INFORMATION NEEDS WITHIN THE NATIONAL FORENSIC MENTAL HEALTH SERVICES IN IRELAND

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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. I further declare that this research has been carried out in full compliance with the ethical research requirements of the School of Computer Science and Statistics.

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Daniel Varghese

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ABSTRACT

The purpose of this study was to identify information needs within National Forensic Mental Health in Ireland. Forensic mental health service in Ireland is provided at Central Mental Hospital, which in the only forensic mental health hospital in the country. The study was carried out at Central Mental Hospital. The aims of the study were

- To explore, capture and identify information needs and requirements within forensic mental health by key informants
- To determine and explore information needs of staff working within NFMHS
- To address the information needs identified by the staff of NFMHS using information provided by key informants

The researcher used a descriptive qualitative design to determine the information needs within NFMHS. Data was collected from key informants (phase I, N=13) and staff (phase II, N=20) working in the setting using semi-structured interviews. Clinicians, clinical information officers, and individuals having experience in a mental health setting or a forensic mental health setting were included as key informants. Phase II participants included the staff currently working in Central Mental Hospital, which included nurses, occupational therapists, social workers, health care assistants and psychologists. A purposive sampling technique was utilized for the study. Key informants identified information needs and requirements within a forensic mental health setting, and staff interviews explored the information needs within the hospital setting. Data analysis of transcribed data yielded themes from both phases. The researcher then used themes generated from phase I interview to address information need themes from Phase II interview. The main themes from phase I interviews were a customizable electronic health record, integrated alarm system, system for patient finances and patient property and video links. Phase II interviews identified errors, lack of information, time and illegible handwriting as critical issues around information needs within the setting. The study also found the information needs identified by phase II participants can be resolved adequately by the information requirements identified by key informants.

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Abbreviations

NFMHS: National Forensic Mental Health Service

CMH: Central Mental Hospital

ICT: Information and communication technology

EHR: Electronic Health Record

CPN: Community Psychiatric Nurse

IT: Information technology

CCTV: Closed circuit television

IPS: Irish Prison Service

Chapter 1 Introduction:

A brief outline of the main aspects of the study will be included in this chapter. Study setting, the background to the study, the proposed research question, an outline of the study design and the significance of the study will be included. A brief introduction to forensic mental health will be incorporated and will highlight the importance of information technology needs within the setting.

1.1 Introduction

Health care delivery has drastically improved around the globe in the last five decades (Vasan, Ellner et al. 2014). A multitude of factors has been attributed to such change processes. One such factor is the advancement in technology, especially information systems within health care delivery (Buntin, Burke et al. 2011). Since the initial adoption of information technology in to health, strong association has been found between IT and increased performance in health industry (Devaraj and Kohli 2000). Bloomrosen and Detmer (2010) opined delivery of proper health care is reliant on robust data capturing, synthesis and dissemination. Within the Irish context, most areas in health care have developed on par with other European counterparts. Furthermore, mental health especially forensic mental health has also undergone considerable changes (Kelly 2004). Forensic mental health services are provided in Ireland through the Central Mental Hospital (CMH) based in Dublin. Historically, this hospital was built in the 1850's with an asylum ethos (Kelly 2004). However, care delivery systems within the CMH have hugely changed in the last two decades. More structured, peer-reviewed delivery systems are in place, and more importantly, they are constantly evolving and expanding. Care is provided using a multidisciplinary approach which includes all health care professionals. When delivery systems become more complex information exchange becomes complex and challenging (Grimson, Grimson et al. 2000).

1.2 Background and justification for the study

The Faculty of Forensic Psychiatry of the Royal College of Psychiatry defines forensic psychiatry as a "speciality in psychiatry concerned with helping people who have a mental disorder and who present a significant risk to the public. It covers areas such as the assessment and treatment of mentally disordered offenders; investigation of the complex relationships between mental disorder and criminal behaviour; working with criminal justice agencies to support patients and protection of the public".

Forensic Mental Health Services (FMHS) in Ireland is similar to many counties around the globe. FMHS involves provision of psychiatric treatment to mentally ill individuals who have committed a crime. FMHS are usually contacted by one of the following agencies: An Garda Siochana, the courts or the Irish prison service and the individual is referred for further treatment. Admission to the FMHS can be for assessment or management of an acute illness. This is necessitated due to unpredictable, violent and challenging behaviour of the individual. FMHS also provides consultation to the general mental health service in relation to management of violent and challenging behaviours.

The National Forensic Mental Health Service (NFMHS) provides forensic mental health care in Ireland. NFMHS provides individualised, specialized and evidenced based mental health care to individuals in a high secure therapeutic environment. High security is one of the unique features that distinguish NFMHS from general psychiatry. Moreover, staff and clinicians within NFMHS have training in dealing with unpredictable, violent and challenging behaviours. Training and expertise is also provided in collaborating with the criminal justice system and the Irish Prison Service for the clinicians within the NFMHS. Forensic mental health services are unique in their way. However, the service demands all the basic ICT structures in place. Nature and diversity of care provided within this environment call for a state of the art informatics system to be in place. Some of the factors which make the services complex are outlined below

1. There is a complex network of interconnected health systems in place with other health care delivery organisations. For example, CMH utilises services of various teaching hospitals in Dublin for its client's physical health. Also, the recovery and rehabilitation care is provided at community level.

2. The prolonged length of stay within forensic mental health hospitals poses challenges regarding patient documentation.

3. Multilevel patient profiles i.e. Acute, medium and rehabilitative. Different levels of patient profiles are seen in all forensic mental health hospitals around the globe (Simpson, Jones et al. 2006).

4. CMH is linked in with the Irish prison service due to the nature of service provided.

5. Patients within a forensic hospital have a two tier documentation system one for the Department of Health and other for the Department of Justice.

There are many commercially available information systems for mental health hospitals such as e Record, ICANotes, Sigmund software, etc. However, due to the complex nature of forensic mental health, it needs a bespoke information system to capture and disseminate data. Hence, a more robust ICT system is warranted for better delivery of quality care to clients within in the CMH. A key process in improving ICT within an organisation is research particularly when interconnected health is at play (Brender, Nøhr et al. 2000). The author in this study attempts to explore information needs within forensic mental health setting and hopes to inform further actions necessary in this regard.

1.3 Research question and study aims
The following research questions guided and were explored in the study.

a. What information systems are necessary within a forensic mental health setting?
b. What are the information needs of the staff working in the National Forensic Mental Health Service of Ireland
c. How can the identified information systems meet the information needs of staff within the forensic mental health setting?

The overall aim of the study is to identify information needs within NFMHS in Ireland. The objectives of the study are

- To explore, capture and identify information needs and requirements within forensic mental health experienced by key informants
- To identify and explore the information needs of staff working within NFMHS
- To address the information needs identified by the staff of NFMHS using information provided by key informants

1.4 Purpose of the study:
This study discusses (1) information needs and systems that will be useful within NFMHS as suggested by the key informants (2) information needs within NFMHS as experienced by the staff (3) and analyse ways to address the elicited information needs within NFMHS.

1.5 Significance of the Study:
Studies exploring information needs within forensic mental health are scarce, and no studies have been done in Ireland in that respect to date. This study explores the information needs of all categories of staff within NFMHS. Moreover, key informants provide an overview of the best practices around the globe in terms of information needs. The conclusion of the

study provides a pathway to address information needs within NFMHS based on themes and ideas from key informants. Moreover, the study results provide policymakers and senior management of the service, a preface for a strategic framework for addressing information needs within NFMHS.

1.6 Mental health and the criminal justice system.

Statistics from the Irish Penal Reform Trust shows the rate of imprisonment in Ireland is 88 per 100,000 of population (Irish Penal Reform Trust October 2014). The number of committals to Irish prison has constantly increased over the last 20 years. According to statistics, a total of 17,000 committals were made in the 14 prisons of Ireland. These numbers are important as there are studies which have found an increased prevalence of mental illness among the prison population. Some of the Irish studies have extensively studied the prevalence of mental illness among Irish prisoners. Curtin, Monks et al. (2009) noted, among the Irish prisoners major depressive illness and psychosis were prevalent. Moreover, the prevalence of severe mental illness is about ten times higher amongst prisoners than amongst the general population, 7.6% of male remand prisoners have a psychosis, and 2.7% of sentenced prisoners have a psychotic illness (Linehan, Duffy et al. 2005). Similar trends can be found in the United Kingdom (Sugarman and Dickens 2015).

Each year in Ireland, around three hundred individuals are admitted to prisons. The majority of these individuals are known to mental health services due to their prevalence of severe and debilitating mental illness. Unfortunately, the individuals are embedded in a vicious cycle of mental health issues, alcohol and substance misuse and profound social and educational disadvantage. Social and educational disadvantage such as illiteracy and unemployment compromise their progress within mental health services. In a cohort of the prison population, the traveller community can be seen over represented along with homelessness. In many instances, such cohorts of prisoners historically have been in touch with the juvenile criminal justice systems which demand specific treatment plans. Female prisoners with mental health issues have been noted in many instances victims of abuse along with other non-conducive circumstances. Hence the aim of the forensic mental health service is to provide more individualised care for such individuals who are unfit to be imprisoned outside the criminal justice system. This is materialised by diverting individuals from a criminal justice system to the forensic mental health setting. Such interventions have proven effective in providing appropriate levels of care.

1.7 Key changes in NFMHS in Ireland in the last 15 years

Forensic mental health services are provided by CMH. Significant changes have taken place in the forensic mental health services of Ireland since 1999. From a two consultant led hospital in the 1999, CMH has undergone huge transformations. The staff profile has significantly changed in the last two decades. Historically, care was provided by 'care officers'. Care officers were care staff with no professional health related qualification and worked on a custodial ethos similar to prison officers. Nurses were then recruited to replace care officers and multidisciplinary teams were developed progressively. Currently, 17 years later CMH has 8 consultants and has well established multidisciplinary team catering for 99 inpatients and a much larger number (150) of patients in the wider community. Prison in-reach teams from the Central Mental Hospital provide care within the Irish Prison service. The building of the Central Mental Hospital dates back to 1850. The hospital is housed in an old Victorian architectural structure. There has been serious criticism about the building its suitability has been a concern for some time. (O'Neil 2011)

Two major legal reforms of acts took place in 2001 and 2006. They were the Mental Health Act of 2001 and the Criminal Law Act of 2006. Both these acts have had a huge impact on the care of mentally ill offenders in Ireland. A more therapeutic care pathway was established and better safeguards on patients' rights have been put in place. (O'Neil 2011).

Collaboration, cooperation and communication between the major stakeholders from the Department of health and Department of justice have made substantial progress within forensic mental health services in Ireland. Such progress has led to advancement in patient care in the wider community. Moreover, the executive clinical director of NFMHS and staff now work closely with Garda Siochana in areas of training, suicide prevention and hostage situations.

CMH receives patients under various sections of the Mental health Act 2001 and the Criminal Law Insanity Act 2006. The patients can be admitted for assessment or treatment. Patients needing inpatient treatment follow a definitive care pathway which involves a progression from acute setting to a medium secure setting and finally to recovery and rehabilitation. Progression through each setting is individualised based on the level of support the patient needs. Within CMH patient demographics would clearly indicate a long term inpatient stay.

Currently, documentation is primarily paper-based. A small scale server based computer system is available for documentation. This, however, does not provide staff with any electronic health records and is primarily used for communication. The information technology is managed by the Health Service Executive's Information Technology department.

The CMH urgently requires an improved information technology system given the long term profile of the patients, transfer of patients within the hospital, care coordination with intra-hospital, inter-hospital and intergovernmental departments. The CMH is in the process of translocating itself to a purpose built, the state of the art premises near Portrane, Co. Dublin by 2018.

