digiPHIT Project

Final Report
to
The Institute of Community Health Nursing

August 2013
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Introduction

This document reports on the first ever pilot of digital pen data entry in public health nursing in Ireland, initiated in response to recommendations from the Population Health Information Tool (PHIT) project (HSE 2011, p8). The report was compiled to meet requirements of the funding agency, the Institute of Community Health Nursing. Public health nursing (PHN) developments within the PHIT framework impacting on information governance are also reported.

Good information governance allows the sharing of information to provide quality care and the Authority have acknowledged the dearth of data available for sharing within primary care (HIQA 2013). An electronic PHIT will provide valid and reliable information on individual patients and patient subgroups. It will be accessible by managers to resource health centres and primary care teams and be used in practice to inform nursing caseloads.

Standardising primary and secondary public health nursing documentation sets nationally will facilitate good information governance and electronic solutions (McDonald 2013). Validating public health interventions as defined in the American Intervention Wheel (MDH 2001) will support an information governance framework for population health interventions and outcomes and PHN service Performance Indicators (PHIG 2013).

Nursing health informatics is a specialist field with increasing relevance to the PHN service. Commonality and accuracy of clinical terms is necessary during the electronic sharing of a person’s health information, clinical terminologies and classifications provide a common language that allows data to be shared (HIQA 2013a). Consultancy work provided to the project by Dr. Pamela Hussey, Dublin City University, recommends appropriate health informatics standards and a reference terminology for an electronic PHIT.

This first phase digiPHIT project has provided evidence to inform subsequent phases which, following procurement, will deliver a clinically pragmatic data collection tool underpinned by health informatics standards to facilitate
interoperability with future national ICT systems. The HSE Business Case drafted during the project, proposes local and subsequent national implementation of an electronic PHIT over a five to seven year timeframe. It has also identified the urgent need for a dedicated public health nursing representative group to ensure good information governance.

Collaboration between the Health Service Executive, the Institute of Community Health Nursing, Dublin City University and a private digital pen company, Penstream, provided for a comprehensive project Advisory Group to steer this first phase project to successful completion. Proof of concept of digital data entry by pilot PHNs in primary care, the endorsement of an electronic PHIT by Directors of Public Health Nursing nationally, and the drafting of the HSE Business Case are the main outcomes of the project.

Signed: _____________________________       Date: _______________
Anne McDonald PHN Project Leader                15th August 2013
Acknowledgements

I would like to thank the Institute of Community Health Nursing for awarding project funding.

I would like to acknowledge the support of the Director of Public Health Nursing Ms Yvonne Fitzsimons who gave permission for and acted as Chairperson to the project and managed the project expenditure.

For specialist health informatics consultancy work to the project and ongoing support to the development of an electronic PHIT, I would like to thank Dr. Pamela Hussey, Dublin City University.

I would like to thank the pilot nurses who volunteered their time and expertise to the digiPHIT pilot; Ms Susan Cox RGN, Ms Annmarie Coyle PHN and Ms Aisling Keogh PHN.

I would also like to thank Mr. Ciaran Ryan and Mr Philip Horton from Penstream for their support to the project.

I would like to thank Ms Teresa O’Sullivan, HSE ICT Service Desk for providing extra ICT support over the course of the project.

Finally thanks to Ms Mary O’Dowd, Director of the ICHN for her contribution to the Advisory Group and for continuing to champion the progress of the PHIT.

Please note. Photographs in the text are used with permission and are of pilot nurses in the digiPHIT project and of photographs taken from the PHIT DVD which was produced in 2008 with funding from the Office of Tobacco Control
Recommendations

Recommendations listed below are supplementary to the health informatics and ICT requirements for a national electronic Population Health Information Tool outlined in the Health Service Executive Business Case template:

- Convene representative groups to steer the national roll out of an electronic PHIT within a framework of information governance

- Develop national core documentation primary and secondary data sets for use by the public health nursing service nationally

- Use the validated Intervention Wheel to support PHN health information governance

- Identify training in and application of, the nursing process in patient care planning as a mandatory requirement for nurses in primary care

- Develop best practice models of caseload management underpinned by the PHIT Patient Dependency Score, to inform caseload analysis, nursing curricula and e-learning modules

- Develop Caseload Analysis e-learning modules incorporating application of the nursing process to community assessment

- Develop and implement skills training for nurse managers and population health nurses in: supervision, data management and analysis, epidemiology, and report writing

- Develop and implement ICT training sessions for nurses who will use the electronic PHIT

- Develop and implement systems for integrating PHIT data into primary care and national reporting systems
Background to the Population Health Information Tool

The population health approach to service provision remains a priority of contemporary public health systems (DOH 2013). The Population Health Information Tool (PHIT) was developed in 2006-2008 and implemented by the PHN service in Health Service Executive (HSE), Local Health Office (LHO) Dublin North Central (DNC) under the leadership of the PHIT project officer (HSE 2011).

The PHIT is a framework for managing PHN population health information within primary care. Information governance is a framework for handling information in a confidential and secure manner to appropriate ethical and quality standards, to ensure that information is available when needed to contribute to safe and quality care (HIQA 2012). The main driver for the project was the need to collect and use public health nursing health information safely and intelligibly.

Public health nurses nationally are employed by the HSE and are responsible for the health of populations within geographically defined areas (DOHC 2000). Providing population health screening, health promotion, acute and continuing care to a range of population subgroups, PHNs constitute the largest group of nurses employed in the primary care setting they therefore have a key role to play in improving outcomes by providing quality care.

