

**Errors, Inaccuracies and Omissions in Electronic Birth  
Notification Data and User Perception of Patient Data  
Entry in to Electronic Hospital System.**

Anne Clarke

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

2018

## **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.

Signed: \_\_\_\_\_

Anne Clarke

9<sup>th</sup> October 2018

## **Permission to lend and/or copy**

I agree that the Trinity College  
Library may lend or copy this  
dissertation upon request.

Signed: \_\_\_\_\_

Anne Clarke

9<sup>th</sup> October 2018

## **Acknowledgement**

I would like to thank my lecturers and classmates for their assistance and encouragement over the past two years of the course. I would especially like to thank my supervisor, Mary Sharp, Assistant Professor, for her help and direction in completing this dissertation and thanks to Professor Lucy Hederman, Course Director, of the MSc in Health Informatics.

I would like to thank all the management and staff at the chosen hospital without whose participation this research would not have been possible. In particular, I would like to thank my colleagues, Judith Fleming, Anne Moyne and Michelle Waldron for their feedback in drafting the questionnaire and for their encouragement and support.

I would like to thank all my colleagues, past and present, in the IT department at the hospital for their support throughout the process, in particular, Tadhg O Sullivan, Emma McNamee, Eamon Sheridan, Carol Cloonan and Gordon McMahan.

A special word of thanks and grateful appreciation to the IT Manager, Melissa Lawlor, for her invaluable assistance and advice with this work.

I would like to thank my husband, Brendan and my sons, for all their determination, drive and encouragement they have given me while carrying out my research.

Lastly I dedicate this dissertation to my late parents, Robert and Mary Watson, in appreciation for all their hard work, for always looking out for me, and showing your love for us all in the most selfless ways.

# Table of Contents

<b>DECLARATION</b>	<b>I</b>
<b>PERMISSION TO LEND AND/OR COPY</b>	<b>II</b>
<b>ACKNOWLEDGEMENT</b>	<b>III</b>
<b>ABBREVIATIONS</b>	<b>VI</b>
<b>GLOSSARY OF MEDICAL TERMS</b>	<b>VIII</b>
<b>DEFINITIONS</b>	<b>IX</b>
<b>INTRODUCTION</b>	<b>1</b>
BACKGROUND TO BIRTH NOTIFICATION AND REGISTRATION	1
CURRENT BIRTH NOTIFICATION PRACTICES IN IRELAND	2
<i>International Birth Notification Practices</i>	3
BIRTH REGISTRATION	3
BIRTH DATA USES	4
RESPONSIBILITY FOR BIRTH NOTIFICATIONS	6
BIRTH NOTIFICATION PROCESS	7
HOSPITAL PROCESS	8
<b>LITERATURE REVIEW</b>	<b>10</b>
INTRODUCTION	10
<i>Factors which Impact the Collection of Quality Data</i>	11
BENEFITS AND USE OF BIRTH NOTIFICATION DATA	13
WHY IS DATA OMITTED / UNDER OR OVER REPORTED?	14
IMPACT OF OMISSIONS / UNDER OR OVER REPORTING OF EVENTS	15
BARRIERS TO ICT IN HEALTHCARE	15
RECOMMENDATIONS	16
SUMMARY	17
<b>METHODOLOGY AND FIELDWORK</b>	<b>18</b>
INTRODUCTION	18
<i>Research Approach</i>	18
RESEARCH PHILOSOPHIES	18
<i>Positivism</i>	18
<i>The Process of Deduction</i>	18
<i>Realism</i>	19
SELECTION OF THE RESEARCH PHILOSOPHY	19
RESEARCH METHODOLOGY	19
<i>Quantitative</i>	19
<i>Qualitative</i>	20
JUSTIFICATION OF THE METHOD SELECTED	20
LIMITATIONS AND DIFFICULTIES	20
<i>Questionnaire Design</i>	21
ETHICAL CONSIDERATIONS	21
<b>DATA ANALYSIS</b>	<b>23</b>
PURPOSE OF RESEARCH	24
RESEARCH METHODS USED	24
<i>Literature Review</i>	24
<i>Questionnaire</i>	24
<i>Questionnaire Design</i>	25
<i>Questionnaire Distribution and Collection</i>	26
DATA ANALYSIS	26
DIFFICULTIES	26
OUTCOME AND RESULTS	27
MAIN FINDINGS	45

<i>Understanding of use of birth notification uses.</i>	46
<i>Lack of Training</i>	47
<i>Practical Barriers</i>	47
<i>Factors which impact how users enter data onto the computer record</i>	48
SUMMARY	49
<b>CONCLUSIONS AND FUTURE WORK</b>	<b>50</b>
INTRODUCTION	50
ANSWERING THE RESEARCH QUESTION	50
SUMMARY OF RESEARCH FINDINGS	50
<i>Literature Review</i>	50
<i>Questionnaire</i>	51
<i>Lack of knowledge as to the use of birth notification uses.</i>	51
<i>Lack of Training</i>	51
<i>Gaps in Clinical Knowledge</i>	51
<i>Practical Barriers</i>	51
<i>IT Infrastructure</i>	52
RECOMMENDATIONS	52
<i>Introduction of Structured Induction and Training Programme</i>	52
<i>Information Sessions on the use of Birth Notification Data</i>	53
<i>IT Infrastructure</i>	53
<i>Appropriate time</i>	53
<i>Data Quality Midwife</i>	53
<i>Clinical Knowledge Workshops</i>	54
<i>Review of Data Entry Process.</i>	54
FUTURE RESEARCH	54
<b>REFERENCES</b>	<b>55</b>
<b>APPENDIX 1 – NOTIFICATION OF BIRTH FORM – TO REGISTRAR OF BIRTHS</b>	<b>60</b>
<b>APPENDIX 2 – NOTIFICATION OF BIRTH FORM – TO DIRECTOR OF PUBLIC HEALTH</b>	<b>61</b>
<b>APPENDIX 3 – NOTIFICATION OF BIRTH FORM – TO HEALTHCARE PRICING OFFICE</b>	<b>62</b>
<b>APPENDIX 4 – NOTIFICATION OF BIRTH FORM – HOSPITAL COPY</b>	<b>63</b>
<b>APPENDIX 5 –MATERNITY PATIENT REGISTRATION FORM</b>	<b>64</b>
<b>APPENDIX 6 – NOTIFICATION OF BIRTHS ACT 1907</b>	<b>67</b>
<b>APPENDIX 7– NOTIFICATION OF BIRTHS ACT 1915</b>	<b>71</b>
<b>APPENDIX 8 - STUDY ON MATERNITY SYSTEMS BIRTH NOTIFICATION DATA QUESTIONNAIRE</b>	<b>74</b>
<b>APPENDIX 9 –NATIONAL PERINATAL REPORTING SYSTEM</b>	<b>79</b>
<b>APPENDIX 10-PARTICIPANT INFORMATION LEAFLET</b>	<b>81</b>
<b>APPENDIX 11- BIRTH NOTIFICATION AND ASSOCIATED PROCEDURES IN IRELAND</b>	<b>83</b>
<b>APPENDIX 12- APPLICATION TO RESEARCH ETHICS COMMITTEE</b>	<b>84</b>
<b>APPENDIX 13 – ETHICAL APPROVAL</b>	<b>105</b>

## Table of Figures

Figure 3.1 – Process of Deduction	23
Figure 4.1 – Occupation of Respondents	34
Figure 4.2.1 – How Patient Data Is Used	35
Figure 4.2.2 – Details of How Patient Data is Used	35
Figure 4.3.1 – Do You Know Who Receives Computerised Details of a Birth	36
Figure 4.3.2 – Who Receives Computerised Details of a Birth	37
Figure 4.4 – Does Computerised Records Match the Paper Record	38
Figure 4.5 – What Happens Patient Information After it is Entered in to Systems	38
Figure 4.6 – Frequency of K2 Maternity System Use	39
Figure 4.7 – Why do Errors Occur	40
Figure 4.8 – Did You Receive Training on K2 Clinical Maternity System	41
Figure 4.9– Who Delivered Training	42
Figure 4.10 – Did IT Training Prepare You for Inputting Accurate Information.	43
Figure 4.11 – Are There Areas in Your Job That IT Training Did Not Prepare You For	43
Figure 4.12 – Practical Barriers to Computerising Records	44
Figure 4.13 – Preferred IT Training Format	45
Figure 4.14 – Factors Affecting How You Add Data to Computerised Maternity Records	47
Figure 4.15.1 – Have You Ever Come Across Errors or Omission in Computerised Records	47
Figure 4.15.2 – Frequency of Errors	48
Figure 4.15.3 – How Did You Deal with the Error or Omission	49
Figure 4.16 – Working Hours at the Hospital	49
Figure 4.17 – Shifts Mainly Worked	50
Figure 4.18 – Clerical Staff Length of Stay	51
Figure 4.19 – Length of Time Practising as a Midwife	52
Figure 4.20 – Length of Time as a Qualified Nurse	52
Figure 4.21 – Check Data Entries with Midwife	53

## Abbreviations

HSE	Health Service Executive
GP	General Practitioner
PHN	Public Health Nurse
ICT	Information Communications Technology
IT	Information Technology
PAS	Patient Administration System
iPMS	i.Patient Management System
K2	Clinical Maternity System
MN-CMS	Maternal & New-born Clinical Management System
OPD	Outpatients Department
HPO	Healthcare Pricing Office
NPRS	National Perinatal Reporting System
BNF	Birth Notification Form
PC	Personal Computer
GDPR	General Data Protection Regulation
WOW	Workstation on wheels
MOH	Minister of Health
EHR	Electronic Health Record
WHO	World Health Organization



## Glossary of Medical Terms

Anomaly	Malformation or abnormality of a body part
Congenital	Present at birth

## Definitions

Registerable Birth	<p>A baby born live at any time or a stillbirth, i.e. a birth after a gestation of 24 weeks (168 days), or more, or weighs 500 grams or more, where a baby shows no identifiable signs of life at delivery</p> <p>(<a href="https://www.datadictionary.nhs.uk/data_dictionary/classes/r/registerable_birth_wu.asp?shownav=1">https://www.datadictionary.nhs.uk/data_dictionary/classes/r/registerable_birth_wu.asp?shownav=1</a> n.d.)</p>
Live Birth	<p>“A Live Birth is the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy, which, after such separation, breathes or shows any other evidence of life, such as beating of heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached”. (National Perinatal Reporting System at the Healthcare Pricing Office 2016)</p>
Stillbirth	<p>A Stillbirth is death prior to the complete expulsion or extraction from its mother of a product of conception, weighing 500 grams or more or having a gestational age of 24 weeks or more, the death is indicated by the fact that, after such separation, the foetus does not breathe or show any other evidence of life, such as a beating of heart, pulsation of the umbilical cord, or definite movement of voluntary muscles”. National Perinatal Reporting System at the Healthcare Pricing Office 2016).</p>
Perinatal Death	<p>Perinatal death occurs whenever a Stillbirth or death before the completion of the seventh day of life takes place. National Perinatal Reporting System at the Healthcare Pricing Office 2016).</p>

## **Introduction**

It is well recognised that the collection of patient health data contributes to decision and policy making. Hurty asserts that vital statistics are crucial to the family, to the state and to medicine (Hurty J.N. 1910). A report published by March of Dimes a US non-profit organization that seeks to improve the health and wellbeing of mothers and babies suggests that “*A robust national vital statistics system is imperative to assess trends in perinatal health and identify emerging issues that require further investigation and response. Perinatal data, as reported from birth and death certificates are fundamental to monitoring the well-being of mothers and infants*” (<https://www.marchofdimes.org/toward-improving-the-outcome-of-pregnancy-iii.pdf> 2010).

As the information technology (IT) midwife in a leading Dublin Maternity Hospital with responsibility for the clinical maternity system, the researcher is aware that errors, inaccuracies and omissions occur in birth notification data as a result of error reports which are raised by the General Registrar’s Office (GRO) and the Healthcare Pricing Office (HPO). This also raises the question if staff entering the birth notification data are aware that errors occur in data entry in to K2, the clinical maternity system. The research also sets out to gain an understanding of what is the user’s perception of entering data in to the electronic hospital system and seeks to identify what measures could be put in place to reduce the incidence of errors, inaccuracies and data omissions.

### ***Background to Birth Notification and Registration***

Historically the counting of populations was undertaken for the purpose of taxation and determining the characteristics of potential military manpower (Brumberg et al 2012). As far back as the 1500’s, elementary birth data from christenings was recorded in English church registers. In 1562, the early American colonists from England, translated this data from church events into birth recordings to ensure mainly property rights for an individual. The role of recording vital birth data moved from the clergy to Government in Massachusetts in 1639, (Hetzel 1997).

In 1836, following an epidemic of cholera in England and Wales, a decision was made to maintain vital records using a single central office. In America, in 1840, the Census Act facilitated the collection of uniform national statistics by using standard forms and developing a system to collect nationally comparable vital statistics annually (Brumberg et al 2012). In 1900, the first standard birth certificate for registration of live births was developed along with the statutory authority to develop areas for registration and was adopted uniformly by all American states by the 1930’s. During World War II, the birth certificate became a legal document as it was used as proof of citizenship to ascertain eligibility for employment and as a valued source of perinatal epidemiology (Brumberg et al 2012).

Following the 1906 General Election, the British Liberal Party passed the Notifications of Births Act in 1907, adopting a system of compulsory notification of births to be followed up by a system of home visitation to mothers from trained health providers. According to the Irish Statute Book, The Notification of Births Act 1907, Appendix 6, states that it is the duty of the father of the child, if he is residing at the house, or a person attending the mother, any midwife or medical practitioner, to notify the medical officer of health (MOH) at his office or residence in writing by means of a prepaid letter or postcard supplied by the local authority within 36 hours after the birth. Failing of any person to give notice of a birth would be liable on conviction to a penalty not exceeding twenty shillings (Notification of Births Act, 1907). As the father had moral responsibility for notifying of a birth, the first case of a prosecution in 1912, resulted in a fine of 2s.6d (British Medical Journal, 1912).

Notification of birth related to any live or stillborn child which had issued forth from its mother after the expiration of the twenty eighth week of pregnancy. The Registrar of births and deaths was provided with access to the recordings in books of notices of births received by the MOH in the sub districts. In 1915, the Notification of Births (Extension) Act extended to make further provision to the care of expectant and nursing mothers and young children under five years of age in all areas that were not adopted under the 1907 Act. A copy of the 1915 Act can be found in Appendix 7. The MOH sent duplicates of birth notifications to the appropriate county medical officer of health.

### ***Current Birth Notification Practices in Ireland***

Nowadays, birth data is collected and risk is adjusted by a consortium of clinicians, midwives, secretarial, vital records personnel and data analysts using technical support to interpret, report and act on the data (Gould et al 1999). Registrars who collect and report data should receive validation and appropriate feedback from those who analyze the data (Langhoff-Roos et al 2014).

In Ireland, by law, the birth of a registerable baby must be notified within thirty-six hours of the birth. This includes, all live births, that is, any baby who shows signs of life after delivery regardless of viability or gestational age. If there are no signs of life at delivery and the pregnancy has reached at least 24 weeks' gestation and/or the baby weighs 500 grams or more, a fetal death is notified. Following notification of a live birth by the attending midwife or doctor in the hospital, the parent/s are required to register the birth within three months of the birth. Stillborn babies can also be registered if the parent/s wish to do so.

Approximately 68,000 babies are born in Ireland every year (HSE). Nowadays, most of those births occur in the nineteen maternity hospitals around the country with 0.2% occurring at HSE planned home birth (Meaney et al 2016). Although birth notification has legal, public health service planning and research implications, the data obtained from births relating to demographics, socioeconomic status, ethnicity risk status, maternal or fetal medical factors, obstetric procedures, previous reproductive history, gestational age, birth weight, congenital abnormalities and pregnancy outcomes, are considered vital records to inform quality

improvements in perinatal activities across generations (Gould et al 1999). There is a need for planners and service users to have access to population based data regarding the availability, quality and access to maternity services (Hilder et al 1998). It is key to ensuring timely, appropriate maternal and child health, including bonding and building confidence early after the birth whether it is a hospital or planned domiciliary birth (Wilshier et al 2014).

In addition, there is also a need to routinely collect birth data for use in studies of reproductive health and surveillance of outcomes to mothers and babies (Elliott et al 2001). Data sharing is increasingly seen as an important and valued resource to facilitate research into the health sciences (Burton et al 2017). “*Birth registration is the continuous permanent and universal recording within the civil registry, of the occurrence and characteristics of births in accordance with the legal requirements of a country*”. Article 7 (1) of the Convention on the Rights of the Child states “*The child shall be registered immediately after birth and shall have the right from birth to a name, the right to acquire a nationality and, as far as possible, the right to know and be cared for by his or her parents.*” (UNICEF 2013).

### *International Birth Notification Practices*

Worldwide, there are 230 million children under five years of age who have never had their birth details recorded with the civil authorities (UNICEF 2013). 59% of these were born in Asia with one in three children living in India, followed by 37% born in sub – Saharan Africa and the remaining 4% born in other areas. Globally, there are 290 million or 45% of all children under the age of five do not possess a birth certificate. The reasons for this vary, from the prohibitive cost of a birth certificate, to the fact that they are not issued in some countries and sometimes they are not collected by or issued to families following registration. (UNICEF 2013). In almost all societies a birth certificate is seen as a basic legal document that gives identity to a child. It automatically confers a number of rights or entitlements to the child such as: nationality, health care, schooling and education, to possess a passport, to own property, voting, employment, or access to banking services (Mikkelsen et al. 2015).

### ***Birth Registration***

“*Birth registration is the continuous permanent and universal recording within the civil registry, of the occurrence and characteristics of births in accordance with the legal requirements of a country*”. (UNICEF 2013). Article 7 (1) of the Convention on the Rights of the Child states “*The child shall be registered immediately after birth and shall have the right from birth to a name, the right to acquire a nationality and, as far as possible, the right to know and be cared for by his or her parents.*” In Ireland, following birth notification, live births must be registered within three months after the birth. If the parents are in a recognised marriage to each other, just one parent can register the birth. If the parents are not married to each other and the couple want both parents’ names to appear on the birth certificate, both parents must attend to register the birth ([https://www.welfare.ie/en/Pages/Registering\\_Birth.aspx](https://www.welfare.ie/en/Pages/Registering_Birth.aspx) n.d.).

A birth certificate is a very important document that proves birth registration ensuring every birth is counted and that every person starts life with social recognition. Birth certificate ownership varies around the world (Kaneko et al 2017). Seen as a vital link, birth notification enables the provision of early support, encouragement and care plans to the mother, young child and family unit. Birth certificates serve legal, administrative, national surveillance and research functions. They assist in the directing of strategies aimed and public health promotion and health interventions (Committee Opinion 2015). availability, acceptability, and utilization of services and the quality of services delivered. A child's survival is inextricably linked to the health and the survival of its mother (RMNCH+A Strategy 2014).

Birth notification data collection has been reviewed over the years and different data items or fields have been added to facilitate the monitoring of trends in public health. In addition to this the paper medium has been replaced by the electronic birth notification and therefore allows for the extraction of medical data from the mother's maternity electronic healthcare record (Brumberg et al 2012).