1.8 Setting the scene

As mentioned in 1.7, currently most of the documentation within CMH is paper based. A typical patient information journey within CMH is outlined here. When the decision to admit a patient is made, the ward staffs receive a faxed copy of the pre admission report. The pre-admission report is compiled by community forensic mental health nurses from prisons. These reports are either faxed or emailed. The hard copy is filed within the patient's file. When the patient is admitted, the admission procedure is documented and an initial integrated care plan is filled in. The initial care plan and other documents are paper based which are then filed. Medical, nursing and other members of the multidisciplinary teams write clinical notes in a bound Integrated Care Plan (ICP) booklet which has 100 pages. Once the ICP is exhausted, a new one is used to for continued documentation. The exhausted ICP's are then filed into the patients file which is an arch lever file. There are subsections under which documents are filed. However, in practice, there is no consistency in the filing of the documents. A patient file will typically include, admission notes, legal documents, case conference notes, a copy of consent of treatment notes, old ICP notes, old kardex, a copy of property list, a copy of three monthly care plans.

When a patient is transferred within the hospital to a different ward, all patient documentation, including the patient file, the current integrated care plan notes and kardexes are also transferred to the other ward. The duration of a transfer between two wards vary on the progress of the patient. On an average, a patient may stay within a ward for 12-15 months and a typical stay of a patient from the time of admission to discharge in to the community ranges from 3-7 years.

1.9 Current IT system within the hospital

The IT system within the hospital is a server based backup system which is divided in to two major drives. The content of the drives are categorised into folders for each patient and they would include case conference notes, scanned copies of legal documents, MDT team review, risk assessment documents, etc. These drives are updated daily by members of MDT, information officer and the mental health administrator. Hospital policies, minutes of meetings and other relevant administrative documents are also found in these drives. Staff roster and allocation (Matrix) was developed in-house and is accessible from the drives. Electronic health records for the patient are currently non existing. Primary health care, Vocational education centre (VEC), the garden project and the recreation department has their folders in the drive. These however, are not integrated. The alarm system, a key element of a secure forensic hospital is not integrated into the server based system and it remains in silos. There is very limited access to hospital drives remotely which needs special agreement from the Health Service Executive IT department. Emails, letters and fax remain the main communication modes within other service agencies such as Irish Prison Service, Courts, External Hospitals and Mental health commission

1.10 Definition of terms and concepts

Key concepts and terminologies used in this research will be briefly discussed here. They are addressed within the context of this study and defined according to their application within this study.

Information needs: Information need is defined as a state or process started when one perceives that there is a gap between the information and knowledge available to solve a problem and the actual solution of the problem. Information competencies are defined as the capabilities developed to reach the solution of a problem by searching for new information or knowledge that could fill the perceived gap (Miranda and Tarapanoff 2008). In this study, information gathered from key informants will inform in finding solutions to information needs experienced by the staff of NFMHS.

Phase I participants (Key informants): Key informants were an integral part of anthropology research. However, they are being used extensively in other qualitative research. Marshall (1996) define key informants as an expert source of information. Moreover, key informants should have five qualities associated with them. They are role in the community, knowledge,

willingness, communicability and ability to be impartial. Key informants chosen for this study do fulfill all the five criteria.

Phase 2 participants (Staff): The staff in this study refers to all grades and disciplines of staff working within NFMHS. In this study, the staff population comprises of nurses, occupational therapist, social worker, psychologist, care officers and healthcare assistants.

National Forensic Mental Health (NFMH): In this study, NFMHS refers to Ireland's only forensic mental health hospital located in Dublin. The service provides hospital based and community-based services.

Notes: Notes in this study refer to both the documentation and the integrated care plan used for documentation.

1.11 Overview of the dissertation

This dissertation is organized into five chapters. Chapter one, the introduction, provides an overview of the topic and its components. Moreover, this chapter provides background information, the purpose of the study and significance of the results.

Chapter two, the literature review, has been organized under information needs within forensic mental health. A subsection within the chapter also deals with evidence on using key informants. Together, this chapter provides the context which the study envisages to explore. An extensive literature review on the broad topics was critically analysed to include only relevant information relating to the study.

Chapter three: This chapter deals with methods and procedures included in the research proposal utilized for the study. A detailed research plan along with elaborate statements of research questions of the study is provided. The research plan introduces the overall research proposal . Moreover, my unique contribution to the area of study, sampling technique, selection of participants, semi-structured interviews, and analysis of data are specified.

Chapter four: Qualitative data analysis and results are presented in this chapter. A semi-structured interview schedule was used for data collection. The interviews were taped and stored. The stored data were transcribed to explore the participant's experiences. Trustworthiness of the conclusion was established by discussing the findings

Chapter five includes discussion of findings. The implications of the study and suggestions for future research in the area are also presented along with a brief summary of the purpose, procedures and methods of this study.

Chapter six is the final chapter of the dissertation and includes the conclusion. This chapter also discusses recommendation and limitation of study. It also reflects on researcher's thoughts on the research process

Chapter 2 State of Art

2.1 Introduction

This chapter explores literature on forensic mental health, use of information technology in mental health and in forensic mental health. The following databases were searched: PubMed, Psych info, MEDLINE and web of science. A general to specific search strategy was applied. The search terms were forensic mental health, health informatics, information technology, adoption of information technology, need assessment, information needs, and key informants. An initial search of literature yielded limited studies, the search then had to be broadened to include mental health instead of forensic mental health. No similar studies were found during the literature search. Literature related to need assessment prior to adoption of information technology in a mental health setting was limited. Most need assessment studies found were related to system requirements. Those studies were ignored as they were not under the scope of this study. This chapter has been organised under the following headings. Forensic mental health, information technology adoption within mental health, use of information technology within mental health/forensic mental health around the globe, information technologies used within mental health and need assessment.

2.2 Forensic mental health

According to McFadyen (1999) "Forensic mental health services deal with those mentally ill people whose presentation has been assessed as requiring a more focused level of expertise and/or increased levels of physical security. Some of these people will have exhibited behaviours which present major challenges, with or without associated violent conduct, beyond the capabilities of general psychiatric services. Others will be mentally disordered offenders who have broken the law or who have the propensity to do so. Some patients will have been identified at the level of general psychiatry and some via the criminal justice system. Of the latter some will be on remand others, however, will be convicted prisoners who are subsequently transferred from prison during their penal sentence."

Tully, Larkin et al. (2015) summarised the complex speciality and stated that mentally ill individuals who have committed violent crimes or are thought to be at high risk of doing so are treated by forensic mental health services

Over the last three decades around the globe, forensic mental health has undergone a systematic shift in service delivery philosophy. A key transformation was in the area of

service delivery and its ethos. The current service delivery mechanism are grounded on evidence-based practice rather than the old philosophy of being punitive and coercive (Sullivan and Mullen 2006). In Ireland, forensic mental health services are provided by the Central Mental Hospital, which is the only National forensic setting (O'Neill, Sinclair et al. 2002).

Forensic mental health is different from general psychiatry in two major aspects. Firstly, it interacts with both health and legal aspects of the patient Mullen (2000) and needs careful documentation of clinical notes. Secondly, forensic psychiatry is characterised by the longer stay of patients within a hospital. Forensic hospitals around the globe, for therapeutic and operational reasons, are fragmented into acute, medium and rehabilitative units/wards even though nomenclature may vary in different organisations. Each unit is characterised by a significantly different security level and care plan (Simpson, Jones et al. 2006).

This organisational anatomy paves the way to the need for care coordination among the different units/wards. Care coordination refers to collaboration between multiple care providers to provide care to patients with a chronic condition (Strauss, Martinez et al. 2015).

2.3 Information technology adoption with mental health.

Uptake of information technology within mental health has been slow in comparison to other specialities of Medicine (Ennis, Rose et al. 2011). Lora (2013) in an Italian study acknowledges the unavailability of information technology within mental health services in Italy. Hence, as part of a future strategic plan to improve the quality within mental health, Lora (2013) underpins the need for a national mental health system with improved information technology. Moreover, a specialist mental health setting such as forensic mental health has been noted to be slow in adopting information technology (Takian, Sheikh et al. 2012).

Many reasons have been attributed to the slow uptake of information technology within mental health services. A study by Duffy, Fochtmann et al. (2015) showed significant variation among a cohort of 1000 psychiatrists. The results show psychiatrists above the age of 50 years were not comfortable in using information technology to perform clinical tasks such as ordering medication, writing clinical notes, etc. However, the younger generation of psychiatrists were found to be more comfortable.

Many countries have initiated National programmes to improve uptake of information technology within mental health services. Both the United Kingdom and the United States of America have notably rolled out such initiatives. In the United Kingdom, the roll out of the National Programme for Information Technology (NPfIT) was undertaken as a major public service step to improve uptake of information technology within mental health services (Takian, Sheikh et al. 2012). In the US, the Agency for Healthcare Research and Quality (AHRQ) have made huge commitments to improve health information technology by increasing funding to health information technology research (Chambers, Haim et al. 2013).

2.4 Use of information technology within in mental health/forensic mental

Information technology within mental health not only aids in gathering data but also ensures governance and service improvements (Organization 2003). Service improvement initiatives and incentives are in place in countries such as the USA to promote uptake of information technology. In the United States, federal incentives exist to support care coordination in the form of Health information Exchange (HIE). HIE is the electronic transfer of patient documentation within or between health care organisation for safer, timely and efficient delivery of care (Blumenthal 2009).

Health information exchange systems are necessary not only to manage patients clinical data but also to facilitate care coordination within a medical setting (Richardson, Vest et al. 2015). Furthermore, Wolff (1998) noted such information exchange systems are quite necessary and will be beneficial within a forensic mental health setting. Forensic mental health in Ireland would benefit from a lead agency or body such as the Agency for Healthcare Research and Quality (AHRQ) in spearheading research and funding. AHRQ historically have supported funding to information technology initiatives deemed to improve the quality of care. However, recently it has changed focus on the financing of investigator-initiated research which would enhance collaboration of stakeholders i.e. staff and clinicians (Chambers, Haim et al. 2013)

An electronic health record is deemed the key in evidence development and implementation. EHR is further being enabled to facilitate comparative effectiveness research (CER). CER aims to customize patient level information and aids in hypothesis generation, comparative assessment and personalised care. Moreover, EHR's also aid in continuous expansion and aggregation using real-time analytics and thus providing point of care evidence to clinicians for decision making.

Duffy, Fochtmann et al. (2015) noted the following uses of information technology within a mental health setting in the United States of America; documenting the clinical notes, prescribing, laboratory test ordering, accessing test results, communication with patients and other clinicians, searching the Internet for clinical information and accessing online patient education materials.

Information technology provides a broad range of options to improve service delivery within a mental health setting. For instance, a patient-centered notification need is seen to be beneficial in quality service delivery. Richardson, Vest et al. (2015) noted notification needs helped end users to be aware of the changes or update on patients changes. Furthermore, they added it would be beneficial to have a visual representation of notification tool.

A number of technologies are being used in mental health settings for assessment, treatment and evaluating the care provided. A touch screen technology was used to obtain feedback from a large sample of 1308 patients both inpatient and outpatient during cognitive behaviour therapy sessions. It was found to encourage regular feedback from the patient especially from those in the high-risk group. (Newnham, Doyle et al. 2012).

Bopp, Miklowitz et al. (2010) used text message and email prompts to monitor mood in bipolar patients in their study on a weekly basis. The results were encouraging and similar to studies which used more traditional retrospective methods to monitor data i.e. one to one interaction. Berrouiguet, Gravey et al. (2014) in a recent pilot study used an intranet based message texting technology for an outreach post suicidal intervention. This study was a feasibility testing pilot study carried out over two month period. Post suicidal patients found text messages to have a positive preventive impact. However, the authors recommend more robust, randomised control trial studies in this area.

Luxton, McCann et al. (2011) used smartphone technology to deliver mindfulness-based therapy to depressive patients and found a major reduction in depressive symptoms. Kauppi, Välimäki et al. (2014) noted that the use of informatics and applications to prompt, remind and alert seriously mentally ill patients, improves their compliance with the treatment plan. Bell, Kilic et al. (2013) studied a search engine based screening to identify drug and alcohol misuse among psychiatric inpatients. The turnaround time was just two minutes. Despite inconsistent documentation, the study was able to determine clearly drug and alcohol abusers.

The use of speech recognition or voice recognition has gained momentum within health care settings especially within mental health setting. One of the reasons of such a huge uptake within mental health settings is the nature of psychiatric documentation. Mental health documentations are dense and narrative in content (Derman, Arenovich et al. 2010). Mixed responses have been found in literature related to the effectiveness of a speech recognition software within health care setting (Johnson, Lapkin et al. 2014). Derman, Arenovich et al. (2010), however, noted speech recognition software to be promising within a mental health setting for documentation.

Electronic prescribing has been proven effective in improving prescribing practices in a mental health setting (Rothbard, Noll et al. 2013). This study was carried out in an outpatient mental health setting and studied suitability of implementing an e-prescribing system. Major findings of the study were the cost effectiveness and improved quality of care within the mental health setting. Chrischilles, Fulda et al. (2002) studied role of the pharmacy computer system in preventing drug errors. The study was carried out at an inpatient mental health setting and the result showed evidence in lower prescribing errors.

However, around the globe, the newer trend in forensic mental health information technology is towards the use of telemedicine as seen in various papers (Philip Merideth MD 1999, Brodey, Claypoole et al. 2014). However, Sood, Mbarika et al. (2007) attribute this to geographical distances between interacting centres or service providers.

Table 1 Information systems and technology used within mental health/forensic mental health around the globe

	Information system and technology
1	Electronic health record
2	Smartphone applications
3	Handheld devices
4	Alert systems for patient
5	Patient electronic health record
6	Telemedicine
7	E-prescribing
8	Voice recognition software
9	Electronic notes

The above table demonstrates information systems and technology used in a mental health/forensic mental health setting around the globe.

2.5 Need assessment

Need assessment has been noted in many studies as a stepping stone towards change management. Cresswell, Bates et al. (2013) stated ten key steps in the successful adoption of information technology within a health care setting. Clarifying the problems that the proposed system aims to tackle is the first of the ten key steps. Need assessment plays a major role in clarifying the existing problems and how proposed systems could resolve them? The third key step is considering the options. Options, however, need to be informed by market availability or be based on information collated from established existing practices. Key informants working in similar practices can inform of the latest options available which are tested and proven.

Implementation of information technology change within a healthcare setting is noted as a socio-technical change(Berg 2001). To promote a smooth transitional change of information technology, it is always advisable to start with user need assessments (Blumenthal 2009).

User involvement needs assessment not only elicits the needs per se but also leads to higher acceptance among the end users during the implementation phase (Mezzich, Dow et

al. 1981). Berg (2001) explains that a need assessment can be contextually defined in two ways. Firstly, user need assessment identifies the necessary system specification on which the information technology is built. Secondly, need assessment identifies what the users need or what would work best in the actual work situation. Furthermore, apart from these defined reasons, Washburn, Fiol et al. (2006) noted information needs usually occur at the point of care and generally remain unmet, and this affects service delivery. Moreover, Currie, Graham et al. (2003) also noted a huge amount of unmet information needs among clinicians while using clinical information systems.

Another phrase used closely with need assessment is user involvement. This, however, is more linked towards the design and implementation of information technology and primarily uses interviews to extract user needs and requirements (Mezzich, Dow et al. 1981).

Needs assessment within a hospital environment can range over a spectrum of needs. Different studies have used various categorization of requirements based on the aims of the individual study. Information need assessment arising from a study conducted by Richardson, Vest et al. (2015) were broadly monitoring, notification, collaboration, reporting, and interoperability. Moreover need assessment can also flag the end user's operational concerns such as irrelevance of informational content, difficulty in managing huge volumes of paper records, untimely retrieval of information and concerns about privacy and confidentiality (Mezzich, Dow et al. 1981).

The benefits of need assessment have been well documented in studies. Kannampallil, Franklin et al. (2013) reviewed information needs assessment of physicians working in a critical environment using think aloud methodology. Their study showed electronic databases provided clinicians with increased information gain and data of superior quality. Allen, Currie et al. (2003) in one of the earliest studies assessing clinicians, information needs identified 154 information needs which were grouped into 11 patterns. However, these information needs were investigated during clinician's use of a clinical information system, and the main aim was to generate info buttons for future use within those clinical information systems. The study was an observational study with audio and video recording.

 There is a scarcity of studies on information needs within mental health or forensic mental health. The shortage of information could be attributed to the slow uptake of information

technology within a behavioural health setting (Puskar, Aubrecht et al. 2004). The limited studies that are available focus on system development, design and implementation.

Qualitative, quantitative or mixed methods have been used in need assessment studies. However, qualitative methods using semi- structured interviews are deemed more efficient in eliciting user requirements than other methods. Furthermore, some need assessment studies incorporate ethnographic study methodology (Forsythe 1995, Hartmann, Fischer et al. 2009). Ethnographic methods incorporate both participant observation and in-depth interviews using key informants. Such methods would discover the actual user need i.e. what they need in a real work environment (Berg 2001). The use of audio and video recording during interviews has been documented in studies which add to the rigor of the study.

A semi-structured interview method is preferred while interviewing key informants as noted by Richardson, Vest et al. (2015). The aim of their study was to identify what types of Information technology are needed to improve care coordination within three patient-centered medical homes. In their study, a progressively refined semi-structured interview schedule was utilised. The major area studied was how IT can support care coordination. They emailed key informants in the different organisations based on publication or title and subsequently found other key informants by using a snowball technique. The recruitment process was stopped once they reached a thematic saturation. During telephone interviews, digital recording, and handwritten notes were taken which were further transcribed for study purposes.

Richardson, Vest et al. (2015) also noted an initial interview guide helps the interviewer in directing the interview in a structured manner, and it is advisable to be constantly reviewed based on key informant's responses. Furthermore, interview questions can be discussed with subject experts to eliminate researcher bias (Strauss, Martinez et al. 2015). Many qualitative need assessment studies using key informants and specific participants use convenience sampling. In that case, there is the risk of researcher bias. However, the researcher bias can be further mitigated by using a non-probabilistic convenience sampling (Strauss, Martinez et al. 2015). Clarification during interviews is crucial especially when participants might reveal unexpected but relevant information (Richardson, Vest et al. 2015).

Strauss, Martinez et al. (2015) note the consensus for the semi-structured interview duration is 30 minutes in many studies. Interviews can be recorded, handwritten or both. However, the recorded data needs to be transcribed. Further analysis of transcribed data if needed can be performed using software such as NVio qualitative assessment software (Richardson, Vest et al. 2015).

Chapter 3 Methodology

3.1 Introduction

This chapter will address the methodological approach used in answering the research question. Furthermore, this chapter will set out the aims and objectives of the study. The purpose of the study and the research question that guided the study is also provided here. It will also provide a rationale for the research design, the sampling method, procedure for data collection and ethical consideration.

3.2 Purpose of the Study

This study had two purposes; firstly, the study explored ideas and experiences from key informants working within mental health and forensic mental health regarding information needs and requirements. Secondly, from staff interviews, the study explored user information needs within NFMHS. Findings from both the interviews were collated to address information needs identified by staff. Aims and objectives that guided the whole study are stated below.

3.3 Research question

The larger issue under study is "Information needs within National Forensic Mental Health Services in Ireland". However, the two specific research questions, the study aims to address are

1. What information systems are necessary within a forensic mental health setting
2. How can the identified information systems meet the information needs of staff within the forensic mental health setting?

3.4 Aims and Objectives of the Study
The overall aim of the study is to identify information needs within NFMHS in Ireland.

The objectives of the study are

-   To explore, capture and identify information needs and requirements within forensic mental health experienced by Key Informants
-   To determine and explore the information needs of staff working within NFMHS
-   To address the information needs identified by the staff of NFMHS using information provided by Key informants

3.5 Research Design

A descriptive qualitative approach was deemed suitable to explore information needs within NFMHS. Qualitative research can be defined in many ways. Strauss and Corbin (1990) define qualitative research as

"Any type of research that produces findings not arrived at by statistical procedures or other means of quantification. It [qualitative research] can refer to research about persons' lives, lived experiences, behaviours, emotions, and feelings as well as about organizational functioning, social movements, and cultural phenomena".

Using a qualitative interview-based design; the study aims to examine information needs within NFMHS. The study uses both key informants and staff of NFMHS. The design enables to elicit first-hand information on user needs and also enables to establish benchmark information technology available around the globe.

3.6 Rationale for research design

Qualitative research differs from quantitative research in many ways. Quantitative research focuses predominantly on causality, prediction and generalisation of findings. However, in qualitative research, the focus is on illumination, understanding, and extrapolation of findings to a similar situation. Strauss and Corbin (1990) identify three reasons for qualitative research to be used. They are 1, to explore, 2, nature of the research problem and 3, complementary to preferences and personal experience of the researcher. Qualitative research enables the researcher to gather enough data to cover the depth and breadth of the question by exploring themes and giving participants freedom of expression respectively.

The research aim of this study is to assess the information need within National Forensic Mental Health in Ireland. Information needs are key in establishing a working platform for future development of information systems within the study setting. To identify setting specific information needs, it is pertinent to establish what are the information systems available and being used in a similar forensic setting or a mental health setting within the country or globally. An extensive review of the literature provided adequate information and furthermore, using key informants from similar settings generated more valuable information. Using key informants is a well-documented approach in assessing information needs. A setting specific information needs can also be evaluated by studying the information needs of the staff of National forensic mental health. An in-depth

understanding of the user needs warrants interviewing both key informants and staff of National forensic mental health. Hence, a descriptive, non-experimental qualitative design is adopted for the study.

This choice of design is justified because an extensive search of published literature failed to produce any information on the research topic within Ireland. This being first of its kind study in the country, a qualitative approach will enable to generate a substantial amount of data.

3.7 Sampling method and recruitment

It is impractical and unethical to study the whole population during the research process hence Marshall (1996) noted sampling as an important step in a research study. One of the challenges when selecting samples for qualitative study is to ensure the diversity and representation of the population (Onwuegbuzie and Leech 2007). Since most qualitative studies incorporate small sample size, a purposive sampling is recommended (Barbour 2001). Furthermore, it enhances the rigor of the study conducted. Hence a purposive sampling method was adopted for this study.

3.7.1 Sampling method

It can be argued that in an ideal situation, data should be collected from everyone in the study population. However, it is impractical and inefficient (Marshall 1996). Hence sampling techniques are used to ascertain the right sample for study. These samples should be reflective of the diversity within the population. In a qualitative study using purposive sampling, the emphasis is on selecting the right sample. Moreover, purposive sampling helps the in-depth understanding of the phenomenon. (Coyne 1997)

3.7.2 Sample population

This study has been carried out using two kinds of samples. For study purposes, they are referred to as phases. Phase I, the key informants and phase II, the staff of NFMHS.

3.7.2.1 Phase I

Key informants were recruited using professional networking. The researcher aimed to interview a total of 20 key informants. However, 7 of the key informants declined to participate in the study. A total of 13 key informants were interviewed. Key informants were initially contacted by mail, phone or directly, and a brief description of the study was provided. A request to send detailed information and informed consent was sought. Once

the request was accepted, information on the study and the informed consent document was sent via e-mail. A cooling off period of one week was applied after receiving consent to participate in the study. Key informants were then contacted to determine the preferred setting for the interview i.e. telephone, Skype or one to one direct interview.

3.7.2.2 Phase II
Phase II participants included both clinical and non-clinical staff of NFMHS. A population data set of all staff was formulated in collaboration with the hospital human resource department. A stratified purposive sampling technique was adopted for the study to include all members of the staff. The staff profile included nurses, occupational therapist, social workers, psychologists, care officers and health care assistants. A total of 20 staff were interviewed for the study. The staffs were contacted through a written letter along with information sheet and informed consent using hospitals internal mailing system. A cooling off period of one week was applied after receiving consent to participate in the study. The participants were then contacted to determine the preferred setting for the interview i.e. telephone or one to one interviews

3.7.2.1 Inclusion and Exclusion criteria
The study aims to assess information needs of staff within National Forensic Mental Health Service (NFMHS). NFMHS include staff working in both the hospital and in the community and are involved in patient care. Both clinical and non-clinical staffs participate in generating and disseminating patient specific information. Clinical staffs include members of the multi-disciplinary team. Key informants will be working either in forensic mental health or mental health setting either in the country or globally. Hence, the study included

- All staff, clinical and non-clinical working within NFMHS
- Key informants who work in a forensic or general mental health setting
- Key informants and staff will be literate in English language.

3.8 Context and study setting
Central Mental Hospital provides NFMHS in Ireland via inpatient and community setting. Central Mental Hospital is the study setting for this study. CMH is the only forensic mental health hospital in the country. Since the study was divided into two phases, interviews settings can be categorised as over the phone and direct interviews. Direct interviews took

place within NFMHS. The participants chose the date, time, and place for the interview. All the interviews took place in a quiet environment away from distractions.

3.9 Procedure:

The study was done in four steps. The initial step was gaining ethical clearance from both the college and NFMH. Once that was obtained, the researcher identified a possible population of key informants within Ireland and around the globe. Professional networking was utilized to identify potential key informants. A total of 20 key informants were identified and contacted. Out of 20 key informants, seven declined to participate in the study. Simultaneously, the researcher approached NFMHS's human resource allocation officer to obtain a list of all staff working within the service. A purposive sampling technique was utilised to identify phase I and phase II participants. Phase I participants were contacted by email, phone or directly. The phase II participants were contacted through NFMHS internal mailing system.

3.10 Ethical consideration

3.10.1 Ethical approval

Any research raises concern about ethical issues regarding procedures being carried out during the study. Ethics committee do play a major role in overlooking the study process. As noted by Guillemin and Gillam (2004), ethics committee should not be seen merely as jumping through the hoops rather; it should be seen as an important safeguard. The study received ethical clearance from Trinity College Dublin. Ethical approval was sought from the ethics committee of the hospital and was granted (Appendix A). All questions of the semi-structured interview were non-invasive. The study avoided questions that might be deemed as sensitive or intrusive. An information sheet (Appendix B and C) was given, briefing the aims and procedures of the study and an informed consent was obtained (Appendix D)

3.10.2 Consent

Informed consent is paramount in any research. Within a qualitative study using semi-structured interview, the importance of consent is further enhanced. Furthermore, if the researcher works within the study setting, there is a real or perceived risk that participants are coerced to participate in the study (Edwards 2005). Therefore, the researcher deliberately spent the time to ascertain that the participants were able to understand the information sheet and then provide an informed consent. The researcher was able to obtain signed informed consent from the participants who agreed for a direct face to face

interview. However, in other cases email confirmation of their consent to participate was ensured before interviews.

3.11 Data collection

Many approaches are used for data collection in qualitative research. Four categories of data collection methods are suggested by (Marshall and Rossman 1999). They are participatory data collection, observatory data collection, in-depth interview, and document analysis. For the purpose of this research, an interview method was utilized as they yield rich information. The researcher also decided to incorporate some structure to the interview. This was to ensure that the data was collected in its richness and completeness. For the purpose of a structural interview, a semi-structured interview schedule was deemed best and most appropriate to collect data. Data collection and analysis were done simultaneously to increase flexibility of research. Such an approach was described by (Coffey and Atkinson 1996). The cyclical process of collection and analysis continues until the concepts and themes become clearer (Miles and Huberman 1984).

3.11.1 Semi-structure interview

Semi-structured interviews are extensively used in qualitative research, particularly in social and psychological sciences. The benefit of a semi-structured interview is the interview schedule. An interview schedule helps the researcher to address all the areas that are relevant and the semi-structured nature enables the participants to express their thoughts and feelings freely. The interview schedule that guided this research was developed based on the researcher's knowledge of information needs within NFMHS and also based on findings from a review of the literature (chapter 2). The interview schedule is incorporated in the appendix of this study (Appendix E and F).

Some of the key informant interviews took place over the phone and the rest of phase I and all the phase II interviews took place at the Central Mental Hospital. For phone interviews, an agreed time was set for the researcher to contact key informants. All the phone calls were made from the landline which enabled the researcher to record the interviews. The researcher utilised the voice recorder application of the smartphone to record the interviews. Before the commencement of the interview, the researcher thanked the participants for their time, reiterated the purpose of the interview, explained about recording the interviews. Few participants declined to be recorded and in those cases, notes were taken and analysed. The interviews lasted between fifteen and twenty minutes. All

through the process of the interview, participant's well-being was of paramount importance and care was taken not to distress the participants. After the interviews had been finished, the researcher spent the time to conclude the process by chatting to the participants.

3.11.2 Reflexivity as a researcher's role

One of the challenges the researcher faced during interviews was to ensure reflexivity. Reflexivity is the continuous process of reflection by the researcher on their own values, preconceptions, behaviour or presence and those of the participants, which can affect responses (Parahoo 2014). The researcher was known to all participants who worked in the NFMHS. The researcher also works at NFMHS and would be easy to have preconceptions about interview content. The researcher had to take a number of steps to ensure reflexivity for this study. Prior to all interviews, a deliberate measure of clearing the mind of preconceived notions and ideas regarding information needs was taken by the researcher. During the interview, efforts were taken by the researcher not to lead the participants and to pre-empt them. Adhering closely to the interview schedule helped the researcher from leading participants into ideas. While there were no instances of deliberate leading during interviews, it was difficult not to lead participants on occasions.

3.11.3 Management and storage of data

Privacy and rights of the participants were upheld with paramount importance throughout this study. All participants were coded as a voice recorder was used. No personal data was collected during the interview. Each audio file was downloaded and saved to the researchers laptop and later on to and external hard drive. Each file was coded and transcribed to ensure confidentiality. Notes were taken during interviews with participants who declined to be recorded, recordings and transcribed notes were kept under lock and key in researchers home. Access to these materials is restricted to the researcher.

3.12 Methodological limitations

One of the strengths of the study was that this study is the first to look into information needs within NFMHS in Ireland. Another strength was the sample size of this study. A total of thirty-three participants were interviewed for this study. This aided to capture information more robustly and in its richness. However, there was some limitation to the study which included the semi-structure interview schedule. The researcher in hindsight felt even though, the interview schedule was of great help during the process, few more questions could have been added such as staff rostering and systems around staff training. There was

also an issue of time constraint. The researcher would have greatly benefitted from having a longer time.

Another limitation was the 'novice 'nature of the researcher in qualitative research. There is always a concern that novice researchers in qualitative research might go beyond the words and ignore the obvious. This, however, was addressed by adequate support and supervision from the supervisor.

3.13 Pilot study

A pilot study was carried out with two interviews. A pilot study is a mini study of the larger study. They are also called as a feasibility study and are a crucial component of a good qualitative study (Van Teijlingen and Hundley 2002). Pilot studies also help in refining interview questions and schedules. Furthermore, they help in forecasting difficulties that may arise in the course of the research (Sampson 2004). Pilot studies were conducted in the same setting as the actual study and participants from both the phases were included. They gave the researcher a test of the interview schedule and the questions. One of the main issue noted was the time keeping in interviews and potential for the interview to be narrowed to fewer aspects of information needs. Time keeping was essential as many of the phase 1 participants were interviewed over the phone.

3.14 Data Analysis

Understanding participant's perspective and answering research questions are the two main objectives of data analysis in qualitative research. Hsieh and Shannon (2005) refer qualitative analysis to organising, coding and attributing meaning to data. A three-step approach was adopted in the analysis of data in this study. They include 1. Data reduction, 2. Data display and 3. Conclusion drawing and verification (Miles and Huberman 1984).

Data reduction: It is imperative to concise the volume of data gathered during a qualitative study. Framework by Miles and Huberman (1984) considers data reduction as the first and foremost step in data analysis. The transcribed data is simplified, selected, and themes are extracted by reading and re-reading. Codes were assigned to emerging themes and were categorized into patterns and concepts that reflected the participant's perspective on the research question.

Data display: this refers to the process of organising summarised information to facilitate conclusion drawing later on. Data display is identified as the second step in data analysis

(Miles and Huberman 1984). Summarised data can be displayed by using either matrices or networks. Matrices use rows and columns and contain coded themes which are extracted from the transcripts (Appendix G, H, I and J). Networks, on the other hand, use the chart to depict summarized information.

Conclusion drawing and verification: the last and final step according to Miles and Huberman (1984) is drawing a conclusion based on data displays. However, these conclusions need to be subjected to verification processes. In qualitative research, establishing the trustworthiness of the findings is deemed as an appropriate verification process.

Trustworthiness of results: GTuckett (2005) outline few strategies that are based on Guba and Lincoln's constructs to ensure trustworthiness within qualitative results. Reliability and validity are the measures used to evaluate a quantitative study. However, in a qualitative study, trustworthiness measures study's utility. Few of the important strategies used to ensure trustworthiness within a qualitative study are credibility, transferability, dependability, and confirmability.

3.15 Conclusion

The study incorporates a qualitative design and uses a semi-structured interview for data collection. There are two phases of the study: phase I which aims to explore information requirements within a forensic mental health setting and phase II, which aims to identify information needs of staff working at the CMH. A total of thirty-three participants were interviewed. The analysis of the data is discussed in the next chapter.

Chapter 4 Analysis

4.1 Introduction

This chapter presents the interview findings from both phases. An overview of participant's profile and analysis is provided. There are two major subsections in the chapter. The first subsection discusses phase I and second subsection discusses phase II findings.

4.2 Overview of participant's profile and analysis

The study was conducted in two phases with two different participants. In phase I, key informants were interviewed and in phase II staffs of NFMHS were interviewed. Recruitment and selection of the participants are discussed in Chapter III.

Table 4.1 profile of key informants in phase I

Profile	N=
Consultant	6
Director of Nursing	1
Assistant Director of Nursing	2
IT Business Analyst	1
Clinical Information Officer	2
Mental health administrator	1
Total	N=13

The above table shows the profile of participants in phase I. Thirteen key informants were interviewed in phase I. The profile included six consultant psychiatrists, one director of nursing, two assistant directors of nursing, two clinical information officers, one IT analyst with experience of working in mental health and one mental health administrator. Four participants were from the UK, one from Italy and one participant was from Germany.

Table 4.2 Participant's years of experience within mental health services

The following table shows the experience key informants had in mental health in years. Years of experience was a decisive factor while recruiting key informants.

	Less than 5 years	5-10 years	10-15 years	More than 15 years
Key Informants	1	2	4	6

Four out of the 13 participants in phase I, did not agree to be recorded and preferred notes to be taken. Detailed notes were taken, and clarification of experiences was sought whenever it was necessary

Table 4.3 Profile of staff of NFMHS (phase II)

Category of staff	n =
Nurses	12
Social worker	2
Occupational therapist	2
Care Officer	1
Health care assistant	2
psychologist	1
Total	N=20

The above table denotes the profile of staff of NHFMS who participated in phase II of the study.

Table 4.4. Years of experience of phase II participants (staff of NFMHS).

The following table shows the experience of phase II participants (staff of NFMHS).

	Less than 5 years	5-10 years	10-15 years	More than 15 years
Staff of NFMHS	7	4	3	6

All twenty participants in phase II agreed to be recorded. The profile of phase II participants, NFMHS staff, consisted of thirteen nurses, two social workers, two occupational therapists, one psychologist, one care officer and one health care assistant.

Reading and re-reading the notes and transcribed text led to data reduction and the emergence of themes. An open coding system was used for emerging themes. Themes were organised into two groups based on the research questions. Phase I and phase II participants were asked question relating to research question 1 and research question 2 respectively. However, themes did overlap between the two research questions and in some instances, phase II participants did have some input towards research question 2. Both phase participants provided a robust and thick description of information needs within NFMHS. In the sections that follow participants' thoughts are presented. Participant's quotes are presented in everyday vernacular to some extent.

4.3 Phase I Themes

The first research question was what information systems are necessary within a forensic mental health setting? Themes relating to this question were identified from the data.

1. Electronic health record
2. Patient portal
3. Integrated hospital information system
4. Telepsychiatry
5. Property and financial management system
6. E-prescribing
7. Unique identifier
8. Voice recognition software
9. Procurement
10. Handheld devices

Along with emerging themes, it was noted categories and patterns were evolving during the interviews. For example, key informants thoughts on information needs were two fold, one based on their experience within forensic mental health service and also its implication within in the service.

4.3.1 Electronic Health Record

Almost all phase I participants identified an electronic health record as an integral part of an information system within forensic mental health setting. However, they differed on how and what should be included in the EHR.

One of the key informants stated "Electronic health record is vital in modern day health care and every hospital irrespective of the nature of service provided should have it. There isn't any excuse for organisations for not having them, and that is the way health care is progressing to."

"Electronic health records facilitates for interdisciplinary and intradisciplinary planning and delivery of care and services. It is true; it needs investment in terms of money and other resources, but it is worth every penny" commented another phase I participant.

Continuity of care and longevity of patients were also reflected in the theme of EHR. A key informant reflected on the experience he had while working with an EHR project and stated: "one of the key drivers in an EHR initiative that I worked ten years ago was the longevity of care provided within forensic mental health."

Most of the key informants had an experience using EHR. However, a few participants from Ireland made a comment on the system used in the Irish Prison System (IPS). Participants familiar with IPS health record suggested having a similar system within a forensic setting. They were of the opinion that such a system will be able to talk to the IPS system facilitating a much smoother data transfer.

"I have been using the prison health record system for a while, and it is fantastic. They are very easy to use, and it generates reports at the click of a button. They are very much user-friendly. I do not understand why we do not have such health record within Central Mental Hospital" stated a participant.

One of the key informants from NFMHS in phase I had a different view of EHR. "I have seen different EHR's being used in the UK across NHS. To me, it has never appealed. Yes, they have their benefits, but are not user-friendly and not well organised. Our system has transformed from the ledger-based system, and the current system has constantly been evolving. We need to work on a system that can digitalize existing system."

4.3.2 Patient Portal
A patient portal was suggested by six out of thirteen phase I participants. It was suggested as an add-on to EHR. "Within a mental health setting, I think it is important to have a patient portal in addition to electronic health record, where patients can log themselves and feedback how they are feeling" commented a clinician.

A consultant reflected similar thoughts: "Patient portal has been successfully implemented in the UK where patients can record their mood. This gives an objective assessment and aids in care planning". How the patients accessed the portal was also highlighted: "Access rights need to be carefully considered while setting up the patient portal and also how they access the portal should be discussed. I would suggest handheld devices can be something worth exploring" stated one of the participants.

4.3.3 Integrated hospital information system

Many key informants highlighted the high secure nature of forensic mental health setting and noted it was imperative that a hospital information system should have an integrated security systems built in. Security systems listed by key informants included the alarms, security and closed circuit television (CCTV).

Three participants commented on the importance of an integrated alarm system which would ensure the safety of the patients and staff within the setting. "In the setting that we work, considerable thought has been put in while procuring an alarm system and has proven to increase the safety of patients and staff" stated one of the key informants

"Most alarms systems in the market would do what it says on the cover, but the key is the ability for an audit trail from a risk management point of view. This, as you would know, is critical within a forensic setting" was noted by another key informant

Seven participants commented on the security aspects of a forensic mental health setting. They suggested security dimensions such as checks, protocols, policies and audits should be inbuilt into the wider hospital IT system. "Physical, relational and procedural security is of prime importance in any forensic setting. The only way you can be sure that they are met is by strict audits. IT system should be able to handle that aspect. I see it as a crucial component" stated a participant from the UK.

One of the participants commented "CCTV's are now used widely within forensic mental health setting. They help in improving security and patient care. In an ideal setting, CCTV monitoring should be centralised and can be incorporated to the hospital IT system as an add-on feature"

4.3.4 Videolinks

Eight of the thirteen participants agreed video links as an important aspect of forensic mental health services. Video link was seen as the way forward by one of the key informants. One of the benefits as seen by a key informant was its use in outreach services as remote assessment and court appearances. This was stated by a key informant from the UK: "We use a video link to assess patients and for court appearances here in the UK, and it saves time and resources. Sometimes it is more than a resource issue; it is safer especially when a patient is unwell."

One of the participants did not see video link to be very useful in Ireland given the small size of the country. The person stated, "we are a small country unlike Australia and America, where video linking is well utilized, but we can utilize the concept of video linking for a court appearance when the patient is very ill. That would be beneficial for the patient by not having to travel to Sligo or Donegal".

"I have used it in Australia, and I think provision for a video contact for assessment should be built into the hospital system especially if the hospital is the only forensic hospital in the country" this was a comment by a participant.

4.3.5 Patient property and patient finance management system

Along with the general needs within a forensic setting, based on their background phase I participants did suggest the need for integration within the system. Four key informants raised the need of a patient property management system. This was attributed to the longevity of the patient within the setting.

"As you would know we have a number of patients who are here more than ten years and one of the issues with such long term stay is how we manage their property. There has been a rise in complaints regarding missing property recently, and one of the ways to address the issue is proper storage with restricted access which should be linked to the IT system".

Patient finance was another area suggested by four participants. One of the key informants opined "in this day and age, patients should have access to online banking and shopping which in itself is a huge topic for discussion."

One of the participants suggested " a financial software would be very beneficial to the service since we deal with a whole lot of financial aspects. For me as an administrator and a

clinician, we need to look into the budgetary part, and also we have to look into patient accounts and how they are dealt with". However, one phase I participants from the NFMHS had a different opinion on financial needs. "we have developed our own little way of managing accounts for patient and we are doing well with that. So to me, a financial software would not be high in the list of IT components".

One of the administrative staff commented "the system that we use is obsolete, and if a new IT system is brought in, it should include patient finance software of some sort. This would empower patient through their recovery pathway".

4.3.6 Electronic Prescribing

All the clinicians in Phase I suggested having an e-prescribing system. "E-Prescribing is the way forward. It reduces errors of both prescribing and dispensing. There is more to it. It sure helps if I have to write a report of the last six months" stated one of the clinicians. Another participant opined "e-prescribing should be integrated into the both EHR and Patient portal so that patients are better informed of the medication they are on. This can be quite empowering for rehabilitative patients". Few of the participants had experience in using e-prescribing before. "I have used it before, and I can say that that would be one of the first in my priority list of an IT requirement even as a standalone module. In my experience it [e-prescribing] prevents drug errors of prescribing and dispensing".

One of the clinicians raised concern about the legal requirement of kardex being signed with pen. "It [e-prescribing] is a very good idea, and I have heard of this being used in other hospitals within Ireland, but what I would be concerned is how do we tackle the legality of prescription being signed with pen. There has to be a way, and we can always have expert opinion. But that is something which has to be kept in mind."

4.3.7 Unique identifier

"We need an unique identifier, but we have to be part of the National initiative. We have been using the date of birth for most of our communication, and it has worked well until this time" stated one of the key informant. "Unique Identifier remains an issue, but then that cannot be resolved overnight, I think it might have an implication on IT systems that will be in place, but there should be ways and means around it" was expressed by another phase I participant. A unique identifier was identified as a theme only by four of the thirteen key informants. All other participants were happy to use the date of birth as the unique

identifier. "We have been using the date of birth for all our communication with St.Vincent's University Hospital, and that has been working well. I suppose that should be ok until something better is identified" opined another participant.

4.3.8 Voice recognition software

Of the thirteen phase I participant only three had experience in using voice recognition software for professional use. All the participants agreed the use of voice recognition would be something to look into when developing an IT system for the forensic hospital. "Voice recognition software will ease the tedious task of writing reports not only that, I also presume it will help in better data quality" stated one of the participants of phase I. Even though all of the participants did suggest the use of voice recognition will help, five of the participants were sceptical about the ease of using the software. "There will be lots of learning and relearning from the part of the software to get it right" opined one of the participants. A similar concern was raised by another participant who stated: "it is the teething problem I am worried about, but sure there will be trial runs before they go live." A more pragmatic suggestion was put forward by another participant who suggested: "we need to talk to people who have used them and maybe negotiate with the IT providers even from the planning stage."

4.3.9 Procurement

Participants described the acquisition of an information system as key in tackling information needs. Key informants were divided in opinion about how to procure an information system for forensic mental health setting. Such difference of opinion arose from the background of participants along with previous experiences they had. One of the participants who had an information technology qualification opined "you are better off buying software off the shelf and then customize it to your requirement." When further explored the reasons why, the participant stated "within in health service to develop such an IT system custom built for one setting, is a daunting task which comes with its problems. Why would you do that when you have tested and reliable systems out there. Yes, there should be the option of customizing systems to suit your requirements. That can be built into the contract, or nowadays, the systems are so user-friendly that clinicians can do it for themselves".

Furthermore, the participant added, "you can always get the integration lads in if you want to integrate other systems into the main IT system, and the bottom line is Everything is Possible."

Contrary to such statements, most key informants who had clinical background suggested that an in-house system should be developed which would reflect the needs of the setting. One of the clinicians suggested "we can always look into the Irish Prison System health records; they were developed in house and is brilliant. We should be thinking in those lines if we have to have a system up and running. Another participant stated "by building in-house, you have the freedom to pace it out and we can start with what is top of the list. Moreover, it's much easier to connect the rest when we have it all done."

Interestingly, a participant who had experience of developing such a system in the past and is a practicing clinician strongly advocated for buying commercially available systems. The argument was "yes in those days, the amount of software available was limited, but that is not the case. There is a huge market out there and so is competition too. The off the shelves software are more refined and tested and can go live once it is set up. That is not the case with an in-house IT system. It takes such a long time to develop one, and you always have the prospect of losing manpower during the process which won't help you either".

Another participant stated, "even if we buy off the shelf product, it will need to be customized to a very large extent that at the end it may not look the same at all."

4.3.10 Handheld devices

Almost all of the participants suggested handheld devices to be used in the forensic setting in the future. This would aid in easy accessibility and timely recording. "Handheld devices or palm devices are the way forward and is something worth exploring" commented a clinician. "Handheld devices give the clinicians like me more freedom and accessibility especially in a setting like this where my patients are located at different units" stated a consultant. One of the participants was critical about the use of handheld devices and pointed out the risk assessment involved regarding the use of such devices. "Prior to any implementation, risk assessment needs to be done regarding introducing handheld devices into a secure forensic setting. I would be more comfortable if there are more desktop terminals available for staff".

All the key informants interviewed had rich data on information requirements within NFMHS. Themes emerged denote the main components of an information technology

systems within NFMHS. One of the themes that stood out from the rest was the concept of how to procure the information system.

4.4 Phase II Themes

Phase II of the study included staff of NFMHS. Staff profile included nurses, occupational therapists, social workers, health care assistants, care officer, and psychologists. The second research question was: What are the information needs within the forensic mental health setting, and the themes relating to this were as follows

1. Lack of information
2. Time
3. Errors/Medication errors
4. Volume of records
5. Recording difficulties
6. Handwriting
7. Session booking
8. Property management

4.4.1 Lack of information

All the twenty participants highlighted there was not enough information at the point of care. The extent of the lack of information varied between staff categories. The nursing staff predominantly revealed the difficulty in accessing information. However, this is mainly due to the volume of documentation attached to each patient.

One participant responded "Most often it does not happen but when it happens you know its trouble. It is hard to root through old notes [clinical notes] and to search for some information." The clinical notes are entered into an integrated care plan booklet and on an average, each patient will have five to six booklets each year.

A concurring view was shared by another participant "I recently had to type up a nursing report for case conference; I spend a lot of time looking for past clinical notes". Such situations also happen when the old clinical notes are taken away by other members of the team to write up reports.