Equity, the core value of population health, is an important aspect of quality and is supported by ensuring the right service for the right patient in the right setting. Traditional PHN service systems do not provide information that is timely or intelligent or which can equitably inform the organisation and management of contemporary PHN practice (McDonald et al 2013).
The motivation for the PHIT project emanated from:

- Unmanageable caseloads in an environment of increasing complexity of health and social care with a corresponding lack of information systems for estimating patient need

- PHN service managers frustration with traditional systems of ‘work returns’ (monthly record of nurses daily child health visiting, home nursing and clinic activities), which did not facilitate equitable caseload allocation or contribute to comprehensive needs assessments

- PHNs claiming that their contribution in primary health care was unseen and unquantifiable

- The emergence of a population health approach with particular emphasis on reducing health inequalities (HSE 2006)

- International literature acknowledging gaps in ‘bottom up’ health information (World Health Organization 2008)

At the launch of the PHIT project in the Ballymun Civic Centre in June 2006, Professor Dame Sarah Cowley used the following quote by Sir Muir Gray to explain good information governance:

*Information is like water. It must be gathered from where it falls, channelled, cleaned, treated and tested before being stored in reservoirs. It must then be made available on tap to those who need it wherever and whenever they need it*

*(Sir Muir Gray cited in DH 2006: 11)*
**Aim of the PHIT Project**

The overall aim of the project was to identify sources of information available on health needs and to explore how this information can be accessed, recorded and used to develop a population health model for use in community nursing practice. Specific objectives were to:

- Identify the information and the systems traditionally used to guide PHN service caseload management and analysis
- Develop a documentation framework to collect, refine and report PHN health information intelligibly
- Underpin this framework with a patient dependency categorisation
- Ensure that this framework would easily migrate to a national electronic solution
- Consolidate the developed framework within a method of caseload supervision which would provide support to the caseload manager, embed ‘tacit’ knowledge to improve the health and well being of communities and provide governance

An action research methodology guided the management of the project and allowed practitioners to examine issues and patterns and gain clarity in their real world of work. It also simultaneously allowed practitioners to act and to create sustainable coherent responses that enhance the lives of people within their communities (McDonald et al 2013).
The PHIT Framework

The PHIT delivered a pragmatic paper based framework comprising; care planning, patient registration, data analysis and caseload analysis (Figure 1). PHIT outcomes are documented in interval and summary reports providing contemporary information on public health, acute and chronic care, case review, case dependency and PHN performance indicators through a population health approach (HSE 2011).

| Screening/ Assessment | Registration & Reporting | Data Analysis & Reporting | Caseload Analysis |

Figure 1. PHIT Framework

Changes in PHN service documentation practice include a standardised approach to patient assessment, registration and summary information. All individual patients registered into PHN caseloads have a care plan initiated and are included in a community assessment which is also guided by the nursing process (Alfaro-LeFevre 2010, MDH 2001).

Patients are assessed for dependency needs and registered into one of four population registers (family, acute, chronic and older adults). Registration requires coding each patient for: geography, caseload, marital / living status, diagnosis and public health issues, self care, nursing treatment and outcome.

The PHIT is introduced to nurses at induction and ongoing training sessions and presented to students in a third-level education institute. The PHIT has been presented at international conferences, and published by the HSE, the

**Recommendations from the PHIT**

The PHIT project reported recommendations under the following five headings: 1) Health Information, 2) Quality and Governance, 3) Research and Development, 4) Service Development and Workforce Planning, and 5) Education and Professional Development (HSE 2011, p8). Appointing a PHN project officer to the implementation phase of the PHIT in LHO DNC supported the progression and implementation of many of these recommendations.

Successful application to the Institute of Community Health Nursing provided funding for the pilot of electronic entry of PHIT data named the digiPHIT pilot which addresses priority PHIT recommendations. Progress made on recommendations will be reported here under the following headings:

1) PHN Service Documentation

2) Caseload Management and Caseload Analysis

3) The American Intervention Wheel

4) The digiPHIT Pilot Project

5) The electronic PHIT HSE ICT Business Case
Public Health Nursing Service Documentation

Documentation is any written or electronically generated information about a client or patient that describes their care or services provided to them and it is integral to the work of nursing. Documentation allows nurses communicate their observations, decisions, actions and outcomes of these actions with other health care professionals and their clients. It supports the planning and quality assurance of care, educational and legal considerations of care giving and contributes to a population health approach to equitable care.

The quality of records maintained by nurses and midwives is a reflection of the quality of the care provided by them to patients and clients (An Bord Altranais 2002). Despite implications of poor quality record keeping, nurses historically prioritise their time to caring duties rather than to daily paperwork routines (Prendergast and Sheridan 2012, p39).

National PHN documentation systems need to be user friendly and intuitive, be underpinned by a common language and generate outcomes which can be shown to have a direct impact on overall service delivery and population health. The Health Information and Quality Authority (HIQA) recommend: *The use of service-user information, both to support the provision of safe and effective care and for secondary purposes, in line with legislation and recognised evidence-based guidance* (HIQA 2012a, p134).
Public health nursing documentation practice is regulated by An Bord Altranais (2000, 2000a & 2002), the Nurses Act (Government of Ireland 1985) the Data Protection Act (Government of Ireland 1988, 2003) and the Freedom of Information Act (Government of Ireland 2007), and guided by the Health Information Quality Authority (2012a) and the Health Service Executive (2010, 2010a and 2011a).

The variation in paper based documentation exhibited in 2013 at the ICHN Documentation Workshop highlights a critical need for core PHN documentation data sets guided by the above evidence, nationally endorsed and supported by the PHN service, and continually updated.

**The PHIT Documentation**

The evidence-based suite of PHIT documents has been fully implemented and regularly audited and upgraded. Public health need indicator data is collected and upgraded through a system of paper based registration and there are currently four PHIT registers which constitute secondary documentation. Electronic versions of primary PHIT documents will allow the generation of secondary data sets from the primary data.

Documentation workflow scoped by the original PHIT Working Group identified core influences on PHN documentation sets: referrals (in), care setting, other home care providers, acute / continuing care, family health, primary care referral (within and out), and discharge (HSE 2011, p37).
Audit highlighted the need to revise care planning documentation to comply with evidence and to align with information needed for the registration process. Nurses from the pilot area delivered a PHIT Patient Assessment / Care Plan to promote valid and reliable registration of patients into three of the four registers. The new documentation was supported by customised care plan training sessions accredited by An Bord Altranais.

The revised care plan was the first form digitised for testing of digital data entry under the pilot project. Feedback from the focus group evaluating the digitised care plan is positive;

*I actually think it is very good....it is a very detailed form...what I really like about it is especially when you are, when I am dealing with a new patient as well that you have a very, very in-depth diagnosis and medical and surgical or medical history especially which is so, so relevant* (Respondent 1, Appendix 1)

*Em, it had been around for years and it didn't cover....an awful lot where as there is, in the PHIT assessment its much more comprehensive view of everything that's going on* (Respondent 3, Appendix 1)
Introduction of the Child and Family Health Needs Assessment Framework provides a tool to assist PHNs in identifying families in need of additional support (O’Dwyer 2012). This framework has been adapted and implemented in LHO DNC and the maternal post natal record document from the framework is the second form digitised for pilot representing the fourth PHIT Register, the Family Health Register.
Caseload Management and Caseload Analysis

Caseload management is a process of managing care for a number of patients whose care is governed at both individual and population level within a defined caseload with reference to a population health model (HSE 2011, p32) and is the prime responsibility of the PHN. The geographic base from which PHN caseloads are managed supports a community leadership role (DOH 2013, p21).