### ***Birth Data Uses***

Issues with birth data quality in relation to under reporting of pregnancy and/or labour complications have been identified as far back as the 1950's (Brumberg et al 2012) with the most serious complications being reported (Lilienfield et al 1951). According to (Reiling 2008), missing data was attributed to "*negligence, unwillingness, failure, indifference*" of physicians and subsequently efforts were made to promote accuracy of data collection and entry as a health strategy (Lilienfield et al 1951).

Public health planners, policy makers and those carrying out epidemiologic research are interested in events that occurs before delivery, for example, it is useful to have the date of first visit to the doctor to access antenatal care during pregnancy. Details of the labour and birth such as method of delivery, and following delivery, for example, baby's birth weight, maternal and childbirth complications and congenital anomalies are also of benefit (Frost 1984). Although some congenital anomalies are difficult to diagnose at birth, some are obvious at the birth.

In Ireland, birth notification data relating to the demographics of the father of the baby are only extracted and sent to the stakeholders if the parents of the baby are married to each other. If the parents of the baby are not married to each other, only the mother's demographics are notified. In a study by (Sims et al. 2014), families most likely to have missing father's information were women who gave birth as teenagers, were unmarried, smoked during their pregnancy, had a child of low birth weight, and lived in areas of socio-economic disadvantage. Together these risk factors provide a simple indicator of families who are more likely to experience adverse health outcomes. Missing paternal information on birth registrations, especially age and ethnicity, are a frequent occurrence throughout the world. Other causes of missing information may be due to the biological father not being identifiable, in cases of adoption, female same-sex couples, multiple sexual

partners, artificial insemination by a sperm donor or in vitro fertilisation using donor sperm. In these instances, information on the biological father is not available on birth notification data.

The absence of the father's information on birth registrations has a strong association with adverse birth outcomes in children, which might be a source of bias in existing data (Sims et al. 2014). According to (Sims et al. 2014), consideration should be given to the collection of the father's details by midwives to aid in the evaluation and monitoring of birth outcomes of at risk mothers.

Birth data is especially important as it provides information on demographic trends, assessing reproductive health, maternity services available, pregnancy outcomes and neonatal care. From studies carried out by (L. R. Ellison et al 1997), three different forms of notification were in use and there was lack of standardisation in the data collected. It was recommended that a set of standardised variables should be recorded at notification and measured using the same techniques (L. R. Ellison et al 1997).

Birth data allows the hospital to qualify and quantify reasons for variances in maternal postnatal length of stay. Length of postnatal stay is influenced by factors such as method of delivery, delivery or post-delivery complications, neonatal mortality and hospital discharge policies (Healthcare Pricing Office 2015). For example, a mother having an uncomplicated spontaneous vaginal delivery may result in a length of stay of zero to three days, while a mother having a Caesarean section delivery could result in staying in hospital for up to six days after the birth. (Healthcare Pricing Office 2015). Some maternity hospitals provide early transfer home to community or domino midwifery services which are provided on a very limited geographical location (Healthcare Pricing Office 2015) ([www.coombe.ie/](http://www.coombe.ie/)), (<http://www.nmh.ie/>)

Perinatal mortality rate in Ireland in 2015 was 4.3 per 1,000 births. This excludes babies who have died as a result of a congenital abnormality. Birth data can be used to monitor infant deaths (Hilder et al 1998). The important data items in relation to infant death include whether the infant died before or during labour, was the infant born alive and subsequently died, what age was the infant at death and what was the cause of death (Gould et al 1999). Birth data also provides information on the details of the birth so a child health record can be generated and can provide a warning to public health nurses that a death has occurred (Hilder et al 1998).

Birth data can be used to support mothers, young children and families in order to reduce morbidity and assist in the prevention of illness and disability. The impact of the early child years on the child's health and development provides the foundations for the outcomes of adult health and wellbeing. Variables in birth notification should be well-defined and accepted by those collecting the data (Langhoff-Roos et al 2014). Systematic validation studies that use the healthcare records as the gold standard can only be carried out for defined periods on selected variables due to the demands on resources (Kristensen et al 1996) (Langhoff-Roos et al 2014).

Medical and health information collected at birth notification is critical to understand the kinds of behaviours and practices that lead to healthy outcomes for mothers and babies in Ireland. According to (Woolbright LA 1995) (Brown 1938) in order for public health researchers to inform statutory health service providers, healthcare providers should accurately provide data on medical conditions that effect the health of mother and baby.

The Healthcare Pricing Office (HPO) produce birth data files and a variety of annual reports at the national level on key maternal and infant health information (Healthcare Pricing Office 2015). These reports are used to monitor trends on topics such as fetal and perinatal death and Caesarean section births. These data alert researchers, clinicians and policy makers to potential public health issues.

There are two indicators of the health of a nation obtained from vital statistic records- maternal and infant mortality. This are dependent on the access to medical care in maternal and infant care taking account of racial, socioeconomic and ethnic disparities (Committee Opinion 2015). Early markers of a baby's health include low birthweight (less than 2,500 grams) being small for gestational age, and prematurity (born before 37 completed weeks gestation). Such babies are more prone to poor health outcomes, including dying before their first birthday (Perry et al 2004) living with respiratory disease (Strachan et al 2004) and being at increased risk for coronary heart disease in mid-life (Kuh et al. 2009). Factors associated with childhood overweight and obesity at age 10-11 years were neighbourhood deprivation, regular maternal smoking during pregnancy and high birth weight (Gilchrist et al 2013).

### ***Responsibility for Birth Notifications***

The principle of the assessment of health support needs and resources by statutory universal health services is triggered by birth notification. This assessment is undertaken in the following ways:-

- The hospital or midwife in the domiciliary setting where the birth takes place completes the birth notification either electronically or in paper format within 36 hours of a registerable birth;
- The maternity services provide care to mother and baby and send discharge details of the postpartum stay at the handover of care to community based child health services;
- The Public health nurse (PHN) carries out a statutory primary visit to the discharge destination of mother and baby;
- Baby is offered universal and targeted screening programmes for example the national newborn hearing screening;
- The community child health service manages and integrate information from all of these actions into a core child health record via the Child Health Information System (CHIS) and ensure that the universal child health programme is offered, completed and followed up in a timely way.



Due to the complexity of services, the Minister of Health has delegated responsibility for receipt of birth notifications to the relevant services namely PHN, child health, newborn screening and immunization services and their associated ICT systems (<https://www.hse.ie/eng/health/child/healthychildhood-news1.pdf> n.d.).

### ***Birth Notification Process***

Statutory notification of births (Live and Stillbirths) feeds demographic information to initiate the community child health record and engages the infant into the universal child health programmes such as immunisation, screening and surveillance. Birth notification is sent electronically from the hospital daily. Electronic birth notification can provide a detailed, legible and timely record of a registerable birth. Secondary uses of the data assists in sharing information for the planning of health services and resources, for research and epidemiological purposes. Staff in some of the nineteen maternity units in Ireland complete the birth notification form (BNF) manually on paper and then forward the documents to the destinations specified at the top of each page. This process is summarized in Appendix 11.

### ***Recipients of Birth Notification***

There are four parts to the birth notification process which can be found in Appendix 1-4.

- Part 1- White Copy- is sent to the Registrar of Births within 36 hours of the birth.
- Part 2 -Yellow Copy- is sent to the Director of Public Health and Medicine within 36 hours of the birth.
- Part 3 - Green Copy is sent to the Healthcare Pricing Office (HPO) on Day 8 after the birth or earlier if infant is discharged. The HPO receives anonymised data to ensure the mother, father or baby cannot be identified as maternity patients have the right to expect confidentiality and protection of their information that defines them as individuals.
- Part 4 - Pink Copy is completed on day 8 after the birth and retained in the institutions records.

Details of birth notification should contain the following:-

- Infant details;
- Father's details;
- Mother's details;
- Mother's health;
- Infant's health;
- Details of the hospital stay;
- Details of the General Practitioner attended by the mother and where the infant will attend for immunisations.

Other details include:-

- Type of birth;
- Place of birth;
- Case number at the hospital;
- Sensitivities around the birth are documented, for example, if a baby was going for adoption, baby has been taken into care, the death of a child or if the mother has indicated she wishes to have the details of the birth concealed;
- In the case of a perinatal death, further details around the type and cause of death are documented.

### ***Hospital Process***

The maternity patient can self- refer to the hospital or is referred by the G.P. a patient registration form is completed by the patient. A maternity patient registration form can be found in Appendix 5. On receipt of the completed registration form, this information is entered on to iPMS the hospital's patient administration system (PAS) at the hospital by the central appointments clerk.

The clerk then schedules an antenatal appointment for the woman on iPMS and this appointment creates a pregnancy record on the K2 the electronic maternity system. This system enables data collection through all stages of pregnancy from registration, to antenatal booking history, labour, birth and up to the postnatal discharge of mother and baby. K2 also facilitates audits, generation of statistics for clinical reports etc. Relevant staff are issued with role based access to enter and review records by the IT midwife. It is important to note that it is possible to carry out a retrospective audit trail for data entries. The hospital birth notification collection process is as follows:-

- Following registration at the hospital, the clerk also allocates and identifies a paper national maternity healthcare record for the woman;
- The midwife then carries out an interview with the woman and enters the data onto the K2 using the Antenatal Booking History questionnaire;
- When the baby is born, the labour ward-registerable births questionnaire is completed by the delivery suite/ theatre clerk. The clerk uses the paper national maternity healthcare record and the paper baby record, transcribes the data from the written records and enters the data onto K2;
- When the mother and baby are being discharged from the hospital, the midwife completes the Postnatal Discharge Mother & Baby questionnaire.

Throughout the above processes, data items are transferred via unique codes to populate the fields required for birth notification. For live births, the clerks enter 49 data items required and the midwife enters 13 data items. In the case of a perinatal death, an additional eight data items are required. These are usually completed by the midwife.

The electronic birth notification system includes standard / edit rules. For example, there is a built in validation that ensures the date of the first antenatal visit cannot be more than 40 weeks before the expected date of delivery. Field programme validations set parameters that define data ranges, alphabetical or numerical field data requirements and set an alert when forms are submitted electronically when there are missing mandatory fields. Such validations cannot control for the correctness of the data entered. The data required for birth notification is extracted from the computer system at the hospital and sent to the relevant recipients daily. Data quality on birth notification is carried out daily by GRO and HPO. These agencies carry out logical checks against predefined rules for value ranges on the data entered into the database. When data entered in these systems does not match the data sources in the maternity or child health records, error reports are received and the records must be corrected. An information leaflet pertaining to data collection can be found in Appendix 9.

If there are any discrepancies in the data, the hospital is contacted and the necessary corrections are made as soon as possible. This is time consuming and the duplication of data also has cost implications for health service providers (Craswell et al, 2013). However it is vital that data is validated as it gives assurance of the accuracy and consistency of data.

## Literature Review

A literature review involved widespread search of online databases available such as Science Direct, EmBase, Cochrane Library, CINAHL Complete and Maternity and Infant Care and other academic databases. Where possible Medical Subject Headings (MeSH) terms were used to provide more precise and relevant results. Combinations of MeSH search terms, keywords and phrases were used including “*birth data*”, “*data quality*”, “*accuracy*”, “*birth notification*” “*birth certificate*”. This provided a wealth of research articles and studies being identified for review. In total 128 articles in English were reviewed, 28 were discarded as they were not relevant to the research subject and 118 were reviewed and included in the review.

### *Introduction*

This chapter begins with a general introduction in to birth notification data collection by maternity healthcare providers. It progresses to provide an overview of the factors which impact data collection and moves on to outline the benefits and uses of birth notification data. The chapter then examines the literature to determine contributing factors, for omitted or under and over reported data and the subsequent impact of these factors. A brief outline of the barriers to the use of ICT in Healthcare is examined. The chapter concludes with recommendations on how data collection could be improved and a short summary.

There is an ever increasing birth rate worldwide, thus the importance of accurate and timely perinatal data collection cannot be underestimated. Birth notification data collection starts with the patient-provider interactions at maternity healthcare facility level. Data is collected from initial maternity registration at the hospital, antenatal attendance, labour and delivery, neonatal care and postnatal discharge from hospital. High quality data is vital for patient care. According to (Woolbright LA 1995) in order for public health researchers physicians should accurately provide data on medical conditions that effect the health of mother and baby. There are two indicators of the health of a nation obtained from vital statistic records - maternal and infant mortality. However, maternity health care workers tend to prioritize care to mothers and babies rather than to data collection and data management (Lafond et al 2003). In addition to this, staff generally are not aware what data is needed for (Hahn et al 2013) even though from the earliest days of medical record keeping, data has been abstracted from medical records (Gibbs D. 1996).

An instruction manual for Irish hospital and domiciliary births was devised by the Healthcare Pricing Office (HPO) and is available to assist with the completion of the Birth Notification Form (BNF01) (National Perinatal Reporting System, Birth Notification Form, 2015. n.d.). This provides definitions, instructions, preferred sources in the medical record where information can be found, keywords and abbreviations that may be alternative terms for items (National Perinatal Reporting System) (NPRS 2015). Routine birth data sets provide a valuable resource surveillance of reproductive trends, provision of maternity services and epidemiological research on birth outcomes (Ghosh et al 2016). The attending midwife or doctor at the birth is responsible for determining whether a live or still birth has occurred and has primary responsibility to complete all or most of the medical and health information required.

Data extracted from the maternity record is used to monitor patterns in health outcomes for mother and baby in terms of midwifery, obstetric and new born care (Fagernas et al 2013). It is also used for research purposes, clinical audit, education of midwives and doctors, planning for future health service delivery needs and funding allocation for resources at local, regional and national levels. Research by (Kristensen et al 1996) found that lack of reliable data on gestational age was a major problem since gestational age is strongly correlated with outcome. (G. R. Ellison et al 1997) concurred that imprecise birth notification data affects the apparent prevalence of preterm births as it is an indicator in maternal and child health. (L. R. Ellison et al 1997). While demographic data, parity and birth weight are usually well reported (Terpi J. 1993), prenatal data available in birth registers tends to be of an inferior quality (Greg et al. 1984). The mother's health section requires data on the existence of maternal disease or condition affecting the fetus or infant. For the infant's health, details of main disease or congenital malformation affecting the infant is required.

According to the World Health Organisation (WHO) perinatal data collection in developing countries remains poor (A. M. Craswell et al 2013). Even in the most developed countries, there is a high degree of variability in the quality and accuracy of perinatal data collected (Craswell et al, 2013).

#### *Factors which Impact the Collection of Quality Data*

Research conducted by (Dattani et al ,2011) found national maternity data in England, was inaccurate, incomplete or unavailable with at least one data item such as gestational age, birth weight of baby, sex or date of birth missing. In Finland, since 1987, the Medical Birth Register contains details on all mothers and babies who have given birth there.

A number of studies have assessed the factors affecting data quality in birth notification. Using an online form of birth notification has reduced errors and omissions according to the validation tests used by (Queensland Health Perinatal Data Collection Unit 2011). A study by (Robertson 1996) identified issues with data entry on paper birth notification which came about due to confusion about perinatal definitions, transcription errors and underreporting due to sensitivity of information. Maternity care is moving rapidly to a data driven enterprise.

Owing to the heavy burden reported for data collection, information related duties are often allocated to junior non-medical staff members (Garrib et al 2008). (Hemminki et al 1992) asserts that inadequate quality in data collected can result from a lack of understanding of the purpose of data collection on behalf of the hospitals providing the data or lack of feedback from the registries.

Barriers to collecting accurate data include or unavailable missing data possibly due to a mother receiving care from more than one maternity healthcare provider at different locations. Clerical officers may be entering data and there may be confusion as to what constitutes an antenatal visit. Some staff may be estimating the frequency of antenatal visits by speaking with the mother. Birth registration faces many challenges including

a decentralisation (Committee Opinion 2015). Data quality issues resulting from inaccurate or incomplete information is a major concern as it leads to invalid conclusions and erroneous data.

Common discrepancies relate to the labour and delivery events, where the medical record shows one or more conditions present where the birth notification lists none (Buescher et al 1993). Clerical staff are often required to sift through the maternity record to transcribe data from the healthcare providers' narrative record or checklist. Clerical staff may not have the appropriate skills to recognise and correct data problems and may not have the authority to take necessary actions (Garrib et al 2008). As a result of such a process, there can be data quality issues in undercounting and under reporting (Butler et al, 2017).

(Diers 2007) identified that most of the data entered for birth notification was carried out by clerks rather than the midwives who were providing clinical and maternity care. Inadequate instructions to clerks who input information can result in under reporting of medical procedures and diagnoses (Kristensen et al 1996). Midwives and clerical staff need to be trained in the definition of data items required for birth notification (Woolbright LA 1995). A study by (Melnik et al 2015) found that staff use, on average, four data sources to collect data for birth notification. (Montgomery et al 1962) concurred that more than one source of information was used for data collection and various persons other than the attending doctor or midwife recorded information for birth notification. (Montgomery et al 1962). Combining data sources have been found to improve accuracy for detecting renal, cardiac and lung disease (M. T. Lydon-Rochelle et al 2005). According to (Montgomery et al 1962), the recoding and coding of birth data should be carried out at the "*same time by the person best able to make the necessary judgements, the attending physician*".

(Kristensen et al 1996) asserts that data required for birth notification should be documented by the midwife before the woman leaves the delivery suite. (Maresh et al 1983) asserts that any postnatal complications should be recorded at discharge from hospital due to the fact that there tends to be under-reporting of maternal morbidity, such as caesarean section wound infections if they occur after discharge from hospital. (Kristensen et al 1996) recommends that checks be carried out on data entry and that doubtful data should not be accepted by the system. Cross-checks should be implemented to validate data in the computer system to identify any inconsistencies for example, the placenta cannot be delivered before the baby's date and time of birth. A study by (A. M. Craswell et al 2016) concurs and recommends that a perinatal data coordinator such as a midwife be in post to identify and resolve errors, omissions and inaccuracies prior to data validation and extraction to the relevant stakeholders.

Staff turnover, multiple data collectors, and the long duration of data collection increases the likelihood of errors in data collection and notification (Kristensen et al 1996). Inaccuracy in data collection can be due to the presence of multiple procedures, multiple medical conditions or diagnoses in the healthcare record (Zozus et al 2015). In a study by (Lucyk et al 2017), the potential to adversely affect data quality was due to the variability in interpretation, the documentation of clinical care and events and the organisation and assembly of the paper record. Doctors and midwives document procedures in ways that are standard to obstetrics. They

may do this quickly and efficiently by providing brief but to the point descriptions. This serves the patient but causes problems with those transcribing data for recording purposes (Lucyk et al 2017). Use of abbreviations, acronyms or shortened terms along with illegible handwriting in the paper record can cause these to be mistranslated (Lucyk et al 2017). Incomplete charts with missing data entries also has implications for the accuracy and completeness of data quality (Lucyk et al 2017) as incomplete charts equals incomplete data.