A social worker working in NFMHS commented, "I usually talk to patient's family over the phone from my office. Those conversations usually go up to an hour. I then have to walk to

the patient's unit and enter my notes [clinical notes] in the patient's notes [integrated care plan booklet]. The real trouble happens six months later when I have to type up my report from my office. I do not have the patient's file you see, and that would mean I will have to go back to the unit/ward and get a photocopy of my own clinical notes I had written six months ago".

The same participant shared a sub-theme of lack of continuation of information leading to confusing information and effectively a lack of information. "In the unit that I work, half of the notes [clinical notes] are sent by email; then they are printed out and attached to the regular notes [integrated care plan booklet]." The concern raised here is regarding documentation in rehabilitative units. The multidisciplinary team meeting of rehabilitative units/wards takes place offsite in Usher's Island in Dublin. The clinical entries from the multidisciplinary team meeting are then sent to the two rehabilitative units/wards of the Central Mental Hospital by email. These are then printed and attached to the integrated care plan booklet.

4.4.2 Time

Time was a theme that was shared by fourteen participants. Participants' revealed time is lost in filing clinical notes and retrieving clinical notes. Duplication of clinical notes was considered to be time wasting exercise. However, they had to be done to comply with Mental Health Commission. One participant stated, "Patient information folder would have updated care plans, and they need to be updated every time the care plan is updated. Many times the synchronised updating does not happen, and it becomes the responsibility of the nurse to go through them."

Another participant's concern about the time was due to misplacement of documents. " at the moment, the only electronic copies are scanned documents and since there is no set practices regarding filing around the hospital it is hard to locate them." This concern reflects the inadequacies in the current system. Efforts are made by staff of NFMHS to scan documents and save it in patient folders on the server. This however, is limited to few documents such as mental health commission's forms, consent to treatment forms, case conference notes and legal documents.

4.4.3 Errors / Medication Errors

One of the striking themes from the participants was medication errors. Medication errors were raised by all nurses in phase II. This was seen as a pressing need which needs to be resolved. Prescribed medications are charted on individual kardexes. Nine medications can be written in one kardex. Patients on a greater number of drugs need more kardexes. It is not unusual for patients to have up to four kardexes for the reason above. Kardexes are used to prescribe and dispensing medication and every change in a kardex has to be closely monitored.

One participant stated, "Drug dosage do frequently change especially in the acute units and the way Kardex is written, the change may not be seen quickly and sometimes needs clarification." A similar concern was raised by another participant who commented: "Non-regular staff in the unit find it hard to keep track of the changes, and it would lead to errors."

Errors were not only limited to drug errors. Errors in leave contract were an area raised by many participants. Patients within the forensic mental health setting need to have leave contract as part of the rehabilitative process. A leave contract is a document that entitles patients to avail leave to the community. Typically, a leave contract will have two parts: one from the hospital and the other from the Department of Justice. It is the responsibility of the staff to check and ascertain both documents are within date before the patient is sent out of the ward/unit. Furthermore, leave contracts need to be in line with Department of Justice's agreement. It was noted by some participants, that on many occasion, errors in the leave contract have led to near misses or incidents in which patients have been on leave without proper documentation. This was an area highlighted by health care assistants working in NFMHS who regularly take patients on leave outside the hospital. "We take them out on leave and most often if you are not regular on the unit, then the chances of you making mistakes are more." Twelve participants highlighted the theme of error.

4.4.4 Volume of records

The volume of records within the hospital in general and especially for long-term patients was seen as an issue by almost all the participants irrespective of the discipline they come from. One of the concerns was as the volume increased there was a risk of improper filing that leads to further problems. Moreover, the huge volume also meant much time was spent looking for information. "Coming up to case conferences or court report, we have to go through previous notes [clinical notes], and often it is a difficult task" one of the participants

stated. Similar thoughts were shared not only by nurses but also by social workers and occupational therapists. "When we change teams, it is difficult in the current system to go through all the previous notes [clinical notes] of patients because of the sheer volume; it would be great if the clinical notes were accessible readily in the computer" stated a social worker.

4.4.5 Recording difficulties

All participants shared difficulties in recording. Timely capture of data was an issue within this theme. Nurses maintained since the clinical notes were kept in the office and there was no ready access, there was a time gap before they could record any event that has happened in the unit.

One of the participants stated "the integrated care plan [clinical notes] is always in the office, and you could be in the day room. Given the issues around staffing, I have, in many instances, been held up in the day room and was not able to write notes [clinical notes] as events happened." Similar thoughts were shared by another staff nurse who stated: "there have been delays in writing notes [clinical notes], and I have experienced there is less objective recording when you write notes after a period of time".

DASA (Dynamic Appraisal of Situational Aggression) is a scaled tool that is used for risk assessment within the hospital. It works efficiently when the data is captured and recorded as the risk event happens. However, in the current system, this is not possible, and they may lead to skewed data.

"DASA works brilliantly in the unit I am in, but the chances that you would fill in a DASA sheet as it happens is very rare. I have noticed when the DASA's are not filled straightaway; more personal judgment of the situation may alter the scores." This was shared by a nurse who works in an acute unit/ward of the hospital

Misplaced clinical notes were another area within this theme. Since the patient file incorporates every discipline's clinical notes, it has been very frequently noted the clinical notes are not readily available for people for data entry. Such situation arises when the clinical notes are taken off the ward office for report generation or other purposes. Allied health professionals such as occupational therapists, psychologists, and social workers usually encountered such difficulties. One of the social workers stated, "many times I have spent more time locating clinical notes than writing in them."

Also, there are times when different members of the team have to enter clinical notes for the same patient at the same time, and that leads to waiting for the clinical notes for a significant period

4.4.6 Handwriting

The handwriting was raised as a concern by fifteen participants, mostly nurses. Nurses would frequently change in units, and the usual practice is when they are in a unit after a while, they read the clinical notes to familiarise themselves with the patient. This is where the handwriting becomes an issue. "Bad handwriting annoys me very much. It takes up so much of your time reading through the notes [clinical notes], and sometimes it becomes a guessing exercise" stated a nurse.

The doctor's handwriting was noted to be an area of concern, especially in the drug kardex's where the chances of errors are greater. "Drug kardex's are an area which would benefit from a computerized system. If you are a non-regular staff of the unit, and you do not know the patient very well, then doing drugs is a huge problem because you have to be very sure what is written in the kardex. Mostly the kardexes are written properly but then you never know when they happen".

The handwriting was also seen as a difficulty when generating case conference notes every three months. The nurse has to read through all the entries of all disciplines in the clinical notes and collate information. This exercise is time-consuming and made more difficult due to difficult handwriting. "As a primary nurse for the patients, I have to do the case conference notes every 3 to 6 months, and it usually takes up two days to write a nursing report for the patient. I would say handwriting is a major factor".

4.4.7 Session Booking

Booking of individual session slots was seen as a concern for the allied health professionals. Patients in a forensic setting part take in individual and group session as part of their treatment program. Both individual and group sessions take place in designated space within the hospital. Each ward/unit has limited availability of such space and an advance space booking system is in operation. In the current system, they either have to ring up the unit and ask the staff an available time. All disciplines currently use the unit diary as a booking document. There is a loss of time, double booking of patients at the same time and planning difficulties in the current system. "As a social worker, my work is scheduled on a

weekly basis, and I can say, I usually have to either ring up the unit or walk to the unit to book a slot to see the patient" stated a social worker. Similar thoughts were shared by occupational therapist and psychologists. One of the occupational therapists said "our activities on the unit are very much dependent on the interviewing space available on the unit. A dedicated patient booking system for each unit will be beneficial".

4.4.8 Patient property management

This is one of the pressing needs raised mainly by the nurses and social workers. Currently, the property management system includes a property folder for each patient, and all properties other than valuables are logged in. The valuables are sent to hospital accounts for safe keeping. A receipt of valuables is provided to the patient which then is filed in the property folder. Most of the difficulties with property management arise with inconsistencies of entry, bad handwriting, missing of papers of the property folder, incorrect descriptions. Most often, if some of the property is sent back home or discarded then, an appropriate entry has to be made in the property folder. This, however, is very inconsistent and doesn't happen. One of the major reasons for the inconsistencies highlighted by the staff was resource issues. "Patient's property can be a nightmare at times especially when they are being transferred to a different unit. Most of the patients will have accumulated stuff; they would have brought during their leave. Many times they are not entered into patient's property list" stated a nurse. Another phase II participant noted, "our patients are here for long time, and they will have a substantial amount of property list, missing or misplacement of a single sheet of paper from the property list has huge implications."

There has been many complaints regarding properties being missing after a while of stay in the hospital, and staff is not sure whether the property has gone missing or was it sent back home. "Patient complaints about missing property are a usual occurrence. It is not fair on the patients too; it is their property, and they have spent money. Even though all the complaints are addressed and the individual patients are compensated, I think there should be a better system which would prevent missing of property and enable some sort of tracking" this was noted by a participant.

4.5 Conclusion

Analysis of the interviews yielded rich data and generated interesting ideas around both information systems required within a forensic setting and staff information needs. The participants were encouragingly vocal about ideas that they thought was important. This

finding, however, needs to be correlated to literature findings to provide comprehensive findings.

Chapter 5 Discussion of findings

5.1 Introduction

This chapter discusses the findings of the study. The discussion will be based on the research question of the study. The major themes will be correlated with findings of literature review presented in Chapter 2.

5.2 What information systems are necessary?

The first research question is what information systems are required within a forensic mental health setting? Both key informants and literature review findings were used to answer the research question.

All phase I participants felt that an electronic health record was necessary within a forensic mental health setting. This finding has been consistent with studies in the literature review in chapter two where EHR was a key component of any information technology initiative within mental health service (Ash and Bates 2005). Moreover, EHR adoption has been seen in National initiatives in the UK (Takian, Sheikh et al. 2012, Ser, Robertson et al. 2014) and America (Berner, Detmer et al. 2005). Participants were vocal about the content of EHR. However, that aspect remains out the scope of this study.

Six of thirteen phase I participants felt that a patient portal is necessary. Ash and Bates (2005) noted a patient portal linked to EHR has been successfully implemented in many hospital settings. The patient portal helps to capture patients mental status and their progress in a more subjective manner (Ammenwerth, Schnell-Inderst et al. 2012). They aid in assessment and evaluation of treatment provided. One of the participants strongly advocated for a patient portal within the EHR which would enhance data capture around the mental state of the patient.

Almost all the participants agreed that a hospital information system should include e-prescribing as a major component. Participants opined, e-prescribing as a time-tested approach with positive results. E-Prescribing has been studied extensively, and a systematic review by Ammenwerth, Schnell-Inderst et al. (2008) outlines the benefits of e-prescribing. There is limited literature on e-prescribing in a mental health setting. Participants strongly suggested e-prescribing within the forensic mental health setting as the way forward. All the clinicians in phase I strongly advocated for an e-prescribing with the hospital setting.

The unique identifier has been reflected in the literature searches regarding hospital information systems. A unique identifier was an important driver in hospital information system adoption in US hospitals (Ash and Bates 2005). Some of the participants were vocal to have a unique identifier within the forensic mental health setting. A few participants, however, were sceptical about the feasibility of a unique identifier and suggested forensic mental health setting to wait until the National initiative is rolled out.

Video link was proposed by practicing clinicians in phase I. There was a mixed response regarding its usefulness in an Irish setting. Video link was suggested by the clinicians as an integral part of information and technology systems in a forensic hospital. Even though participants were divided on its use, one of the main uses identified by the participants was in court appearances for the patient. This suggestion was reflected in literature searches around video linking and telepsychiatry as noted by (Khalifa, Saleem et al. 2008).

Property and financial management system were suggested by five of the key informants. This theme emerged from a senior management and administration perspective. A suggestion for a purpose-built financial system to be incorporated into the hospital information system was raised.

Most clinicians suggested handheld devices in phase I. Luxton, McCann et al. (2011) noted handheld devices were successful within mental health services for assessment and care planning. Similar thoughts were shared by key informants especially clinicians. However, incorporating handheld devices within a secure setting warrants rigorous risk assessment and health and safety consideration

Use of voice recognition software for documentation was strongly suggested by all participants in phase I. However, the participants were not clear of the process, and there was no disagreement about the success rates of voice recognition software. The use of voice recognition software in a mental health setting has been studied, and the results are promising (Derman, Arenovich et al. 2010).

An integrated hospital information system was seen as one of the key elements when IT systems are incorporated into a forensic mental health setting. There is a range of add-ons that need to be integrated. First and foremost are the alarms and security systems, and they needed to be part of the hospital information system. The hospital information system

should be able to track and audit every event in the alarm system. They should also incorporate additional functionality based on individual EHR. Participants also suggested CCTV monitoring and recording should be part of the hospital information system which enhances the secure nature of forensic mental health setting. These findings align with literature around CCTV monitoring integrated alarm monitoring systems (Tully, Larkin et al. 2015)

There was no disagreement among the participants regarding the need of an IT system. However, they remained divided on the ways of acquiring the system. Most phase I participants were keen to develop an in-house system similar to the Irish Prison Service. One of the participants who had experience in developing an in-house system in the UK interestingly suggested buying off the shelf product is the way forward. Literature searches around this theme did not yield any information. Procurement becomes an issue for the hospital management and HSE to address.

5.3 Information needs experienced by forensic mental health staff

Research question two was regarding information needs within the National Forensic Mental Health hospital as experienced by staff. A total of 20 staff was interviewed in phase II.

All phase II participants expressed a lack of information at the point of care. Many factors could be attributed to the lack of information such as inaccessibility of clinical notes, improper filing, etc. Similar findings were found during the literature searches underpinning disadvantages with paper-based records (Bates, Ebell et al. 2003).

Time as a theme emerged strongly from phase II participants. Time taken by the staff to document clinical notes, to locate clinical notes and to access information were of major concern. This can be attributed as a disadvantage of the paper-based recording system. Time was also mentioned in terms of timely capture of data which if not done properly can lead to skewed data. Lots of studies have shown time-saving with the implementation of an IT system within a hospital setting (Yoon-Flannery, Zandieh et al. 2008) (Hendrickson and Kovner 1989).

Phase II participants highlighted errors including medication errors. Agrawal (2009) noted an increase in medication errors with a paper-based system. The participants were vocal regarding the need for a system which would reduce errors. Errors highlighted were not only limited to drug errors but also included wrong intervention for the patient. Many of these

errors are unique to a forensic mental health system. Errors such as carrying out patient's leave to the community without proper documentation, errors during admission due to incomplete legal documents, etc. are few to name. These were attributed to lack of information regarding the patient's plan of care at the point of care.

The volume of records was seen as a pressing issue for the participants. Longevity of the patients within the service was noted as the prime reason for the huge volume of records. This inadvertently led to a suite of problems in report generation, data synthesis, and audits. Moreover, all the clinical notes were entered into a single booklet with no possibility of a grouping of information. This was a key concern for disciplines other than nurses.

The handwriting was a theme that emerged from phase II specifically, and it was highlighted as a factor leading to errors. Illegible handwriting is harmful, wasteful and preventable (Rodríguez-Vera, Marin et al. 2002). Bad handwriting often led to the loss of time in collating information from the clinical notes. Medication Kardex's were an area in which illegible handwriting posed potential errors. Handwriting as a concern was highlighted by almost all the participants in phase II.

Difficulties with session booking were noted mainly by allied health professionals in the forensic mental health setting. Participants comprising of occupational therapists, psychologists, and social workers experienced a huge need for a booking system that can be accessed at different locations within the hospital. This will have an impact on timekeeping, saving time and more importantly in the care planning of the patient. Key informants did not identify session booking as a priority among the information requirements. However, a number of appointment scheduling systems are available which can be incorporated in the hospital-wide information system. Appointment scheduling is an important component when a new hospital IT initiative is rolled out.

The property management system was identified as a theme by most phase II participants. The need arises from an increase in discrepancies regarding the patient's property management. Participants advocated for a dedicated property management system built into the hospital information system.

5.4 Addressing identified information needs using key informant's suggestions and literature findings

The third research question was to find out how the information systems suggested by phase I participants and the literature review could address the information needs identified by the phase II participants.

Table 5.1 Information systems to meet information needs

Needs identified by staff	Key informant's suggestions and findings from literature review
• Lack of information	- Server based EHR, Handheld devices, patient portal, alarms, CCTV
• Time	- EHR, dashboards, handheld devices, voice recognition software, alert systems for patient care, video link,
• Illegible handwriting	- Electronic notes, EHR, voice recognition software,
• Errors / Drug errors	- Electronic prescribing, part of EHR or separate standalone module, alert systems, alarms, CCTV
• Volume of records	- EHR, Electronic notes, handheld devices, smartphone application, e- prescribing
• Session booking	
• Property management	- Electronic property management portal built into the hospital information system, handheld devices, patient portal,

The above table shows the information needs identified by the 20 staff of forensic mental health hospital in Ireland and the information systems suggested by 13 key informants in phase I of the study. Almost all the needs identified by the staff can be resolved by the

information systems suggested by key informants. Sessions booking is the only identified need that could not be addressed by information provided by the key informants. Key informants did not identify session booking system as a priority when addressing information requirements. However, numerous appointment scheduling systems Ralston, Valentine et al. (2002) are available, and one of them can be incorporated into the future information systems.

5.5 Conclusion

Information needs have been explicitly stated by the participants in phase II. Key informants interviews yielded valid suggestions to address information needs of the staff in NFMHS. Findings from the literature review also helped to address the information needs of the staff.

Chapter 6 Conclusion

6.1 Introduction

This chapter will firstly outline a summary of the study findings and will then look at the recommendation, implications, and future research in this area. This chapter also aims to look at the outcomes of the study and dissemination of research.

6.2 Summary of findings

The purpose of the study was to identify information needs within the nation forensic mental health services in Ireland. The study questions were what information systems are necessary within NFMHS (identified by key informants)?, what are the information needs of the staff of NFMHS?, and how information systems suggested by key informants can resolve information needs of the staff?. The research was carried out in two different samples or phases as discussed in chapter 3. There was a total of 33 participants, [N=13 key informants (phase I and N=20 staff (phase II)]. When assessing information needs within National Forensic Mental Health Services, it was interesting to note different themes emerged from both phases. Electronic health record was recognised as a prime component of any information technology system within a forensic mental health setting. Key informants, however, remained divided on how the electronic health record will be procured. The most favourable option was developing a system in-house rather than buying an off the shelf software. The argument put forward for such a strategy was the unique nature of forensic mental health hospitals. Along with an electronic health record, many key informants also advocated for a patient portal and an e-prescribing system.

Key informants also shared thoughts on using video links between the forensic hospital and courts around the country to help patients avoid travel when they are acutely unwell. Two key informants had experience in using video links for court appearances in the past. However, both these participants had used it outside the Republic of Ireland. Information technology provision for managing the patient property and the patient's finances was a theme that was highlighted by many key informants. Patient property management was stated to be an issue in all similar settings with a long-term inpatient population. Voice recognition was deemed as an integral part of information technology implementation within NFMHS. Three participants were of the opinion that such innovative approaches will enable staff to capture more robust and clear information.

The information needs of the staff were mainly around the lack of information. The lack of information was linked to a number of factors such as the huge volume of information, improper filing, illegible handwriting, etc. Time loss was also highlighted by many staff in phase II. Time loss was noted to be in documentation and retrieving information. Errors especially medication errors were raised as a concern by participants. Another area that needs attention within the forensic setting is the volume of records. This was highlighted by phase II participants. The volume of records in a forensic mental health setting is substantially large and is due to the long stay of the patients within the setting.

The illegible handwriting was noted as an issue by the staff of NFMHS and plays a major role in errors. Errors due to illegible handwriting were not only limited to drug errors but also other errors such as clinical decision errors. Issues around the booking of session slots were highlighted mostly by non-nursing staff.

6.3 Recommendation and implications

There are some robust and clear outcomes from the study. Key informants expressed clearly the components that should be included in an information system within a forensic mental health setting. The participants in phase II, however, stated where and what the information needs are in the current setting. As discussed in chapter 5, all the information needs can be mapped to the suggestions given by key informants and information needs can be addressed. Based on study findings, the following recommendations are made

1. Information needs of the staff should be considered when planning for an information technology system within NFMHS
2. More extensive research should be done to outline the specific needs of each discipline of staff in NFMHS
3. A customised information technology system is necessary to address information needs of staff with NFMHS.

The researcher believes there are a few implications of this study. They include

1. This study results will inform all stakeholders the current information needs of the staff within NFMHS.
2. This study also will guide the procurement process of an information technology system

3. There is a huge scope for further research in this area. This study is the first of its kind within NFMHS in Ireland.

The study being the first of its kind in NFMHS remains the strength of the study. Moreover, the large sample (N=13 key informants, N=20 NFMHS staff) has enabled the researcher to capture data more robustly. However, there are a few limitations to this study. One of the limitations of the study was that this study aimed to address information needs from a staff perspective. However, if a patient portal is going to be introduced, it will be pertinent that a study assessing patient needs is undertaken. Another limitation is the use off of a semi-structured interview. Focus groups could have been used to collect data and would have yielded richer response. Using survey as a method of data collection along with semi-structured interviews would have benefited the study. Surveys would have given a wider geographical reach, and response rates would have been better. Semi-structured interviews schedule helped a lot during the interview process, however, on hindsight, the researcher felt few other areas could have been added such as staff rostering and systems around staff training.

6.4 Challenges
During the process of this research, the researcher had few challenges. The first challenge was the limited literature around staff information needs within the forensic mental health setting. Second was the ethical application and its approval. Interviewing key informants was a challenge in itself given the profile and geographical location of the participants. It was encouraging to see, the consented participants in both phases were vocal and raised issues that were crucial. Their participation was not only just to write up a thesis, but also, they felt this research will aid to highlight information needs within NFMHS.

6.5 Outcomes of the study
This research study is a part of the academic programme, a Master's degree and is written as a thesis. However, the findings will be disseminated through a number of different ways. A copy of the dissertation will be made available and communicated to the Health Service Executive and forensic services in Ireland. The researcher would also like to present the findings of the study at conferences of both mental health and health informatics. The researcher would also like to use the results of research to inform further discussion on IT

implementation within NFMHS. This research is timely, as the Central Mental Hospital is in the process of relocating to a new purpose-built site in Portrane in north county Dublin by 2018. As part of the move, there have been initial discussions of implementing a hospital-wide information system. The researcher hopes, the findings will benefit during this process of planning.

The researcher has learned a lot during the process of this research study and the knowledge gained will positively impact on further research carried out by the researcher in future. This study has given the researcher knowledge to critically evaluate literature and studies and to have an improved understanding of completing a research project

This piece of study is first in Ireland to be done to assess information needs within forensic mental health. The research would advocate further extensive research in the area. Further research will help to inform specific information needs of every stakeholder involved.

6.6 Conclusion

The study looked at the information requirements within NFMHS from a key informant point of view, information needs of the staff of NFMHS and to address the information needs identified. It is hoped research like this will inform future planning and implementation of information technology within NFMHS.

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Appendices

Appendix A : Ethical Approval from Research Ethics Committee

RE: for ethical approval Msc Health Informatics 003/16   Inbox   x

Bridget Gavin <Bridget.Gavin@scss.tcd.ie>
to me, research-ethics

5 Feb

Hi Daniel

The Research Ethics committee has reviewed and approved your application. You may proceed with this study.
We wish you every success in your research.

Regards
Bridget

Bridget Gavin
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TRINITY COLLEGE DUBLIN

INFORMATION SHEET FOR PHASE I PARTICIPANTS

I am a registered mental health nurse working in a National Forensic Mental Health setting in Ireland. Currently, I am doing a master's degree in health informatics at Trinity College Dublin. As part of the partial fulfillment of master's program, I am studying the information needs within the national forensic setting in Ireland. The aim of the study is to assess the information needs within National forensic hospital in Ireland.

Why me?

You are working in a forensic / general mental health setting. I need you help to identify the information needs within your setting which would increase the quality of care

If I say Yes, What will happen?

You will be provided with information about the study and an informed consent will be sought. You will be asked to participate in a semi-structured interview with the researcher in person or over the phone or any other media which would last for 25 minutes and would include an introduction, actual interview based on the structured format and a conclusion.

If I say no, what will happen?

There is no problem if you say NO, that is your right. There will not be any repercussions. If you agree to participate, you are free to change your mind anytime.

What about my privacy/anonymity

The researcher would know only your name. However, the interview data will be anonymized. You do not have to fill in any personal information on the ration scale sheet. The organization that you work for will not be identified in the study. The interviews will be recorded using tape/digital media. The contents will be used solely for study analysis. Once the study is completed, the data will be deleted.

Confidentiality

No one individual will be identified in the written reports related to the project. Only the researcher will have access to the recorded material.

Conflict of interest: The researcher and you work in similar organization.

Risks: By participating in this study you will not be at risk at any time.

Benefits:

a. The researcher is a practicing mental health nurse within a forensic setting. I would always be interested in improving service delivery

b. You will be making a valuable contribution to heath research and eventually improve Information systems within the service

c. The general results of the study could be made available to you if you are interested

Debriefing: After the study, if you are interested, the researcher can furnish you with study results.

Recording: The whole interview will be recorded on tape or digital media for study purposes. The researcher will use the data only for study purposes. The media of recording and its process will be explained to you. You can have the recording stopped at any time.

How can I get more information?

The researcher is

Daniel Varghese
CNM 2
Central Mental Hospital
Dundrum
Dublin 14

What now?

After you have finished reading this information sheet and the consent form, let me know if you like to participate in the study or not, or if you want more information.

I would deeply appreciate your participation in the study which aims to assess information needs within a forensic mental health setting.

TRINITY COLLEGE DUBLIN

INFORMATION SHEET FOR PHASE II PARTICIPANTS

I am a registered mental health nurse working in a National Forensic Mental Health setting in Ireland. Currently, I am doing a master's degree in health informatics at Trinity College Dublin. As part of the partial fulfillment of master's program, I am studying the information needs within the national forensic setting in Ireland. The aim of the study is to assess the information needs within National forensic hospital in Ireland.

Why me?

You are working in a forensic mental health setting. I need you help to identify the information needs with your setting which would increase the quality of care

If I say Yes, What will happen?

You will be provided with information about the study and an informed consent will be sought. You will be asked to participate in a semi-structured interview with the researcher which would last for 25 minutes and would include an introduction, actual interview based on the structured format and a conclusion.

If I say no, what will happen?

There is no problem if you say NO, that is your right. There will not be any repercussions. If you agree to participate, you are free to change your mind anytime.

What about my privacy/anonymity

The researcher would know only your name. However, the interview data will be anonymized. You do not have to fill in any personal information on the ration scale sheet. The interviews will be recorded using tape/digital media. The contents will be used solely for study analysis. Once the study is completed, the data will be deleted.

Confidentiality

No one individual will be identified in the written reports related to the project. Only the researcher will have access to the recorded material.

Conflict of interest: The researcher and you work in the same organization.

Risks: By participating in this study you will not be at risk at any time.

Benefits:

   a. The researcher is a practicing mental health nurse within a forensic setting. I would always be interested in improving service delivery
   b. You will be making a valuable contribution to heath research and eventually improve Information systems within the service
   c. The general results of the study could be made available to you if you are interested

Debriefing: After the study, if you are interested, the researcher can furnish you with study results.

Recording: The whole interview will be recorded on tape or digital media for study purposes. The researcher will use the data only for study purposes. The media of recording will be shown to you before the interview. You can have the recording stopped at any time.

How can I get more information?

The researcher is
Daniel Varghese
CNM 2
Central Mental Hospital
Dundrum
Dublin 14

What now?

After you have finished reading this information sheet, let me know if you like to participate in the study or not, or if you want more information.

I would deeply appreciate your participation in the study which aims to assess information needs within a forensic mental health setting.

Appendix D: Informed consent

TRINITY COLLEGE DUBLIN

INFORMED CONSENT FORM

LEAD RESEARCHER: Daniel Varghese

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 understand that I may stop electronic recordings at any time, and that I may at any time, even subsequent to my participation have such recordings destroyed (except in situations such as above).
- I understand that, subject to the constraints above, no recordings will be replayed in any public forum or made available to any audience other than the current researchers/research team.
- 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:

Daniel Varghese
CNM 2
Central Mental Hospital
Dundrum
Dublin 14

INVESTIGATOR'S SIGNATURE:

Date:

Appendix E: Interview guide (phase I)

Interview Guide (phase I)

Preamble to the interview

Welcome the participant and explain about the study

Clarify any doubts that the participant might have

Ensure the consent form is filled and the participant is happy about it

Ask about recording the interview and their views on it. If they agree, demonstrate the operations of the voice recorder and how to turn it off (the latter is not possible for phone interviews)

Guide questions

1. How long have you being working in forensic mental health?
2. Have you any experience within forensic mental health outside Irish jurisdiction?
3. Do you have any experience with Information technology
4. Have you worked in a forensic mental health setting equipped with information technology, if so, what are your views on it?
5. What are your thoughts of information technology within a National Forensic Mental Health setting?
6. What do you think are the information technology requirements within a National Forensic Mental Health setting?
7. What benefits would you see from information technology being brought into a forensic mental health setting?
8. Do you think an information technology system will work within a forensic mental health setting
9. If resources were not an issue, what information systems would you think should take priority within a forensic mental health setting?
10. How feasible is it to incorporate the requirements you mentioned within a forensic mental health setting?
11. How would you go about in implementing the information requirements you mentioned in forensic hospital

Examples of probes

Can you describe a bit more?

What do you think about it?

Can you give me an example?

Do you think that might work?

Conclusion to the interview

Thank the participant; explain how the data will be analysed

Clarify with participant if they would like a transcript of the interview and if they would like to change anything that they have said

Clarify any questions that they might have.

Appendix F: Interview guide (phase II)

Interview Guide (phase II)

Preamble to the interview

Welcome the participant and explain about the study

Clarify any doubts that the participant might have

Ensure the consent form is filled and the participant is happy about it

Ask about recording the interview and their views on it. If they agree, demonstrate the operations of the voice recorder and how to turn it off

Guide questions

1. How long have you being working in forensic mental health?
2. Have you any experience within forensic mental health outside Irish jurisdiction?
3. What are the difficulties that you face in accessing information in your work place?
4. How well is information accessible for you at your work place?
5. Do you spent much time looking for information, if yes, can you describe?
6. Is there any other difficulties you face in relation to clinical notes and its access?
7. How big do you think are the problems you mentioned in your daily working environment?
8. Have you had any trouble with information generation and retrieval, if so, can you explain?

Examples of probes

Can you describe a bit more?

What do you think about it?

Can you give me an example?

Do you think that might work?

Conclusion to the interview

Thank the participant; explain how the data will be analysed

Clarify with participant if they would like a transcript of the interview and if they would like to change anything that they have said

Clarify any questions that they might have.

Appendix G: Staff of NFMHS and information needs themes

	1	2	3	4	5	6	7	8
N1	√	√	√	√	√	√		
N2	√	√	√		√			√
N3	√	√		√	√	√		√
N4S	√		√	√	√	√	√	
N5	√	√		√	√			√
N6	√	√			√	√		√
N7S	√		√	√	√	√	√	
N8	√	√	√	√	√			√
N9	√	√		√	√	√		√
N10O	√		√	√	√	√	√	
N11	√	√		√	√	√		
N12	√	√	√		√			√
N13O	√		√	√	√	√	√	√
N14	√	√		√	√	√		√
N15	√	√	√		√	√		
N16P	√		√	√	√	√	√	√
N17	√	√		√	√	√		
N18P	√		√	√	√	√	√	
N19	√	√			√			√
N20	√	√	√	√	√	√		√
TOTAL	20	14	12	16	20	15	6	14

1. LACK OF INFORMATION
2. TIME
3. ERRORS/MEDICATION ERRORS
4. VOLUME OF RECORDS
5. RECORDING DIFFICULTIES
6. HANDWRITING
7. SESSION BOOKING
8. PATIENT PROPERTY MANAGEMENT

Appendix H : Key informants and information requirements themes

	1	2	3	4	5	6	7	8	9		10
									9.1	9.2	
N1	√		√	√		√		√	√		√
N2	√	√		√	√	√	√	√		√	√
N3	√	√				√		√		√	√
N4	√		√		√	√		√	√		√
N5	√		√	√		√	√	√	√		
N6	√	√		√	√	√		√	√		
N7	√	√			√	√	√	√		√	√
N8			√			√		√			√
N9	√	√	√	√		√		√		√	√
N10	√		√	√	√	√		√	√		√
N11	√					√		√		√	√
N12	√		√	√		√		√		√	√
N13	√	√	√	√	√	√	√	√	√		√
TOTAL	12	6	8	8	6	13	4	13	6	6	11

1. EHR
2. PATIENT PORTAL
3. INTEGRATED HOSPITAL SYSTEM
4. TELEPSYCHIATRY
5. PATIENT PROPERTY AND PATIENT FINANCE MANAGEMENT SYSTEM
6. E-PRESCRIBING
7. UNIQUE IDENTIFIER
8. VOICE RECOGNITION SOFTWARE
9. PROCUREMENT
   a. IN HOUSE DEVELOPMENT
   b. BUY OFF THE SHELF PRODUCT
10. HANDHELD DEVICES

Appendix I: Staff themes and significant statement reference

Themes generated, participant number and significant statement reference

	Lack of information	Time	Errors	Volume of records	Recording difficulties	Handwriting	Session booking	Property and finance management
N1	3	10	4	6	12	5		
N2	2	5	4		1			3
N3	14	4		1	2	5		3
N4	3		1	4	2	6	5	
N5	4	3		5	8			2
N6	1	12			5	2		4
N7	2		5	1	14	4	8	7
N8	11	2		3	16	7		5
N9	6	1		9	2	5		3
N10	4		6	1	5	9	3	7
N11	3	1		2	12	5		
N12	9	1	4		3			5
N13	1		5	4	2	7	3	6
N14	13	2		1	11	4		5
N15	4	1	2		5	3		
N16	2		4	12	7	8	5	3
N17	9	3		2	9	6		
N18	1		4	6	2	5	3	7
N19	8	1			2			4
N20	2	5	1	3	4	7		6

Examples of significant statement reference:

N8: statement 18 "I recently had to type up a nursing report for case conference; I spend lot of time looking for past clinical notes".

N20: Statement 7 "Bad handwriting annoys me very much. It takes up so much of your time reading through the notes, and sometimes it becomes a guessing exercise".

Appendix J: Key informants themes and significant statement reference

Themes generated, participant number and significant statement reference

	Ehr	Pt portal	Integrated hospital system	Tele-psychiatry	Patient property and finance	E prescribing	Unique identified	Voice recognition	procurement In house	Off the shelf	Hand held devices
N1	1		3	5		2		4	6		11
N2	2	1		5	4	6	3	9		7	12
N3	4	1				5		2		7	6
N4	13		1		7	12		11	3		6
N5	5		1	4		14	2	6	7		
N6	2	1		11	7	3		15	4		
N7	7	2			3	1	6	16		5	15
N8			2			13		4			1
N9	7	1	12	6		5		14		4	11
N10	2		1	4	12	11		3	7		6
N11	1					4		6		3	2
N12	5		7	11		6		12		2	4
N13	3	2	4	6	8	1	9	5	7		15

Examples of significant statement reference

N5: statement 14: "I have used it before, and I can say that that would be one of the first in my priority list of an IT requirement even as a standalone module. In my experience it [e-prescribing] prevents drug errors of prescribing and dispensing".

N7: statement 15: "Handheld devices or palm devices are the way forward and is something worth exploring"