Systems for managing patient caseloads in primary care although frequently recommended (DOH 1997, HSE 2006, 2011) have not been widely researched (Pye 2011, McDonald et al 2013). Standardising and replicating caseload management models in primary care, is a recommendation of the PHIT (HSE 2011, p8). Competencies underpinning effective caseload management, where caseload is seen as a unit of service delivery within primary care, require identification and inclusion in educational curricula.

The PHIT framework provides guidelines for caseload managers when admitting, planning care for, and discharging patients. A glossary of terms, checklists for active and inactive patient status and a patient dependency score underpin the framework supporting caseload management and caseload analysis. However, competencies needed by PHNs managing a team of nurses and health care assistants within a primary care caseload framework, need further consideration.

The value of using PHN quantitative and qualitative health information such as is recorded in the CA process is recently documented (DOH 2013 p27). Caseload Analysis (CA) provides a systematic approach to identifying needs and responses of geographic caseloads, and of caseload managers. Audits of care plans and patient registers are undertaken during the CA. Comprehensive health information embracing wider determinants of health will be obtained from collective CA outcomes and further optimised by inclusion of primary care team members in the process.
The CA is a process which is experienced as supportive by both PHNs and Assistant Directors of Public Health Nursing (HSE 2011), and is defined as:

*A process undertaken jointly by geographic caseload holders and their line managers at agreed intervals which will identify the quality of the nursing interventions and the nursing needs of a public health nursing service caseload. It will contribute to resourcing of the public health nursing service to population health and to integrated service planning generally and to professional and practice development within public health nursing* (HSE 2011, p54).

The CA guideline requires that the Director of Public Health Nursing maintains a register of CA’s undertaken and of the ‘Cause for Concern’ families identified. The PHN management team in LHO DNC with support from the project leader are currently evaluating their experience of CA’s undertaken in the implementation phase of the PHIT project. This evaluation will inform competencies needed for best practice caseload management for clinicians and skills such as; supervision, data analysis, epidemiology and report writing for line managers. It will contribute to collaboration with third level colleges and national leadership programmes to further develop the CA process in primary care.
Application of the nursing process by PHNs when assessing communities for the CA process is a new development and one which was influenced by the core assumptions underpinning the American Intervention Wheel. Core assumptions of the American PHN Intervention Wheel require that all PHN interventions are population focused and that the nursing process applies at all levels of practice (MDH 2001, PHIG 2013).

Outcome reports from the PHIT data analysed by the project leader are currently circulated to managers in one local health office. A bespoke PHIT database when developed will stream summary reports and views. Merging streamed reports with qualitative information to develop recommendations for service planning will require analysis and report writing skills and indicates a need for a specialist population health nursing role.

Whilst the scope of the overall PHIT project is related to public health nursing function, the data recorded in the CA is relevant to other key stakeholders engaged in primary care delivery. Methods of using information compiled from collective PHIT CA’s in primary care when developed will bridge the identified gap in information workflow (HSE 2013 p28).
The American Intervention Wheel

A review of the international nursing literature, undertaken during the process of developing the PHIT framework, highlighted work already undertaken by American PHNs. Public Health Nurses based in Minnesota created and named an “Intervention Wheel” to identify and name public health actions or interventions that they undertake to improve the health of their population, underpinned by a set of ten assumptions (MDOH 2001).

The Intervention Wheel provides a conceptual model for PHN practice and was developed, fifteen years ago, through a grounded theory process. It aimed to highlight and make visible the core functions of PHN practice and has been presented as a model for practice in the United States of America and internationally (Keller et al 2012).

The ten assumptions underpinning the Intervention Wheel define a PHN practice which operates at the population level emphasising all levels of prevention and embracing the wider determinants of health which is informed by an assessment of community health. They articulate three practice levels; community, systems and individual / family, the use of the nursing process at all three levels and the interventions or actions taken at these levels to improve or protect health status. The seventeen public health interventions or actions of the Intervention Wheel are visually represented in a colour-coded wheel comprising five wedges (Figure 2).

A set of values and beliefs outlined in the Cornerstones of Public Health Nursing Practice (MDH 2004) accompanies the interventions explaining the overall motivation and challenges for public health nursing practice. A book of Intervention Wheel stories describes the experience of American PHNs from their perspective of day-to-day practice (MDH 2006).
The value of adapting a system of comprehensive PHN interventions for use within the Irish context is obvious and will contribute to PHN educational requirements and to the health information framework of the PHIT. The ICHN Population Health Information Interest Group (PHIG) was convened in 2011. One of the objectives agreed by the PHIG group was to continue the work initiated by the PHIT project; validating the American Intervention Wheel in the Irish context.

A collection of stories from the *Irish Wheel* (Figure 3) adapted from the American Intervention Wheel and validated by the co-authors, Sue Strohschein and Linda Olson Keller has been compiled by the PHIG group and will be launched at the 3rd International Public Health Nursing Conference in Galway in August 2013 (PHIG 2013). This validation process has provided a set of interventions that describes the role and boundaries of Irish PHNs.
Further development work for the ICHN, PHIG group will be to outline competencies and outcomes needed to support the interventions which can contribute to: the An Bord Altranais agus Cnaimhseachais na hEireann requirements and standards for PHN registration (ABA 2005), PHN curriculum development, and further inform population datasets collected by an electronic PHIT.

Core PHN primary and secondary documentation data sets developed and supported by a national representative group will contribute to the work of the PHIG. Professional development work undertaken by the ICHN and the PHIG will inform the business processes of the electronic PHIT and support the expansion of PHN service roles needed to deliver the PHIT community assessment and caseload management model in primary health care in line with the goals identified in Healthy Ireland (DOH 2013).
The digiPHIT Pilot Project

The recommendation that the PHIT should be migrated to an electronic solution for future integration into a national Electronic Healthcare Record to inform population health has been identified and documented (HSE 2011p8). Aligning public health nursing service information to a quality data collection process for workforce prediction and service planning supports the overall aim of the primary care strategy which is to manage the health of the population.

The electronic PHIT project was brought to design stage following collaboration during 2010 and 2011 between the two project researchers Ms Anne McDonald and Dr. Pamela Hussey. Successful application for project funding from the Institute of Community Health Nursing provided for the first project phase in 2012, the digiPHIT project. A meeting with the Local Health Office Manager procured a letter of endorsement from the HSE for the project.

Objectives and Scope

The first project phase aimed to test proof of concept of one electronic solution to the PHIT framework in one HSE Local Health Office and develop a supporting data dictionary. However, following a meeting with Mr. Gerard Hurl HSE National Director of the ICT Department in the project first quarter, the progression to business case application was agreed as a method to progress the multiphase electronic PHIT project and to access funding.

Drafting and revising the Business Case Template in collaboration with the HSE ICT Business Planning Unit and engaging with key stakeholders (Appendix 2) during the first phase project required investment of time and expertise. However significant learning has resulted from this additional undertaking and the Business Case application has reached final draft.
Advisory Group

A project Advisory Group and Terms of Reference were agreed for the one year project commencing June 2012. The Advisory Group comprised; the Director of Public Health Nursing, the Director of the ICHN, a Nursing Health Informatics expert, a representative from Penstream the private agency supplier of digital pens, and the PHIT Project Leader (Appendix 3). Dr Pamela Hussey, Dublin City University was engaged as the nursing health informatics consultant to the project and acted as co-researcher with the PHIT Project Leader.

The Advisory group met formally on four occasions and informal contact was conducted by meetings, email and phone over the course of the project. Three open sessions were provided to inform key stakeholders and colleagues on the progress of the project and to demonstrate the use of the digital pen. Information fliers were circulated to all nursing staff in the pilot area to communicate key project milestones and a power point presentation and digital data entry demonstration was also provided to these nurses.

Project updates were provided at the ICHN Professional Forum and on the ICHN website. The researchers presented information on the digiPHIT project at the ACENDIO Conference, the ICHN Documentation Workshop and to the HSE ICT Primary Care Governance Group.

Project Set Up

The project budget was maintained by the Chairperson and three digital pens, an iPad and a printing licence were purchased from the Penstream Company www.penstream.ie. Penstream software was installed on the three pilot nurses and the project leader’s computers digital printing software was also installed. A digital device for recording the focus group session was later purchased.

Three pilot nurses (one Registered General Nurse and two Public Health Nurses) volunteered to take part in the project. Initial meetings between these
nurses and the project leader agreed a written protocol for patient interviewing and entering and transferring data. A patient consent form and information sheet was developed in collaboration with HSE Consumer Affairs personnel to accompany the revised PHIT Care Plan which was the first digitised form for piloting. Data protection guidelines required the removal of sensitive information from forms transferring to the private agency database resulting in the need for nurses to use both digital and regular black pen for data entry on forms.

**Digital Data Entry**

The choice of digital data entry device was influenced by successful international community nursing e-health projects, outcomes of which recorded significant time savings for nurses using digital pens (NHS 2013). The use of the digital pen system requires minimal new technology and it supports the traditional nurse-patient interview process. The encrypted digital pen can capture and hold a significant amount of data before transferring to a laptop or PC. It will record and hold data even when out of range and data can later be transferred by mobile phone or docking device.

It was agreed that data would be transferred from pen to pilot nurse’s computer by a docking device rather than bluetoothing via the mobile phone for the pilot phase. The safe transfer via bluetooth may be easily resolved when the digital pen system has been agreed for wider use. Digital forms can be configured for either digital pen only, tablet only, or for combined use, ensuring a choice in future data collection devices.

Due to HSE restrictions it was not possible to host Penstream operating software on the HSE server. A solution agreed between Penstream and the HSE ICT Department transferred data by docking digital pens and sending data through HSE Port 23 to the Penstream server. A written agreement ensures that data transferred will be deleted within agreed timeframes.
Project Progress
Following training and laboratory simulation pilot nurses based at three local health centres, tested the digitised forms and then piloted digital data entry on patients in their caseloads. The pilot nurses were trained and supported by the project leader and Penstream representatives. Trouble shooting difficulties with data capture and transfer stemmed from the capacity of broadband to transfer data on the HSE network which was particularly slow on the pilot sites. This created significant time delays and interruption of pilot nurses daily schedules. The start of the actual pilot data entry was delayed by approximately 3 months.

Project Evaluation
Formative evaluation took place at the planned advisory group meetings when interval reports were reviewed and used to guide subsequent project stages. Questions and feedback from stakeholders and colleagues at the planned demonstration sessions also contributed to the evaluation process.

The researchers spent significant amounts of time collaborating with the HSE Business Planning Unit on the Business Case template and on digiPHIT project issues throughout the course of the project, feedback from the HSE ICT Business Planning Unit and background information on other ICT projects in primary care contributed to ongoing review and evaluation.

Pilot nurses recorded items in journals provided for the purpose of reflection and fed back on their experience of digital data collection and transfer, at informal meetings with the project leader and within the focus group session. Items from the pilot nurses’ snag list commenting on the quality of the Penstream Viewer provided a more user friendly Viewer for the maternal postnatal record which is the second form digitised.
Items from the overall project Snag List are included in the Business Case template and will contribute to the procurement process and inform a future national roll out of an electronic PHIT.

Summative evaluation took place in May 2013 when a formal Focus Group session recorded the experiences of the three pilot nurses. Overall, pilot nurses welcome the progression to more comprehensive patient assessment forms and an electronic environment and could see the potential efficiencies for case and caseload management and quality and patient safety. Main themes identified in the focus group report are:

1) Time
Time: wasted on administration, delays due to ICT issues, to train, with patient, not to duplicate and, protected time

2) PHIT Form Structure
All participants spoke favourably of the digitised patient assessment forms

3) Change Management
Change management issues mostly centred on anxiety about integrating technologies in the workplace

Recommendations from the report suggest:

- Review of workflow of PHNs in relation to administrative duties and in particular in relation to referral documentation
- Need for training in a protected environment with protected time and due consideration to patient participant sampling
- Design of the graphical user interface for digital data entry
- Dedicated HSE ICT resources for any work progressing from this pilot (Appendix 1)
Project Outcomes

- Proof of concept of one digital data entry device using PHIT documentation, which was the main aim of the project, was achieved in the 3rd Quarter of the project when PHIT patient data was transferred over HSE Port 23 into the Penstream server.

- Development of a data dictionary to achieve semantic operability, which was a second aim of the project, was not possible in this project phase. SnomedCT is the preferred reference terminology and access to an affiliate or national licensed SnomedCT platform is awaited. National guidance on classifications systems and clinical terminologies for use in electronic communications between healthcare providers will be soon provided by HIQA and will facilitate data dictionary development in the next phase of the project (HIQA 2013a).

- Drafting of the HSE Business Case Template over the course of the project term achieved collaboration with the HSE at executive level.

- Correspondence by the diPHIT Chairperson, with the Local Health Office General Manager, procured written HSE endorsement for the project. Correspondence with Directors of Public Health Nursing achieved 81% written endorsement for a national electronic PHIT.

- Co-working with Dr. Pamela Hussey provided a comprehensive overview of the international health informatics landscape and the need to deliver PHN information systems which adhere to standards as outlined in the Business Case. Access to a national health informatics network has been facilitated by the inclusion of the project leader in the HISINM group chaired by Dr. Hussey [www.hisinm.ie](http://www.hisinm.ie)

- Engagement with the HSE ICT department during the pilot phase provided significant learning on the capacity of the current ICT
resources in place and the minimum requirements for a national roll out of the electronic PHIT.

- Initial contact and follow up by the researchers with project stakeholders (Appendix 2) provided significant learning and networking and resulted in site visits to St. Munchin’s Hospital in Limerick and the Healthlink project in Dublin. A meeting is planned with the Single Assessment Tool group for the end of August 2013, the outcome of which will be a contributory factor to the success of the Business Case.

- The researchers compiled the Terms of Reference document, the Database Discussion Document, the three interval Project Reports, the Snag List document, the HSE Business Case, transcribed recordings from the focus group session and compiled the Focus Group Report.

- Care Plan Training Sessions (funded by the HSE and accredited by An Bord Altranais) incorporating PHIT documentation were rolled out to all nurses over the course of the digiPHIT pilot. Ongoing training is a core practice of good information governance (HIQA 2012).

- The project was completed within, the allocated budget and the one year timeframe.

- Pilot nurses are currently testing (August 2013) the digitised maternal post natal form. Informal feedback suggests that piloting this shorter form on younger patients with increased experience of digital pen use is a more positive experience. Funding sanctioned by the HSE in August 2013 has provided for naturalising of this form for pilot with iPad data entry.

- Advocacy work undertaken by the ICHN has brought the work of the PHIT and digiPHIT projects to the attention of policy makers within the Department of Health.
The Electronic PHIT Business Case

An electronic PHIT will address the key principles identified by the Authority namely a record of health information which delivers and monitors the quality of patient care. Single entry data collection of quality data at the point of care, patient data which is collected once but used many times, presented within a model that is fit for purpose and cost effective (HIQA 2012).

As mentioned above the progression to business case application was not included in the original digiPHIT project aims, but was agreed in the first month of the project as a method to progress the multiphase electronic PHIT project and to access funding. A meeting Mr. Gerard Hurl, HSE National Director of ICT introduced the researchers to the HSE ICT Business Planning Unit and the HSE Business Case template.

The purpose of the Business Case document is to outline the rationale and justification for the need to purchase an ICT system to support the PHIT in the PHN service nationally. On completion of the Business Case, the HSE ICT will make a submission on behalf of the project to CMOD in the Department of Finance to obtain capital funding and approval to proceed with the purchase of an ICT system.

Following CMOD sanction a HSE procurement process will be undertaken during which suppliers will be invited to tender for the supply of an ICT system for the PHIT. The ICT system selected from this procurement will then be implemented under the guidance of national and regional steering groups.

The system procured for full solution roll out must have the capability to:

- Register a client's full record of care; including personal information, health assessments and care plans e.g. the PHIT paper documents
- Provide for personal health records
• Support the use of standardised profiles, data types and reference terminology codes

• Provide access to the system irrespective of location e.g. client’s home, health centre, school

• Support automated interfaces with other relevant information systems e.g. CHIS, Hospital PAS, SAT, Healthlink Primary Care Referral

• Produce predefined caseload statistics, management reports including those required for Performance Indicators, service planning and register profiles

• Provide a facility to generate ad-hoc reports and letters

To deliver the requirements above as outlined in Table 1 below, the next phase project aim is to create a bespoke PHIT database for two purposes:

• For use by the PHN service nursing case managers in order to provide individual patient care in the primary care setting

• As a national database for storing and generating population outcome data, summary views, and reports facilitating integration with National Client Registries and the National Messaging Service Infrastructure Plan to improve the quality of patient healthcare
<table>
<thead>
<tr>
<th>Phase</th>
<th>Description</th>
<th>Status</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot</td>
<td>a) Proof of concept of a digital data collection tool for nursing</td>
<td></td>
<td>a) Proof of concept achieved</td>
</tr>
<tr>
<td>digiPHIT</td>
<td>b) Development of Data Dictionary</td>
<td>Project Completed</td>
<td>b) Awaiting SnomedCT licence to develop data dictionary</td>
</tr>
<tr>
<td>Funded by</td>
<td>c) HSE Business Case development</td>
<td>June 2013</td>
<td>c) Business Case drafted with support from HSE ICT Business Planning Unit for forwarding following meeting with Single Assessment Tool project leaders, August 2013</td>
</tr>
<tr>
<td>ICHN</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procurement</td>
<td>Following CMOD approval a procurement process will take place to select a suitable solution and contract agreed with the successful tenderer</td>
<td>Letters of interest circulated to 3 agencies in the pilot phase</td>
<td>Late 2013</td>
</tr>
<tr>
<td>Phase 1</td>
<td>Training / Roll out of the solution to the nurses and managers in the specified region</td>
<td>LHO Dublin North Central</td>
<td>2014</td>
</tr>
<tr>
<td>Phase 2</td>
<td>Training / Implementation of the solution to the nurses and managers in specified regions</td>
<td>Dublin North East 440 nurses Dublin Mid-Leinster 402 nurses HSE West 418 nurses HSE South 418 nurses</td>
<td>2014/15 onwards</td>
</tr>
</tbody>
</table>

Table 1: Electronic PHIT National Implementation Plan
Feedback on successive drafts of the business case was received both by teleconference and face to face meetings with HSE Business Planning Unit personnel based in Sligo and Kells, Co. Meath. The final draft of the Business case includes outcomes from the digiPHIT focus group evaluation report (Appendix 1). Estimates for digital data entry devices for inclusion by the HSE ICT Business Planning Unit and outcomes from the meeting with the Single Assessment Tool (SAT) team will complete the template.

The SAT is a standardised needs assessment for older people adapted from the interRAI suite of tools which will replace the Common Summary Assessment Record (CSAR). The CSAR is currently used by the PHN service in some Local Health Offices nationally to procure packages of care for older adults.

The SAT has been approved by the CMOD in the Department of Public Expenditure and Reform and has been awarded funding from Atlantic Philanthropies (HSE 2013). Procurement of data entry devices by the SAT team will impact a future electronic PHIT.

The need to collect, transfer and share patient information in primary and secondary care from all four PHIT registers (Family Health, Acute Care, Chronic Sick & Disability and Older Adults) will have implications for the data entry device employed by the public health nursing service nationally.
Healthlink national messaging for referral and response ([www.healthlink.ie](http://www.healthlink.ie)) will be required for future processing of information to primary care team referral. The Healthlink Programme Co-ordinator suggests that PHIT could be linked with the Primary Care Referral Programme to support referral in and response out messages.

Recommending international health informatics standards to underpin electronic sharing of PHIT patient health information will facilitate the safe transfer of patient information providing efficiencies across primary and secondary care pathways and is the domain of health informatics experts.

The HSE ICT Information Security Policies (HSE 2010) will be addressed when considering PHIT data transfer and database location and development, security and encryption of data collection and storage instruments will be guaranteed and methods will be devised to protect the identity of service users in accordance with HSE policy and Data Protection Acts (GOI 1998 & 2003). The awaited Health Information Bill will deliver unique health identification to facilitate safe and effective sharing of patient data in and across primary and secondary care.

Making point of care nursing documentation available to a target audience of PHNs and registered general nurses (RGNs) without duplication or transcription of data will have a positive impact on time management and co-ordination of care. Collation of data from a bespoke PHIT database and collective Caseload Analyses has the potential to deliver dynamic community profile / health needs assessments to plan and evaluate public health interventions in primary care positively impacting the health of the population.

A positive response to the Business Case application will see a national roll out of an electronic PHIT within a five to seven year time frame supported by a representative steering group and underpinned by good information governance.
Conclusion

An electronic PHIT will provide cost effectiveness by significantly decreasing the time spent in manual data entry and refocusing and redirecting priority nursing time to providing patient care. It will allow clinicians and managers to more readily and efficiently access identified patient care plans describing individual needs, the range of interventions that have been planned and the documented outcomes. DigiPHIT pilot nurses appreciate the efficiencies and time saving elements that electronic referral systems offer for case and caseload management (Appendix 1). Ideally, one optimum data entry device will support an electronic PHIT.

At systems level an electronic PHIT will provide safe and efficient transfer of information across primary and secondary care. It will generate a suite of summary views and reports to contribute to the caseload analysis process demonstrating key performance indicators on population health activity in primary care and support a framework for public health nursing information governance. In the event of the family health function of the PHN role transferring to a dedicated agency an integrated PHN population health information system in primary care will be further warranted.

This first phase digiPHIT project provides evidence for electronic solutions to the PHIT highlighting ICT challenges which will require dedicated responses and the need for appropriate health informatics expertise in the development of a bespoke PHIT database.

Crucial to the success of the electronic PHIT and the simultaneous development of the public health nursing service will be the alignment and co-ordination of all elements of information governance in the progress to national roll out.
References / Bibliography


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- digiPHIT (2012b) 1st Report to Advisory Group
- digiPHIT (2012c) 2nd Report to Advisory Group
- digiPHIT (2013) 3rd Report to Advisory Group
- digiPHIT (2013) HSE Business Case draft 6
- digiPHIT (2013) Focus Group Report (see Appendix 1)


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Appendix 1

Report on Focus Group of PHIT Digital Pen Data Entry Pilot Study
HSE Local Health Office, Dublin North Central
Date: Thursday 9th May 2013 @ 12 pm
Venue: Meeting Room 2, Ballymun Health Care Facility

Participant Detail: Number of participants in focus group interview – 3 Pilot Nurses who engaged in the Pilot Study two of which are public health nurses and one a community registered general nurse.

Background: The digital data entry pilot study by the public health nursing service in Dublin North City was undertaken in response to recommendations made in the original Population Health Information Tool (PHIT) project (HSE 2011) and was completed from June 2012 to May 2013. Pilot nurses trialled digital pen devices and digitised care plan templates on patients from three of the four PHIT Registers in the primary care setting. Focus group interviews, outcomes of which are reported below, were completed to evaluate this pilot.

The context of the study was influenced by a number of factors. Due to the lack of appropriate resources, available at the time in the HSE ICT, for example network infrastructure and database provision, anticipated outcomes from the pilot study in regard to views and summaries from a pilot database were not possible. The existing PHIT documentation summary files however have already reported on potential views and summaries.

The need to ensure data protection when transferring data to a private server required the pilot nurses to use digital and non-digital pens on each template. This required extra vigilance which impacted on nurse’s time when entering and transferring data. Protected time was not available to the pilot nurses so time spent on training sessions and live data entry was included in and increased their day to day workload.

Documenting patient care using digital pens is increasingly viewed as a viable option in primary care (NHS 2013). A number of key themes were identified in the focus group discussion and excerpts from the taped discussion are presented in this summary report.

Results: The key themes identified were Time, PHIT form structure, Change management with a specific focus relating to the ‘fear factor’ when integrating technologies on both the individual patient, and the nurse’s relationship with the patient. A degree of anxiety was evident in the nurses documenting patient care using digital and non digital devices contemporaneously.
Summary of Themes

1) Time

This theme was by far the largest discussed by the participants in the focus group, a total of 57 matches were identified relating to the topic of Time. This theme was discussed by the participants from a number of different perspectives. For example, they noted the overall time wasted on administrative duties, the time required to use the software, issues relating to duplication of processes, and the need for designated time for pilot projects. The following excerpts are included as examples of the nursing participant’s views.

Time wasted on administration duties

Well I think admin support would be fantastic ....it’s hard sometimes to kind of say what percentage of time you spend at it but you seem to spend a lot of time ....I am going to do an assessment on, on Mrs. J and the amount of work that comes out of that in terms of you know, all those referrals and follow up and all of that and em, I know, you know the majority of that could be done by somebody else really (Respondent 2)

Time delays due to ICT issues

There was a couple of spelling issues that you had to go through, so I mean em, if that could be updated, I know that that’s just, that’s a database thing, and obviously going back and checking it was fine but apart from that I found it was good and if I had ticked a box and a mistake and crossed a line and put my initials in it that actually came up as well, which was good. It didn’t pick up sometimes on my signature on the bottom, that’s the only thing……and then you have to put aside an extra 10 or 15 minutes to get on to the computer to actually upload to dock your pen and then you have to check the chart all over again, (Respondent 3)

Yeah well like that I just think that everyone does need you know an individual, people need individual computers and em I suppose it has to be as user friendly as it can be in order to sort of em, to sell its use I suppose (Respondent 2)

Time to train

I found myself, it’s probably just me really not being too au fait with em with the computer end of things really, when I maybe might have missed a box let’s say and I had already docked the pen and then I would be going and filling it in again and docking it again so, eh, so that was probably just me really and then you would have a couple of entries. I felt that was you know, probably not the way to go (Respondent 1)

It wouldn’t log on and then I had to get Anne up because em, my computer was slow and I thought there was something wrong with it (laughing) when I was trying to log in but it was actually just taking its time to upload (laughing),a very silly mistake,....(Respondent 3).

It took time really to go through it and correct it and I found that you were maybe a little bit against the clock (Respondent 2)

Time with patient

As the girls have said really, you know you are actually going in to provide a service for them or to see them and they are very, very vulnerable really and then you are asking them for permission to do, to em to use the pilot on them really so it actually left me with just a couple, lets say a few that I actually could manage to, em, you know, enter into this, enter into the pilot for that reason because we don’t take under, too many under 65’s really, they would be all kinda 80, 90 kind of age group as such and seeing them for the first time (Respondent 1)

Time not to duplicate

I found a little bit just repetitive a couple of places, em. I found then again when you went to, there was a couple of boxes just with the description of the patients most urgent health need. So you were kind of putting some of the same things from diagnosis and history in there
again. And just on the description of patient's daily routine I found it was something similar that had already been captured in the boxes em,(Respondent 3)

Protected Time
We were happy to participate...but it did......take more time...because you were involved it was taking your time...amn't saying it wasn't acknowledged or anything but there was no such thing as ...you can stop doing this for a while because you are doing this (Respondent 2)

I know some companies actually pay people when they are putting a project on they will give a designated time really, so if this actually had happened really (Respondent 1)

2) PHIT Form Structure
The second theme that emerged from the focus group related to the revised PHIT form structure, all participants spoke favourably of the new form devised. The following excerpts are included as examples of the nursing participant’s views.

I actually think it is very, very good it is a very detailed form, it’s very, very good and what I really particularly like about it is especially when you are, when I am dealing with a new patient as well that you have a very, very in-depth diagnosis and medical and surgical or medical history especially which is so, so relevant (Respondent 1)

Um, I liked it, one of the things I thought was really good was from the point of view of the diagnostic codes and the treatment it kind of elaborated on them a lot more than what we would be used to, so it broke down a lot of that stuff so let’s say if somebody had respiratory disease it was broken into asthma or COAD or cystic fibrosis, so that was much more specific and that I liked, you know (Respondent 2)

Um, um, yeah, I think it is very, very good, it actually covers a lot....it actually does cover a lot really of things that we, we mightn’t previously have asked as such really, so, em and, em, yeah I would actually find it very, very comprehensive (Respondent 1)

em, it had been around for years and it didn’t cover... an awful lot where as there is, in the PHIT assessment its much more comprehensive view of everything that’s going on. (Respondent 3)

3) Change Management Using Digital Pen
The third theme which emerged related to change management, the participants specifically spoke about their anxiety integrating technologies in to their practice and the potential impact it may have both for the individual patient, and the nurse’s relationship with the patient and the process of documenting patient care. The following excerpts are included as examples of the nursing participant’s views.

I am dealing with a patient to try to get them to understand the whole concept it was kind of a little bit frightening for them, this is what I felt, that was just on that part (Respondent 1)

I found the pen very easy to use, once you weren’t swapping and changing it was absolutely fine. And I found it good because on one occasion I came back and realised that I hadn’t ticked one box that was relevant and I ticked it when I got back and that actually came up on the system as well because it hadn’t been downloaded and inputted em which I found really good, I didn’t realise that that would actually work that way. Em, what I found, em in terms of using it was fine, I found it all came out...when you were inputting it (Respondent 3)

I found it em, difficult to use on first clients that I was meeting for the first time because I felt I was going in meeting them, em, I was there to help them as such and then I was asking for a consent and would you like to do this assessment which is new…. and I didn’t feel it was appropriate for me to actually ask some of those clients for a signature and to go into straight away explaining what I was doing to capture the assessment em, so that was just something
that I had mentioned before, that it was difficult. But obviously if it comes in and is being used all of the time it’s not going to be something that you are asking for permission for consent form, em for them. (Respondent 3)

I suppose I would have quite a lot of, em, what we would describe as being chronic sick patients under 65, I found they were, and that’s the majority of whom I used the form on, and they were really up for it, they thought it was great and you know, thought the idea that I was writing on this pen and that it was going to be captured was just fantastic and I could go, you know, I obviously explained all of that, and I could go back and put it in the computer. So most of what I was getting from them was quite was definitely positive but I felt a little bit like XXX that I was, you know sort of, mulling over this form a little bit more than what I might normally have done, you know, and I suppose just as I have said already I think that was just being unfamiliar with it, you know. (Respondent 2)

Its all learning I suppose, where I thought I had docked it and I just couldn’t find it on it and I was panicking I was thinking I have gone to the bother of doing this assessment and where is it you know (laughing) but again that was just probably the way I had the pen in (Respondent 2)

Summary and Conclusion
The focus group participants in this small pilot study would welcome the progression to more comprehensive patient assessment forms ....it’s unbelievable the difference this has made.....new forms...you’re way more professional and accountable (Respondent 3) and an electronic environment If this is actually captured on the screen instead of ringing doctors...hospitals...different places...it would be fantastic...to look up at a screen and see everything in front of you (Respondent 1) and could see potential efficiencies for case and caseload management I think that it will be time saving.......and if you could use a source of referring out it would be fantastic (Respondent 2) and quality and patient safety It should be more legible as well............when you get a care plan and you can’t actually read their writing the assessment isn’t much use to you (Respondent 3). This small pilot study has provided evidence, albeit in one data entry form that an electronic solution for data entry of the PHIT going forward is a viable option.

Recommendations
Based on the focus group participants responses to the use of digital pens and piloting of the PHIT with digital pens a number of key points may be useful to consider in larger studies in the future.

1. Referral in and out of PHN Services / Administration Duties
   A great deal of time seems to be invested in completing referral documentation therefore an electronic referral system to relevant agencies may offer future significant benefits to public health nurses workload. Suggest review of workflow of PHN’s in relation to administrative duties to maximise potential uptake and use of PHIT at local level by PHN’s. Such an approach will maximise value proposition.

2. Onsite Training and Participant Sampling needs to be managed.
   Training PHN’s on site in the community proved to be stressful. Increased anxiety levels decreases cognitive uptake of training schedules. Future larger studies should complete training in a protected environment such as a clinical simulation laboratory to maximise training outcomes with PHN service participants. Nurses also articulated potential for concern regarding the patients particularly in the over 65 year age bracket when requesting pilot study consent and consent for nursing care simultaneously. Consideration on participant sample grouping should be given for any future developments with PHIT.

3. Design of Interface
   The design of the graphical user interface should be user friendly and sensitive to role based registries to realise benefits for data entry and avoid duplication in various modules within the PHIT.

4. HSE ICT Project Management
Any future digital data entry pilot study should be fully supported by HSE ICT resources and dedicated HSE ICT personnel appointed.

5. Protected time for Participants
Designated time for training and data entry in the clinical area should be negotiated for all primary care pilot study participants.

Completed by Dr Pamela Hussey and Ms Anne McDonald 17/06/2013

References:
Health Service Executive (2011) Population Health Information Tool (PHIT) Changing practice to support service delivery, Office of the Nursing and Midwifery Services Director, Dr. Steevens Hospital, Dublin 8

National Health Service (2013) NHS Western Isles Poster per email from Christine Chlad, ehealth project officer, Western Isles Hospital, March 2013.
| Appendix 2 |
|-------------------|---------------------------------------------------------------|
| 1 | HSE ICT | Mr Gerard Hurl, National Director HSE ICT  
Ms Bernie Davey, Project Manager, ICT West / Sligo  
Mr Michael Redmond Head of ICT Planning A/Director (HSE NE) |
| 2 | Health Service Executive  
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| 3 | ONMSD  
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Ms Ethne Cusack, Director |
| 4 | HSE Primary Care | Mr Brian Murphy. National Lead Primary Care |
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2) Ms Brid Brady, Child Health Dev Officer Sligo |
| 6 | UL Primary Health Care  
Research | Ms Madeleine O’Sullivan  
Research Assistant PHC University of Limerick |
| 7 | INMO | Mr David Hughes, Deputy General Secretary |
| 8 | DOPHN Group | Ms Marianne Healy DOPHN  
Chairperson of DOPHN National Group |
| 9 | Institute of Public Health | Owen Metcalfe. Director of IPH. Patron of ICHN |
| 10 | Dublin City University | Professor Anthony Staines. Health Info Systems & Population Health. (Member of original PHIT Advisory group |
| 11 | UCD | Dr Kate Fraser. Lecturer H-Dip Public Health Nursing |
| 12 | DOH | Dr Kathleen McLellan. Nursing Representative |
| 13 | SAT | Natalie Vereker . Project Lead. Single Assessment Tool |
| 14 | An Bord Altranais | Ms Christine Hughes, Professional Advisor  
Ms Kathleen Walsh, Professional Officer |
| 15 | ICGP | No contact made yet  
Proposed contact with Dr Mel Bates |
| 16 | Health Atlas Ireland | Dr Howard Johnson, Health Information Unit. Dr Steevens Hospital. Member of original PHIT Advisory group |
| 17 | DOH  
Primary Care | Ms Roisin Shortall replaced by;  
Mr Alex White Minister for State with (responsibility for PC) |
| 18 | Heart of England NHS UK | Vanessa Wort. Professional Lead Community Services |
| 19 | Community Services Health of England Trust | Alison Massey  
Professional Nurse Advisor Solihull Community Services |
| 20 | Nursing Metrics | Paula Kavanagh. NMPDU North West |
| 21 | Nursing Metrics Group PHN /  
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| 22 | Draft HSE Health Care Records Management | gaymurphy@hse.ie  
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| 24 | Irish Patients Association | www.irishpatients.ie |
| 25 | HL7 Project  
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Community Nursing Digital Pen Project | Ms Christine Chlad  
Ehealth Project Officer  
Western Isles  
Scotland |
Appendix 3

Advisory Group Members as per Terms of Reference Document:

Ms Anne McDonald PHN Digiphit Project Leader who developed and led the PHIT, oversaw the implementation phase and wrote the PHIT publication (HSE 2011) will act as researcher

Dr Pamela Hussey, Dublin City University, who will act as researcher providing health informatics expertise to the project

Ms Yvonne Fitzsimons Acting Director of Public Health Nursing who will provide access to the PHN service, collaboration with the senior management team and advice on relevant Health Service Executive policies and guidelines.

Ms Mary O’ Dowd, Director of the Institute of Community Health Nursing, the project funding agency, who will provide information on developments nationally within the public health nursing service

Mr Ciaran Ryan (from June to September 2012) representative from Penstream Digital Pen and Paper Solutions who will assist in the implementation of the pilot study and act as support to the research team

Mr Philip Horton representative from Penstream Solutions replaced Mr Ciaran Ryan from September 2012