(Mark n.d.) asserts that on average office staff are interrupted or change tasks every three minutes and five seconds. Consequentially, after being interrupted, it takes an average of 25 minutes to return to the original task. External interruptions (56%), take the form of phone calls, colleagues / clients seeking your attention, while internal interruptions (44%) involve self-directed interruptions for example, checking mobile phones etc. The issue that interruptions cause is that the person does not immediately go back to the task they were doing before they were interrupted as on average two further tasks are carried out before the person returns to the original task.

### ***Benefits and Use of Birth Notification Data***

Birth notification can be used to determine the prevalence of medical conditions in the population and investigate the association of these factors with the likelihood of women giving birth prematurely or having a low birth weight baby and to examine differences in subpopulations of mothers (Woolbright LA 1995). It can also improve the detection of birth events by identifying the method of delivery and obstetric and labour complications (Lydon-Rochelle et al 2005).

Accurate birth data benefits the person and the healthcare facility or service where the birth took place. According to (Shapiro et al 1952), place of birth was influential in whether the birth was registered, with hospital births having a 99.4% registration compared with home births of 84.5%. Failure to register a birth was likely to be higher in lower socioeconomic groups, where mothers with little or no education (Shapiro et al 1952). Benefits for the public's health include tracking and understanding trends in at risk infants and allows comparisons of Caesarean Sections between hospitals nationally. The Healthcare Pricing Office receives an anonymised data set. The names, addresses and other identifying data items are removed in advance of sending data. Data protection law states who can use this information, how security is maintained and with whom the data is shared. According to the Notification of Births Act, morally, the responsibility of notifying a birth rests with the parents.

Although birth notification has legal, public health service planning and research implications, the data obtained from birth relating to demographics, socioeconomic status, ethnicity risk status, maternal or fetal medical factors, obstetric procedures, gestational age, birth weight, congenital abnormalities and pregnancy outcomes, are considered vital records to inform quality improvements in perinatal activities across generations (Gould et al 1999). There is a need for planners and service users to have access to population based data regarding the availability, quality and access to maternity services (Hilder et al 1998). It is key to

ensuring timely, appropriate maternal and child health, including bonding and building confidence early after the birth whether it is a hospital or planned domiciliary birth (Wilshier et al 2014).

In addition, there is also a need to routinely collect birth data for use in studies of reproductive health and surveillance of outcomes to mothers and babies (Elliott et al 2001). Data sharing is increasingly seen as an important and valued resource to facilitate research into the health sciences (Burton et al 2017).

It has long been established that adequate appropriate antenatal care is important to maximise the possibility of a healthy pregnancy and a positive outcome for mother and baby. The main source of antenatal data is the birth notification. Using this data, public health and policy planners and health officials can monitor the availability and use of care to ensure resources and services are directed to areas with inadequate care. Timing of the first antenatal visit is an indicator of access to antenatal care. Variables such as the timing and frequency of antenatal care visits are crucial indices in the valid assessment of adequate antenatal care. This can be influenced by maternal social conditions and the organisation of care. (European perinatal report) (<http://www.europeristat.com/reports/european-perinatal-health-report-2010.html>). A study by (Martin et al 2013), found this caused discrepancies in the number of antenatal visits in the medical record and those recorded on the birth notification data. (Northam et al 2006) concurred and suggested that in addition to this, birth notification data are invalid sources of information on pregnancy complications and maternal risk. A report by (Ahuja et al n.d.) found that barriers to collecting accurate antenatal care data appears to be missing or unavailable data. As a result, in these cases the hospital birth clerk has been estimating the information or attempts to obtain the information from the mother.

Maternal medical conditions and pregnancy complications continue to be under reported on birth notification data (Lydon-Rochelle et al 2005). According to (Smith 2014) there is a wide variation in data quality, indicating under reporting of medical conditions when compared with the maternity healthcare records. This may be attributed to the use of open ended questions when collecting data related to pregnancy complications and congenital malformations of the baby (Frost 1984).

### ***Why is data Omitted / Under or Over Reported?***

Under reporting of maternal and infant complications are grossly under reported (Montgomery et al 1962). This results in important limitations regarding the usefulness of vital records for epidemiologic and outcome research. (Gould et al 1999). Under reporting is not infrequent and often occurs in the case of mothers at highest socio economic disadvantage with associated poor pregnancy outcomes. (Gould et al 1999) Birth notification data varies worldwide (Committee Opinion 2015).

There is a disconnect between the purpose of the healthcare worker documentation providing clinical care versus its secondary uses. (Tang et al 2017). Collaborating with all those who contribute to perinatal data collection will potentially increase their knowledge and motivation of the importance of entering accurate, consistent data to reduce misinformation and its associated risks to mother and baby.



Agreement is used to mean that information regarding a data item is found on both the hospital record and the birth notification and it is the same. If one or other record does not supply any information for a certain item, this is not interpreted as a disagreement but is considered to be incomplete reporting.

Omissions in birth notification regarding congenital anomalies or birth injuries can be as a result in a delay in diagnosing the condition (Montgomery et al 1962). There may be a reluctance on doctors to stigmatize a child with a diagnosis of a congenital anomaly (Montgomery et al 1962). There is also broad consensus on stigma and discrimination as potential barriers to access and uptake of health information and services so there may be a reluctance on staff to notify such conditions (Nayer et al 2014). In the case of birth injuries, there may be a fear of litigation if the information is reported and so the details may be omitted (Montgomery et al 1962). Under reporting of data items result in important limitations regarding the usefulness of vital records for epidemiologic and outcome research. (Gould et al 1999).

A study by (Gissler et al 2002) found a 98.5% correlation between birth data recorded originally and at a subsequent births in the Finland medical birth register. (Hangsleben et al 1985) identified that designating a person responsible for checking and verifying midwifery data entries increased data accuracy but increased costs at the same time and was therefore unlikely to be adopted. (Lain et al 2011) reviewed forty-three studies looking at completeness and accuracy of data and found that birth data was less accurate than hospital discharge databases.

Over-reporting conditions in birth notification is also a concern (M. T. Lydon-Rochelle et al 2005). As staff can mistake certain conditions for more dangerous conditions and predispose them to making coding errors. An example is where staff mistake eclampsia for other hypertensive conditions.

### ***Impact of Omissions / Under or Over Reporting of Events***

(Ahman et al 2007) asserts that incomplete data has an impact in reliably demonstrating mortality and morbidity and therefore can impact on the provision of resources and services where they are needed most. Birth notification data contains unique essential data on the delivery of care and allows for cohorts of patients to be examined more closely but is not be adequate for quality improvement and clinical research (Kristensen et al 1996).

Flawed data sent to government agencies may be used in the evaluation and planning for future maternity services and could therefore have an adverse effect on the mothers and babies utilising these services.

### ***Barriers to ICT in Healthcare***

Research indicates that healthcare workers are more likely to embrace ICT, when it is used to carry out administration rather than clinical work. According to (Poon et al 2006) the adoption of information

technology in healthcare is limited and is likely to remain so, unless significant financial resources are made available. The adoption of systems that deliver safety and quality benefits are less likely to be adopted unlike systems that generate financial benefits (Poon et al 2006).

(Venkatesh et al 2003) asserts that the adoption of IT may be improved by providing education, training and information to promote the benefits of the system as well as providing the appropriate IT infrastructure. Several authors such as (Chau et al 2001) and (Mundy et al 1993) argue that the adoption of technology is directly related to the attitude of the healthcare worker to IT, how useful the system is and the impact that IT has on job satisfaction, for example speeds up work or reduces repetitive tasks.

### ***Recommendations***

Using a technology approach towards improving data quality is not enough (Lafond et al 2003). The capability of maternity computer systems are influenced by the skills and behaviour of staff using the systems (Lafond et al 2003). There is a gap in the provision of professional data managers at health facility level (Hahn et al 2013). In addition, automated validity checks at data entry may also improve data quality. Providing feedback on data quality and the completion of a self-assessment of data quality may increase the level of data usage and quality awareness (Hahn et al 2013). There is a need to implement interventions to improve the legibility, reliability and completeness of healthcare workers documentation in order to achieve quality health care data. (Lucyk et al 2017).

In studies by (Cowan et al 2007) and (van Walraven et al 1999) electronic accuracy in the notes and discharge summaries were found to be more complete. However, in contrast (G. R. Ellison et al 1997) found there was no evidence that the computerised data was better than that recorded in the hand written paper hospital files. Incomplete paper records and the organization of the paper records were found to be major barriers to data quality (Lucyk et al 2017). Results show that if more staffing hours were dedicated to birth notification, there would be more accurate and complete reporting (Melnik et al 2015).

Some researchers indicated that a healthcare qualification would be essential for data entry due to their fluency of medical language, ability to locate information in the health care records and the knowledge of workflow and its documentation in a healthcare setting (Eder et al 2005). Essential data required for birth notification should be made mandatory on the system so it would be impossible to omit answers to crucial questions (Kristensen et al 1996).

The provision of feedback in the form of training can address the cause of errors or inaccurate data. It can also raise awareness of the importance and relevance of the data (Garrib et al 2008). However, one must be mindful also that feedback can also have a negative effect on the healthcare worker's motivation to take part in the reporting process (Lafond et al 2003).

## *Summary*

Research into this subject has found that perinatal data was perceived to be more complete when completed electronically, however it raised the question if the data entered was more accurate (A. M. Craswell et al 2016). According to (Kristensen et al 1996) an electronic record should substitute a paper-based data collection. In written records, there may be data items missing or there may be no record for the mother or baby at all and this can raise concerns when transcribing data from the written record to enter into the computer for birth data collection (A. M. Craswell et al 2016). This can result in errors or omissions being sent to the government agencies. After failing validation tests, some data can be returned to the hospital, via email error reports for clarification or correction. This increases the workload for those correcting or clarifying the data as well as the potential for underreporting of vital statistics for local, regional and national level. More studies are needed to compare data obtained from birth notification with alternative data sources such as the national maternity healthcare record to determine the reliability and validity of the data.

It is evident from reviewing the literature that no studies have been completed from an Irish perspective to understand why errors, inaccuracies and omissions occur in electronic birth notification data and to understand the user's perception of patient data entry in to electronic hospital system. This research hopes to address and fill this gap.

## **Methodology and Fieldwork**

### ***Introduction***

In this chapter, the writer outlines the details of the research philosophies and the various approaches which were considered for this research. It outlines the chosen method and provides reasoning, as to why the particular approach was used. The chapter also discusses data collection methods and outlines the limitations of the chosen method. It concludes with an overview of ethical considerations.

### ***Research Approach***

(Remenyi et al. 2004) suggests that the primary aim of empirical research is to have a better understanding of the research subject. As the research question aims to understand why errors, inaccuracies and omissions occur in electronic birth notification data and also seeks to gain insight in to the user's perception of patient data entry in to electronic hospital systems an empirical research strategy was selected. Having selected an empirical approach, positivist and realist philosophies were considered in order to determine which was the most appropriate in addressing the research question.

### ***Research Philosophies***

#### ***Positivism***

Positivism supports the belief that natural science methods should be followed in order to find the truth. It also assumes that the answer is quantifiable and can be proven using hypothetic deduction. In general terms, positivists collect large volumes of empirical data, which is analysed and used to generate a hypothesis or prove a theory. (Bennett 1984) defines hypothetic deduction as “*something that starts with general hypotheses, deduces consequences from them, and checks those against the data*”.

Positivists maintain that the validity of the research is based on the fact, that the collected data is a true representation of reality. According to (Saunders et al. 2003) the guiding principles of the positivist approach is that researcher must assume “*the role of an objective analyst, coolly making detached interpretations about those data that have been collected in an apparently value-free manner*”. Experiments, questionnaires and field studies tend to be the preferred research methods used by positivists.

#### ***The Process of Deduction***

Deductive reasoning is often used to hypothesise theories which can be tested. (Bryman et al. 2007) outlined the deduction process which is shown below in figure 3.1. A deductive approach was selected as it provides an appropriate framework for collecting and analysing data in order to meet the requirements of this research.

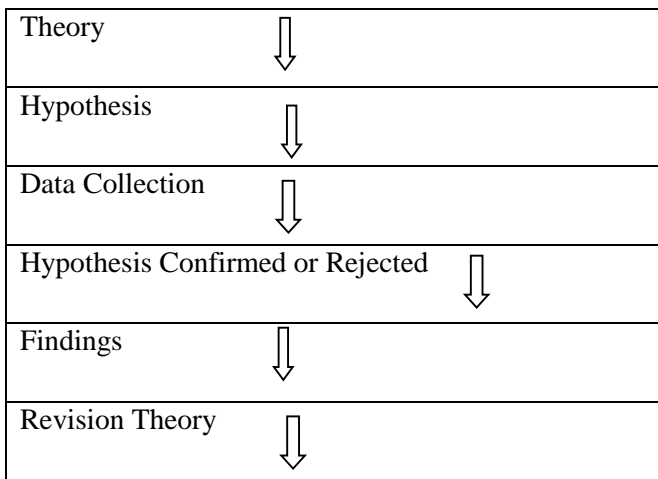


Figure 3.1 - The Process of Deduction

### *Realism*

(Saunders et al. 2003) asserts that realism is based upon the belief that social forces exist which can impact an individual's behaviour and how they perceive things. Consequentially, realism recognises the importance of the researcher having an understanding, of the individual's subjective reality when seeking to understand influences or processes that can influence the individuals' views or behaviour.

### *Selection of the Research Philosophy*

Many authors including (Bryman et al. 2007) and (Saunders et al. 2003), suggest that researchers select the research method that best fits the purpose of the research or which answers the research question. It is important to note that each method has its own advantages and limitations. Thus a positivist approach has been selected as this research sets out to: -

- Collect and analyse data from primary sources;
- Test a hypothesis.

### *Research Methodology*

The value of the various research methods continues to be debated. It is important that the selected method takes into account the following factors: the research question; sample population; the size and willingness of subjects to participate in the research; timescales and the experience of the researcher. Thus a number of research methods were considered for use in this dissertation.

### *Quantitative*

Quantitative research tends to use scientific, experimental methods to test a theory / hypothesis. Quantitative research is generally concerned with empirical research using a deductive approach using as questionnaire as a data collection tool. Data analysis is shown by means of graphs, tables and charts. (Bryman et al. 2007) assert that quantitative research is preoccupied with measurement, causality, validity, generalisation and replication.

Quantitative research generally results in reliable, valid and reproducible outcomes that are statistically significant. The most common method of collecting and analysing quantitative data is through a questionnaire.

### *Qualitative*

(Strauss et al. 1990) suggest that qualitative research can be defined as “*any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification*”. Qualitative research methods assist the researcher in gaining an insight or understanding of the research subject not readily available with quantitative methods. Qualitative research requires that the research is carried out using an exploratory, dependable and interpretive approach. (Strauss et al. 1990) suggest that qualitative methods can be beneficial in gaining a fresh perspective.

Qualitative methods can be subjective and do not always provide desirable outcomes, generally due to the fact that it is possible to receive different responses to the same question from respondents. This can be problematic if the answer does not meet the needs of the researcher. In addition, qualitative data collection can be time consuming and may not be representative of the population.

### *Justification of the Method Selected*

The purpose of this research is to understand why errors, inaccuracies and omissions occur in electronic birth notification data and understand user perception of patient data entry in to electronic hospital system. It was therefore decided that a quantitative data collection and analysis approach should be used. The research took the form of:-

- A comprehensive literature review in order to gain insight into the research area;
- A survey of delivery suite / theatre clerk’s central appointment clerks, clinical midwife / nurse managers, staff midwives, staff nurses, student midwives, agency midwives and clinical skills facilitators at the maternity hospital chosen to determine their attitude to using IT to computerise data entries.

Although the preferred method would have been to also include focus groups or semi-structured interviews, it was decided not to use qualitative methods based on past difficulty in seeking meetings with staff, time constraints and also to allow for anonymity and confidentiality.

### *Limitations and Difficulties*

Quantitative surveys have a number of data quality issues such as reliability, how data is analysed and bias in terms of how questions are phrased. To mitigate this risk, the questionnaire was piloted by 10 members of staff to ensure that questions were clear and not phrased in a biased manner. Some modifications were made as a result of feedback, namely the number of questions was reduced from 25 to 21. As questionnaires provide

less flexibility to respondents in expressing their views, both open and closed questions were included to capture the views of individual participants. The benefit of a survey is that:-

- It provides anonymity and confidentiality to participants;
- it is self-administered, so respondents can complete the questionnaire at a time that is convenient to themselves and the data collected is quantifiable and standardised.

Some minor difficulties occurred using the survey. As the responses were completed on paper, it was sometimes difficult to decipher handwriting. Also to carry out analysis all responses had to be manually entered into Excel for analysis which was time consuming.

### *Questionnaire Design*

A questionnaire (also referred to as a survey) is a method of collecting data from participants through the administration of questions in written format (Parahoo 2014). The aim of this questionnaire was to collect as much information as possible from staff that enter data items into K2 which are required for birth notification at the hospital. The staff included delivery suite / theatre clerks, central appointments clerks, clinical midwife managers, staff midwives, staff nurses, student midwives, agency midwives and clinical skills facilitators.

Questionnaires can be a reliable, efficient and quick way to collect data from multiple respondents within a one month's duration of data collection. The data was used to explore and yield statistical results to create information. A disadvantage of the questionnaires is that the format of data collection is fixed and strict.

The questionnaire consisted of twenty-one questions containing a variety of open and closed questions. The use of closed questions was used to facilitate standardised results. The use of open ended questions allowed for more comprehensive answers (Parahoo 2014). The purpose of which was to ascertain the individual narratives on concepts relating to training and gain insight in to the staff members understanding of their role in data entry. At the beginning of the questionnaire, staff were asked to identify their current occupation in the hospital, this purpose of this was to ascertain if responses differed between staff groups participating in this survey, for example clerical staff versus midwives etc.

The full scripts of the participant cover letter and questionnaire are available in the Appendix 8 and 10. The results obtained from the questionnaires were presented in chart and table format and the major findings of this study will be discussed in detail in Chapter 3.

### *Ethical Considerations*

Ethical issues concerning data collection methods were considered due to the nature of the research. It was felt that respondents may believe that they were criticising their own or their colleagues' work practices. Thus

it was possible that the research could be perceived negatively by staff. In order to protect the identities of the individuals involved in this research, it was decided that only aggregate responses / results would be provided. The ethical principles of voluntary participation and informed consent were also applied.

Ethical approval was sought from the Research Ethics Committee at the researcher's maternity hospital in June 2018. Verbal approval was received from the Chairperson of the Research Ethics Committee on the 26<sup>th</sup> July 2018, prior to the research being undertaken. Written approval was received on 20<sup>th</sup> August 2018. The following documents were submitted to the maternity hospital's Research Ethics Committee:-

- A copy of the questionnaire;
- A participant information leaflet;
- Completed ethics application form;

Copies of each can be found in Appendix 8,10 and 12.

Each paper survey was accompanied by a participant information leaflet (Appendix 10). Invitees were informed of the researcher's background and the purpose of the research and that no staff member would be identified in the research document. Participants were informed that responses would be confidential, that participation was voluntary.

Care was taken during the research and analysis stages to ensure that this was done in a fair, objective and unbiased manner. (Saunders et al. 2003) advises that care must be taken in the analysis and reporting stage, to ensure that data is not misrepresented or is selective in its presentation.



## Data Analysis

The research hospital is a large Maternity Hospital in Dublin and is one of the largest providers of maternity and infant health care in the Republic of Ireland. The hospital provides care for up to 10,000 pregnant women every year at a local, regional and national level. In 2017, 8,600 babies were born at the hospital. All women attending the maternity hospital have data recorded in the hospital's K2 clinical management system. Each woman has a record of clinical information relating to her pregnancy from the first antenatal visit to the postnatal discharge. The data set includes:-

- Maternal medical and surgical history;
- Past obstetric history;
- Social and psychological history;
- Family history;
- Current pregnancy;
- Baby's father medical history.

Electronic patient data is available at the hospital dating back to 1985. The Health Service Executive (HSE) which has responsibility for the provision of healthcare and personal social services in Ireland, has begun investing in the computerisation of maternity care. The implementation of the national Maternity New-born Clinical Management System (MN-CMS) has resulted in the provision of electronic patient records. Since the first implementation in Cork, Ireland, in December 2016, hand written maternity records will be phased out and replaced with computerised records nationally, as the system is implemented at each of the 19 maternity sites.

There are many potential benefits of an electronic health record (EHR) to public health. Structured EHRs could greatly increase chart review efficiency, providing more robust information for clinical and public health research and earlier identification of emerging trends. Another benefit of an EHR is the ability to provide a platform for performance measurement, to facilitate quality improvement by drawing attention and resources to practices and clinical outcomes where there is an established gap in care. Electronic systems must be supported by good policies and procedural practices to help prevent opportunities for individuals to make mistakes or to manipulate data. Automation saves time, improves outcomes, and increases throughput, whilst removing errors. Electronic systems can also provide clear visual or audio warnings to users where a step has been missed or something is out of the normal range. Systems should have full audit capabilities.

High quality data is vital for patient care and evidence based decision making at local, regional and national level, thus the collection of patient data at various healthcare provider encounters is required. In the data collection journey, clerical staff are required to sift through the maternity record to transcribe data from the healthcare provider's narrative record or checklist.

## ***Purpose of Research***

The purpose of this research is to determine why errors, inaccuracies and omissions occur in the electronic birth notification data and to gain an understanding of what is the user's perception of entering data in to the electronic hospital system. Quantitative data collection and analysis approach should be used. The research took the form of:-

1. A comprehensive literature review in order to gain insight into the research area;
2. A survey of delivery suite/theatre clerk's central appointment clerks, clinical midwife/nurse managers, staff midwives, staff nurses, student midwives, agency midwives and clinical skills facilitators at the maternity hospital chosen to determine their attitude to using IT to computerise data entries.

Although the preferred method would have been to include semi-structured interviews it was decided not to use qualitative methods. This decision was based on previous experience in seeking meetings with the above staff groups time constraints and the need for anonymity and confidentiality.

## ***Research Methods Used***

### *Literature Review*

As mentioned earlier, a comprehensive search of the literature was conducted between January 2018 and May 2018, using on-line databases such as Medline, Science Direct, CINAHL Complete, Cochrane Library, EMBASE and Maternity and Infant Care. As far as was practical searches were conducted using recognised medical subject headings (MeSH). The advantage of using MeSH terms is that search results tend to be more precise and relevant. A number of relevant books and journal articles were also reviewed.

### *Questionnaire*

As mentioned above a survey was selected as the primary research method and was conducted between 1<sup>st</sup> August 2018 and 29<sup>th</sup> August 2018. Analysis was completed in mid-September 2018. The staff grades listed above, were invited to participate. The total number invited to participate was 100. A total of 100 questionnaires (Appendix 8) were distributed in paper format to the following clinical areas at the hospital:-

- Central appointments office;
- Outpatients reception;
- Antenatal outpatient's department;
- Community midwives' office;
- Admissions office;
- Delivery suite;
- Theatre;
- Postnatal wards;

- Gynaecology ward;
- Private clinic.

Open questions were used where possible to ascertain the views of participants that were not captured within the structured survey questions. The survey questions were created to address the research question, knowledge of the existing data entry process in the chosen maternity hospital and from information obtained in the literature review. The benefit of using a survey is that: -

- It provides anonymity and confidentiality to respondents;
- It is self-administered, thus staff can complete the questionnaire at a time that is convenient to themselves; thus reducing the elapsed time for data collection;
- As each participant is asked the same set of questions, it is likely that the data is standardised and quantifiable and may allow inferences to be made about the general population.

### *Questionnaire Design*

The development of the questionnaire was guided by the relevant studies published in the literature, (Melnik et al 2015) (Chan et al. 2004) (Vermeulen et al. 2018) (Sharma et al. 2018). Survey items related to maternity healthcare workers use and adoption of the computer systems in the hospital.

In order to obtain the maximum number of responses it was decided to keep the questionnaire as short as possible while still capturing the data requirements. Where possible the questionnaire used a Likert style rating scale to ask questions. Likert rating scales allow respondents to specify their level of agreement to a statement or question (Saunders et al. 2003). The purpose of this was to facilitate the coding and categorisation of answers.

Initially a total of 25 questions were asked, 15 open questions and 10 closed questions and there was an option for participants to add additional comments. The researcher met with the Director of Midwifery and Nursing at the chosen maternity hospital. The questionnaire was reviewed with some staff followed by discussion and subsequent pilot of the questionnaire by 10 staff. As a result, modifications were made to the questionnaire to improve the consistency and reliability of respondent answers. The questionnaire now comprised mainly closed questions and the number of questions were reduced to 21, 13 open questions and nine closed questions and there was an option for participants to add additional comments. It was agreed to invite representation of staff groups who enter details on the K2 clinical system and the iPMS to participate in the study.

### *Questionnaire Distribution and Collection*

Following ethical approval, it was distributed in paper format, to the relevant clinical areas of a large Dublin maternity hospital. These areas included the central appointments area, the out-patient department including the private clinic, the labour ward/theatre, the community midwives office, the gynaecology department and the postnatal wards at the hospital. The questionnaire was self-administered and all questionnaires included a self-addressed envelope. Participants were advised to place completed questionnaires a sealed collection boxes at each location.

Questionnaires were issued with a study number to ensure anonymity so no staff member could be identified. The use of a paper questionnaire allowed participants to omit questions they did not feel comfortable in answering. The researcher visited the above areas regularly during the data collection period to encourage participation. The questionnaire pack included a 'Participant Information Leaflet' (Appendix:10) which explained the purpose and nature of the study and requested voluntary participation and ensuring confidentiality. Participants in the study were free to choose to participate and consent was implied if they returned a completed questionnaire.

The time allocated for data collection was three weeks which was later extended by one week to allow for staff to return from annual leave as the survey was being completed over the holiday period. The questionnaire title was a "Errors, Inaccuracies and Omissions in Electronic Birth Notification Data and User Perception of Patient Data Entry in to Electronic Hospital System".

To maintain confidentiality, the data collected was stored in a password protected computer and each respondent's completed questionnaire was issued with an identifying number accessible only to the researcher. The hard copy questionnaires were stored in a locked filing cabinet in a locked office at the hospital.

### *Data Analysis*

Data collected was entered onto Excel manually. Narrative comments for the open ended questions were coded and categorised.

### *Difficulties*

A number of difficulties were found in using the questionnaire. This was mainly due to the fact that some responses were illegible, participants did not return completed questionnaires by the initial deadline due to the fact that the survey took place over the summer holidays. Consequentially, the initial deadline was extended by a week. In addition, all responses were entered into excel for analysis which was time consuming.

## ***Outcome and Results***

There were 70 responses returned out of 100. This provided a 70% response rate which indicated that that hospital staff wanted to voice their opinion. The professions of the respondents were as follows:-

- Staff midwives (n=48; 68.5%);
- Clinical midwife/nurse managers (n=10; 14.2%);
- Delivery suite/theatre clerk (n=5; 7.1%);
- Central appointments clerk (n= 2; 2.8%);
- Staff nurse (n=2; 2.8%);
- Agency midwives (n=2; 2.8%);
- Clinical skills facilitator (n=1; 1.4%).

It is important to note that 15.7% of respondents indicated that they had no training at all in the use of K2 which is concerning.

### *Question 1 -What is your occupation here at the hospital?*

This question received a 100% response rate. As indicated in Figure 4.1 below, 48 responses were from staff midwives, ten from clinical midwife/nurse managers and two each from staff nurses and agency midwives. In total seven clerks responded, five being from the delivery suite / theatre area and two from central appointments. The majority of respondents are employed by the hospital on contracts with just 2.86% working on a casual basis via an agency. In busier times when there is a requirement for additional staff, more agency staff are utilised. There is a risk that agency staff may not be familiar with the hospital computer systems, but are still required to enter their own data. This may contribute to inaccurate or incomplete data (Craswell et al, 2016).

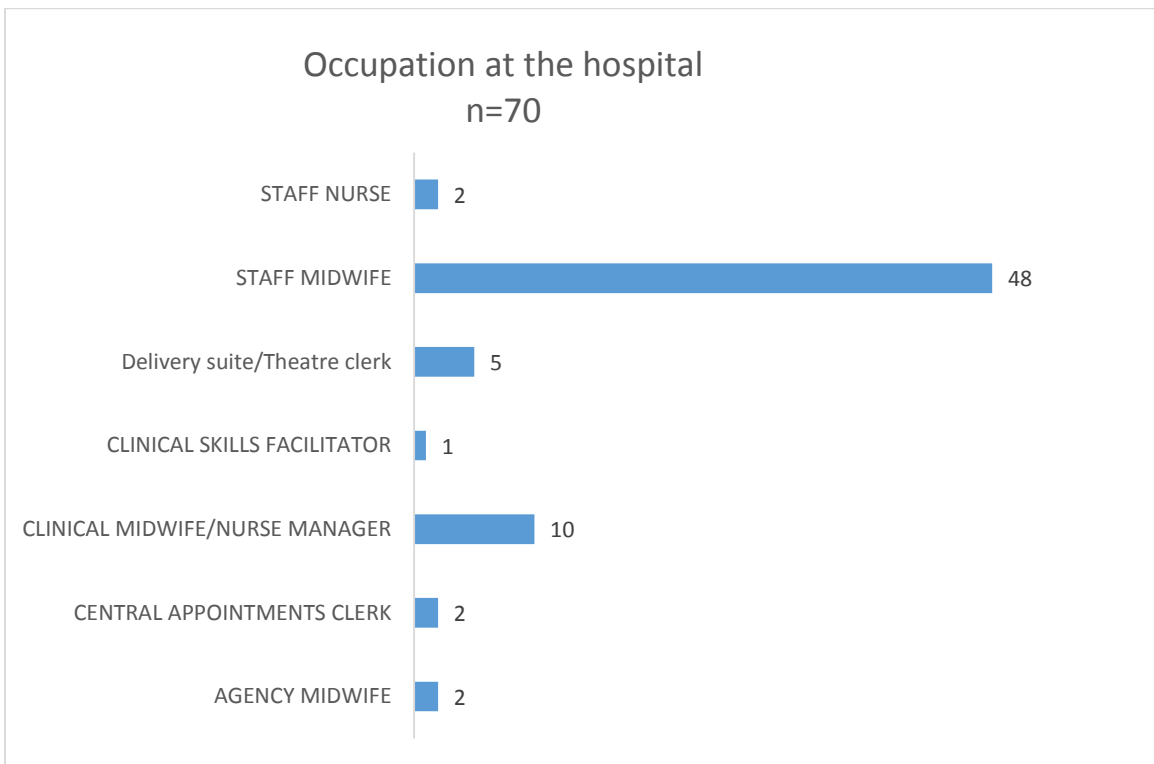


Figure 4.1 - Occupation of Respondents

*Question 2 -Do you know how the patient information you enter into the hospital computer is used?*

This question also received 100% response rate. 50 respondents (70%) indicated they knew how the information was used and 30% indicated they did not know what the information was used for (Figure 4.2.1). This highlights the need for education and training on the role of the data items collected and entered on the computer system. According to (Davis 1989), education and training provided to staff on the benefits of using a computer system encourage use by staff.

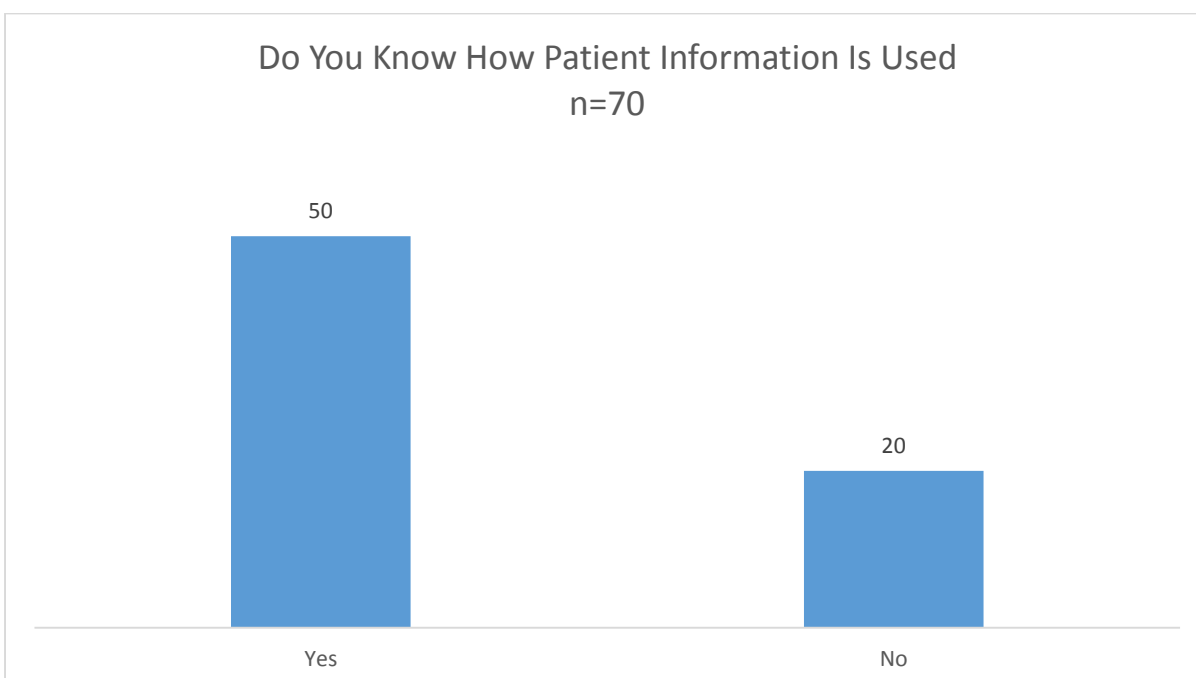


Figure 4.2.1 – How Patient Data is Used

### *How is the information used?*

Of the 50 respondents who indicated that they know what patient information is used for, the following answers were received. Participants were asked to tick all relevant answers

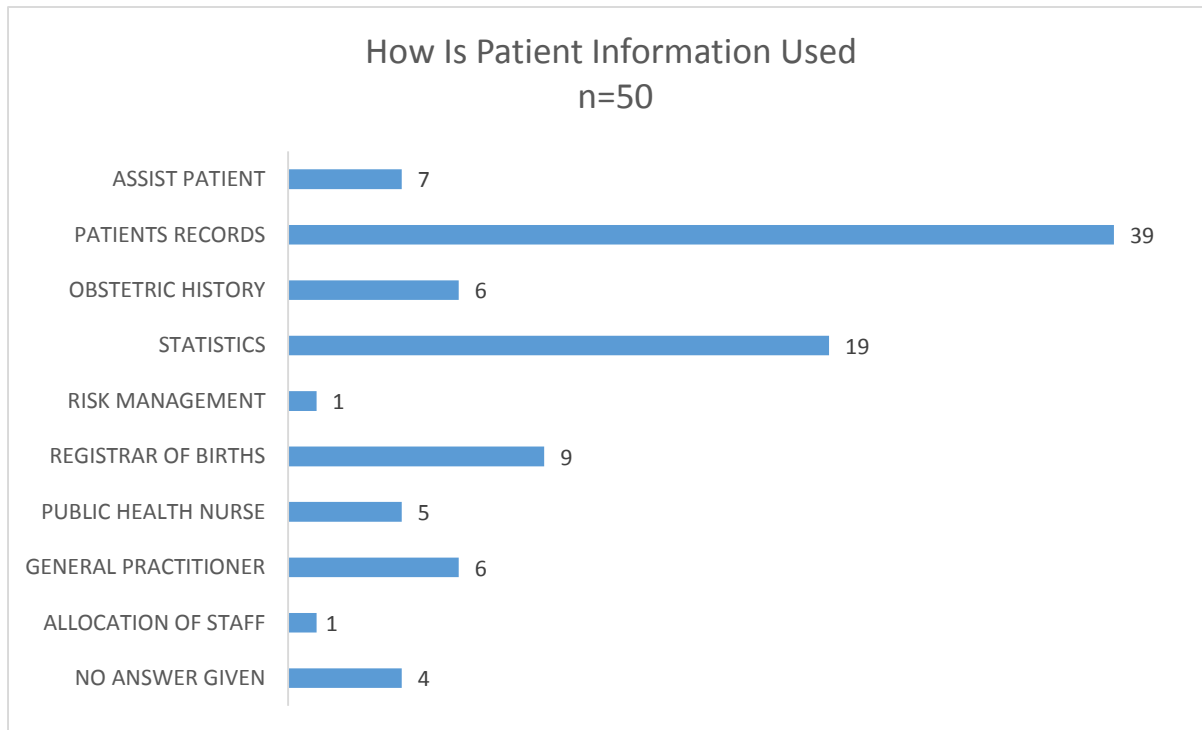


Figure 4.2.2 – Details of How Patient Data is Used

### *Question 3 - Do you know who receives computerised details of a birth?*

For this question, there was also 100% response rate. As indicated in Figure 4.3.1, 72.8% indicated they knew who receives computerised details of a birth. Of these 28 or 40% of respondents knew the Registrar of Births receives the information. 34 respondents indicated that the GP and the PHN receives the details. It is surprising that no respondent was able to correctly identify all recipients i.e. HPO was not identified.

The findings for this question indicated there is a lack of knowledge and a need for education and training and information sessions to staff on the purpose of data collection for birth notification.

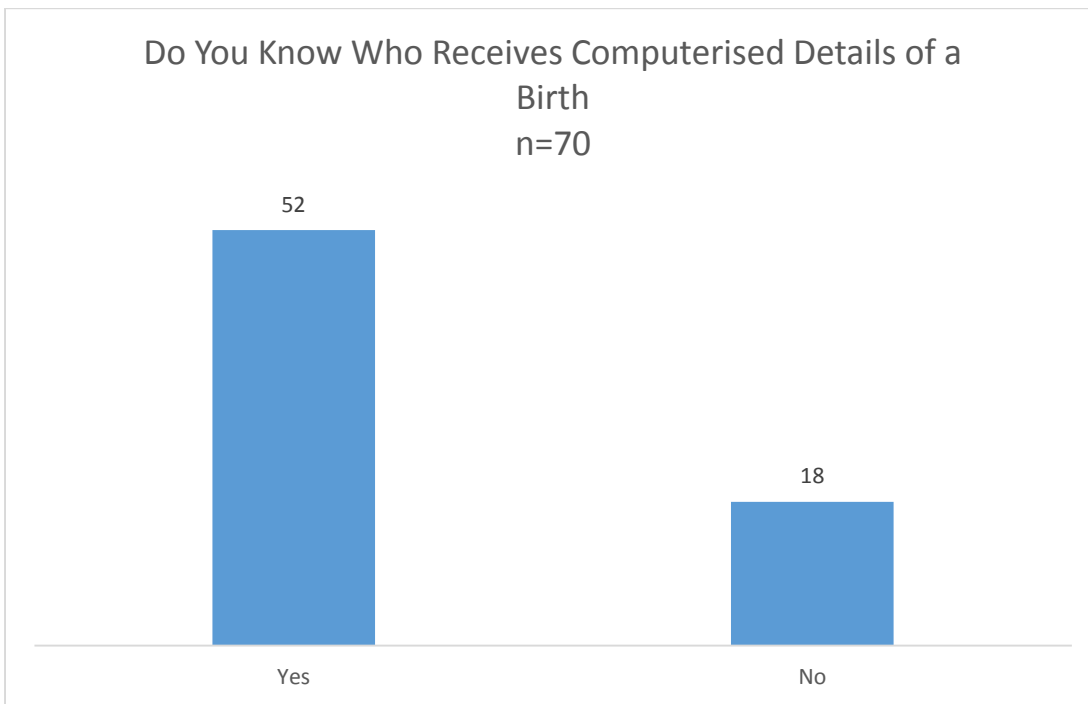


Figure 4.3.1 – Do You Know Who Receives Computerised Details of a Birth

Of the 52 respondents who indicated they know who receives computerised details of a birth, the following answers were given:

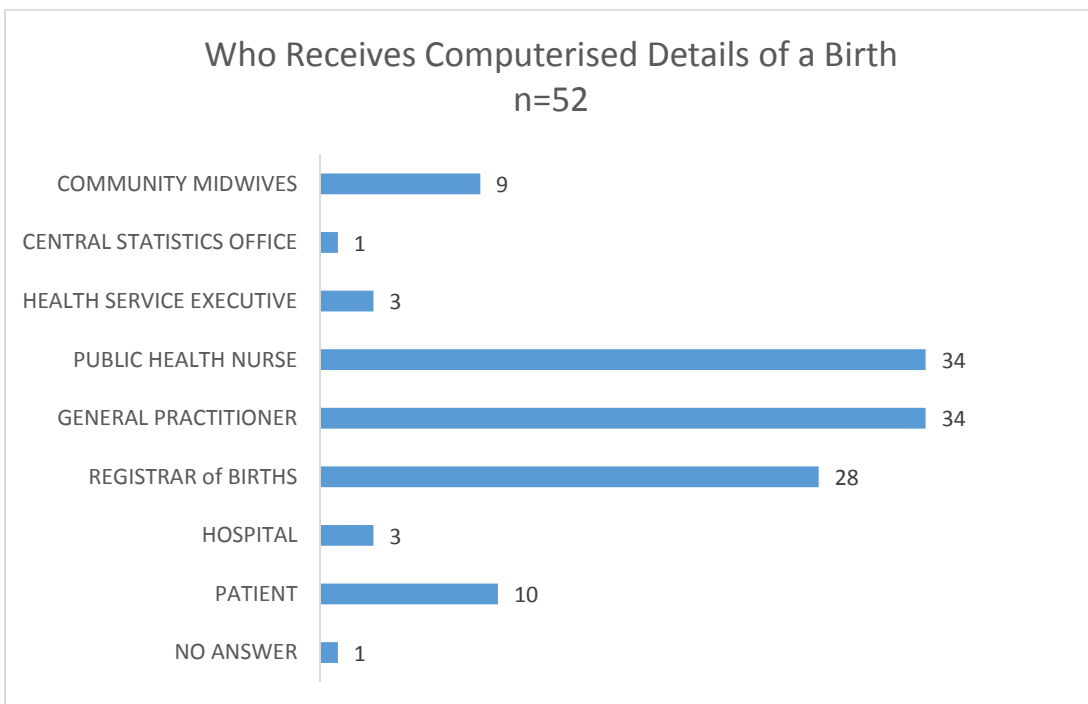


Figure 4.3.2 – Who Receives Computerised Details of a Birth

*Question 4 -Do you think the information entered on the computer accurately matches paper maternity record?*

There were 66 responses to this question with four respondents skipping this question. 53% of respondents stated the records matched and 18% stated that records did not match. 29% of respondents were uncertain if



the records matched (Figure 4.4). This highlights the need for information and training sessions. (Craswell et al, 2016) found that when staff were aware that data was inaccurate or incomplete, they left the record unchanged due to lack of time.

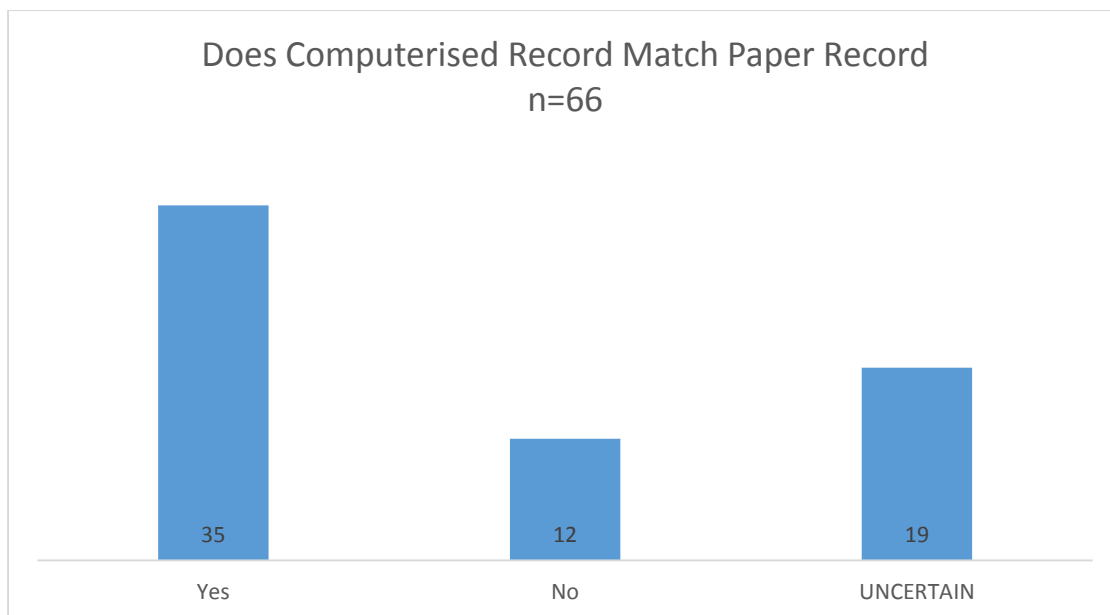


Figure 4.4 – Does Computerised Records Match the Paper Record

*Question 5 -What is your understanding of what happens to patient information after you enter it onto the IPMS or K2 maternity system?*

There were 67 responses to this question with some respondents giving more than one answer and 6 respondents are unsure as to what happens to the information (Figure 4.5). The findings for this question indicate there is a lack of knowledge and a need for education, training and information sessions regarding the purpose of data collection at the chosen maternity hospital.

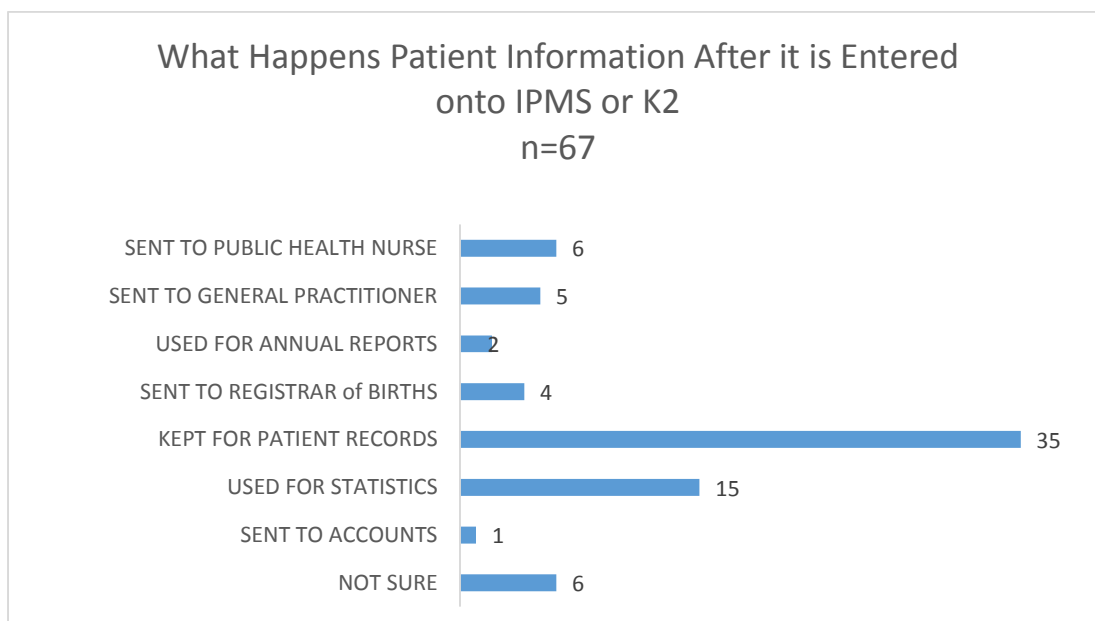


Figure 4.5 – What Happens Patient Information After it is Entered in to Systems

*Question 6 -How often do you use the K2 maternity system?*

There was 100% response to this question. 69% of respondents use K2 at least every day. 19% use K2 weekly and the remaining 13% use K2 monthly (Figure 4.6).

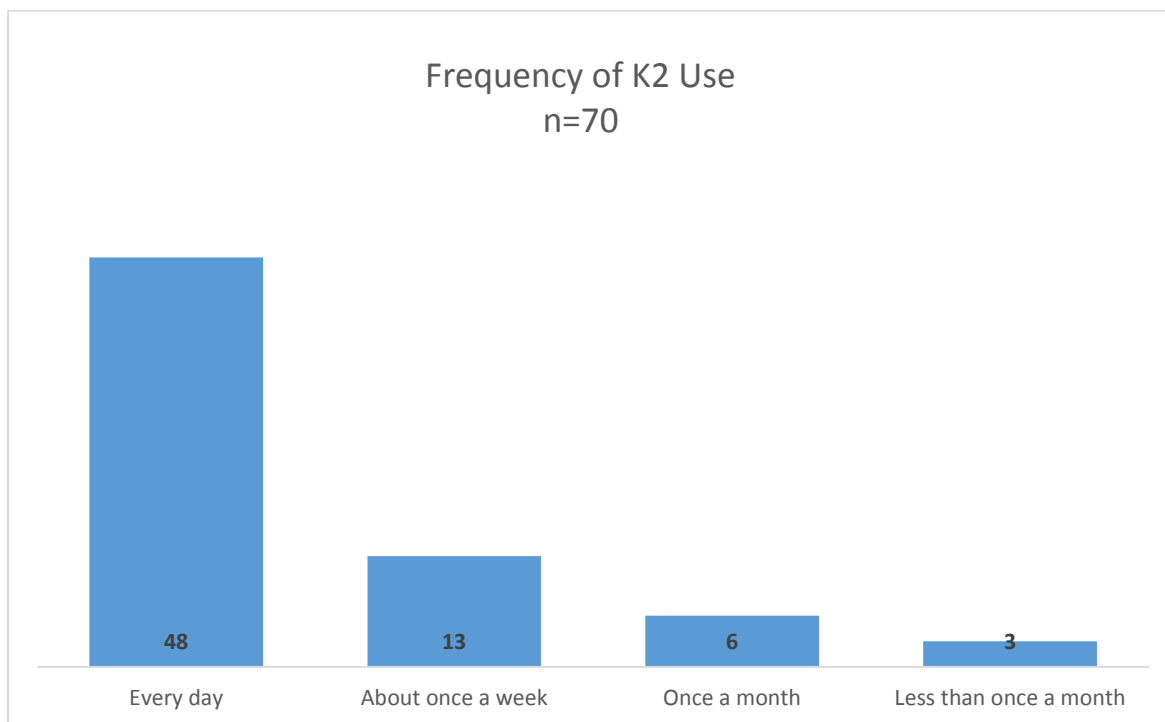


Figure 4.6 – Frequency of K2 Maternity System Use

*Question 7 -I think errors in computerising records happen because of the following:*

There was 100% response to this question. Participants were invited to tick as many answers as were relevant to them. 45.7% or 32 respondents stated they had difficulty understanding clinical terms in the paper maternity chart. 35.7% or 27 respondents stated it was too easy to pick wrong answer form the dropdown. 32.8% or 23 respondents indicated that errors could not be rectified (Figure 4.7). The findings of these questions indicated a lack of knowledge and a requirement for education, training and information sessions on the correction of errors whilst using system.

A surprising finding is the high number of respondents who cited that they difficulty understanding clinical terms in the paper record. 27 of the 32 responses were staff midwives or a higher level. The remaining 5 were clerical staff.

Access to and the use of technology and the perception of organisational support can directly impact on the use of technology. The impact of leadership at managerial level an increase the use of technology and an appreciation of the benefits to the user and to the organisation (Taylor et al. 1995).

Perceived usefulness and perceived ease of use are of major importance to computer system acceptance (Pare et al. 2006). Insufficient knowledge of IT can be a barrier to using it (Anderson, 2006). Some users may not know how to use various functions such as the scroll down / drop down functionality to select an appropriate response from a list of pre-defined options, with the result that data may go unrecorded (Craswell et al, 2016). This has a direct effect on the quality of care given and to the collection of statistics relating to mothers and babies. There may be many understandings of field definitions across settings or units, for example, the number of visits required to define midwifery led care may vary (Craswell et al, 2016).

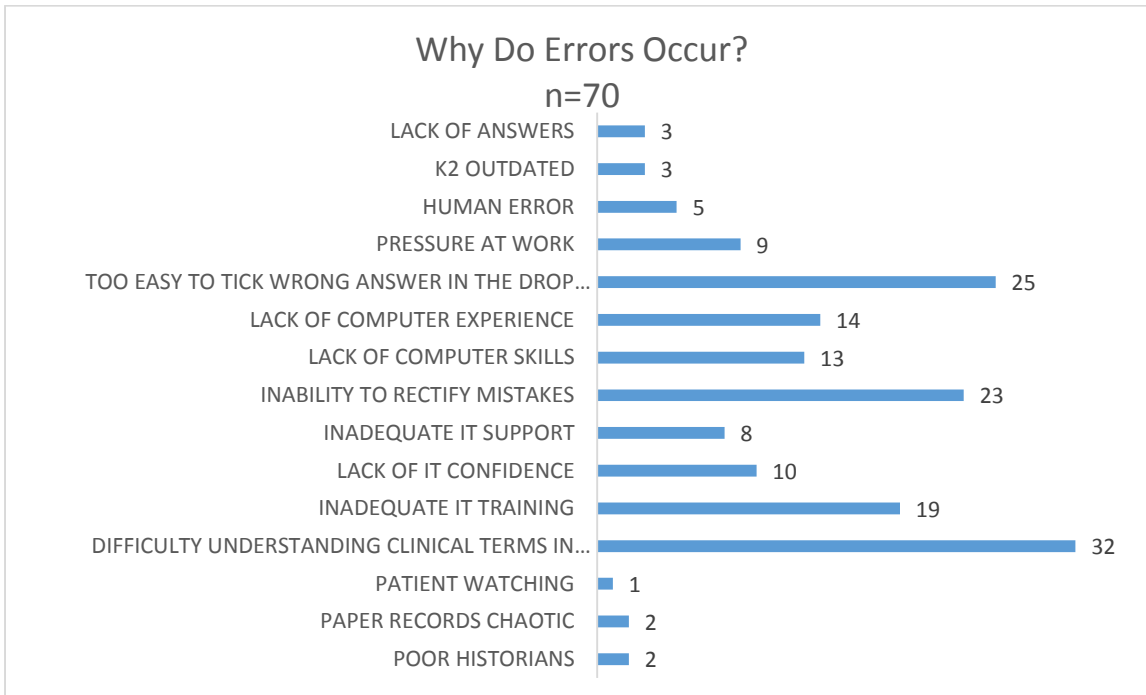
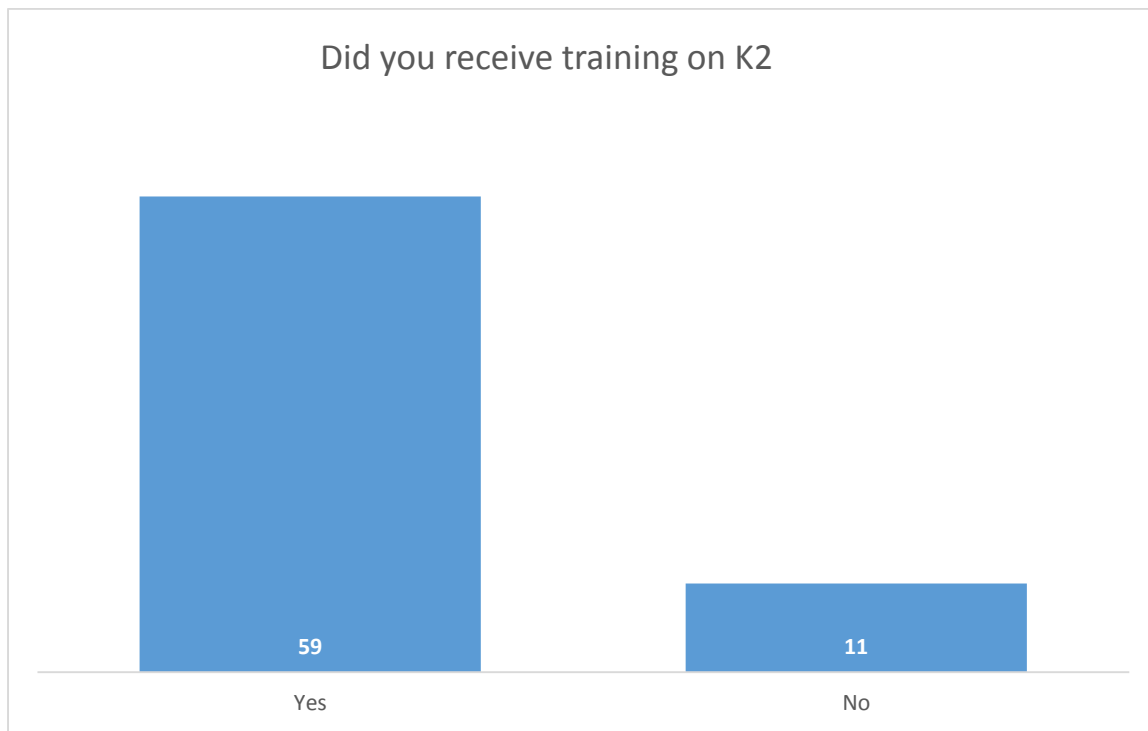


Figure 4.7 – Why to Errors Occur

*Question 8 -Did you receive training on K2?*

There was 100% response to this question. Over 84% (59) of staff had received training K2 clinical maternity system. Just over 15% (11) of respondents did not receive training on K2 (Figure 4.8).



*Figure 4.8 – Did You Receive Training on K2 Clinical Maternity System*

*Question 9 -Who did you receive K2 maternity system training from?*

Fifty-nine respondents were eligible to answer this question. Of these 54. 2% or 32 respondents received on the job training from a colleague. Twenty-one (35.5%) respondents indicated they had training from the IT midwife (Figure 4.9).

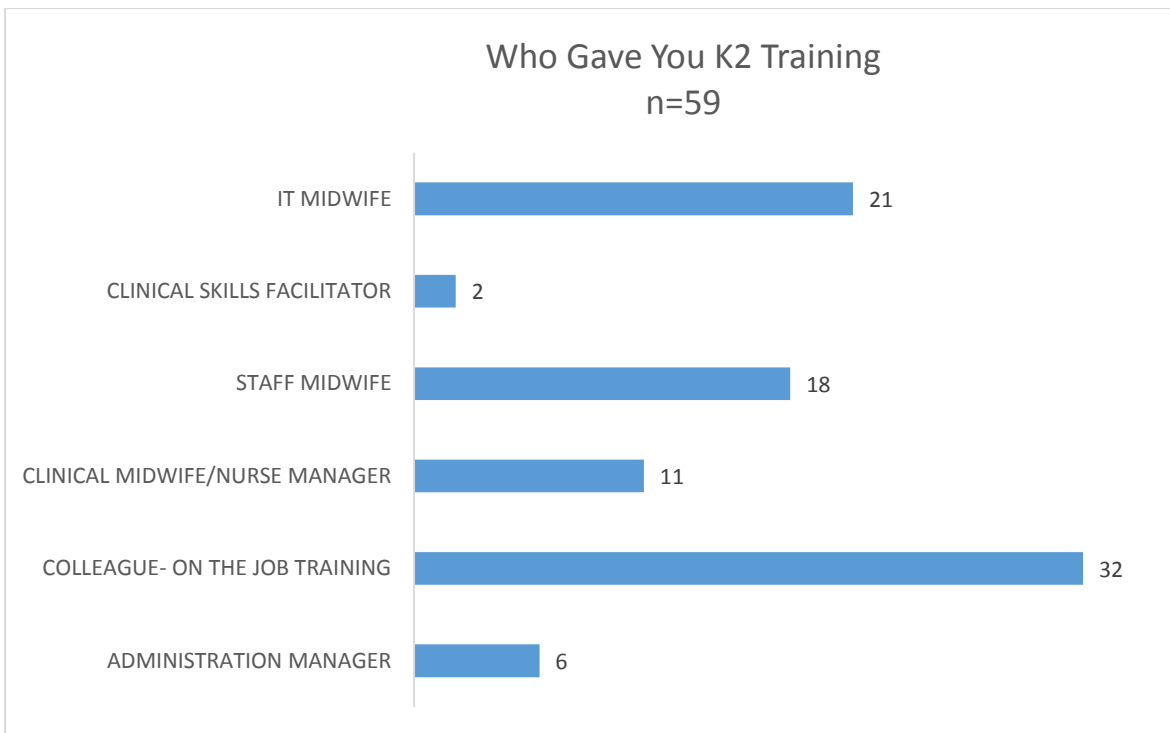


Figure 4.9– Who Delivered Training

*Question 10 -Do you feel IT training received prepares you to input accurate information?*

Research suggests that users are concerned about the ability to use computer systems and that training can increase the user’s knowledge and understanding about the use, relevance and capabilities of computers (Schwartz 1970). Using a Likert scale (strongly agree to strongly disagree). Figure 4.10 illustrates the frequency that participants agreed or disagreed with the statement. The question received 70 (100%) response.

The majority 61.4% of respondents agreed/strongly agrees that the provision of IT training would prepare them to input accurate information

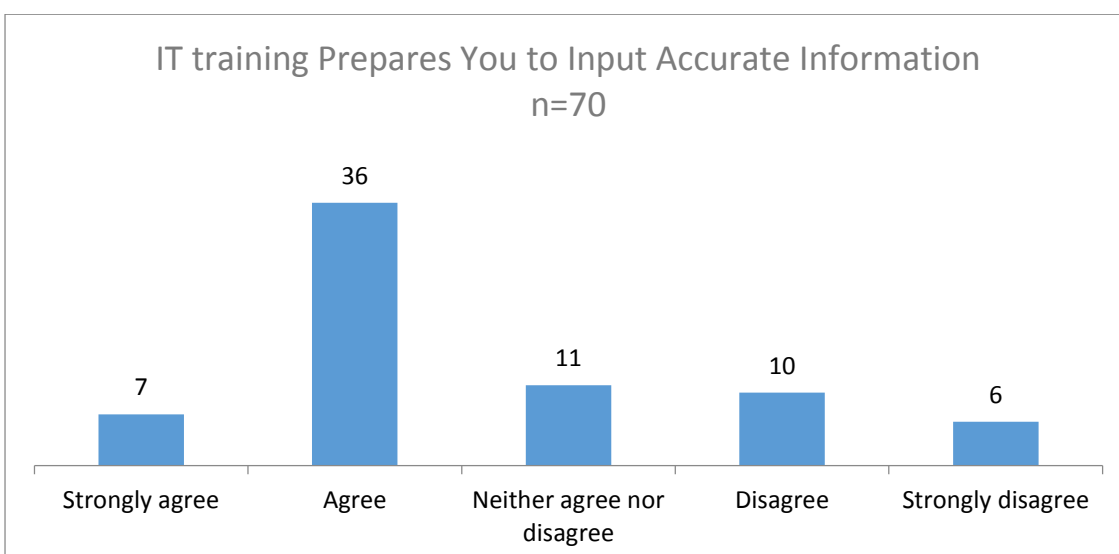


Figure 4.10 – Did IT Training Prepare You for Inputting Accurate Information.

*Question 11 -Are there areas in your job where you feel that your IT training did not prepare you for?*

This question received 65 responses. The majority (61.5%) of respondents indicated that there were no areas that IT training did not prepare them for. However, 38.4% or 25 respondents stated there were areas in their job that their IT training did not prepare them for (Figure 4.11).

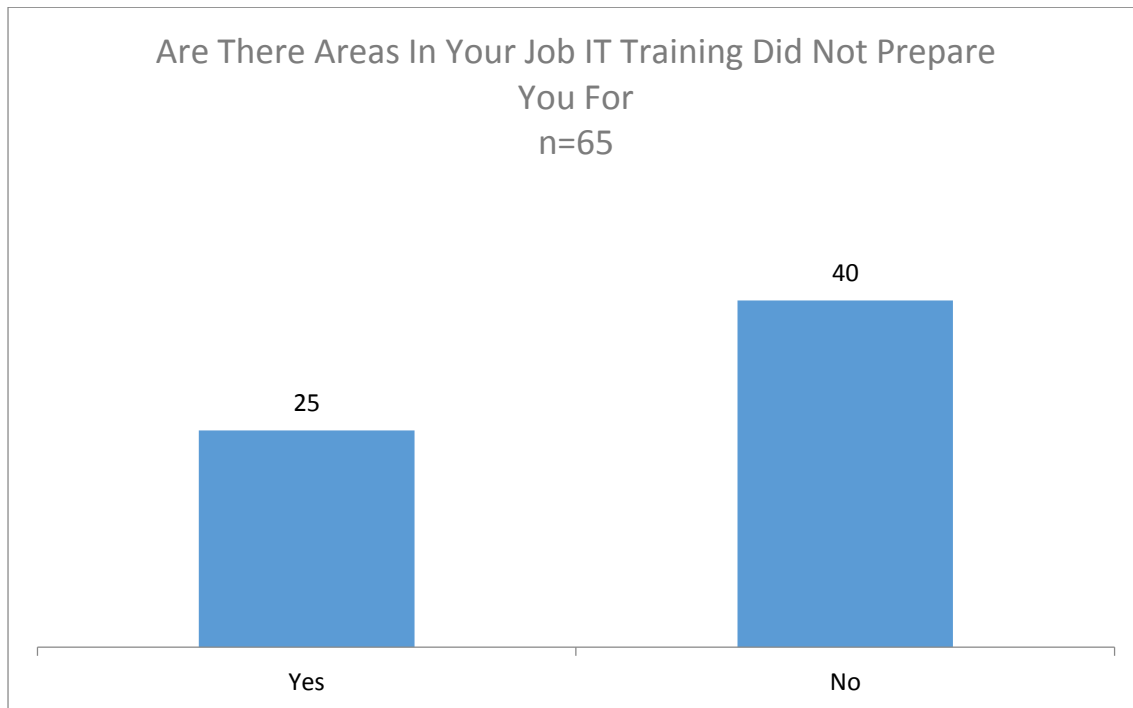


Figure 4.11 – Are There Areas in Your Job That IT Training Did Not Prepare You For

*Question 12 -Are there any practical barriers to computerising records?*

This question received 100% response rate with respondents being invited to tick all relevant answers. It is clear from the figure below that there is more than one contributory barrier to computerising records. 35 (50%) of respondents indicated they were too busy. 38.5% of responses revealed that computers were not available when they were needed (Figure 4.12).

Lack of availability to the necessary hardware or technical infrastructure in appropriate locations can influence user’s perception of computer access (Venkatesh et al 2003). Lack of capital investments is one of the biggest barriers to clinical computerisation (Lai et al. 2004). Functionality of a computer system can contribute to the user’s perception as to whether it is easy or difficult to use, though often users are willing to cope with some difficulty of use in a system that provides critically needed functionality (Davis, 1989). Difficulty in using a system can be overcome with training (Davis 1989). According to (A. M. Craswell et al 2016), staff enter less data onto the perinatal data record when they are busy or pressed for time.

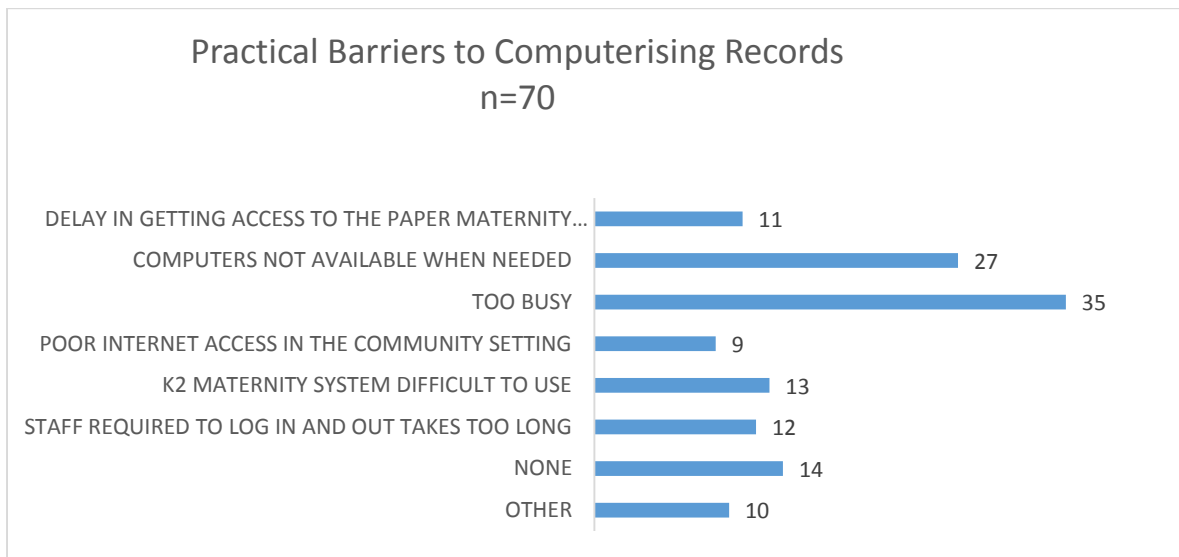


Figure 4.12 – Practical Barriers to Computerising Records

Under “other” comments from respondents included the following barriers are below:-

- Computers too old and slow;
- Delay in computerising charts after 4pm;
- Triage on IPMS too complicated;
- Issues with login/passwords expiring of faults;
- Takes longer to enter data on the computer than writing it down;
- Insufficient clerical support;
- Patients complaining (due to length of time it took to enter data);
- Paper records poorly organised- takes too long to find the information.

*Question 13 -What would be your preferred format for IT training to better prepare you for your job?*

There were 69 responses to this question. Only 1 respondent indicated they would prefer on the job training. A majority (44.9%) of respondents indicated their preference would be mandatory in service training, followed by the preference of skills workshop (37.6%), study days (34.7%) and one to one from 31.8% of respondents as illustrated in Figure 4.13. According to (Lambrecht et al. 2004) 71% of people learn their computer skills through informal on-the-job training, observation or just “picking things up”. In addition, the value of supervision and peer support can increase the effectiveness of training programmes (Lambrecht et al. 2004).

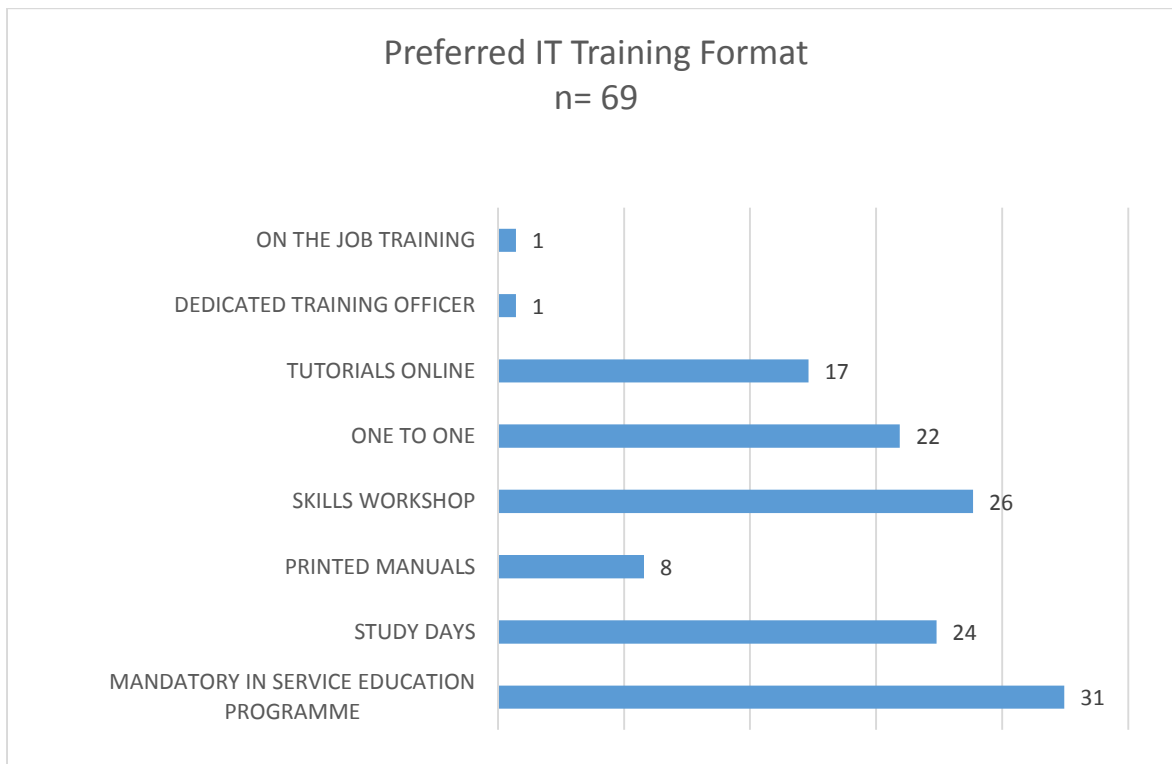


Figure 4.13 – Preferred IT Training Format

*Question 14 -Do any of the following affect how you add to the computerised maternity records?*

There were 65 respondents to this question with participants invited to tick all relevant answers. The most common answers were interruptions and illegible and unreadable handwriting in paper charts (69.2%) followed by limited time from 64.62% respondents. Other factors affecting how respondents computerise maternity records include information found in multiple places in the maternity chart (53.8%) or incomplete information in the maternity chart (50.7%) (Figure 4.14). There is a pivotal need to implement interventions that improve healthcare workers’ documentation, for its illegibility, unreliability, and incompleteness at times present barriers to the accurate recording of conditions and procedures essential to achieving high quality health data.

The introduction of EHR is an area with great potential for improving the accuracy of documentation (Lucyk et al 2017). Clinical information systems as well as electronic health records have offered new opportunities for efficient and high-quality patient care (Chaudhry et al. 2006) which could also prevent human error which resulted in many patients rescreening due to lost records (Times n.d.).

Lack of a complete maternity chart is a major problem (Ross, 2009). Electronic records can eliminate poor handwriting and use of unrecognised abbreviations in the healthcare environment. Midwifery as a specialist profession is an environment that is frequently interrupted (Cooper et al, 2004) and factors such as workload, access to computers and IT competency may influence accurate and efficient data entry onto records.



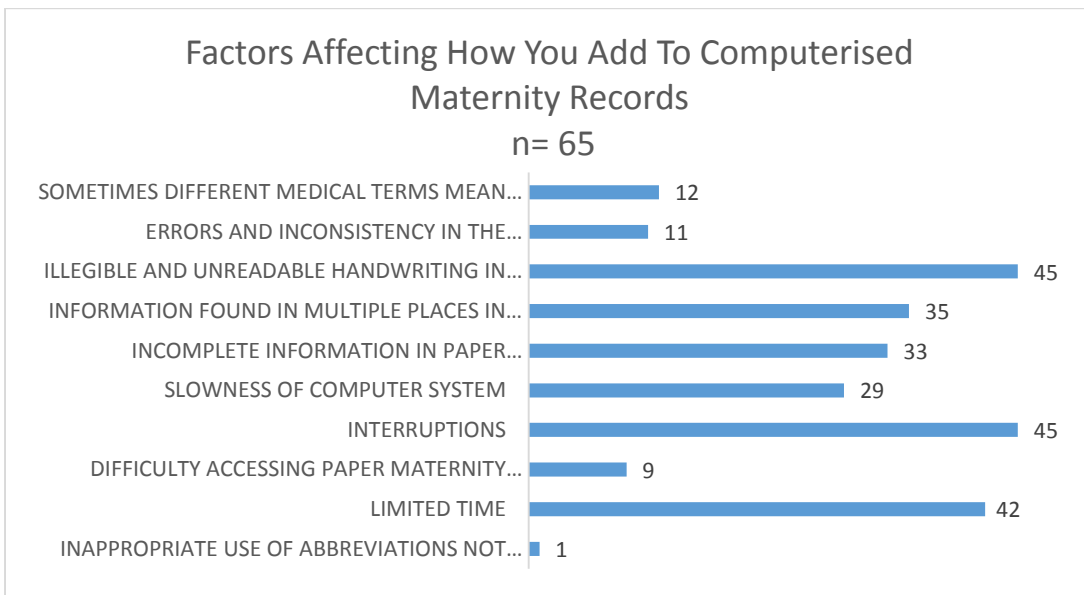


Figure 4.14 – Factors Affecting How You Add Data to Computerised Maternity Records

*Question 15 -Have you ever come across errors or omissions in the computerised maternity records?*

There was 100% response to this question. 65 (92.8%) respondents indicated they have come across errors or omissions in computerised maternity charts. Just 5 or (7.1%) respondents stated they never came across an error or omission (Figure 4. 15.1).

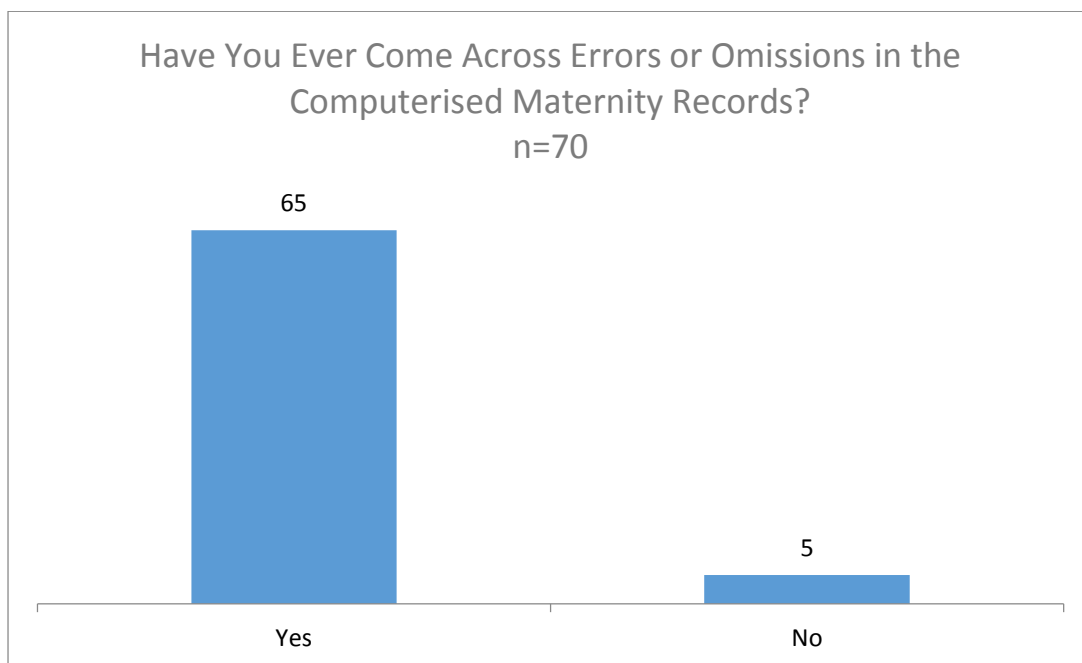


Figure 4.15.1 – Have You Ever Come Across Errors or Omission in Computerised Records

*If yes, how often would this occur?*

Of the 65 respondents who indicated they had come across errors or omissions in computerised maternity charts, 81.5% or 53 respondents had experienced this frequently or sometimes. It is surprising that 93% of respondents indicated that they had come across errors or omissions.

These were defined as follows:-

- Frequently is almost every day;
- Sometimes is once a week;
- Rarely is once a month.

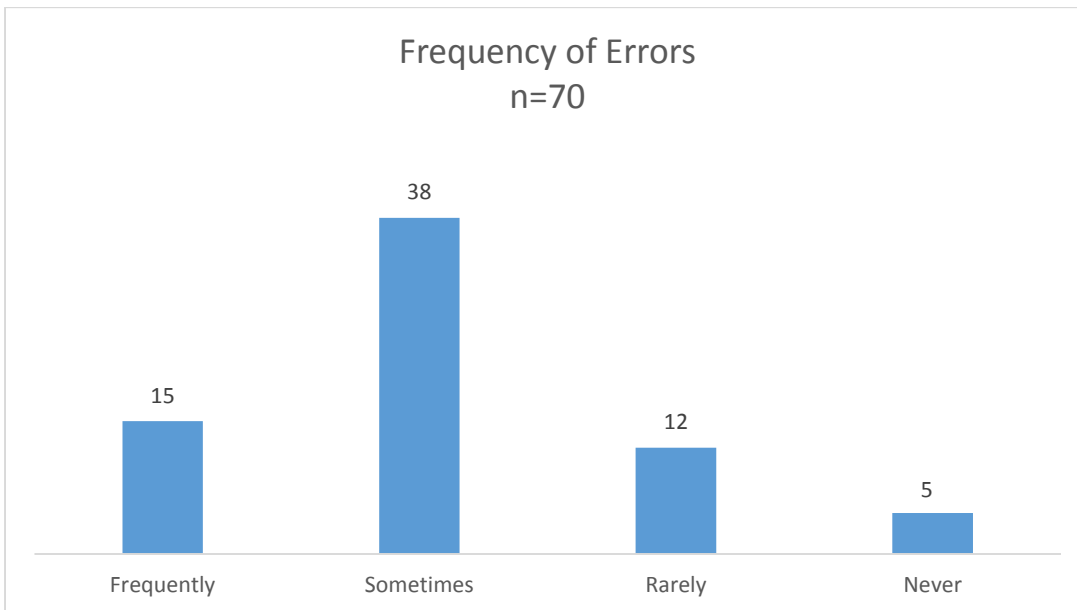


Figure 4.15.2 – Frequency of Errors

*If Yes, how did you deal with the error or omission?*

There were 65 responses to this questions. 98.4% or 64 respondents either asked the clerical staff to amend the record (61.5%), or amended the record themselves (53.8%). Other responses to this included asking the midwife or nurse for clarification (29.2%) or contacting the IT midwife (9.23%) (Figure 4.15.3).

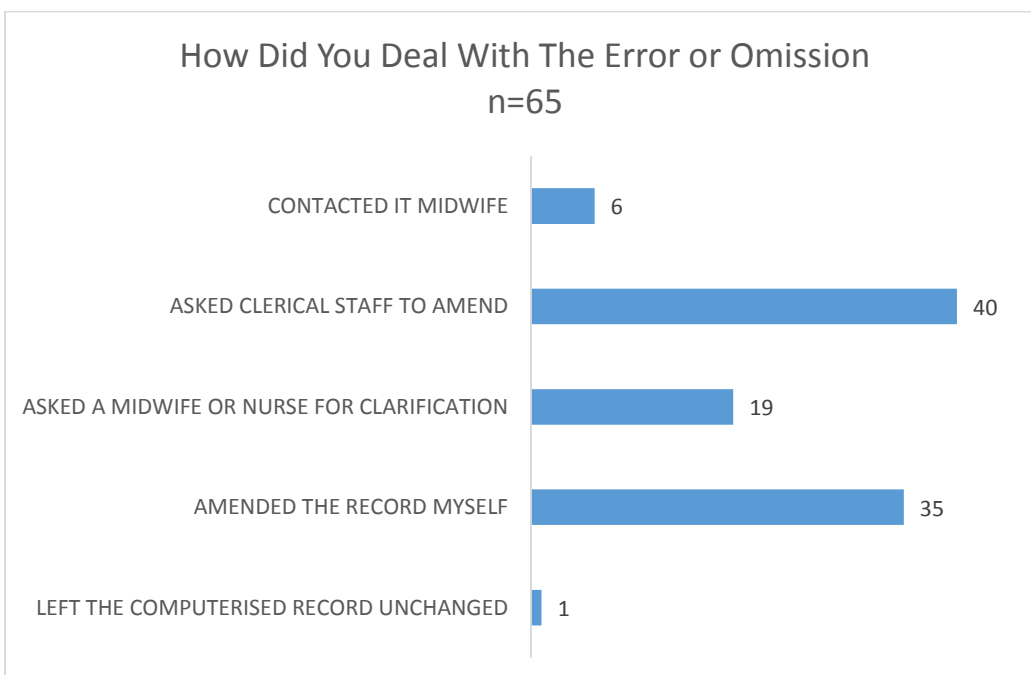


Figure 4.15.3 – How Did You Deal with the Error or Omission

*Question 16 -What are your working hours?*

There was 100% response to this question. Most respondents work full time (75.7%) and (24.2%) working part time (Figure 4.16). The purpose of this question was to ascertain if there was greater competence among full time staff in comparison to part-time staff. Findings revealed that no significant difference.

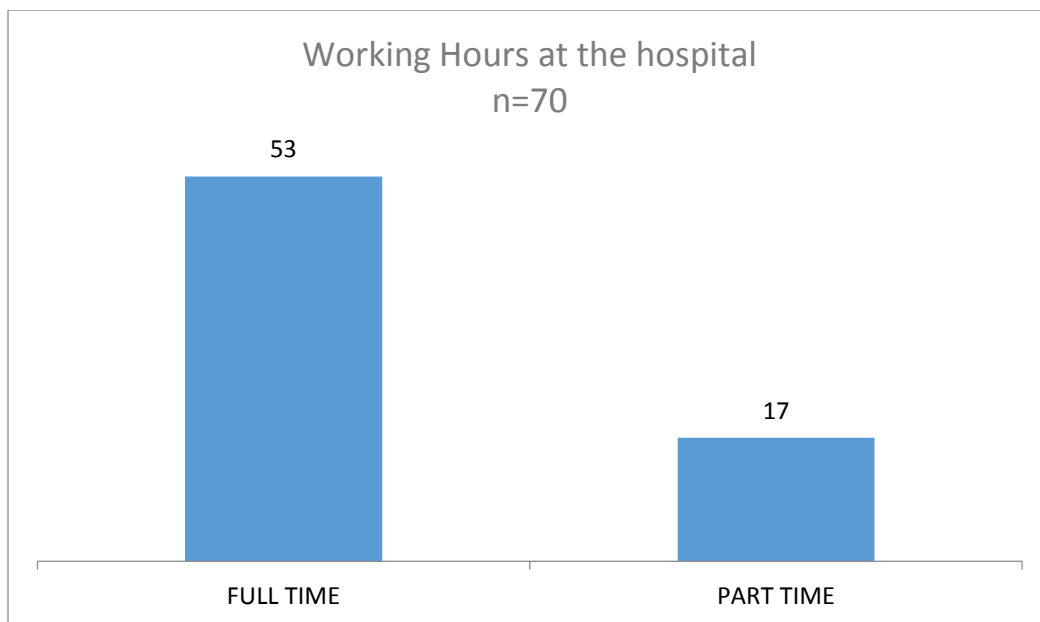


Figure 4.16 – Working Hours at the Hospital

*Question 17 -What shifts do you normally work?*

There were 68 respondents to this question. Most respondents rotate between working days and nights (54.4%), 44% work on days only and one respondent works on nights only (Figure 4.17). Similar to Question 16, the purpose of this question was to ascertain if there was greater competence among night staff in comparison to day staff. Findings revealed that no significant difference. Collecting demographic information allows the researcher to have a better understanding of the background characteristics of the participants This question was asked as more babies are born during the day than at night so it follows that there is more activity during the day than at night (Mathews et al. 2015). According to (Folkard et al. 2006) certain work patterns are associated with higher risks for errors .

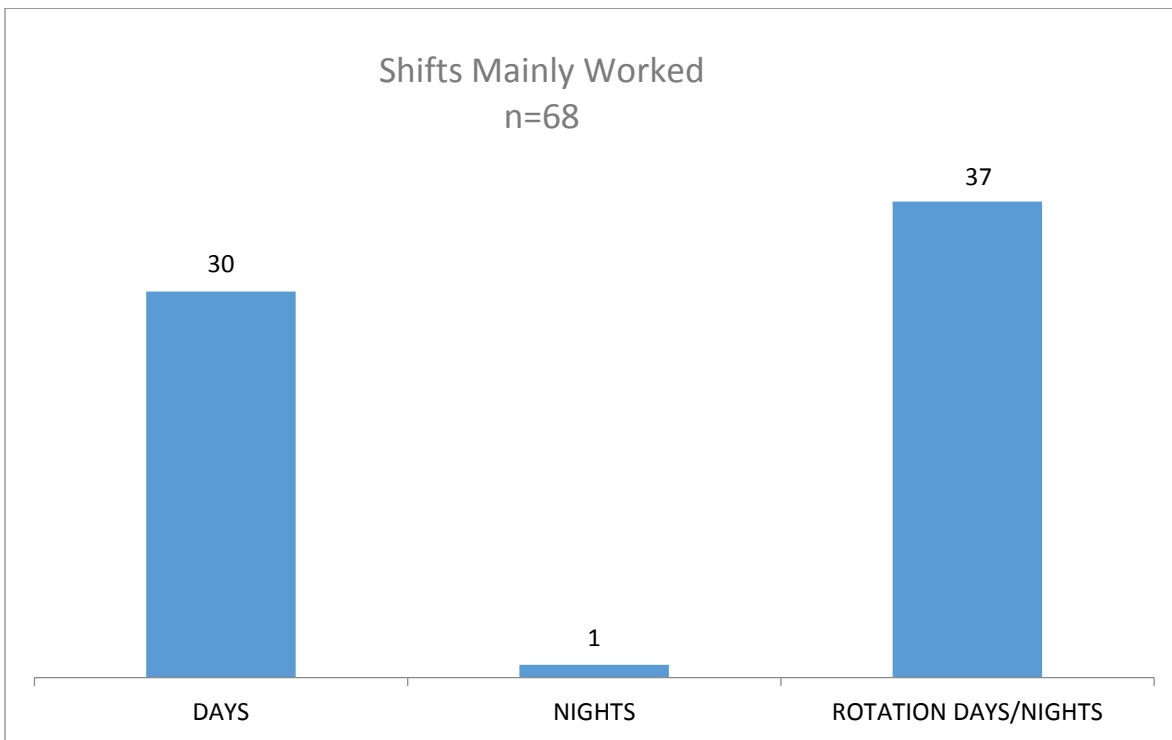


Figure 4.17 – Shifts Mainly Worked

*Question 18 -For clerical staff only: I am working as a clerk at this hospital for*

The majority of respondents working as clerical staff are working at the hospital for more than 10 years (66.6%). The average amount of years of respondents working as a clerk in the hospital is 2.25 years (Figure 4.18). The purpose of this question was to determine if there was a correlation between competence and length of service. Findings did not reveal significant differences between 3 and 10+ years' experience.

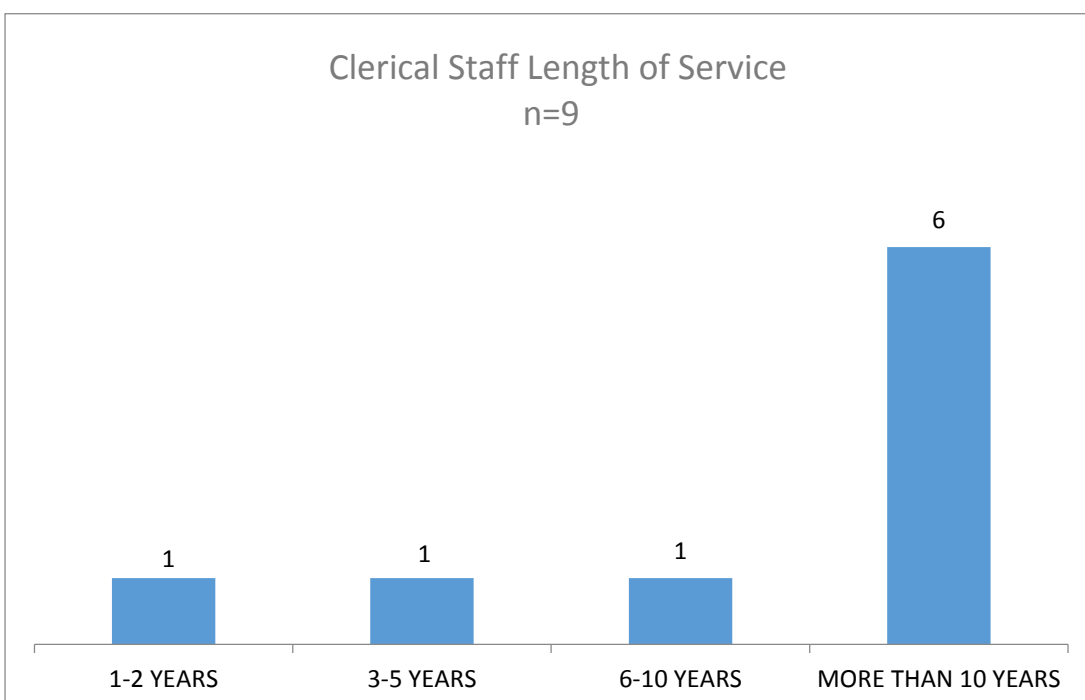


Figure 4.18 – Clerical Staff Length of Stay

*Question 19 -For Midwives only: I am practicing as a registered midwife for*

The majority of midwife responses including clinical midwife managers 58 have been practising as midwives for more than 10 years (32.7%), (20.6%) of respondent midwives are practicing 6-10 years, (25.8%) of respondents have been practicing for 3-5 years and the remaining (20.6%) have been practicing for 0-2 years (Figure 4.19). The average amount of years practicing for respondent midwives is 11.6 years. The purpose of this question was to determine if there was a correlation between competence and length of service. Findings did not reveal significant differences between 3 and 10+ years.

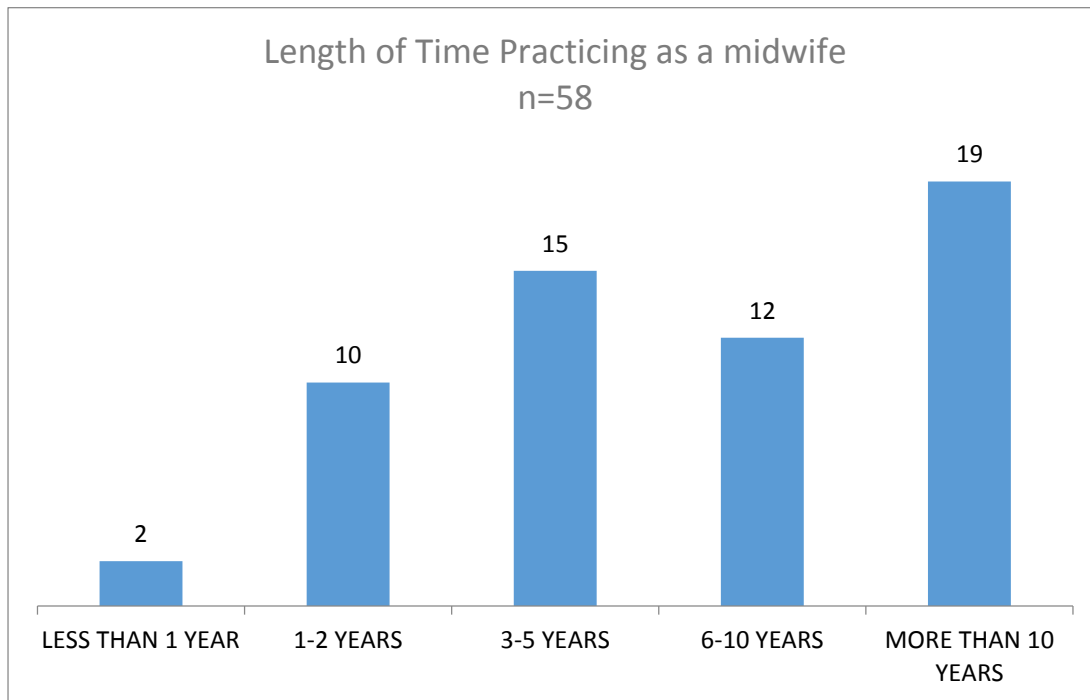


Figure 4.19 – Length of Time Practising as a Midwife

*Question 20 -For Nurses only: I am practicing as a registered nurse for*

100% of the respondent nurses have been qualified for more than 10 years (Figure 4.20).

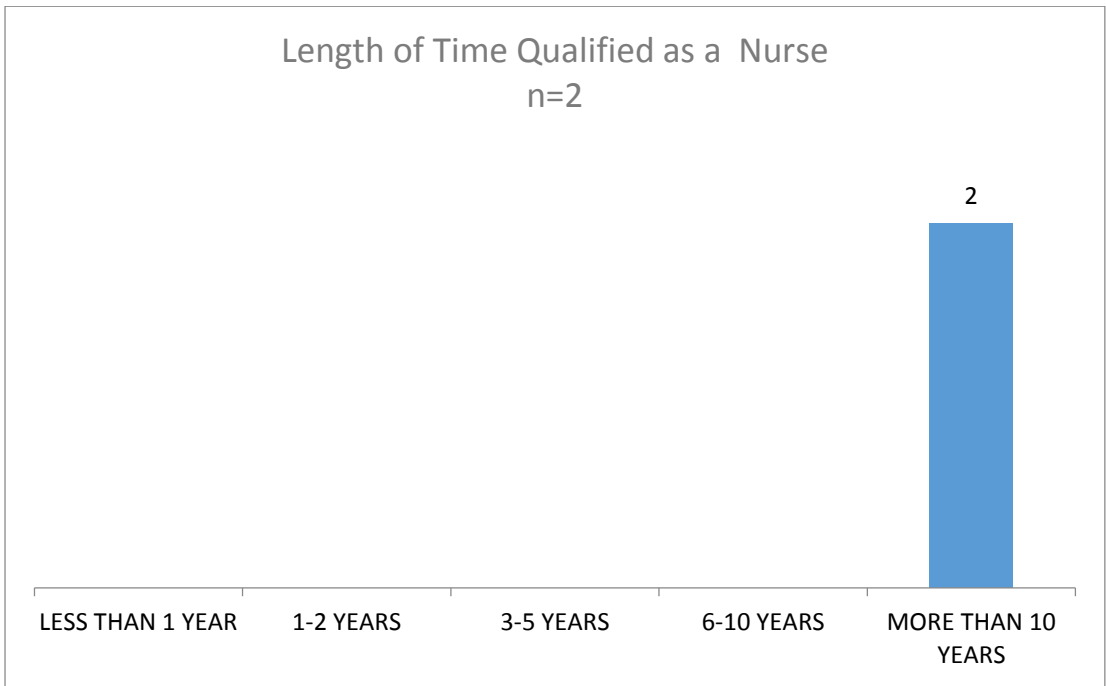


Figure 4.20 – Length of Time as a Qualified Nurse

*Question 21 - For clerical staff, nurses and student midwives: I always ask a midwife in delivery suite/theatre/postnatal ward/OPD to check the information I have entered*

There were 9 staff members eligible to answer this question and there were 8 responses. The majority of respondents (87.5 %) indicated they ask the midwife to check their computer data entries (Figure 4.21).

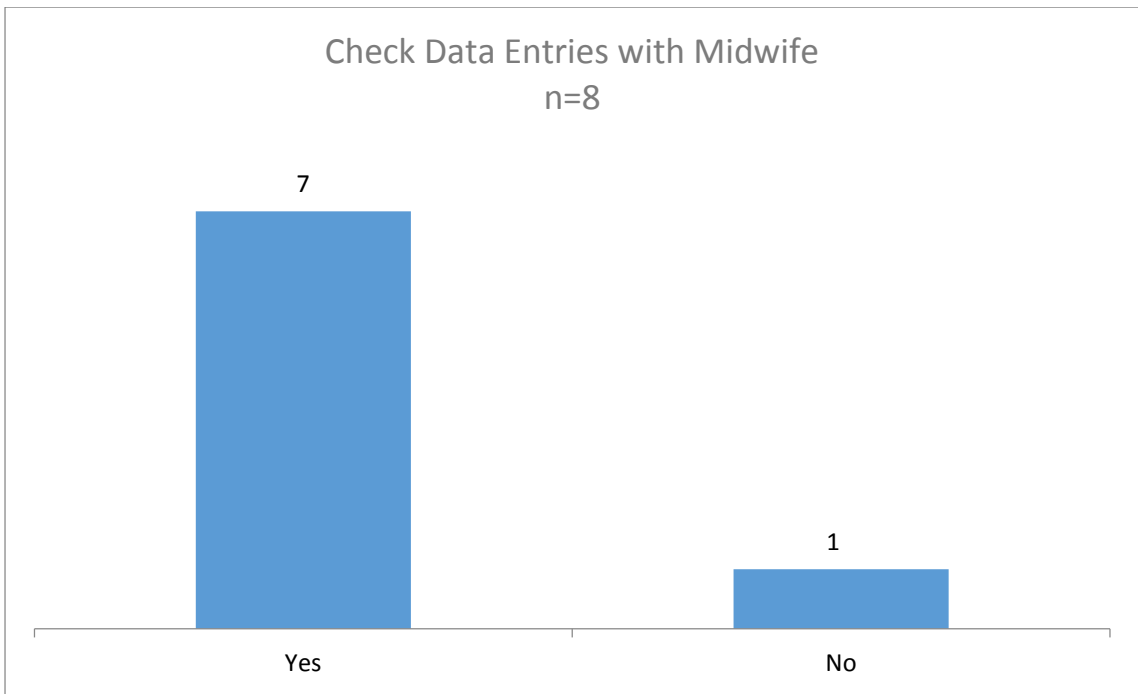


Figure 4.21 – Check Data Entries with Midwife

*Additional Comments and Suggestions were received from 12 respondents.*

Respondents were given the opportunity to provide additional comments or suggestions. Feedback was provided by 17% (n=12). Comments are outlined below.

- “iPMS and k2 is a powerful tool. comprehensive training is required to know what k2 and iPMS are capable of. as a new manager i am at sea with all this.”
- “K2 is not user friendly. very slow. k2 does not always have required option available (gynae). no standard training given. not known that some maternity questions lead down certain pathways.”
- “I think that the it system is very helpful for staff. I am hoping to get the electronic chart. I think that is the best way to avoid confusion on writing to give the best care to the patient. avoid recording information in the wrong place”.
- “A lot of information that needs to be manually entered could be automatically entered at delivery suite e.g. date of PKU should be estimated by computer”.
- “All systems should be linked so postnatal questions are on the system”.
- I love computers. wish we had full electronic record. having some electronic and some paper records a bit messy”.
- “No formal training on computer system. relying on midwives/clerks to teach. often not adequate time to sit and go through systems which I’m sure can lead to mistakes being made.”
- “Some conditions are not available on system iPMS in assessment room takes too long to input data. There should be a way of clicking on multiple list items.”
- Regular evaluation of questions and how they can be improved.”
- A number of questions need to be updated. no appropriate questions for same sex couples. no questions for neurological family problems.”
- “Skin to skin question- move to baby section of postnatal discharge”
- It is difficult due to the busyness of postnatal wards for midwives to complete postnatal discharge questionnaire.” “

As can be seen above, comments were both positive and negative and correlate with findings to specific questions in the questionnaire. For example, there is a requirement for training, investment in newer IT systems and infrastructure and users being too busy to enter data. It is interesting to note that users suggest that data requirements should be reviewed on an ongoing basis.

### ***Main Findings***

Analysis suggests that there are a number of reasons why data errors, omissions or inaccuracies occur. These can be categorised in to a number of broad areas namely, lack of appropriate knowledge / training, access issues, lack of data ownership, insufficient IT infrastructure, environmental factors. It is worrying to note that 93% of respondents indicated that they had come across errors or omissions. However only 54% had the capability to resolve issues themselves.

### *Understanding of use of birth notification uses.*

Question three sought to ascertain if respondents had knowledge of who receives birth notification data. 26% (n=18) stated that they did not know who received information. Of the recipients to (n=52) who stated that they were aware of recipients on only 54% (n=28) was aware that the Registrar of Births is notified. It is surprising that no respondent (n=70) was able to correctly identify all recipients.

The findings for this question indicated there is a lack of knowledge and a need for education and training and information sessions to staff on the purpose of data collection for birth notification.

In trying to ascertain why errors occur, all participants provided at least one response to this multiple choice question (Question 7). The main reasons cited are as follows: -

1. Difficulty understanding the clinical terms in the paper record (n=32);
2. Too easy to tick the wrong answer in the dropdown list (n=25);
3. Inability to rectify mistakes (n=23);
4. Inadequate IT training (n=19);
5. Lack of computer experience (n=14);
6. Lack of computer skill (n=13);
7. Lack of IT confidence (n=10);
8. Other - Pressure at work (n=9).

An unexpected finding is the high number of respondents who that had difficulty understanding clinical terms in the paper record. Of the 32 responses, 27 were staff midwives or a higher level. This may warrant further investigation as to the reasons for this, for example, language, translation difficulties, use of non-approved abbreviations, poor communication of new tests, procedures, medications etc. The remaining 5 were clerical staff.

Computer literacy is often taken for granted and there can be an assumption that staff have the required skills to use technology in their work (Mills et al. 2014). It is clear from this study that staff need support and education. This is supported by (Lium et al. 2006) and (Brumini et al. 2005) who assert training and support on the use of IT improves the uptakes of new technologies and workplace efficiency

Of the 36% who responded that it was “*too easy to tick the wrong answer in the dropdown answers*”, 100% of these also cited one of the following as additional reason for errors: -

- Pressure at work (n=9);
- Human error (n=5);
- K2 outdated (n=3);
- Lack of available answers (n=3);



- Poor historians (patients recall) (n=2);
- Paper records chaotic (n=2);
- Patient watching (n=1);

This may indicate that data entry maybe inaccurate as the user maybe distracted, frustrated, or under time pressure during the course of their work.

The third most common reason given as to why errors occur was the inability to rectify mistakes (32.8%=70). This may be due to lack of appropriate training which is discussed below.

### *Lack of Training*

Of the 70 respondents, 59 had received training on the K2 clinical maternity system and 11 did not. Of the 59 who received training 36% of the respondents (n=21) received training from the IT midwife. 100% of those who received training from the IT midwife had the ability to address and resolve the errors themselves. Of the 38 respondents who did not receive training from the IT midwife, only 14 staff were able to amend the record themselves. This indicates that when staff received structured training from the IT midwife, knowledge and competence was improved.

### *Practical Barriers*

In seeking an insight in to user perception of what the perceived barriers to data entry were, all participants voiced an opinion to this multiple choice question (Question 12). 20% (n=14) indicated that there were no practical barriers. Of the remaining 56 responses, (n=80%) the following reasons were cited: -

- Too busy (n=35);
- Computers not available when needed (n=25);
- K2 maternity system difficult to use (n=13);
- Logging in / out of system takes too long (n=12);
- Delay in getting access to paper chart takes too long (n=11);
- Other (n=10).

It is interesting to note that the single biggest practical barrier is that staff are “too busy” to enter data. This may suggest that staff do not see the recording of electronic birth notification data as part of their core duties and this may require education or information sessions. This is supported in the literature by (Lafond et al 2003) who found that maternity health care workers tend to prioritize care to mothers and babies instead of data collection and data management. (Poon et al 2006) concur and assert the adoption of IT in healthcare is more likely to be adopted when it is used to generate financial benefits rather than to deliver safety and quality benefits.

Based on feedback, it can be assumed that investment in IT infrastructure, for example, the implementation of workstations on wheels (WoWs) at the bedside, or mobile devices could result in data being entered directly onto the maternity system. This in turn, may reduce the need to review the paper chart in order to enter data. The introduction of a swipe single sign-on solution may eliminate the need for staff to manually log in and out of PCs thus providing time efficiency.

*Factors which impact how users enter data onto the computer record.*

Question 14, sought to identify non practical barriers to data entry. For example, process or information deficits. 93% (n=65) responded to this multiple choice question. The main findings are as follows: -

1. Interruptions (n=45);
2. Illegible handwriting (n=45);
3. Limited time (n=42);
4. Information found in multiple places in the maternity record (paper chart) (n=35);
5. Incomplete information found in the paper maternity record (chart) (n=33);
6. Slowness of computer system (n=29).

Illegible handwriting and interruptions had the highest response with 69% each. The implementation and use of an electronic maternity record has the capability to eliminate the need for a paper chart. The hospital is due to implement the national maternity and new-born clinical management system (MN-CMS) shortly. This will address illegibility issues as the paper chart will be eliminated.

Issues relating to information found in multiple places (54%) and incomplete information in the paper record (49%) are due to the fact that there is currently no validation carried out in the hospital prior to the submission of birth notification data to GRO or HPO to ensure staff complete the paper record fully. It is expected that these issues will also be addressed with the implementation of an electronic maternity system through the use of cross validation and mandatory fields.

Interruptions when entering birth notification data can take the form of internal interruptions by oneself, for example, checking one's mobile phone while external interruptions can take the form of telephone calls, colleagues seeking advice, patient's children etc. External interruptions are more difficult to avoid.

65% of respondents (n=42) indicated that they had limited time. This supports the finding in question 12 where staff indicated that they were too busy suggesting that data entry in to computer systems is not seen as a priority for midwives.

## ***Summary***

The aim of this research was to collect data to understand why errors, inaccuracies and omissions occur in the electronic birth notification data and also to gain an insight into the user's perception of patient data entry in to the electronic hospital system. The research also sought to identify what measures could be put in place to improve data quality in the electronic hospital system.

Analysis suggests that there are a number of reasons why data errors, omission or inaccuracies occur. These can be categorised in to a number of broad areas namely, lack of appropriate training, access issues e.g. to the paper chart, insufficient IT infrastructure, lack of data ownership and environmental factors.

## **Conclusions and Future Work**

The principal objective of the research was to examine why errors, inaccuracies and omissions in electronic birth notification data occur and also gain an understanding of user perception of patient data entry in to the electronic hospital maternity system. A comprehensive literature review was conducted and a questionnaire was distributed to 100 staff who enter data in to K2 and iPM the hospital's computer systems which are used to collect birth notification data. Survey findings were extrapolated from questionnaire responses.

### ***Introduction***

This chapter examines the findings of the primary and secondary research, suggest areas for future research and concludes with the contribution that this dissertation has made to research.

### ***Answering the Research Question***

A quantitative research strategy was used to answer the research question. The research strategy comprised: -

1. A comprehensive literature review;
2. A survey of delivery suite/theatre clerk's central appointment clerks, clinical midwife/nurse managers, staff midwives, staff nurses, student midwives, agency midwives and clinical skills facilitators at the maternity hospital chosen to determine user's perception of patient data accuracy on the electronic hospital maternity system, their understanding of data uses and barriers to data entry.

### ***Summary of Research Findings***

#### ***Literature Review***

The literature review was carried out from January 2018 to May 2018, in order to provide a greater understanding of the research topic. It provided suggestions from international studies as to the reasons why errors, inaccuracies and omissions occur in electronic birth notification data. The research also identified the main factors which impact staff perception in entering data in to the electronic hospital system.

The literature indicated that despite the benefits and uses of birth notification data, many health care professionals remain sceptical as to the practical value. Several authors such as (Chau et al 2001) and (Mundy et al 1993) suggest that the adoption of technology is related to the IT attitude of healthcare staff, the usefulness of the system and the impact that IT has on job satisfaction. The adoption of IT may be increased through the provision of the appropriate hardware and software. In addition education, training and information sessions can be used to promote the benefits of the system (Venkatesh et al 2003).

Research also suggests that healthcare workers are more likely to embrace IT, when IT is used to carry out administration tasks. According to (Poon et al 2006) the use of IT in healthcare to deliver safety and quality

benefits are less likely to be adopted than when IT is used to generate financial benefits. Thus it is vital that hospital staff are aware that birth notification data has a direct funding implication for the Hospital.

### *Questionnaire*

Responses to questionnaire supported the literature review and revealed the following shortfalls or barriers to birth notification data entry.

- Lack of knowledge as to use of birth notification data;
- Lack of structured training / induction;
- Insufficient IT infrastructure;
- Users reported that they were “too busy or under pressure” to complete data entry tasks.

### *Lack of knowledge as to the use of birth notification uses.*

The questionnaire revealed that no respondents were able to correctly identify all recipients of birth notification data. This suggests that there a need for staff education and information sessions. This lack of knowledge is supported in the literature (Hahn et al 2013).

### *Lack of Training*

Respondents provided a number of reasons as to why errors occur. A number of responses relate to a lack of IT training, skills, experience etc. 16% had no training, while only 36% who had received training (n=21) had received it from the IT midwife. 100% of those that received training from the IT midwife, had increased knowledge and competence in using systems and were able to rectify mistakes.

In contrast, of the 38 respondents who received training but not from the IT midwife, only 14 had the skills to amend the record themselves. This indicates that structured training may result in improved IT competence and data quality. It is worrying to note that 93% of respondents indicated that they had come across errors or omissions. However only 54% had the capability to resolve issues themselves.

### *Gaps in Clinical Knowledge*

A surprising finding was the high number (84%) of clinical staff who experienced difficulty in understanding clinical terms recorded in the paper record. Not surprising was that 5 of the 7 clerical staff found difficulty in understanding terms which raises the question if it is appropriate that they enter clinical data at all.

### *Practical Barriers*

Analysis revealed that the biggest practical barrier (question 12) was that that staff are “too busy” to enter data. This suggests that staff do not see the recording of electronic birth notification data as part of their core

midwifery duties. This finding is supported in (question 14) as 65% of respondents (n=42), indicated that they had limited time to add data to computer records.

36% responded that it was “*too easy to tick the wrong answer in the dropdown answers*”, this may suggest that data entry errors occur due to the user being interrupted, distracted, or under time pressure. Issues relating to illegible handwriting, incomplete information also scored highly.

### *IT Infrastructure*

Analysis suggests that IT systems and infrastructure is insufficient. Based on feedback, it can be assumed that investment in IT infrastructure, for example, the implementation of workstations on wheels (WoWs) at the bedside, or mobile devices could result in data being entered directly onto the maternity system. This in turn, may reduce the need to review the paper chart in order to enter data. The introduction of a swipe single sign-on solution may eliminate the need for staff to manually log in and out of PCs thus providing time efficiency.

### ***Recommendations***

Maternity health care staff are required to enter specific data items into the maternity computer system in order to provide birth notification data to GRO, HPO and HSE. To do this staff require: -

- Structured training / induction programmes;
- Information sessions on the use of birth notification data supported by clear documentation policy / procedure regarding the collection of birth notification;
- