evidence, and in line with national and organisational policies. This should in turn lead to improved quality of care and improved patient safety.

### 1.2.2 Study Aim

This study will implement a system to collect data on nursing interventions, and compile this data using an online clinical dashboard which will then provide feedback to nursing staff on whether they are meeting the care requirements expected of them based on key metrics. The dashboard will enable nursing staff to evaluate their care interventions by consistent measurement of key nursing metrics.

### 1.2.3 Objectives

The research objectives are:

1. To measure nursing care data in a standardised way using quality care nursing metrics that have been set by the HSE
2. To implement at local level a web based clinical dashboard to compile and feedback all results in a standardised format.

3. To provide accurate data to nurses with regards to delivery of safe care and quality care.
4. To evaluate the effect clinical dashboard has on improving adherence to nursing metrics.

### 1.3 Motivation for Study

People receiving mental health care are some of the most vulnerable people in our society and in times of mental health crisis they rely on the mental health services provided by the HSE for treatment and support. However there have been incidents in Ireland of system failures and poor levels of care that are not safe and are not of high quality (Gallen, 2015). This is also a problem for other health care systems, for example a recent Kings College report (2015) noted there is widespread evidence of poor-quality care in the UK. In a HSE staff survey 1 in 3 staff reported they were not happy with the standard of care HSE services delivered (Gallen, 2015). And many staff in the HSE do not feel their work is valued or acknowledged by managers and the organisation as a whole, with a lack of recognition and respect in evidence (HSE, 2014). Dashboards can help in compiling data in a visual format that is easy for nursing staff to use and act upon which can in turn ensure that care is being provided in line with current best evidence based practice and congruent with national and organisational policies. HSE mental health services are facing increasing demands and have limited resources that need to be used as efficiently as possible. Patients have high expectations of health care services and there is an increased need for transparency and standardisation of care. There is also a continuous drive to improve quality and patient safety within HSE, and as the largest group employed within the HSE nurses have an important role in implementing initiatives in this area.

### 1.4 Overview of this dissertation

The introduction chapter gives the background and outline of the study. It introduces research problem, objectives of the study and summary of methods.

The remaining of this thesis is arranged as follows:

The second chapter contains the literature review and examines the current understanding of clinical dashboards and metrics in the literature, and analyses national and international literature in relation to the topic of the study. This informs and gives a basis for the study proposed.

The third chapter involves the research methods and discusses the methodology and approach of this study.

In the fourth chapter presents the results of the quantitative and qualitative analysis of this study are described.

The fifth chapter consists of detailed discussions on the outcome of the study.

And finally the sixth chapter concludes the dissertation and gives recommendations and discusses study limitations.

## **1.5 Summary and Conclusion**

Advances and increased adoption of technology within the health care sector have now made it possible to implement tools such as the clinical dashboard as an aid to nursing staff to deliver more effective, efficient and safe patient care in a very transparent and collaborative way resulting in better outcomes for patients and a more satisfied and validated workforce.

## **2. Literature Review**

### **2.1 Introduction**

In this chapter an extensive literature review was carried out around the research topic of evaluating the effect of clinical dashboards designed to measure and improve the quality of care and patient safety. The literature review aims to provide background information and knowledge on the subject and an understanding of the relevance of the research topic in relation to health informatics.

### **2.2 Search Strategy**

The literature reviewed for this dissertation included original articles, systematic reviews, and other documents identified through the databases shown in Table 1. Several articles were also identified through other sources that are also shown in Table 1. Depending on database being searched and the development of the search, keywords, related terms and alternative terms were included the search terms these are also shown in Table 1. The studies included in the literature must describe a dashboard used in a clinical setting either by nurses or by the multidisciplinary team which include nursing staff and have at least one element of quality improvement such as patient safety or quality of care.

Table 1: Literature Review Sources

Databases	Limitations	Other Sources	Types	Search Terms
CINAHL Complete	English	Snowballing	Journals	Clinical
MEDLINE	1994 - 2016	Smart text search	Books	Nursing
Academic Search Complete	Within a healthcare setting	Websites e.g. NHS, HSE, WHO	Websites	Dashboard
PubMed	Free articles		Reports	Patient Safety
The Cochrane Library			Thesis	Design
Stellar Search				Performance Measurement
Google Scholar				Clinical Decision Support
NICE Evidence Search				Quality
				Visual Feedback
				Hospital

A number of themes emerged from the literature review regarding the clinical dashboards in use including patient safety, quality of care, design of clinical dashboards, visibility of dashboard, staff engagement, feedback, and quality of data.

### 2.3 Background to implementation of clinical dashboards.

Traditional medical records are largely used for storage, and were not designed with patient care in mind. It is difficult for clinical staff to sort through these large amounts of paper work to see what has happened to their patients. Now traditional medical records are now becoming increasingly computerised, making them more readable but hardly any more meaningful for clinicians, large amounts of data can be captured electronically but information can be just as hard to find (Firth, 2014). However the traditional record has proved hard to replace as it is easy to use and most suggested electronic systems require more effort on the part of clinicians (Powsner and Tufte, 1994). This is because there are often there are several different information systems

storing data such as performance, quality and outcome measures and it requires individuals in health care services to access a variety of sources to retrieve the data which takes up valuable clinical time (Mick 2011).

To make electronic records less complex and for health care staff to obtain easy access to timely and meaningful information there is now a move towards integration of patient data. One system that integrates data and is being increasingly used is the clinical dashboard, they are being implemented in a variety of health care settings to improve workflow by providing a graphic visualisation of patient data and are seen as relatively cheap to implement (Firth, 2014).

Clinical dashboards have been adopted from the business sector where they are mainly used for measuring targets, these targets are usually financial or have a financial incentive. Measurement is fundamental to improvement and dashboards have helped many businesses transform their businesses. Single-screen “snapshots” of operational processes, marketing metrics, and key performance indicators can be visually elegant and intuitive. They show just-in-time views of what’s working and what isn’t there is no need to wait for weekly or monthly reports from a centralized data centre. A quick scan of a dashboard gives frontline managers transparency and, ideally, the opportunity to make rapid adjustments. (Shapiro, 2017) They strengthen organisational operations and systems, dashboard operates as an integrative and supportive system. Uses objective data to measure, provide feedback, publicize and continually improve performance.

From the literature there appears to a diverse range of clinical dashboards in use. There are many definitions of clinical dashboards, one definition that is used frequently defines the clinical dashboard as a toolset developed to provide clinicians with the relevant and timely information they need to inform daily decisions that improve the quality of patient care. This enables clinicians to have easy access to clinical data that is being captured locally, in an easy to use and visually effective display that is available whenever they need it (The NHS Connecting for Health, 2009).

In America for the past 20 years, the American Nurses Association has been formally compiling a database of nursing quality indicators, the National Database of Nursing

Quality Indicators, using nursing audit data gathered from 1,700 hospitals in the US (White and Giltenane, 2017).

In the U.K Lord Darzi's high quality care for all review (2008) was for the NHS the starting point for the use of clinical dashboards, it was stated for the first time in the NHS there would be systematic measurement and publication of information about the quality of care from the front line up. He stated the goal of the NHS is that every provider of services should systematically measure, analyse and improve quality. They will need to develop their own quality frameworks, combining relevant indicators defined nationally, with those appropriate to local circumstances. This will include quality measures that reflect the visions for improved services that are at the core of this Review (Darzi, 2008). Shortly after Lord Darzi's review and due to an increase in complaints about falls, medication management and pressure ulcers the NHS chief nursing officer Ms Sunderland introduced nursing metrics in 2009 in the Heart of England Foundation Trust (HEFT) these metrics aimed to address patient safety concerns and promote quality care. After putting into practice these nursing metrics in HEFT, results indicated significant improvements across quality of nursing care provision in all areas (White and Giltenane, 2017). However in other trusts in the NHS the implementation of these dashboards has been inconsistent and is reliant on the strength and enthusiasm of individual Nursing Directors. Clinical dashboards have been recommended as a tool that every Trust should employ for improving practice. (Sawbridge and Hewison, 2013). Ms Sunderland has made several visits to the Irish Association of Directors of Nursing and Midwifery (IADNAM) and presented her work on metrics which has helped to support metrics implementation in various regions in Ireland. (White and Giltenane, 2017).

## **2.4 Metrics in Health Care**

### **2.4.1 Targets or process of care?**

Every clinical dashboard is built on a set of selected metrics which are essentially priorities and assumptions about what's important (White and Giltenane, 2017). There has been considerable discussion relating to the effect of performance targets on

behaviour in the health care sector. Performance targets and performance management systems used in today's public healthcare organisations have moved from financially focused systems to integrate various non-financial concerns, such as service quality, process efficiency, and other factors of interest to their various stakeholders (Mesabbah and Arisha, 2016).

In the UK the Health and Safety Executive (2001) describes the importance of measurements in developing the right environment for safety, they summarise this approach by citing Drucker (1993) who states 'You can't manage what you can't measure'. Performance measures were also reviewed by the the King's Fund (2010) the aim was to assess how the NHS had improved across number of performance measures and found that the NHS had been largely successful in meeting the Government's targets and that this showed there was an improvement in patient care. An example of a target that was met and showed an improvement in care was reducing waiting times from 18 months to 18 weeks for a critical operations such as a heart bypass this represented a significant improvement for patients. Conversely there was concern from the review that having targets to meet can affect behaviour and divert attention from away from clinical concerns that are not being measured. However, nursing and midwifery metrics aim to measure the outcomes of processes as opposed to targets, the nurse's principal function is to deliver high quality and safe care, which can be difficult to describe, let alone measure. Nurses are increasingly using performance management framework methods to measure nursing care and the development of clinical dashboards locally (Sawbridge and Hewison, 2011).

#### 2.4.2 Evolution of Metrics

Now clinical dashboards are being developed for nurses to evaluate the quality and safety of the care they deliver to their patients, as they need to be able to measure the care outcomes resulting from the structures and processes of care. (Griffiths et al 2008, Maben et al, 2012) This will enable nurses to be able to identify underlying issues and trends and help them to understand where improvements can be made to the their delivery of care, in so doing it is thought this will enhance their own job satisfaction by being able to demonstrate to themselves, their managers, the public and the patients



they serve, the value of their contribution to patient care or professional input (Eccles et al, 2001, Doran et al, 2006). HIQA have also specified the importance of measuring quality of care is critical and have stated, unless we actually measure the quality and safety of care, we cannot determine if improvements are being made (HIQA, 2013, pg.2).

Measuring the degree to which nurses and midwives adhere to care processes plays an important role in assuring, sustaining and improving the safety and quality of care delivered to patient and clients (eHealth, 2016)

Nursing metrics provide the framework for how the fundamental aspects of nursing care can be measured and support quality improvement and accountability of care by generating evidence about the quality of nursing care by utilising care process quality indicators (Foulkes, 2011). Thus, nursing metrics aim to highlight the contribution of nursing to safe and effective care and provide the evidence and reassurance to managers, governance structures and regulators that care quality is a priority for the professions of nursing. Furthermore Nursing metrics are a continuous quality improvement journey highlighting areas of practice that require improvement and measuring for tangible evidence that improvement efforts are impacting in the delivery of care (eHealth, 2016).

Experts have recognized that quality measurement is a key driver in delivering change and improvements to the health care system, and routinely measuring quality using performance measures derived from evidence-based practice guidelines is an important step to this end. This has led to the increasing use and development of performance and quality measures to assess and ensure adherence to evidenced based health care and best practice guidelines. Performance measures are being developed and implemented nationally and internationally by governments, regulatory bodies, other organisations and health care services for a vast range of different health services physical health illnesses and mental health needs. In the U.S these organizations have included the National Committee on Quality Assurance and the National Quality Forum (Gilteneane, 2016).

Many countries have researched and tested the production and analysis of data on the quality and performance of health services (Huw, 2005) this data is more than often presented broken down into units by health care providers, or by hospital or by region. Once collected and analysed they provide 'report card' on the quality of health service delivery. Increasingly due to more open and transparent healthcare and impacts of freedom of information this information is being brought into the public domain.

## 2.5 Increased use of technology in health care

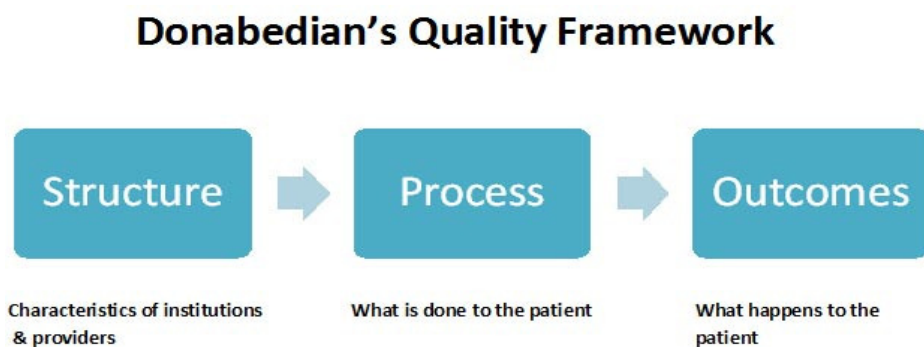
There is an increased emphasis on health care providers to adopt technology to improve communication, efficiency and enhance the uptake of performance measures that support clinical dashboards (Kilbourne et al, 2010). In 2013 the eHealth Ireland Strategy was published (Department of Health, 2013), this strategy created a vision for Ireland to have access to high quality healthcare and has been recognised internationally as a vision for a health system supported by a digital infrastructure. The main benefits of technology in relation to clinical dashboards found in this literature review are, it provides the software tools needed to ensure health care resources as a whole can be utilised more efficiently and effectively. The integration of data ensures patients can receive safe, secure healthcare within a high quality service environment. Supports transparency in healthcare which provides patients with accurate data empowers patients in their care choices.

## 2.6 Challenge of measurement in Health Care and the application of dashboards

The major purpose of clinical dashboards is also to measure but not with the main purpose of meeting financial targets but processes of care. It is believed that measurement of evidenced based care outcomes including treatment, clinical measures, patient preferences and comparison will also help to drive efficiency in health care settings. However health care is very complex there can be hundreds or

thousands of different interactions within the healthcare system every day and it is a challenge to measure these all and meet standards of care consistently.

The need to measure the impact of nursing care on patient outcomes is not a new concept, however Identifying indicators that are sensitive to nursing has not been straightforward to do. It is a complex task to define potential indicators, demonstrate an association between the indicator and nursing care and the collection and analysis of the data. To assist in identifying potential indicators, Donabedian's framework of quality assessment (cited in Burston et al, 2014) has consistently been used in healthcare services. This framework illustrates the relationship between the attributes of nurses providing the care (structure), the interventions of those nurses (process) and the outcomes for their patients (Burston et al, 2014). Donabedian theorised that an organisation with the right structures and processes in place will produce better outcomes. He also adds that quality assessment aims to determine how successful providers have been able to do their work and that quality monitoring generates constant surveillance which facilitates early detection and correction of any deviation from standards (Oducado, 2014).



**Figure 1. Donabedian's Quality Framework**

In the healthcare setting measuring can be approached in several different ways, each different type of quality measurement has its strengths and limitations and these have to be considered when implementing any measures. Structure measures come from sources such as reports the benefits of using this type of measure are they are relatively

simple to determine but one of the limitations of using these types of measures are they are subject to response bias or ambiguity in questions used. Structure measures are not able to inform us whether good care happened, but only if the site being measured has the capability to provide good care. Process measures are seen as a better way to measure care and they have been frequently used for performance measurement, they are seen as more appealing to clinical staff such as nurses because they represent aspects of care over which clinicians have the most control. However, one of the limitations with this type of measurement is the concerns that many of the process measures are overly reliant on a patient's engagement with clinician's which is often not reported in data sources (e.g., were outpatient visits not completed because they were not scheduled by the provider, or did the patient miss them?). Finally outcome measures may be used to measure care the benefit of this type of measurement is they actually assess whether a patient's status improves or not. However, use of these measures requires additional case mix adjustment in order to ensure that observed differences in outcomes are not due to clinical differences in severity of illness across patients. Currently, methods to adjust for case mix (risk adjustment) in mental health are limited, primarily due to incomplete data on psychiatric symptoms and other patient characteristics. (Kilbourne et al, 2010).

## 2.7 Clinical Effectiveness of Dashboards

What is clinical effectiveness? Clinical effectiveness is a key component of patient safety (Department of Health, 2014). Clinical effectiveness relies on the development and use of nursing evidence, as well as evidence produced by other disciplines with relevance to nursing practice to produce high quality and patient safe care (Wakefield, 2008).

### 2.7.1 Quality of Care

In 1999, *To Err Is Human: Building a Safer Health System* was released (Kohn et al, 2000). The alarming conclusion of that report was that thousands of people were injured by the very health system from which they sought help. And it stated there is no guarantee that any individual will receive high-quality care for any particular health problem (Wakefield, 2008). There is increased awareness since this report of the depth and complexity of quality challenges. Wide ranging efforts have begun to bring more

sophistication and precision to measuring and improving the quality of health care (Wakefield, 2008). Health informatics tools such as Clinical dashboards can be viewed as a tool to aid staff in improving quality of care.

From the literature reviewed dashboards did help aid staff with compliance to guidelines and protocols (Clarke, 2016). Transparency of data in real time was also viewed as valuable in supporting improvement in quality of care (Clark, 2013). Clinical dashboards provided visual evidence of the overall performance within the ward and helped to get staff to understand why changes need to be put in place to improve practice and therefore patient care (Russell M et al 2014).

For some nursing staff and other clinicians a clinical dashboard is the only measure of clinical effectiveness they have. Doran (2011) described the potential of measuring outcomes to inform decisions about patient care and promote evidenced based practice. It was stated clinical dashboards can add value to health care services by including features such as nursing staff being prompted to add risk assessments when required and providing additional guidance to the nurse's routine care. Data can also be used for safety initiatives and accessing it for certification purposes. The literature clearly demonstrates quality as a central focus in today's health care system. There is evidence that the collection, reporting and benchmarking of nursing sensitive data makes a powerful contribution to the realization of that quality. Expectations of Patients are now rising and they are becoming more informed about their care and empowered to request the type of care they want. This is obviously a welcome development as it helps to encourage people to take more responsibility for their health and wellbeing. However, it is proving challenging for health care services to provide the level of choice and access people want, and to provide the quality of services they expect with the limited resources health care services have is a growing challenge.

### 2.7.2 Patient Safety

Patient safety is of paramount importance, evidence has shown that to maintain and increase the health status of their populations, countries must strengthen their health systems in terms of addressing patient safety and quality of care. Health services need to be committed to enhancing the quality of health care, and patient safety is a crucial element of that quality. This encompasses: facilitating effective evidence-based care; monitoring improvement and ensuring that systems in place are supporting staff to provide high quality and safe care. (WHO, 2017).

Research findings indicate that IT applications can enhance patient safety by standardizing, flagging errors, and eliminating handwritten data, among other functions. Utilizing informatics can influence knowledge management, communication, and decision making (Wakefield, 2008) It was also noted clinical dashboards allow clinicians to scrutinise clinical areas that scored amber or red and put in measures such as staff training to safeguard patient safety Chandraharan (2016). Clinical dashboards were also noted to reduce events of preventable harm to patients. E.g. Line infections, use of restraints, and falls have all decreased (Bakos, 2012) and importantly help to reduce errors (Clarke 2016).

### 2.8 Clinical Dashboards and Performance Measurement

One of the main uses of clinical dashboards is real time performance measurement and receiving feedback on performance measurement as an individual clinician or as part of a team. Feedback can be defined as the reaction of clinical staff to their performance of a task which is used as a basis for improvement. As it is one of the main uses of a clinical dashboard it is discussed widely in most of the articles included in the literature review. The literature review found a variety of ways data was disseminated in some studies the data was disseminated monthly others had access to more frequently updated data (Chandraharan, 2016. Russell et al, 2014). Staff found feedback about performance measures useful (Russell et al, 2014) Visual feedback it was noted can motivate staff to carry out specific tasks that will increase quality of care and patient safety (Dowding,

2015). Reporting of performance is vital for holding health care organizations accountable for improving care (Kilbourne et al, 2010). Feedback given to staff and patients. Transparent to patients. Patients and staff found the information useful (Phull, 2015). Clinical dashboards were seen to help advance staffing effectiveness and patient safety efforts (Russell et al, 2014), as the transparency of data and results in continuous performance feedback, provide actionable data that can be used in planning care (Anderson et al, 2015). At the same time, physicians have significant anxieties about the public sharing of individualised data on clinical performance (Davies, 2005). It can be argued what at present can patients do with the information provided by clinical dashboards as currently in the HSE health care system patients have little choice in where they receive healthcare.

In one of the studies they attributed the use of a clinical dashboard to increased productivity in the clinical setting (Clark, 2016). Clinical dashboards were described as being able to allow comparison of performance between different wards. Another positive way clinical dashboards aided performance measurement was the clinical staff could set standards locally and set thresholds relevant to the local area. Staff valued seeing data as they could visually see how they are performing and Nursing managers and their teams are beginning to have more of an understanding of the interconnected nature of performance measures. Furthermore, through having information via one access point in the dashboard, staff are beginning to make better links between process and outcome measures. Mills and Walters (2006) highlight the importance of establishing clear lines of accountability and responsibility for data review. The dashboard can help supports health care services and their teams to take ownership of the data as well as the resulting actions. (Russell M et al, 2014)

Evidence-based performance improvement begins with baseline performance measurement that can be compared with relevant benchmarks as a basis for interpreting relative performance position and establishing strategic improvement targets. One of the reasons measuring performance by clinical dashboards leads to an increase in adherence to measure may be due to motivational gain effect (Albanese M.P 2010, Anderson, 2015) This effect is seen when an individual's performance and motivation improves as a member of a team working under conjunctive task demands,

than the individual working alone, especially when that individual feels indispensable to the team. Adopting and refining performance dashboards that integrate regional and national benchmarks may be invaluable to establishing evidence-based strategic targets and documenting excellence (Donaldson et al, 2005). However Doran (2011) notes the effect of improvement in metrics being measured is difficult to sustain does begin to plateau after a year, he argues this may be due to clinicians meeting maximum achievement and having no further incentive. Doran also observed that aspects of care that are not measured stay the same and gradually get worse over time.

## 2.9 Design of Dashboards

Good workflow design of clinical dashboards is thought to have an impact on improving care delivery. Dashboards operate by reducing dependency on memory, increasing easy access to patient information, and increasing compliance with best practice. (Bakos et al, 2012). In the design of clinical dashboards there needs to be a consideration of how targets are chosen. To successfully implement of clinical dashboards needs the full support and long-term commitment of senior management. In healthcare systems, local clinicians' objectives and priorities may differ from - or even conflict with - those of top management's, so it has been suggested that those setting targets for local clinicians should bear this in mind and a bottom-up approach to implementing a clinical dashboards is used, rather than the top-down approach (Mohammed, 2016). Clarke (2016) and Clark (2013) noted the use of an iterative process to design a dashboard. This is where dashboards are designed and revised with input from the end users making incremental changes to create relevant and up to date dashboards this is expected to produce a higher quality outcome than more traditional methods of developing dashboards (Clark, 2013). A multidisciplinary approach was also used in some studies (Bakos, 2012. Chandraharam 2016) however it was noted it was difficult to accommodate all staff requests in the building of a dashboard as it will become overloaded. As dashboards produce consolidated reports it is difficult to accommodate lots of information an example of this is found in Phull's (2015) study that shows when



patients were asked for feedback on dashboards they felt it should also include more information including shortages of staff and patient length of stay. Of the literature reviewed the majority of dashboards used a traffic light system (Dowding 2014, Phull 2015, Crofts et al 2014, Guha, 2013), this is seen as visually effective and easy to interpret by staff at a glance. However there was some variation noted and some clinical dashboards used graphs, pie charts, or radar diagrams (Russell et al, 2014).

## 2.10 Visibility of Dashboard

As well as wide variation in the design of dashboards it appears from the literature there is also variation in how dashboards can be accessed by clinicians, they were displayed on computer workstations, smart boards in staff rooms and printed copies displayed on bulletin boards (Jeffs et al, 2014, crofts et al, 2014. Dowding (2014) notes that when dashboards were visible at all times to staff this was associated with more positive outcomes. Jeffs et al (2013) noted that visibility helps staff see trends in care and help support the implementation of best practice in care. One of the reasons for this may be it is providing relevant information to clinicians at the point of care in a similar way to CDSS does. Anderson (2015) noted they were not able to reliably assess how regularly the clinical teams used the dashboard. And in Bakos (2012) study staff felt better accessibility to the clinical dashboard would enhance usage. Clinical dashboards displayed on computer screens or interactive whiteboards can be updated in real-time and can also show more complex clinical relations by allowing users to interact with the data by selecting and modifying elements of the graphic (Powsner and Tufte, 1994).

## 2.11 Data

Increasingly there are examples of how the availability of data about nursing process and patient outcomes at the organizational and unit level can result in significant improvements in the quality of care (Donaldson et al, 2005). To increase the use of performance measures requires a refinement of data definitions to facilitate electronic data capture of. It is noted in the literature there have been recent initiatives to refine coded medical data such as the development of International Classification of Diseases (ICD 10/11) codes and in mental health the development Diagnostic Statistics Manual (DSM 5) codes to provide more clinically precise information which is particularly important for mental health treatment where quality measures have been hard to define. In recognition of this ongoing need to improve classification of data multiple stakeholders around the world have begun to engage in standardization activity and develop clinically meaningful quality indicators. Organisations involved in health informatics are increasingly using measurement ontology which in computer science is the rigorous organization of a knowledge domain, one of the aims of doing this is to facilitate the uptake performance measures by making them as relevant and accurate as possible and improve practices related to measurement of evidence-based care (Kilbourne et al, 2010). The benefits of Accurate collection of right type of data to clinicians is it is a valuable source of information, it has the potential to be used by multiple people at once, it does not get depleted over time, and can be viewed in real time. There is an underpinning belief is that data is viewed as a product that is delivered to a consumer, therefore it needs to be 'fit for purpose' (Wang and Strong 1996).

In the literature reviewed it is recognised that dashboards need to have a continuous flow of data from multiple existing sources (Clark, 2013). Where data was transferred from existing sources, it was recognised clinical quality needed to evaluated for accuracy and quality. Data in the dashboard should be categorised around the four domains of the Leading Better Care role framework: safe and effective, person centred, workforce, and organisational systems. Data was transparent, all wards should see all data this allows for benchmarking and promote discussion and critical thinking (Russell M et al, 2014).

Some of the data used in the dashboard had to be scanned into the EHR and it is possible that some forms were completed but not scanned (Anderson et al, 2015). Variations in clinical judgement can affect data, for example studies have shown there are differences in data collected through the risk department vs data collected locally this was due to under reporting to the risk department (Phull, 2015)

## 2.12 Unintended consequences of dashboards

Concerns over unintended consequences of staff using workarounds to ensure that the technology fits with existing work practices. Rather than resulting in more effective, efficient and safer care may result in a greater workload burden for clinicians and different types of threats to patient safety (Jeffs et al, 2013). Every dashboard is built on a set of priorities and assumptions about what's important, it has been shown that when they are metrics that are being measured other areas where there is no measurement do not improve and over time deteriorate.

Nursing metrics can be taken out of context too much importance can be placed on them, whereas they need to be viewed as one part of the system. Staff may experience negative feedback from others if they are seen to be failing to meet metrics, this can be demoralising for staff and a unproductive consequence of clinical dashboards (Anderson et al, 2015). 1

However as both Bevan and Hood (2006) and the King's Fund report (2010) found, the focus on targets can have an undesirable effect on behaviour. Effectively what begins to happen is that the focus shifts to deliver the targets for example 'what matters is what's measured'.

Use of outcome measures to incentivize providers can also be problematic, as there is concern that providers may be reluctant to take on sicker patients in order to make patients panels look better overall (Kilbourne et al, 2010)

### 2.13 Lack of evidence from lit review about

From the literature reviewed it was noted there was a lack of evidence from the studies about the processes of shared decision making in relation to clinical dashboards, action plans were another area with limited research in relation to clinical dashboards. Also there was little discussed in studies about the future of dashboards.

### 2.14 Conclusion

This chapter has provided a critical discussion of the key issues surrounding the implementation of clinical dashboards, their value as tool in health informatics to help guide best practice and safe patient care and give feedback. The literature search only found one article that reviewed the use of a clinical dashboard used by nurses in a mental health setting, the other articles described the use of dashboards in other hospital ward settings some were used solely by nursing staff and some were used by the multidisciplinary team which included nursing staff.

## **3. Methodology**

### **3.1 Introduction**

The literature reviewed in Chapter 2 highlights there is a need for nurses to continue to review and evaluate the care they provide to ensure it is safe and of high quality. Clinical dashboards are increasingly being used to help support nursing staff with this task, however the literature shows there is much variation in the way data is collected and variation in the type of clinical dashboards used. However there are also some common elements noted in the literature as well such as benefits in performance management and improved adherence to metrics. The complex nature of health care may explain why there is not one simple standard type of dashboard that can be applied across all healthcare settings. There is a need more now than ever for there to be a strong robust way of collecting high quality data in health care and presenting it in a way that is usable to staff working on the frontline with patients and making decisions about care.

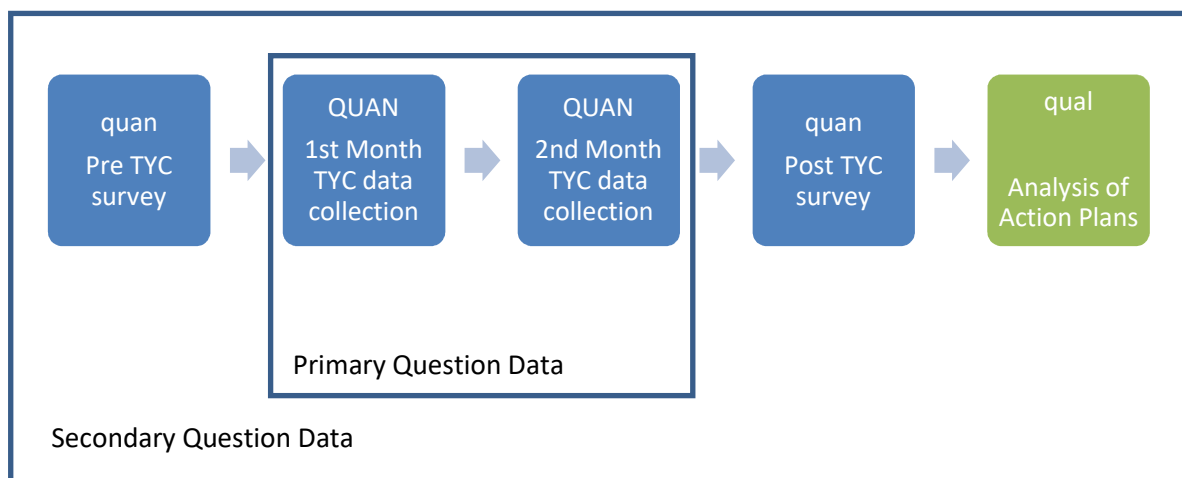
This chapter outlines briefly the rationale for the choice of clinical dashboard used and describes the methodology in terms of the research design, the study duration, sample, statistical analysis which will incorporate the hypothesis, pre and post TYC questionnaire, action plans and the ethical considerations. The study setting, the information technology system and the procedure to conduct the study are described.

It was hypothesized there would be a significant increase in nurses use of practice guidelines and evidenced based care processes once clinical dashboards are introduced, when this information was made available to them via a clinical dashboard. This in turn will support nursing staff in improving patient safety and quality of care.

### 3.2 Research Design

A mixed method research design was used for this study, Creswell (2014) describes this approach as collecting both quantitative and qualitative data and this combination provides a more complete understanding of a research problem than either approach alone. In this research approach there will be 3 sets of data being collected, 2 sets of data will provide a supportive secondary role in a study based primarily on the first set of data. Mixed methods such as this can help capture a more real picture of the complexity of implementing changes within in health services. Quantitative and Qualitative data were gathered in a sequential order during the research project, and used to answer the primary and secondary question as shown in figure 1. The overall research design is an embedded sequential mixed methodology, mixing occurs in discussion after analysis. The objective of this research is exploratory, it is design to explore the question and is not looking for a solution.

**Figure 3.1 Sequential collection of Quantitative and Qualitative Data**



The Primary Question focused on during this research project is, does using the Test Your Care (TYC) clinical dashboard to record data on Quality Care Metrics (QC-M) work in improving quality of care and patient safety? To answer this question Quantitative data was collected and used to evaluate QC-M data collected from the home based treatment teams on the test your care website at beginning of project and compared after 1 month to assess whether there was an improvement in adherence to QC-M and therefore in theory this should lead to an increase in patient safety and quality of care nursing practices.

The Secondary Question addressed by the research is, how does the test your care dashboard and QC-M work? To answer this question quantitative data in the form of an online questionnaire was administered to staff in the home based treatment teams before the implementation of nursing metrics collection and use of the test your care dashboard. Same Questionnaire was given to the same staff at end of research project (2 months later). The questionnaire used a rating scale to capture the opinions and working practices of nursing staff in relation to patient safety and quality of care before and after the implementation of QC-M and use of TYC website. Qualitative Data will also be collected from the action plans on the test your care website and thematic analysis will be used to analyse this data. The secondary question data will be complementary to the quantitative data collected for the primary question.

### 3.3 Study Duration

The study took place from May 2017 to 12<sup>th</sup> July 2017. The 1<sup>st</sup> data collection for QC-M took place in the last week of May, and the 2<sup>nd</sup> data collection for QC-M took place in the last week of June. Action plans were put in place after the first TYC dashboards had been produced in the first week of June. The first staff questionnaire was emailed to staff before the first data collection in May and the second questionnaire was emailed to staff after the June clinical dashboards had been produced and disseminated to nursing staff.

### 3.4 Ethical Considerations

The Ethical approval of this study was authorized by the Research Ethics Committee of the School of Computer Science and Statistics (SCSS) of Trinity College Dublin and permission from the North Dublin Mental Health Service director of nursing was granted to conduct this research. The researcher ensured full compliance with principles of autonomy, beneficence, and maleficence, Justice and Data Protection Act-2003 (Ireland). Anonymised data from a questionnaire were collected from the participants to ensure beneficence and maleficence. Anonymised data from the test your care website was also collected, no patient information was used in this study. All participation was voluntary and the participants selected were 18 years or older and was competent to provide informed consent. Informed written consent (Appendix 1) was obtained from all the participants after giving participation information Leaflet to comply with principles of autonomy (Appendix 2). Participants were informed that they could withdraw from the study at any time. This research project will abide by the Data Protection Acts 1998 & 2003, and NMBI Code of Professional Conduct and Ethics for Registered Nurses and Registered Midwives.

### 3.5 Research Setting

Within the North Dublin Mental Health Services (NDMHS) there are three home based treatment teams, each team has a clinical nurse manager and clinical nurse specialists working in them. They cover different geographical areas within North Dublin and North County Dublin and provide intensive support to people experiencing an acute episode of mental health difficulties in their own home rather than being admitted to hospital. Evidence has shown the majority of service users prefer to be treated at home if it is possible rather than being admitted to hospital as it is less disruptive to them and their family's lives it is also thought to be more cost effective for health services to treat people in their own homes (Jones, 2010). This care is usually provided for a period of 6 to 8 weeks, therefore care must be planned, evidence based and effective to help the person manage their mental health crisis within this short period of time. When people present in an acute phase of mental illness or mental health crisis they can present with significant risks to themselves and others there are many guidelines around treatment



and care that nursing staff should be following as routine to ensure the care given is of high quality and safe and effective.

Three home care teams within north Dublin mental health services were invited to take part in this research project, however after giving information on quality care metrics to all the teams one team declined to take part as they felt it was not a priority at the moment for their team to focus on this and as they had other policies they were trying to develop and implement.

### 3.6 Rational for Dashboard and Metrics Selected

Nursing Quality Care-Metrics (QC-M) are a measure of the quality of nursing and midwifery clinical care processes aligned to evidence based standards and agreed through national consensus in healthcare settings in Ireland (HSE Office of Nursing and Midwifery Services, 2015). The Nursing and Midwifery Quality Care Metrics developed for mental health services will be used for this project as it provides a standardised approach to implementation of Quality Care Metrics across HSE and voluntary organisations will ensure consistency in the measurement of the standard of care across all services (HSE Office of Nursing and Midwifery Services, 2015). The dashboard uses the traffic light system this was also noted to be the most used model in the literature reviewed.

Before starting any data collection the researcher received training in how to collect the relevant data in a standardised way. Nursing staff that were identified as being eligible to take part in this research study were also given information on nursing metrics and were invited to attend a presentation on nursing metrics and the test your care dashboard.

### 3.7 State of Readiness

Change is a big challenge for any organisation especially for complex organisations such as the HSE. To help measure readiness for change a state of readiness questionnaire was completed see appendix 3. Completing this questionnaire is recommended by (HSE Office of Nursing and Midwifery Services, 2015) that this assessment is carried out. This

information will assist ensuring the sustainability of this project by helping in planning how to provide support in order to increase readiness and confidence to lead and deliver change. Without sufficient planning the clinical dashboard may yield weak and mixed effects (Mesabbah, 2016)

### 3.8 Primary Question

As stated earlier the primary question in this research is does using the Test Your Care clinical dashboard to record data on Quality Care Metrics (QC-M) work and therefore help in improving quality of care and patient safety?

### 3.9 Steps in collecting Quality Care –Metrics

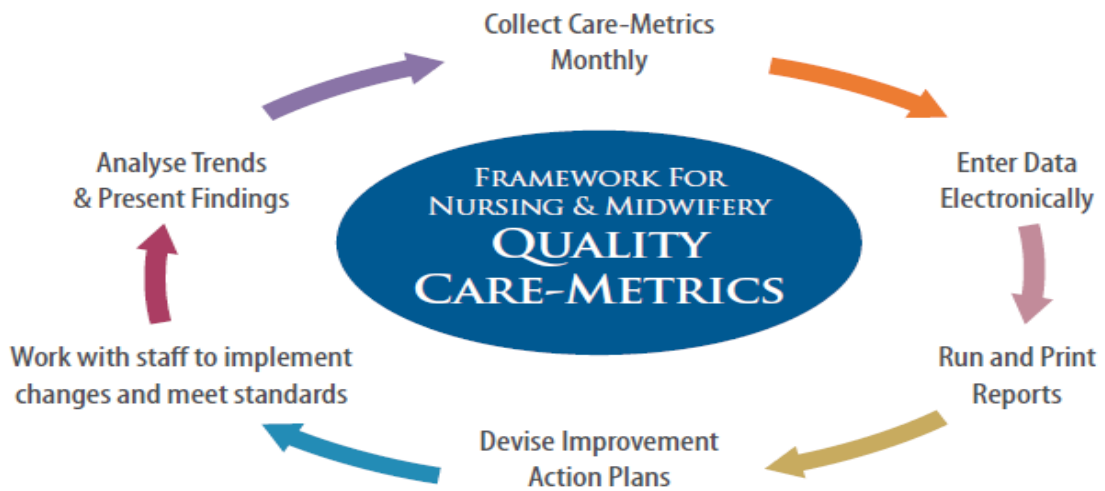
#### 3.9.1 Sample

The guidelines for sample collection for the test your care dashboard recommend that samples of 25% or more of patient records are selected on a monthly basis. It is recommended that a minimum of 5 patient records are used each month and where 25% exceeds 10 sets of patient records a maximum of 10 should be collected in a month (HSE, 2016). Based on these guidelines approximately one third of the case notes (33%) were used from each team during the data collections. Case notes were chosen at random to make to reduce the chance of bias results.

#### 3.9.2 Source of data

The test your care website provides the software for the data to be recorded and displayed to staff in a meaningful and useful way. The QC-M process is a cyclical process and takes place monthly (see figure 2.2). Data from a particular area can be entered at any time over the month in order to be included in the results for that month. Data is collected from reviewing the patient's paper medical records and also from the electronic patient records. The data is entered electronically, once data collection is complete for that month, reports can be run and printed. Trends from the previous months' scores are analysed and data collection begins again for the next month as the cycle continues (eHealth, 2016).

## PROCESS FOR NURSING & MIDWIFERY QUALITY CARE-METRICS

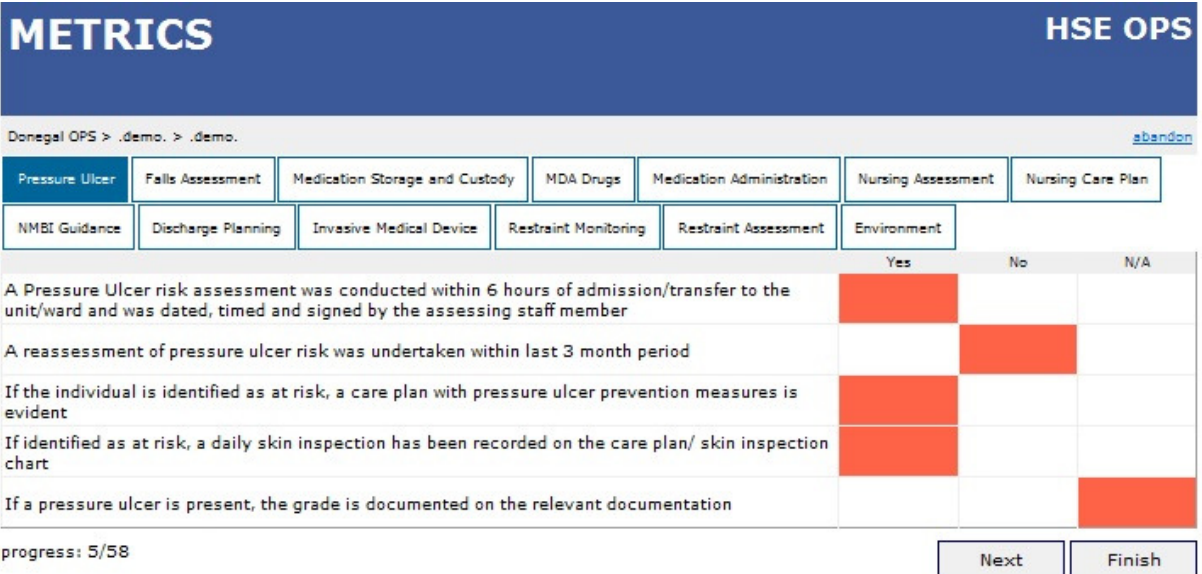


**Figure 3.2. Process for Nursing and Midwifery Quality Care Metrics**

This complete process is uses the TYC system which is an online software application that is password protected the HSE use this system under licence from the Heart of England Foundation Trust in the United Kingdom.

### 3.9.3 Collecting Data

As shown in fig 2.3 data are entered electronically for each metric using yes/no/not applicable for each question (quality indicator). See appendix 4 for the specific mental health metrics questions that were chosen for this research project and explanation of data required for each metric. The researcher also referenced the full procedure guide for quality care metrics data collection (HSE Office of Nursing and Midwifery Services, 2015) to ensure data collected was consistent in order to ensure reliability and validity to the results.



**Figure 3.3 Collecting Data**

### 3.9.4 Scoring

Every question has a target score of 10. Every answer has a weighted score of between 0 and 10, with the exception of 'Not applicable' type answers. Scores are calculated as: sum of all answer scores / sum of all question target score expressed as a percentage. Note, Questions with a 'Not applicable' response are excluded from all reporting. See fig 2.4 for Example of weighted scoring.

Question	Answer	Score	Target
Risk Assess 6 Hours ADM	Yes	10	10
Reassessment done	Yes	10	10
Careplan Preventative Measures	No	0	10
Daily Skin Inspection	N/A	-	10
Grade Recorded	Yes	10	10
	Total	30	50
		Score	60%

**Figure 3.4 Example of weighted score**

### 3.9.5 Reporting

When data has been collected for the complete sample and has been entered for the month, a clinical dashboard report is produced and can be viewed online or printed from the TYC system, see appendix 5 and 6 for examples of dashboards produce. The report displays compliance with each metric as a percentage of the agreed national standards for that month. Reports generated are 'real-time' as they can be displayed immediately once all data for that month has been entered. There is not the delay normally characteristic with other types of clinical audit. The format of the online report uses a traffic light and percentage value system (Red/Orange/Green) as shown in fig 2.5 to indicate level of compliance with standards. Once the dashboards were compiled they were printed off for teams in both locations and displayed on the home care team staff notices boards.

Score	Action
Over 90% (Green)	Target achieved
80% - 89% (Amber)	Aim to achieve incremental improvement over the next 6 months
0 -79% (Red)	Areas of risk which require action as agreed with senior management

**Figure 3.5 System for Reporting Standards**

### 3.9.6 Data Analysis

The data collected from the 2 months will then be statistically compared using the hypothesis testing of proportions. The *research hypothesis* as stated earlier is that there would be a significant increase in nurse's use of practice guidelines and evidenced based care processes once clinical dashboards are introduced, therefore improving patient safety and quality of care when this information was made available to them via a clinical dashboard. The *null hypothesis* is that there is no measurable change in the use of practice guidelines or evidence based care and therefore no improvement in quality of care or patient safety will be measured through the TYC clinical dashboard.

### 3.10 Secondary Question

The secondary question of the research is how do clinical dashboards work?

The secondary question provides a supportive role to the primary question and will be answered by analysing the action plans completed by staff as well as analysing the results of a survey nursing staff with the home care teams completed.

### 3.11 Action Plans

Action plans are documents that were then devised following the results of the clinical dashboard, action plans are used to facilitate setting realistic timelines and guidelines. They were completed by the clinical nurse managers in each team, they assessed indicators that scored poorly in the clinical dashboards and required improvement. These action plans contained goals, implementation steps, and evaluation components to address QC-M that were not met. Clinical nurse managers and nursing staff within the service then work together to implement the changes needed. (See appendix 7 for example of action plan). The action plans were kept with the service managers but discussed with the team of nurses. Thematic analysis guided by the use of Braun and Clarke (2008) framework was used to analyse the actions plans that were used to capture data in relation to the research question. The thematic analysis involved the searching across the action plan data sets to find repeated patterns of meaning, and the finished product contains an account of what was done, it does not necessarily have to be that detailed. What counts as a theme also has to be considered and the following guidance was used to help with this. A theme captures something important about the data in relation to the research question, and represents some level of *patterned* response or meaning within the data set. An important question to address in terms of coding is what counts as a pattern/theme, or what 'size' does a theme need to be? This is a question of prevalence both in terms of space within each data item, and prevalence across the entire data set (Braun, 2008).

### 3.12 Questionnaire

A questionnaire can be an effective method to collect data that will help in answering a research question. A good questionnaire is one which help directly achieve the research objectives, provides complete and accurate information; is easy for both interviewers and respondents to complete, is so designed as to make sound analysis and interpretation possible and is brief.

The main objective of this questionnaire is too collect data regarding the opinions of nurses around patient safety, quality of care and feedback about these aspects of care before the implementation of the TYC dashboard and the same questionnaire was used after the implementation to track if there was any change in opinion. The same nurses were invited to take part in both surveys therefore allowing the author to track the opinions of the exact same respondents recurrently. Qualtrics, which is a provider of web-based survey solutions, was selected to enable the chosen method. A paper version of the questionnaire was also developed to ensure the opportunity of participation in the study to those employees who either may not have ready access to their employer-hosted email account or may not have an account, as within the HSE, having a work email address is dependent upon the work role of the employee

They are provided with a Likert rating scale as follows for each question - Strongly agree, agree, neither agree or disagree, disagree, strongly disagree. Rating scales such as the Likert scale permit researchers to try to measure attitudes and motivation (Parahoo 1997). Questions were developed following the literature review, and seek nursing staff's opinion on how they view patient safety and quality of care as well as their opinions on measuring and feedback on patient safety and quality of care. It was noted in the literature review that staff felt that measuring care and not reaching targets may be used negatively against them (Albanese et al, 2010) so this question was also included. Also another area for concern when carrying out the literature review was that it would be time consuming for staff to enter additional information therefore a question on current levels of paper work was also included to see if nursing metrics did have an impact on this. See appendix 8 for copy of questionnaire.

A questionnaire is a data collection tool comprising of a list of questions with advice on how to complete the form. It allows the participant to answer the questions and to provide their own opinion without any interference from the researcher. The main benefit of using a questionnaire is the consistency and anonymity it provides (Giesen 2012). In this study a survey method was used where the participant was invited to complete the questionnaire via an anonymised link which was sent to them via email and then the researcher was able to access the results. Email was chosen as the way to disseminate the survey as it is one of the main ways the HSE communicates with all staff therefore staff would be familiar with receiving and completing surveys this way.

The survey was purposely kept short as the researcher was aware that asking staff to fill them out during working hours when staff are already time constrained is difficult. The survey was also tested with selected staff before being sent out to ensure that the wording of the questions was right and each question was easy to understand.

### 3.13 Conclusion

This chapter presented the research design and outlined the methodology for evaluating the effectiveness of the TYC dashboard. A mixed method design using quantitative and qualitative data was identified as an appropriate research approach as health care is complex and this method will help to give a more complete understanding of the research question.



## Chapter 4 Research Findings











### 4.1 Introduction

Chapter 3 describes the methodological steps used to record data on the test your care software and the production of the nursing dashboard, it also describes how the survey was administered to staff. This chapter presents the findings from the quality care metrics data and how they relate to the hypothesis that there would be a significant increase in nurse's use of practice guidelines and evidenced based care processes once feedback about nursing staff in the team meeting metrics was made available to them via clinical dashboards, which would therefore improving patient safety and quality of care. Responses to the survey administered to staff are also analysed in this chapter. Examples of Clinical dashboards from both locations can be seen in appendix 5 and 6.

### 4.2 Primary Question

The overview of the clinical dashboards from each location as shown below in fig 4.1 and fig 4.2 show at face value there have been improvements in nursing staffs adherence to nursing metrics.

#### Location 1

<b>Mental Health : Home Based Treatment Team</b>	<b>May 2017</b>	<b>Jun 2017</b>
Medication Storage and Custody		
MDA Drugs		
Medication Administration		
Medication Prescription		
Nursing Care Plan: Personal Details	 72%	 97%
Nursing Care Plan	 49%	 87%
Nursing Care Plan: NMBI Guidance	 98%	 98%
Provision of Information		
Discharge Planning	 15%	 25%
Total	 63%	 82%

**Figure 4.1 Location 1 Clinical Dashboard**

## Location 2

Mental Health : Home Based Treatment Team	May 2017	Jun 2017
Medication Storage and Custody		
MDA Drugs		
Medication Administration		
Medication Prescription		
Nursing Care Plan: Personal Details	↑ 81%	↑ 90%
Nursing Care Plan	↑ 68%	↑ 80%
Nursing Care Plan: NMBI Guidance	↑ 85%	↑ 100%
Provision of Information		
Discharge Planning	↑ 25%	↓ 7%
Total	↑ 68%	↑ 75%

**Figure 4.2 Location 2 Clinical Dashboard.**

However to see if these improvements are statistically significant further analysis needs to be carried out, this was done using the theory of proportion testing. The TYC dashboard allows the overall results as shown in above figures 4.1 and 4.2 to be 'drilled down' into separate components see table 4.2 below. These separate components were then compared using the Z-Score method to test the hypothesis.

## 4.2 Results of Adherence to metrics criteria

**Table 4.1 Percentage Results of Adherence to QC-M**

Metric	Location 1 1 <sup>st</sup> Data Collection	Location 1 2 <sup>nd</sup> Data Collection	Location 2 1 <sup>st</sup> Data Collection	Location 2 2 <sup>nd</sup> Data Collection
1. Nursing Care Plan: Personal Details : Name and HCRN	78%	88%	75%	100%
2. Care Plan: Personal Details : Presenting Complaint on Admission	100%	100%	100%	100%
3. Nursing Care Plan: Personal Details : Past History	89%	100%	100%	100%
4. Nursing Care Plan: Personal Details : Allergy Status	22%	100%	50%	60%
5. Nursing Care Plan : Care Plan reflects current condition	11%	88%	50%	80%
6. Nursing Care Plan : Risk Assessments Completed	78%	100%	100%	100%
7. Nursing Care Plan : Risk Management Plan	62%	100%	60%	80%
8. Nursing Care Plan : Interventions dated signed	89%	100%	88%	100%
9. Nursing Care Plan : Evaluation updated	0%	33%	20%	40%
10. Nursing Care Plan: NMBI Guidance : Dated, Timed 24 HR Clock	89%	88%	25%	100%
11. Nursing Care Plan: NMBI Guidance : Legible, permanent ink, signed	100%	100%	100%	100%
12. Nursing Care Plan: NMBI Guidance : Chronological order	100%	100%	100%	100%
13. Nursing Care Plan: NMBI Guidance : Abbreviations approved	100%	100%	100%	100%
14. Nursing Care Plan: NMBI Guidance : Alterations correct	100%	100%	100%	100%
15. Nursing Care Plan: NMBI Guidance : Student entries signed	100%	100%	100%	100%
16. Discharge Planning : Evidence of D/C Planning	22%	38%	38%	20%
17. Discharge Planning : Predicted Date of Discharge	22%	25%	38%	0%
18. Discharge Planning : Individual/Family Involvement	0%	12%	0%	0%
Total	63%	82%	68%	75%

Each locations data after 1<sup>st</sup> data collection and after 2<sup>nd</sup> data collection were compared separately using the Z-Score to obtain standardised results through the use of the p-values, this enable the researcher to statistically assess whether there were any

improvements in adherence to nursing metrics guidelines. Z-Scores can be obtained by using an online calculator (<http://www.socscistatistics.com/tests/ztest/Default2.aspx>). Z-score testing is appropriate when two different proportions are being measured against each other to test for significance capture (Social Science Statistics). One tailed testing was used as the hypothesis is testing to see if there was an increase in use of nursing metrics guidelines. The below tables show the results of the Z-Score testing The significance level was set at 0.05 which is an acceptable level in research (Social science statistics).

Metric	Location 1 1st Data Collection n=26	Location 1 2nd Data Collection n=27	p-value	Z-Score
1	20	23	0.22065	-0.7685
2	26	27	0	NaN
3	23	27	0.03438	-1.8172
4	6	27	0	-5.7755
5	3	24	0	-5.6312
6	20	27	0.00402	-2.6507
7	16	27	0.00017	-3.5777
8	23	27	0.03438	-1.8172
9	0	9	0.00062	-3.231
10	23	24	0.48006	-0.0491
11	26	27	0	NaN
12	26	27	0	NaN
13	26	27	0	NaN
14	26	27	0	NaN
15	26	27	0	NaN
16	6	10	0.1335	-1.1067
17	6	7	0.40517	-0.241
18	0	3	0.04006	-1.7499
Total	16	22	0.0537	-1.6112

**Table 4.2 Statistical Analysis Metrics results from Location 1**

Metric	Location 2 1st Data Collection n=30	Location 2 2nd Data Collection n=26	p-value	Z-Score
1	22	26	0.00226	-2.8441
2	30	26	0	NaN
3	30	26	0	NaN
4	15	16	0.19215	-0.8662
5	15	21	0.0082	-2.3966
6	30	26	0	NaN
7	18	21	0.04551	-1.6858
8	26	26	0.0268	-1.9322
9	6	10	0.06301	-1.5252
10	7	26	0	-5.816
11	30	26	0	NaN
12	30	26	0	NaN
13	100	100	0	NaN
14	100	100	0	NaN
15	100	100	0	NaN
16	11	5	0.07493	1.4404
17	11	0	0.00029	3.4444
18	0	0	0	NaN
Total	20	19	0.30153	-0.5203

**Table 4.3 Statistical Analysis Metrics results from Location 2**

#### 4.3 Analysis of Nursing Care Plans Personal Details

Nursing care plan personal details are shown in metrics 1, 2, 3 and 4. The data for these metrics had to be collected both from handwritten notes and forms in the medical chart and also from the electronic patient records. Both teams showed there was a statistically significant improvement in 2 out of 4 of these metrics.

#### 4.4 Analysis of Nursing Care Plans

Metrics 5, 6, 7, 8 and 9 measure a different set nursing care plan metrics. Again for these metrics there can be a mixture of handwritten care plans and care plans documented on the electronic patient record (EPR) to collect data from. It can be difficult to collect as there was no standardised way that all staff are documenting this some were completed in the electronic patient notes and some were completed on paper and filed in the medical charts. Team 1 made a significantly statistical improvement in all 5 metrics related to nursing care plans. Team 2 made statistical

significant improvements in 3 out of the 5 metrics, in 1 metric there was a non-statistically significant improvement. And 1 metric remained unchanged.

#### 4.4 Analysis of Nursing Care Plans: NMBI Guidance

Metrics 10, 11, 12, 13, 14 and 15 measure nurses use of nursing and midwifery board of Ireland (NMBI) guidance. This is a legal and professional requirement for nursing staff to follow this guidance. To assess this all documentation completed by nurses in the selected sets of cases notes was taken into account. Progress notes were mainly written in the EPR, therefore they were more standardised. Both teams were at 100% for metrics 11,12,13,14 and 15 at the first data collection. Team 1 made a non-significant statistical improvement in the metric 10, and team 2 made a significant statistical improvement in the metric 10 at the second data collection.

#### 4.5 Analysis of Discharge Planning

Metrics 16, 17 and 18 are used for measuring adherence to best practice guideline and evidence based care on discharge planning. The metrics for this area showed both teams had low percentages in these metrics. Team 1 made a non-significant statistical improvement in metrics 16 and 17 and significant statistical improvement in metric 18. Team 2 made a non-significant improvement in metric 16 and a significant improvement in metric 17, in metric 18 it did not make any improvement.

#### 4.6 Secondary Question

The results from the questionnaire and action plans are to support the aims of the primary question

#### 4.7 Questionnaire response rate

The response rate to the pre implementation of the clinical dashboard was 100%, nine staff were emailed all staff responded and completed the questionnaire via the anonymous link provided.

The same nine staff were again invited to participate in the second questionnaire post implementation of the clinical dashboard. The response rate for the post implementation was 66% which is within guideline for research questionnaires. Fincham (2008) states Response rates approximating 60% for most research should be the goal of researchers

## 4.8 Questionnaire Findings

### 4.8.1 Questionnaire results pre-clinical dashboard intervention

Responses of nurse's opinions on quality of care and patient safety were collected before the implementation of the test your care dashboard, and responses are shown in the table below.

Question	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1. It is important for nursing staff to measure quality of care	6	3	0	0	0
2. It is important for nursing staff to measure patient safety	6	2	0	0	0
3. In my own working day I am continually improving my performance	4	2	3	0	0
4. I receive regular feedback about patient safety	4	3	0	2	0
5. I receive regular feedback about quality of care	4	2	2	1	0
6. Measuring a nursing teams performance may be used negatively against staff	1	2	3	2	1
7. It is easy for team members to identify problems with patient safety	2	4	1	2	0
8. It is easy for the team to identify problems with quality of care	1	5	1	2	0
9. All team members have input into making changes of any identified problems	2	5	0	2	0

**Table 4.4 Questionnaire results pre-clinical dashboard**

### 4.8.2 Questionnaire results post clinical dashboard intervention

Responses of nurse’s opinions on quality of care and patient safety were collected after the implementation of the test your care dashboard, and responses are shown in the table below.

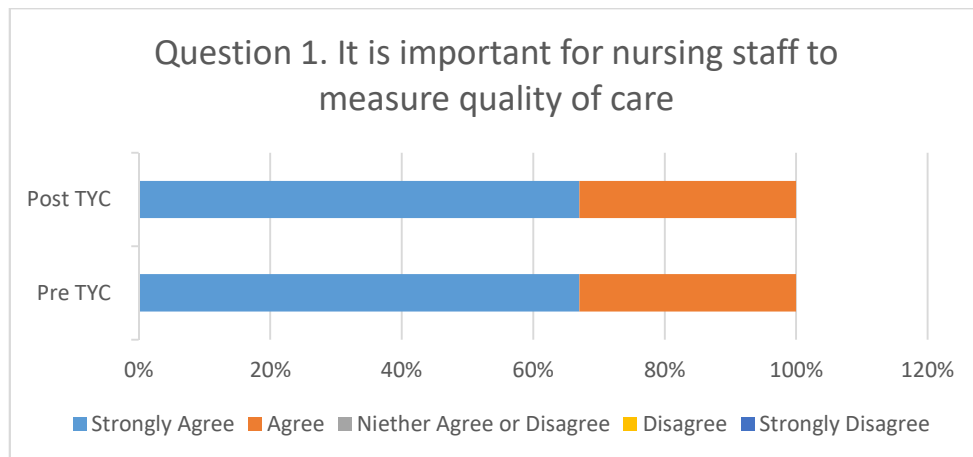
Question	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1. It is important for nursing staff to measure quality of care	4	2	0	0	0
2. It is important for nursing staff to measure patient safety	4	2	0	0	0
3. In my own working day I am continually improving my performance	1	4	1	0	0
4. I receive regular feedback about patient safety	0	5	1	0	0
5. I receive regular feedback about quality of care	0	6	0	0	0
6. Measuring a nursing teams performance may be used negatively against staff	0	0	3	3	0
7. It is easy for team members to identify problems with patient safety	0	3	2	1	0
8. It is easy for the team to identify problems with quality of care	2	3	1	0	0
9. All team members have input into making changes of any identified problems	1	5	0	0	0

**Table 4.5 Questionnaire results post clinical dashboard**



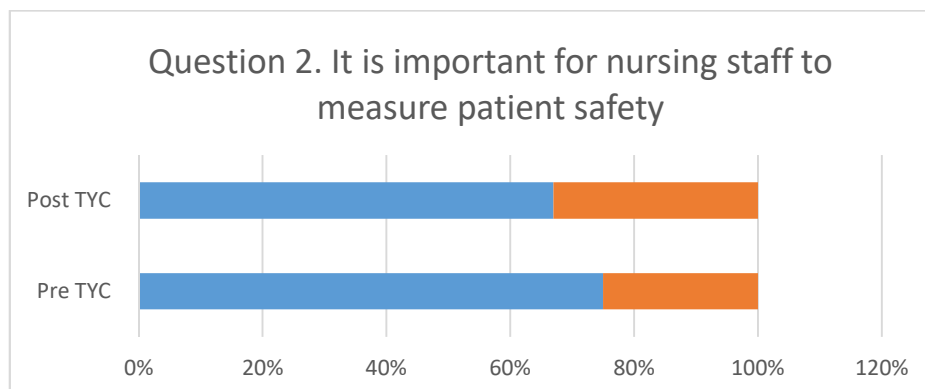
### 4.8.3 Comparison of Questionnaire Answers

A comparison of each question in the pre TYC clinical dashboard questionnaire and post TYC dashboard questionnaire was undertaken to identify any significant results and trends in answers.



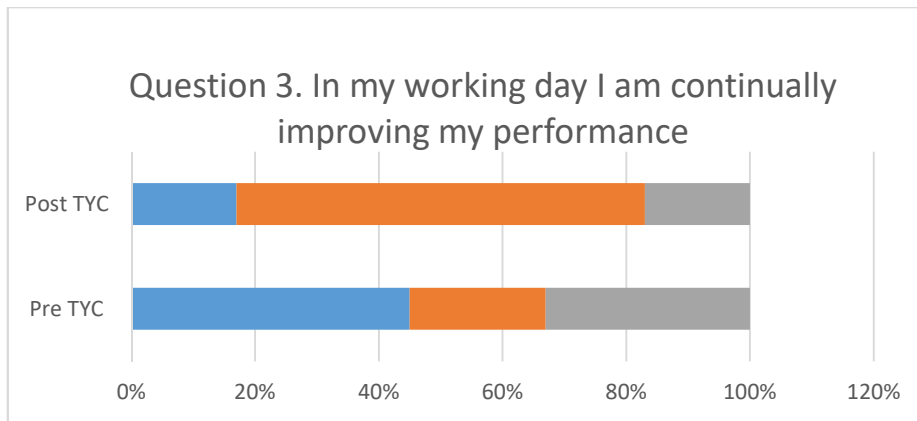
**Figure 4.3 Comparison of Results from Question 1**

As the results show from question 1 staff opinions on measuring quality of care did not change, the consensus from staff pre and post the implementation of the TYC dashboard is that they strongly agree and agree it is important to measure quality of care.



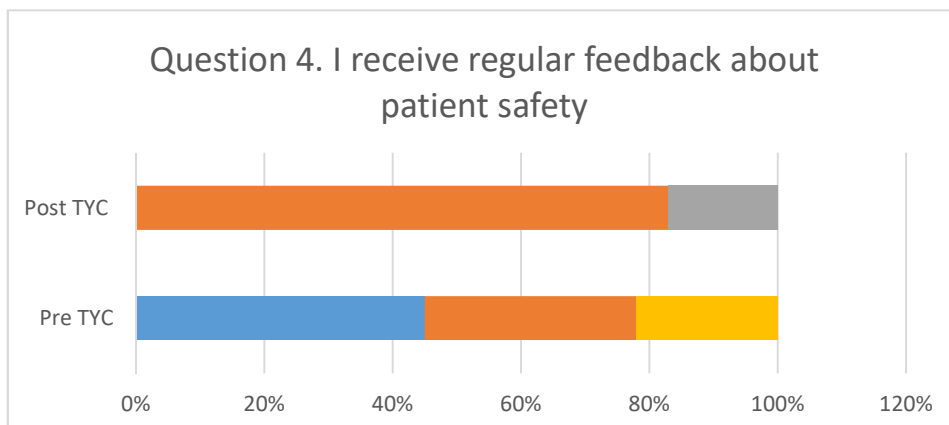
**Figure 4.4 Comparison of Results from Question 2**

The results from question 2 are similar to question 1, there is little variation before and after the implementation of the TYC dashboard, again measuring patient safety is viewed as important and staff strongly agreed and agreed with the statement in question 2.



**Figure 4.5 Comparison of Results from Question 3**

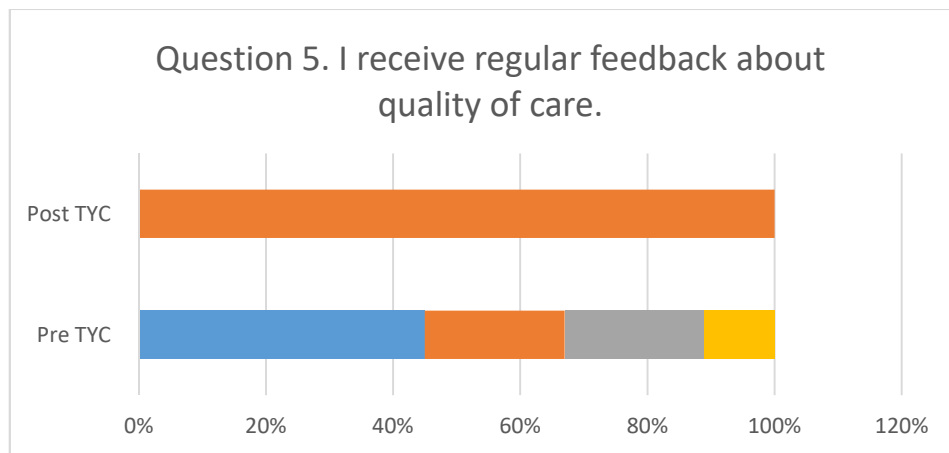
Question 3 Gave mixed opinions pre and post the implementation of the TYC dashboard. Pre the dashboard the highest percentage of staff 45% strongly agreed that they are continually improving their performance at work, there was also a large percent who neither agreed nor disagreed with this question 33%. Post the implementation the percentage of staff who strongly agreed had reduced and the percentage of staff who neither agreed nor disagreed had also reduced. Therefore there was a higher percentage that agreed with the statement post the implementation of the TYC dashboard. Overall post TYC the percentage of staff who strongly agreed and agreed improved and the percentage who neither agreed nor disagreed reduced.



**Figure 4.6 Comparison of Results from Question 4**

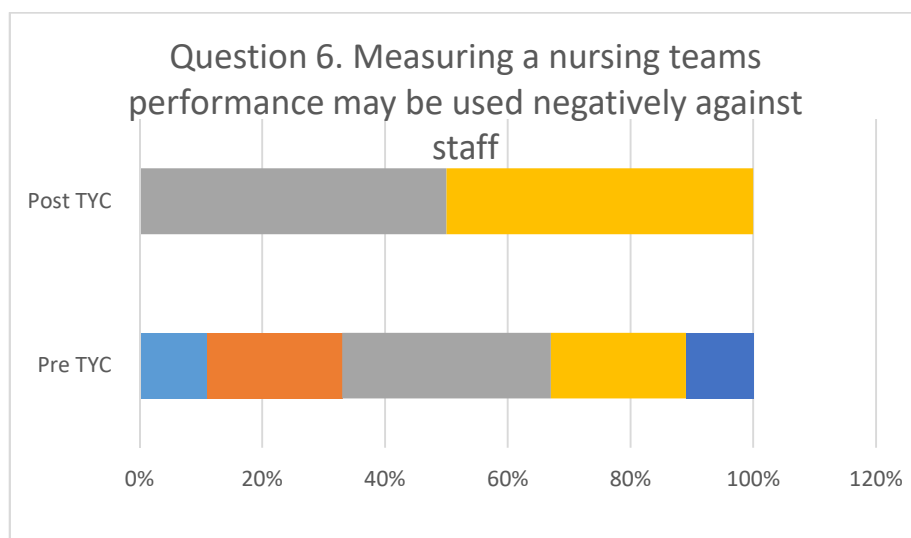
Question 4 shows before the implementation of TYC dashboard a there was a lot of variation in answers, the highest percentage 45% of staff strongly agreed with the statement. 22% disagreed with the statement. After the implementation of the TYC

dashboard there was less variation in answers, and the majority of staff (83%) agreed with the statement and none of the respondents disagreed.



**Figure 4.7 Comparison of Results from Question 5**

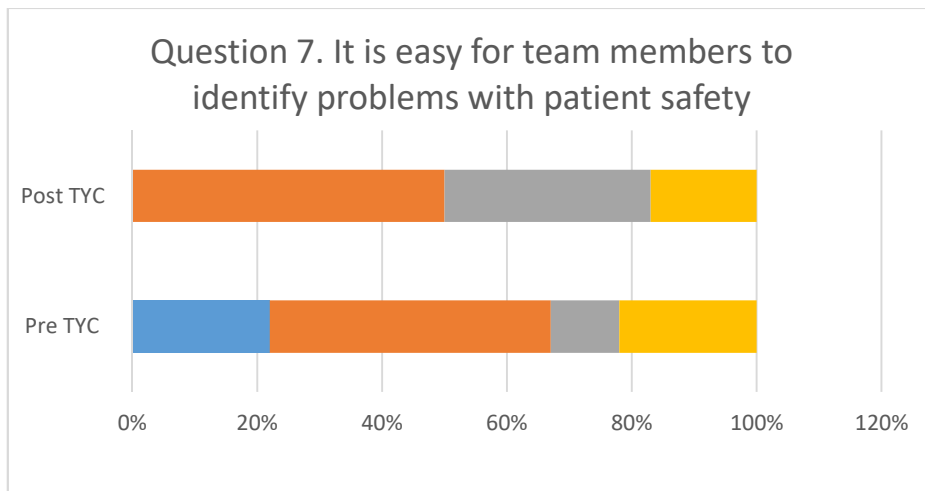
Again with question 5 there was a lot of variation in respondent's answers before the TYC dashboard was introduced. Pre TYC dashboard the majority of respondents strongly agreed with the statement and a minority of 11% disagreed with the statement. After the implementation of TCY dashboard there was no variation in answers and 100% of respondents agreed with the statement.



**Figure 4.8 Comparison of Results from Question 6**

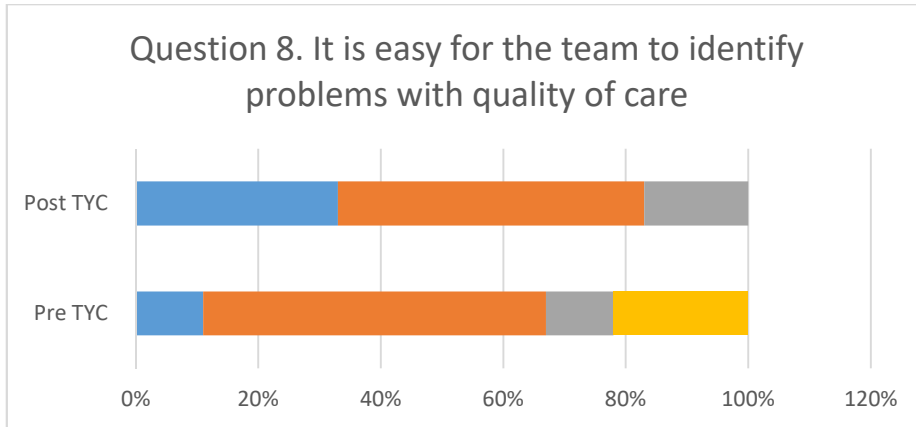
Question 6 saw the most variation in answers from respondent's pre implementation of TYC dashboard, from strongly agree to strongly disagree. The highest response for this

question was in the middle with 34% neither agreeing nor disagreeing with the statement. After the implementation of the dashboard. Post implementation, there was a lot less variation in answers and 50% neither agreed nor disagreed, and 50% disagreed that measuring performance may be used negatively against staff.



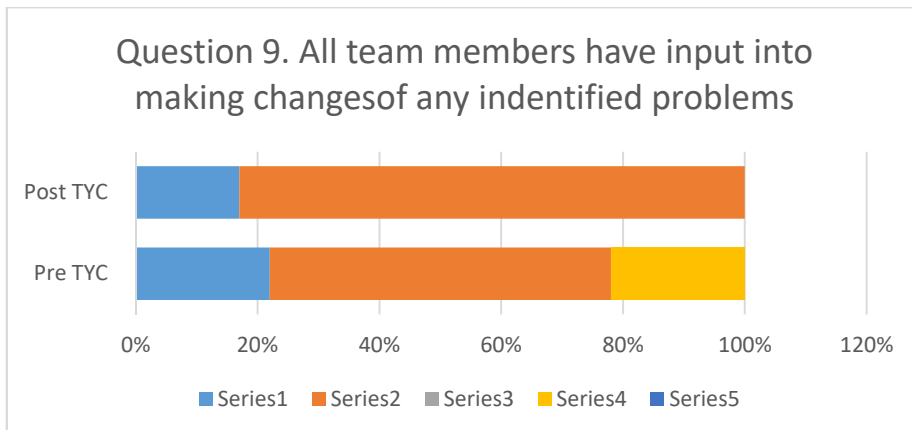
**Figure 4.9 Comparison of Results from Question 7**

In question seven the trend of the pre TYC dashboard questionnaire showing more variance continues, and the majority of respondents 45% agreed with the statement. Again the post TYC dashboard questionnaire shows less variation in answers the highest response was still agree at 50%, there was an increase in the amount of respondents who neither agreed nor disagreed with the statement. The amount of respondents who disagreed with the statement reduced 22% to 11% and post TYC there were no respondents that agreed with the statement.



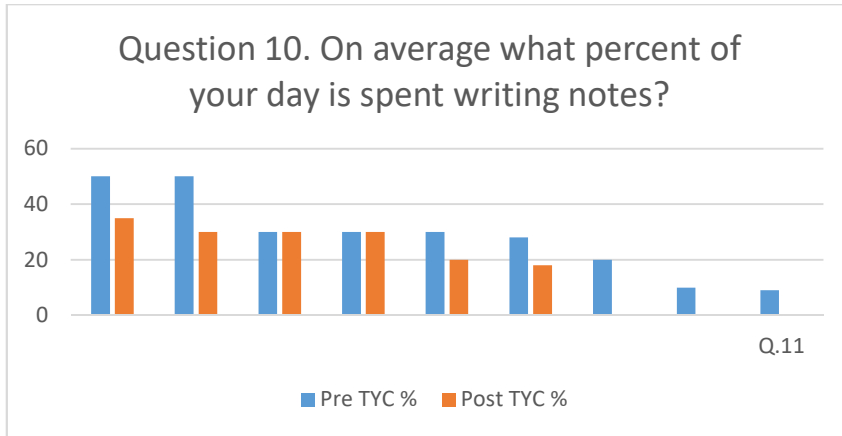
**Figure 4.10 Comparison of Results from Question 8**

The responses to question eight pre TYC show there variation in responding to the statement however a large proportion 56% of the respondents agreed with the question. The second largest response pre TYC dashboard was disagree at 22%. Post TYC dashboard there was an increase in the percentage of respondents who strongly agreed from 11% to 33%, the highest rating was still agree at 50% and post TYC there were no respondents that disagreed with the statement.



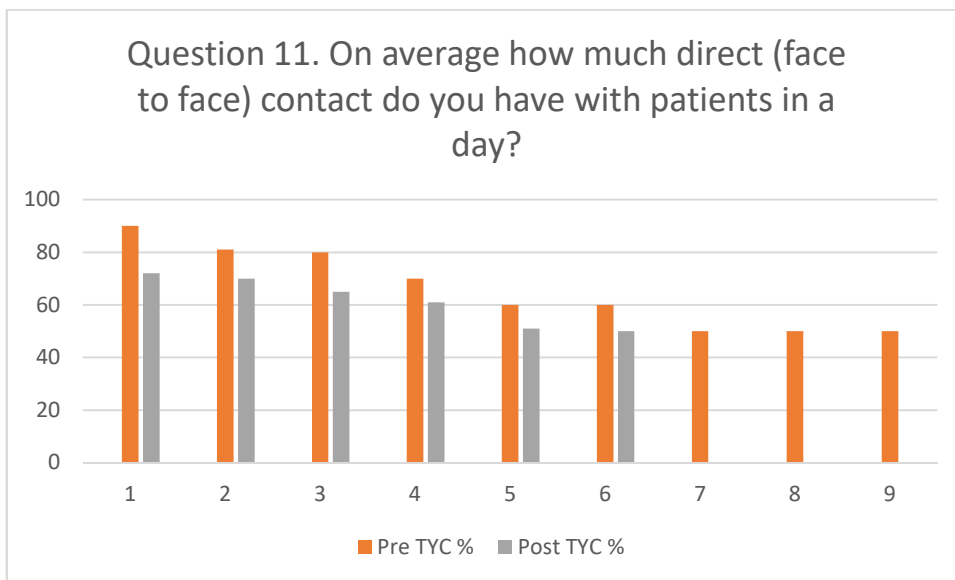
**Figure 4.11 Comparison of Results from Question 9**

Question 9 pre TYC dashboard questionnaire shows the majority of respondents agreed with the statement, 22% responded that they strongly agreed and 22% stated they disagreed with the statement. In the post TYC clinical dashboard questionnaire, none of the respondents disagreed and the majority continued agree with the statement.



**Figure 4.12 Comparison of Results from Question 10**

Question 10 compares the percentages nurses reported they spent time writing notes, as fig 3.10 shows in the pre TYC questionnaire there was there was slightly higher reported levels of time spent writing notes. However it is difficult to make much of a comparison using this data as there was a different amount of respondents to the two questionnaires.



**Figure 4.13 Comparison of Results from Question 11**

Question 11 compares the percentages nurses reported they had face to face contact with patients, the results show the same trend that is seen in question ten, as fig 3.11 shows in the pre TYC questionnaire there was there was slightly higher reported levels

of time spent in direct contact with patients. However again with this question it is difficult to make much of a comparison using this data as there was a different amount of respondents to the two questionnaires.

#### 4.9 Action Plans

See appendix 7 for example of actions plans as they are shown on the test your care website. The analysis of action plans using Braun and Clarke's (2008) revealed four key areas that the two home care teams focused on following the first TYC dashboard.

**Theme 1-** Nursing care plans reflect current condition – both teams included this metric in their action plans.

**Theme 2** – Nursing Care Plan: Evaluation updated, action to evaluate care plans as specified.

**Theme 3** – Risk management plans - Where a client is identified at risk on their risk assessment a risk management plan of care must be put in place. The second location team although they met this metric specified that the risk management plans should be carried out by the multi-disciplinary team in the action plan.

**Theme 4** - NMBI guidance – As a general area was included in both teams' action plans. An example of a recommendation was - Ensure all entries are dated, and timed using the 24 hour clock.

It was noted when carrying out a thematic analysis that the actions plans were not filled out as had been anticipated and were lacking in qualitative data which makes analysis limited.

#### 4.10 Conclusion

From evaluating the data collected to answer the primary question it appears that the clinical dashboard has helped to significantly improve compliance with a number of the QC-M. Some non-significant improvement were also recorded and some QC-M were already at a 100% and this was maintained by nursing staff in the second month. From comparing the data from the QC-M and the opinions of nurses there are some contradictions. Questionnaire showed nursing staff rated the quality of care practices and patient safety practices highly before and after the implementation of clinical dashboards. Although only limited information could be examined from the qualitative data it did show that managers were paying attention to aspects of the clinical dashboards and putting in actions plans to address issues. The following chapter will provide a discussion of these results, within the context of the literature, related theories and clinical relevance.



## **Chapter 5 Discussion of Results**

### **5.1 Introduction**

Chapter 5 presented the results and analysis of the study. This discussion is divided into 3 main parts. The main purpose of this chapter is to explain the meaning of the results and their significance. It will also aim to compare the findings to those of similar studies where possible.

### **5.2 Meeting the study aims and objectives**

The aim of the study was to determine if clinical dashboards are effective in the measurement and improvement of patient safety and quality of care. A mixed methodology was developed, in this method quality care metric data that is used in a clinical dashboard was collected and analysed. Also thematic analysis of action plans was undertaken to build on the data collected and a questionnaire was also used to gain insight into the opinions of nurses using clinical dashboards. Statistical analysis was used to measure the data from quality care metrics. Action plans were analysed using thematic analysis and questionnaire results were compared pre and post implementation of clinical dashboards. The findings of this study suggest clinical dashboards do help nursing staff measure and improve patient safety and quality of care within the study setting of a mental health home care team. Statistical significance was attained in many individual components of the quality care metrics used.

### 5.3 Clinical Dashboard and quality care metrics findings

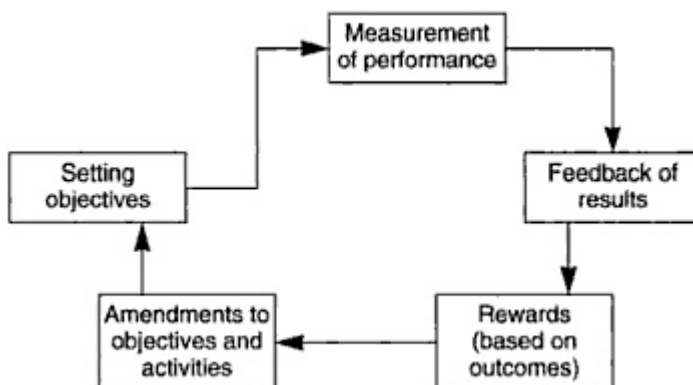
From the results analysed there were an overall high number of statistically significant improvements in quality care nursing metrics recorded, and it appears from the results clinical dashboards did have an impact on improving adherence to quality care nursing metrics within the mental health home care teams. Clinical dashboards provide tangible evidence for nurses that they are utilising processes that are linked to high quality and safe patient care.

These findings are consistent with the findings from previous studies which have shown when clinical dashboards are introduced and there is measurement of standards that there is an increase in adherence to these measurements (Clarke, 2016. Chandraharan, 2010. Smith et al, 2014. Jeffs et al, 2013). The literature shows that collecting data helps staff understand performance, and identify where there is need for improvements and helps staff test changes to see if they lead to improvement (Pincus, 2015). The feedback mechanism within dashboards has a valuable role to play and can be a very effective at giving staff feedback on what they have actually done and their outcomes. The clinical dashboard engages staff and raises awareness amongst nursing staff and shows staff in an easy to understand way and empowers them to make improvements in their practice (Jeffs et al, 2014). Real time clinical dashboards give clinician's timely access to accurate information which is often lacking when carrying out other forms of system examination such as audits. Previous studies have shown that clinical dashboards enable the joining up health systems to support service redesign and improve outcomes for patients. It should also encourage individuals and teams to regain control of the quality of nursing and midwifery care and thus lead to increased accountability (parlour, 2015). During this study the TYC dashboard was emailed to staff and also a copy of the dashboard was printed off and displayed on the staff notice board. This visibility of the dashboard acts as a reminder for staff and prompts them to adhere to professional guidelines and evidence based practice. This correlates with previous studies where they also recognised the visibility of the dashboard as an important aspect in improving standards of care.

One of the theories behind how measuring metrics can improve quality of care and patient safety is the Theory of the Donabedian model (Burston et al, 2014) in this theory it is stated that increased adherence to professional guidelines and evidenced based practice will improve quality of care and patient safety, according to the Donabedian model the clinical dashboard works by drawing connections between processes such as evidence based care practices and outcomes such as health status of patients. According to this theory the outcome measures displayed in the clinical dashboard are the final result of care being provided by nurses.

This study and the literature also supports another theory that links the clinical dashboards performance improvement to the theory of Performance management as described by Mabey et al (1999) he described performance management system as a form of 'performance management cycle'. This cycle has five elements as shown in fig 5.1 below which suggest how performance management system should be implemented in an organization. The elements of performance management system cycle includes:

1. Setting of objectives.
2. Measuring the performance.
3. Feedback of performance results.
4. Reward system based on performance outcomes
5. And amendments to objectives and activities (Mabey et al, 1999).



**Figure 5.1 Performance Management Cycle**

Another theory that might explain what might motivate staff to meet the QC-M is goal theory in this theory it is suggested that the individual goals established by a member of staff play an important role in motivating him for greater performance. The members of staff keep following their goals and if these goals are not achieved, they either improve their performance or modify the goals and make them more realistic. If it results in staff improving their performance it will produce the desired achievement of the performance management system aims (Agarwal, 2011)

Clinical dashboards also apply the principles of human factors by helping staff to avoid reliance on memory, make things visible, review and simplify processes, Standardize common processes and procedures, routinely use checklists, and decrease the reliance on vigilance. Human factors takes into account the limitations of human performance and aims to help staff reduce errors or and the consequences of errors. Many health care services recognise the importance of human factors in patient safety and are adopting the principle of human factors to support and enhance clinical performance. ( NPSA, 2009. WHO, 2009). When designing any technology it is important to consider human factors, technological solutions are becoming increasing common within healthcare however they can be unsuccessful if people cannot successfully interact with the system.

A small number of statistical analysis results showed that QC-M did not improve, this was in discharge planning nursing teams in both locations scored very low in their compliance with the three metrics associated with it in the first month the clinical dashboard was produced and only one team had made a statistical improvement in one of the metrics in the second month.

From the literature reviewed this could be because the way nursing staff in both locations were planning for discharge was not easy to measure. This problem has been discussed in previous studies which suggest a review of the data used to record discharge planning may need to be refined (Kilbourne et al, 2010). Many studies reported a lack of standardised processes caused problems measuring metrics. a reason for this maybe that the current system does not allow staff to capture this information

routinely and may be an area that requires changing the system, which will involve looking at the root causes of the problem designing changes to the system and is beyond the scope of the clinical dashboard (Cohen et al, 2013). Changing how staff measure the planning and recording of discharges, is most likely to be a complex task and staff have to consider any part of a system they change will have a knock on effect elsewhere.

It is also worth considering key metrics monitored for nursing quality alone will not provide the whole picture on nursing quality and patient safety (Doran 2003). There is a concern highlighted in the literature that what gets measured improves and that may be to the detriment of other areas. High performing teams not only need to measure performance there also needs to be data about the factors that underpin quality, including for example staffing levels, staff to patient ratios, Skill mix of staff, Sickness rates, staff turnover rates (Maben et al, 2012).

Literature also recognises there is data that can't be measure that also needs to be taken into account, this is known as soft data and this kind of data evades easy capture. It also has to be considered that perhaps only the recipient of care can decide whether it was compassionate and met their needs or not (High Impact Actions for Nursing and Midwifery , 2011). These levels of complexity make the science of measuring care a continuous journey of improvement.

The choice of indicators used to measure quality of care is vital and should be based on what is important to the health care service user or patient and nursing team. Otherwise there is a risk that dashboards could be used to measure what is convenient, rather than what is necessary. Literature shows it is difficult to maintain quality improvements. In many studies quality of care initially improves for incentivised activities but quickly reached a plateau. Incentives had little impact on non-incentivised activities in the short term, but after three years quality of care for some fell significantly below levels predicted from pre-incentive trends (Doran, 2011).

### 5.3.1 Clinical relevance of the findings

In practice for nursing staff, clinical dashboards increase transparency in regard to performance and can encourage individual nurses and teams to regain control of the quality of nursing care (Parlour, 2015).

There is a need for health care services and clinical staff to recognise the benefits of technology information as a key enabler for improving care and driving change. The benefits of technology such as clinical dashboards have not yet been realised in secondary care settings such as mental health and investing in technology to deliver high quality joined up care is fundamental to improving the health care system. (Kilbourne et al, 2010) Health information technology (Health IT) has the potential to improve the collection and exchange data, however it will take time to create or adapt local infrastructure (e.g. information systems and technologies) to minimise the burden of measurement on staff.

This study highlights the need for clinicians to view quality improvement as a continuous process and to sustain momentum staff need to continually review what has been done and assess progress. It has been suggested that staff should share achievements via progress reviews, presentations to key stakeholders to gain feedback. Assess any fears or stresses staff have and address these concerns (NHS Institute for Innovation and Improvement, 2010).

To successfully implement clinical dashboards and manage any resistance to change will require strong leadership and the development of an open and positive organisational culture that enhances human performance, supports working relationships that are strong, respectful and accountable. It should also be an environment that acknowledges the potential for human error at all levels and, ensures a systematic approach to best practice through proactive identification of risk, effective debriefing, learning from feedback and complaints, and dissemination of learning (NHS, 2013). There is a need to further work on standardisation of clinical care that are based on evidence, guidelines, care pathways and protocols.

Healthcare organisations due to their complexity should always be aware of risks, using only a small number of channels of information such as nursing metrics can cause staff

to be over confident in their past results. Healthcare organisations should take care not to suppress the view points of the marginal and take care to ensure they are not giving of priority to acute performance expectations or production pressures. To guard against impulses that can cause health care organisations to drift into failure, it is advised clinicians stay curious, open-minded, complexly sensitised, inviting of doubt and scrutiny toward the past ( Dekkera, 2013)

#### 5.4 Questionnaire Findings

The results and analysis of the questionnaire given to staff pre- implementation of clinical dashboard and again post implementation of clinical dashboard, found that staff agreed high quality of care and patient safety were both very important. This was expected and in line with what the literature also states, the HSE state they are committed to the provision of safe, high quality health services (HSE, 2017) it is also recognised by health services worldwide as the most important aspect health service delivery and the World Health Organisation also recognise patient safety and high quality of care as fundamental health care services (WHO, 2017)

However there were some unexpected responses to the questionnaire, in the pre implementation questionnaire there was a high level of agreement with some of the statements such as respondents agreeing with the statements that they received regular feedback on patient safety and quality of care, there was also a high level of agreement that they were able to identify problems with patient safety and quality of care. This was unexpected as at the pre implementation stage of the study there was no system in place or practice identified by the researcher that would have provided this information on patient safety and quality of care to nursing staff. Also in the pre-implementation questionnaire the majority of respondents also strongly agreed with the statement that they are continually improving their performance at work, whilst considering the statement on its own there is no way to verify whether this is true. But taken in context with the other answers where there was unexpected high levels of

agreement, it may also show uncharacteristically high levels of agreement. The post implementation questionnaire results show a slight change in respondents opinions a high percentage agreed they did receive feedback on quality of care and patient safety, less variation was recorded in respondent's answers. The less variation in answers may be due to the standardised way staff were receiving feedback through the clinical dashboard. The second questionnaire correlates with the literature reviewed, many of the studies reported increased awareness of patient safety and quality of care issues once due to the visual feedback clinical dashboards provide. And clinical dashboards providing standardised results to nurses.

Also the questionnaire did not show any significant change in the amount of time nurses spend on paperwork, which again was unexpected as the literature shows that staff found meeting metrics an extra burden. Rocque and Cadden (2017) found one of the greatest concerns clinical teams had in relation to measuring metrics was the impact of workflow, specifically related to documentation. This might not have been a concern in this study because the clinical dashboard was using data that was already being gathered for other purposes, such as patient care plans.

The pre implementation question answers were not the same as the literature review which found before the implementation dashboards nursing staff did not have any other means to get feedback on these issues. One reason for these unexpected responses to the questionnaire may be explained by attribution this is the act of attributing positive events and outcomes to one's own work but attributing negative events and outcomes to external forces (McLeod, 2012). Staff answering the questionnaire may not have experienced any patient safety issues or issues with quality of care and they may attribute this to their good working practices as an individual clinician and as working as part of a team. However if the same questionnaire was given to staff after there had been a patient safety issue or an issue with quality of care they may have answered the questionnaire differently and there may have been less agreement that they receive feedback on patient safety and quality of care as it is more likely with this theory that staff will attribute any failings with external factors such as there being no system in place to give feedback on quality of care and patient safety.



It should also be considered if there was some exaggeration by respondents when answering the questionnaire. It has to be considered whether respondents were claiming knowledge about feedback mechanisms that were not used at the pre implementation stage of the study. (Labaree, 2017)

In regards to staff agreeing they are improving their performance, this may be seen as overestimating their performance this is a widespread multidisciplinary phenomenon that occurs among professionals of different hierarchical levels, flawed self-assessment of one's own abilities is usually due to one of the following reasons (Dunning, 2004). Firstly, inaccurate self-assessments can arise because nursing staff assessing themselves may not have all of the information necessary to provide accurate assessments. Staff rating themselves cannot take into account what they do not know. For example in this study there may have been patient safety issues or issues with the quality of care that they were not aware of as there was no system in place to give them this feedback. Second, inaccurate self-assessments arise because people neglect relevant and useful information that they do have in hand, their views may be biased (Grossmann et al, 2015).

#### 5.4.1 Clinical relevance of the findings

The questionnaire highlighted concerns about nursing staff's knowledge of patient safety and quality care issues may be incomplete, and they are not aware of the ongoing risks they should be monitoring and trying to address. There is a need to provide training for staff to raise awareness and highlight the ongoing need to monitor patient safety and quality of care issues. The analysis from the questionnaires in the researchers opinion supports the need for systems such as clinical dashboards to aid the continuous monitoring of patient safety and give unbiased feedback to staff. The national roll out of Clinical dashboards would help nursing staff in all areas of the health care service identify errors and aid learning at a national level.

## 5.5 Action Plans findings

The analysis of the action plans show they are needed to help facilitate change and improve practices that were identified by the clinical dashboards as areas nursing staff were not performing well in. The action plans in this study provided a framework for identifying problems, planning actions to take and ensuring there is follow up. And is in a format that is easy for staff to use.

In the literature few of the studies on clinical dashboards addressed the use of action plans one study did consider the use of action plans, it reported they helped to identify areas of concern thereby allowing staff to address key elements of care, and helping staff link processes to outcomes of care (Russell et al, 2014). Although action plans were not mentioned much in studies related to clinical dashboards there is a large volume of literature in relation to action plans being an important part of quality initiatives. And are recognised as crucial for the successful implementation of change (Hughes, 2008). The NHS have stated that more emphasis needs to be put on action plans. (NHS quality and service improvement, 2010). One area that both teams did not perform well in but was not addressed in the action plans was following guidance on the discharge of patient, the literature would suggest this may be caused by healthcare workers not having adequate knowledge about quality improvement and secondly incentivizing performance improvement using simple metrics is unlikely to work before incentivizing behaviour change in clinical systems. In the literature this is seen as beyond the scope of the action plans. It is argued that it is usually not the people who create the problems in our health system; rather, it is the processes of the care delivery “system” that require change (Cohen et al, 2013)

### 5.5.1 Clinical relevance of the findings

Action plans again support the findings from the questionnaire and highlights planning quality improvements and change is an area nursing staff need to be aware of and have training in. In clinical practice guidance from NHS Institute for Innovation and Improvement (2010) suggest action plans should be easily accessible to all staff and presented in a clear format to all individuals involved and there should be regular discussion about the schedule plan to make sure it stays on track. There needs to be

commitment from managers and clinicians to be involved in quality improvement for changes to be successful (Hughes, 2008). And ensure staff have the training and opportunity to develop effective action plans. Clinical staff should consider other tools to understand and gain insight into the causes of any problems before making changes based on assumptions. There are different types of tools that can help ensure nursing staff's approach to solving problems is based on facts or evidence. Examples of tools are an affinity diagram which helps staff to brainstorm ideas and/or group them into themes. The cause and effect (fishbone) diagram can be used to visually summarise the findings of the affinity diagram. Root cause analysis using five whys will help you identify why things are happening. This tool simply involves asking 'why?' several times over. It helps to develop a questioning attitude so that you never accept the first reason given and are always prepared to probe further (NHS Institute for Innovation and Improvement, 2010). It should be recognised by nursing staff that local quality improvement initiatives that are the result of action plans represent an important part of achieving change in a healthcare system, complementing the top-down institutional and national initiatives. (Curcin et al, 2014).

## 5.6 Conclusion

This study has shown that clinical dashboards have an important part to play in help nurses provide high quality care and safe care, it is acknowledge high performing teams engage in processes to monitor their performance and clinical dashboards are a way to do this. This discussion has highlighted the importance of measuring quality care metrics, however it is recognised that nursing metrics should only be considered one part of the whole picture and other factors that affect care also need monitoring such as numbers of staff and skill mix, and also there needs to be a way to consider soft data as well. The improvements shown through the use of clinical dashboards also need to be maintained, previous literature has shown it has been difficult for nurses and teams to sustain these improvements after time, as once nurses have met targets they lose motivation and enthusiasm. There needs to be a culture in the workplace that supports

continuous improvement, action plans were identified as a tool that can help in this area. However they were not well used by staff in this study and it was identified this may be because staff have not been adequately trained in this area. Action plans also require commitment from managers and clinicians to develop quality improvements that are identified through the use of the clinical dashboard, this can be hard at times for staff as it can be seen as an extra burden on their workload. This discussion also considered the results of the questionnaire, nursing staff's responses to statements within the questionnaire provide insight into how they view patient safety and high quality care. There were high levels of agreement before the implementation of clinical dashboards that they were getting feedback about quality of care and patient safety and felt they were able to identify areas that needed improvement and felt they were improving their practice continually. There are several reasons considered in this discussion why nurses responded in this way and the researcher believes the responses to the questionnaire highlights a need for more awareness of patient safety issues and quality care issues, and less reliance on self-reported feedback amongst staff which in turn could lead to a greater emphasis on using tools such as clinical dashboards in the long run to help continually monitor care.

## **6.1 Conclusion**

Quality and patient safety is at the core of health care delivery. Technical measures such as clinical dashboards can help to support nursing staff in this core purpose.

Creating an environment in which change and improvement can flourish has been identified to be an important aspect of the work environment when implementing new initiatives. Staff need to feel enabled and supported to take ownership and lead changes they need to be provided with innovative tools and techniques to make changes happen. The test your care clinical dashboard is a tool that can help identify problems, measure for improvement and allow staff to create ways to manage improvements through the action plans. For it to be successful in the long term and not just to become another target that has to be met monthly, staff need training and skills to identify the root causes of problems and they need to be supported in making changes to improve care and patient safety.

This research has found using QC-M as indicators is an effective way of tracking whether staff are adhering to best practice guidelines and evidenced based care. Clinical dashboards have been shown to provide a more standardised way of giving feedback to staff and make staff more aware of areas of care that are not meeting metrics.

## **6.2 Limitations and Flaws**

Actions plans did not have sufficient qualitative information in them to gain much of an analysis, this maybe because staff had insufficient time to complete them it is an additional burden on their workload. In hindsight for this study it may have been more useful consider a different methodology to explore how nursing teams use the information in clinical dashboards to make changes and improve practice.

Data collected by the researcher from nursing notes and documents, would have been seen as more reliable if it had of been reviewed by an independent person for accuracy and bias.

The design of the research methodology lacked a comparison group, therefore any changes in outcomes could still be due to selection bias and the changes could reflect

differences in participants who were exposed to the program compared with people who were not exposed to the program.

If the researcher had a longer period to conduct the study data could have been collected from the same participants over time using a longitudinal design. This would allow a greater observation period which could help when analysing results.

### 6.3 Recommendations

Following on from this study on clinical dashboards and analysing its impact on patient safety and quality of care.

Further study and development of future metrics indicators needs to be undertaken as healthcare systems continue to evolve and develop based on new evidence and changes to best practice so should the indicators we use to measure care.

Quality management and improving the use and function of action plans within clinical dashboards, was an area highlighted in this study that requires further study and attention to develop and improve practices.

Developing way to ensure there is continuous quality improvement when using dashboards is also another important area.

Developing early warning systems for failing quality, investigating the use of hand-held technology such ICT tablets, further developing reporting functionality of electronic health records.

Using longitudinal data to predict and prepare for future trends in the health care service.

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## Appendix

### Appendix 1. Informed Written Consent

# TRINITY COLLEGE DUBLIN INFORMED CONSENT FORM

**LEAD RESEARCHER:** Susan Henry

**Project Title:** Evaluating the effect of clinical dashboards designed to measure and improve the quality of nursing care and patient safety, in a mental health setting.

**BACKGROUND OF RESEARCH:** Technology is increasingly being used in nursing to support the practice of delivering high quality and patient safe care. This research project aims to investigate the effect clinical dashboards have on the quality of nursing care and patient safety.

**PROCEDURES OF THIS STUDY:** Data from a sample of nursing notes will be chosen randomly and collected monthly for the period of this research project (4 months), this information will be inputted into the quality care metrics website [testyourcare.com](http://testyourcare.com). After each monthly collection of data feedback will be provided to the three home based treatment teams in the form of a clinical dashboard and where teams have not met their targets for that month they will have a opportunity to develop a action plan to improve the team's performance. The study will also include a questionnaire to complete at the beginning stage of the research project and the same questionnaire will be repeated at the end. The questionnaire consists of 11 questions and will take approximately 5 minutes to complete.

**PUBLICATION** The findings will be reported in a postgraduate dissertation in June 2017. Data may also be included in conference presentations and may be published in peer-reviewed scientific journals.

**DECLARATION:**

- I am 18 years or older and am competent to provide consent.
- I have read, or had read to me, a document providing information about this research and this consent form. I have had the opportunity to ask questions and all my questions have been answered to my satisfaction and understand the description of the research that is being provided to me.
- I agree that my data is used for scientific purposes and I have no objection that my data is published in scientific publications in a way that does not reveal my identity.
- I understand that if I make illicit activities known, these will be reported to appropriate authorities.
- I freely and voluntarily agree to be part of this research study, though without prejudice to my legal and ethical rights.
- I understand that I may refuse to answer any question and that I may withdraw at any time without penalty.
- I understand that my participation is fully anonymous and that no personal details about me will be recorded.
- I have received a copy of this agreement.

**PARTICIPANT'S**

**NAME:**

**PARTICIPANT'S**

**SIGNATURE:**

**Date:**

**Statement of investigator's responsibility:** I have explained the nature and purpose of this research study, the procedures to be undertaken and any risks that may be involved. I have offered to answer any questions and fully answered such questions. I believe that the participant understands my explanation and has freely given informed consent.

**RESEARCHERS CONTACT DETAILS:**     **henrysu@tcd.ie**

**INVESTIGATOR'S SIGNATURE:**

## Appendix 2

### Trinity College Dublin

#### Information Sheet

**Project Title:** Evaluating the effect of clinical dashboards designed to measure and improve the quality of nursing care and patient safety, in a mental health setting

**Principal Supervisor:** Mary Sharp, [mary.sharp@scss.tcd.ie](mailto:mary.sharp@scss.tcd.ie)

**Student Researcher:** Susan Henry, [henrysu@tcd.ie](mailto:henrysu@tcd.ie)

**School of Computer Science and Statistics, Trinity College Dublin**

**Who is conducting the research?** This research is being conducted by myself, Susan Henry, as part of my final year research project in MSc Health Informatics at Trinity College Dublin (TCD). The research will be conducted under the direct supervision of Mary Sharp, lecturer in computer science and statistics at TCD.

**Why / what is this research being conducted?** This research project aims to investigate the effect clinical dashboards have on quality of nursing care and patient safety.

**Why am I being asked to participate in this study?** This study is being conducted in the three home based treatment teams in North Dublin Mental Health Services. As you are a nurse working in a home based treatment team in one of these areas you are being asked to participate in this study.



***What will happen if I decide to participate in this study?*** Should you decide to participate in this study data from a sample of nursing notes will be chosen randomly and collected monthly for the period of this research project (4 months), this information will be inputted into the quality care metrics website [testyourcare.com](http://testyourcare.com). After each monthly collection of data feedback will be provided to the three home care teams in the form of a clinical dashboard and where teams have not met their targets for that month they will have a opportunity to develop a action plan to improve the team's performance. The study will also include a questionnaire to complete at the beginning stage of the research project and the same questionnaire will be repeated at the end. The questionnaire consists of 11 questions and will take approximately 5 minutes to complete.

***How will my information/privacy/confidentiality be protected?*** The information on the [testyourcare.com](http://testyourcare.com) website is stored securely and is password protected. Data kept in this data base is entirely anonymous and can be accessed by HSE staff trained in collecting data for [testyourcare.com](http://testyourcare.com) and have approval by the director of nursing to access the data.

The questionnaire will also be entirely anonymous, once you submit your answers to the questionnaire the researchers will not be able to identify participants' answers. Data will be stored on websites server and transported to a password-protected computer at TCD. The researchers should be the only people who will have access to participants' questionnaire data. However, the examiners of the dissertation paper and the Qualtrics administrator at TCD may be given access to the data by either of the researchers if required.

***Do I have to participate? / Do I have the right to withdraw?*** Your participation in this study is entirely voluntary. You are in no way obliged to participate in this study. Should you decide to participate in the quality care metrics data collection you may withdraw from the study at anytime however any data already submitted to the [testyourcare.com](http://testyourcare.com) website is anonymous and not identifiable therefore the researchers will not have the ability/resources to remove a participant's data.

Should you decide to participate in the questionnaire, you may withdraw your data from the study at any time, up until you submit your answers online (submit button). Participants should be advised that while they have the right to withdraw from the questionnaire at any time, once their answers have been submitted the researchers will not have the ability/resources to remove their data after this point.

***How will the data be used and subsequently disposed of?*** The findings will be reported in a postgraduate dissertation in June 2017. Data may also be included in conference presentations and may be published in peer-reviewed scientific journals. Regardless of the format, participant's information will never be identifiable. Data will be stored for at least 12 months on a secure, password-protected computer at TCD. If findings are publishable, data will be kept for a period of 5 years. Data destruction will be undertaken by the Research Supervisor/Principal Investigator after the storage period.

***What are the benefits involved?*** Participants who take part in this study will benefit from the

monthly feedback that their team will get. The results may also help to identify and further understand the effects clinical dashboards have on nursing staff and whether they led to an improvement in the provision of high quality and safe care, should significant results be found it could draw the attention of the local North Dublin Mental Health Services to the results of this study.

***Are there any risks involved?*** There are no known risks involved; however should any illicit activities become known these will be reported to the appropriate authorities

***Conflict of Interests:*** This research is being carried out at work and involves the participation of colleagues

***Ethical Approval:*** This research study has received approval from the director of nursing and is awaiting ethical approval from TCD

***Where can I get additional information about this study?*** Should you require additional information about this study, or have any concerns about the manner in which this study was conducted, please contact the Research Supervisor Mary Sharp, email: [mary.sharp@scss.tcd.ie](mailto:mary.sharp@scss.tcd.ie) or contact me at email: [henrysu@tcd.ie](mailto:henrysu@tcd.ie).

## Appendix 3: Readiness Checklist

## Nursing & Midwifery Quality Care-Metrics State of Readiness & Capacity Checklist

Rate your organisation from the perspectives of capacity and readiness to implement the Quality Care-Metrics	Readiness How do you rate your organisation's readiness?		Capacity How do you rate your organisation's capacity?	
	Yes	No	Yes	No
<b>Areas for Consideration</b>				
The Executive Management team are aware and supportive of the implementation of Nursing and Midwifery Quality Care-Metrics	✓			
The organisation is confident that it has the capability and capacity to successfully support the implementation of Nursing and Midwifery Quality Care-Metrics			✓	
<b><u>Please Identify Required Resources:</u></b>				
A Quality Care-Metrics <b>Project Lead/Champion</b> with allocated time & responsibility	✓		✓	
Agreement to support & release nursing/midwifery staff to train and become metric facilitators	✓		✓	
Nurse /Midwife Managers have been identified & have agreed to collect & input metric data monthly	✓		✓	
ICT resources and ICT support is available <i>e.g. Laptops, tablets etc</i>	✓		✓	
Internet &/or Wi-fi availability: online or offline metric collection will both be possible	✓		✓	
A Quality Care-Metrics Governance Group is in place and an implementation plan is in development	✓			
<b><u>Consider the Identification &amp; Management of:</u></b>				
A phased roll-out across wards/units in your service	✓		✓	
Area specific metrics to be collected in wards/units in your service	✓		✓	
There is a clearly defined governance reporting process to feedback and disseminate findings from the Quality Care-Metrics <i>e.g. ward communication boards, monthly staff meetings</i>	✓		✓	
There is an action plan review process and governance system to escalate and action on any risks or poor performance identified in Quality Care-Metrics measurement.	✓		✓	
There is a Whole Systems Approach on how findings can be disseminated and utilised in conjunction with key nursing and midwifery data to improve care delivery.		✓	✓	

#### Appendix 4: Nursing Metrics – Test Your Care- Mental Health Metrics

<b>Nursing Care Plan Personal details</b>	
<b>Question</b>	<b>Related Information</b>
The Individuals Name and Healthcare Record Number are on each page/screen	Check nursing documentation entries for last 72 hours or for the last 3 pages of entries. Check care plan documentation to ensure that the individuals name and HCRN are on each page/screen
Presenting Complaints/Reason for admission/attendance is recorded and the admission date and time are recorded	Reason for admission/attendance is clearly recorded with date and time (using 24 hour clock) on relevant documentation
Past medical/psychiatric history are recorded	Medical and psychiatric details are clearly documented and accessible in nursing/ MDT notes
The Allergy Status is clearly identifiable on relevant nursing documentation	Any known allergies are clearly documented
<b>Nursing Care Plan</b>	
<b>Questions</b>	<b>Related Information</b>
A Nursing Care Plan is evident and reflects the individuals' current condition	An individualised nursing care plan is in place. This care plan should be reflective of the current condition
Relevant risk assessments have been completed	There must be evidence from examination of the clinical nursing file of risk assessment and management.
A Risk Management plan of care is evident if the individual is deemed at risk to self or others Nursing interventions are individualised, dated, timed and signed	Nursing risk management plan of care for the individual is in place in the relevant documentation
Evaluation of the nursing care plan is evident and has been updated accordingly	Evaluation of nursing care plan is undertaken in accordance with planned review date.

<b>Nursing Care Plan: NMBI Guidance</b>	
<b>Questions</b>	<b>Related Information</b>
All entries are dated and timed (24 hour clock)	Check care plan and assessment documentation entries for last 72 hours. Day/month/year is recorded for each 24 hours and time is listed in 24 hour clock
All written records are legible, in permanent ink and signed	Legible, permanent ink and signed.
All entries are in chronological order	Entries for past 72 hours or 3 days are in chronological order.
All abbreviations/grading systems are from a national or local approved list/system	Approved HSE and local abbreviations only
Alterations/corrections are as per NMBI Guidance	The alteration must be signed and dated
Student entries are countersigned by the supervising nurse	All student entries are countersigned
<b>Discharge Planning</b>	
<b>Questions</b>	<b>Related Information</b>
There is documented evidence of Discharge Planning	Discharge planning to commence as soon as possible
A Predicted Date of Discharge is documented	Evidence of predicted date of discharge in documentation
There is evidence of Individual and Family Involvement in Communication in the Discharge Plan	The individual and/or family/carer has been involved/consulted in the discharge plan

## Appendix 5. Location 1 Test Your Care Dashboard











### Location 1





































<b>Mental Health : Home Based Treatment Team</b>	<b>May 2017</b>	<b>Jun 2017</b>
Medication Storage and Custody		
MDA Drugs		
Medication Administration		
Medication Prescription		
Nursing Care Plan: Personal Details	72%	97%
Nursing Care Plan	49%	87%
Nursing Care Plan: NMBI Guidance	98%	98%
Provision of Information		
Discharge Planning	15%	25%
<b>Total</b>	63%	82%

	May 2017	Jun 2017	
Nursing Care Plan: Personal Details : Name and HCRN	78%	88%	
Nursing Care Plan: Personal Details : Presenting Complaint on Adm	100%	100%	
Nursing Care Plan: Personal Details : Past History	89%	100%	
Nursing Care Plan: Personal Details : Allergy Status	22%	100%	
Nursing Care Plan : Care Plan reflects current condition	11%	88%	
Nursing Care Plan : Risk Assessments Completed	78%	100%	
Nursing Care Plan : Risk Management Plan	62%	100%	
Nursing Care Plan : Interventions dated signed	89%	100%	
Nursing Care Plan : Evaluation updated	0%	33%	
Nursing Care Plan: NMBI Guidance : Dated, Timed 24 HR Clock	89%	88%	
Nursing Care Plan: NMBI Guidance : Legible, permanent ink, signed	100%	100%	
Nursing Care Plan: NMBI Guidance : Chronological order	100%	100%	
Nursing Care Plan: NMBI Guidance : Abbreviations approved	100%	100%	
Nursing Care Plan: NMBI Guidance : Alterations correct	100%	100%	
Nursing Care Plan: NMBI Guidance : Student entries signed	100%	100%	
Discharge Planning : Evidence of D/C Planning	22%	38%	
Discharge Planning : Predicted Date of Discharge	22%	25%	
Discharge Planning : Individual/Family Involvement	0%	12%	
<b>Total</b>	63%	82%	

## Appendix 6 Location 2 Test Your Care Dashboard

### Location 2

	May 2017	Jun 2017
Medication Storage and Custody		
MDA Drugs		
Medication Administration		
Medication Prescription		
Nursing Care Plan: Personal Details	 81%	 90%
Nursing Care Plan	 68%	 80%
Nursing Care Plan: NMBI Guidance	 85%	 100%
Provision of Information		
Discharge Planning	 25%	 7%
Total	 68%	 75%

	May 2017	Jun 2017	
Nursing Care Plan: Personal Details : Name and HCRN	 75%	 100%	
Nursing Care Plan: Personal Details : Presenting Complaint on Adm	 100%	 100%	
Nursing Care Plan: Personal Details : Past History	 100%	 100%	
Nursing Care Plan: Personal Details : Allergy Status	 50%	 60%	
Nursing Care Plan : Care Plan reflects current condition	 50%	 80%	
Nursing Care Plan : Risk Assessments Completed	 100%	 100%	
Nursing Care Plan : Risk Management Plan	 60%	 80%	
Nursing Care Plan : Interventions dated signed	 88%	 100%	
Nursing Care Plan : Evaluation updated	 20%	 40%	
Nursing Care Plan: NMBI Guidance : Dated, Timed 24 HR Clock	 25%	 100%	
Nursing Care Plan: NMBI Guidance : Legible, permanent ink, signed	 100%	 100%	
Nursing Care Plan: NMBI Guidance : Chronological order	 100%	 100%	
Nursing Care Plan: NMBI Guidance : Abbreviations approved	 100%	 100%	
Nursing Care Plan: NMBI Guidance : Alterations correct	 100%	 100%	
Discharge Planning : Evidence of D/C Planning	 38%	 20%	
Discharge Planning : Predicted Date of Discharge	 38%	 0%	
Discharge Planning : Individual/Family Involvement	 0%	 0%	
Total	 68%	 75%	



## Appendix 7 Action Plan

### Action Plan

**Questionnaire:**

HSE Mental Health

**Location 1**

Home Care Team

**Area/ Issue(s):**

**Recommendation(s):**

**Progress:**

Area/ Issue(s):	Recommendation(s):	Progress:

**Lead Person:**  
**Date:**

**Target Date:**

**Review Date:**

**Completion**

## Appendix 8 Nursing Metrics Questionnaire

### Nursing Quality Care Metrics

#### **Trinity College Dublin** **Information Sheet**

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**Project Title:** Evaluating the effect of clinical dashboards designed to measure and improve the quality of nursing care and patient safety, in a mental health setting

**Principal Supervisor:** Mary Sharp, [mary.sharp@scss.tcd.ie](mailto:mary.sharp@scss.tcd.ie)

**Student Researcher:** Susan Henry, [henrysu@tcd.ie](mailto:henrysu@tcd.ie)

**School of Computer Science and Statistics, Trinity College Dublin**

**Who is conducting the research?** This research is being conducted by myself, Susan Henry, as part of my final year research project in MSc Health Informatics at Trinity College Dublin (TCD). The research will be conducted under the direct supervision of Mary Sharp, lecturer in computer science and statistics at TCD.

**Why / what is this research being conducted?** This research project aims to investigate the effect clinical dashboards have on quality of nursing care and patient safety.

**Why am I being asked to participate in this study?** This study is being conducted in the three home based treatment teams in North Dublin Mental Health Services. As you are a nurse working in a home based treatment team in one of these areas you are being asked to participate in this study.

**What will happen if I decide to participate in this study?** Should you decide to participate in this study data from a sample of nursing notes will be chosen randomly and collected monthly for the period of this research project (2 months), this information will be inputted into the quality care metrics website [testyourcare.com](http://testyourcare.com). After each monthly collection of data feedback will be provided to the three home care teams in the form of a clinical dashboard and where teams have not met their targets for that month they will have a opportunity to develop a action plan to improve the team's performance. The study will also include a questionnaire to complete at the beginning stage of the research project and the same questionnaire will be repeated at the end. The questionnaire consists of 11 questions and will take approximately 5 minutes to complete.

**How will my information/privacy/confidentiality be protected?** The information on the testyourcare.com website is stored securely and is password protected. Data kept in this data base is entirely anonymous and can be accessed by HSE staff trained in collecting data for testyourcare.com and have approval by the director of nursing to access the data.

The questionnaire will also be entirely anonymous, once you submit your answers to the questionnaire the researchers will not be able to identify participants' answers. Data will be stored on websites server and transported to a password-protected computer at TCD. The researchers should be the only people who will have access to participants' questionnaire data. However, the examiners of the dissertation paper and the Qualtrics administrator at TCD may be given access to the data by either of the researchers if required.

**Do I have to participate? / Do I have the right to withdraw?** Your participation in this study is entirely voluntary. You are in no way obliged to participate in this study. Should you decide to participate in the quality care metrics data collection you may withdraw from the study at anytime however any data already submitted to the testyourcare.com website is anonymous and not identifiable therefore the researchers will not have the ability/resources to remove their data. Should you decide to participate in the questionnaire, each question is optional and you may withdraw your data from the questionnaire at any time, up until you submit your answers online (submit button). Importantly, since participant's data will be entirely anonymous, participant's individual answers will not be identifiable to the researchers. Therefore, participants should be advised that while they have the right to withdraw from the study at any time, once their answers have been submitted the researchers will not have the ability/resources to remove their data after this point.

**How will the data be used and subsequently disposed of?** The findings will be reported in a postgraduate dissertation in June 2017. Data may also be included in conference presentations and may be published in peer-reviewed scientific journals. Regardless of the format, participant's information will never be identifiable. Data will be stored for at least 12 months on a secure, password-protected computer at TCD. If findings are publishable, data will be kept for a period of 5 years. Data destruction will be undertaken by the Research Supervisor/Principal Investigator after the storage period.

**What are the benefits involved?** Participants who take part in this study will benefit from the monthly feedback that their team will get. The results may also help to identify and further understand the effects clinical dashboards have on nursing staff and whether they led to an improvement in the provision of high quality and safe care, should significant results be found it could draw the attention of the local North Dublin Mental Health Services to the results of this study.

**Are there any risks involved?** There are no known risks involved; however should

any illicit activities become known these will be reported to the appropriate authorities

**Ethical Approval:** This research study has received approval from the director of nursing and ethical approval from TCD

**Where can I get additional information about this study?** Should you require additional information about this study, or have any concerns about the manner in which this study was conducted, please contact the Research Supervisor Mary Sharp, email: mary.sharp@scss.tcd.ie or contact me at email: henrysu@tcd.ie.

**Having read the above information, if you would like to participate in this study please confirm you agree with the following statements.**

- I have read the information sheet presented above
- I Understand the information provided to me
- I understand by submitting my responses I consent to take part in this study
- I understand that it will not be possible for me to withdraw my answers from the study after I have submitted my answers
- I confirm that I am 18 years of age or older

Yes, I agree

Please note all questions are optional you may leave any questions blank if you do not wish to answer them.

It is important for nursing staff to measure quality of care

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

It is important for nursing staff to measure patient safety

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

In my working day I am continuously improving my performance

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

I receive regular feedback about patient safety

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

I receive regular feedback about quality of care

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Measuring a nursing team's performance may be used negatively against staff

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly Disagree

It is easy for team members to identify problems with patient safety

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

It is easy for the team to identify problems with quality of care

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

All team members have input into making changes of any identified problems

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

On average what percent of your working day is spent writing notes?

\_\_\_\_\_ %

On average how much direct (face to face) contact do you have with patients in a day?

\_\_\_\_\_ %

End of Survey If you wish to end survey without submitting answers please exit survey, otherwise please click on submit.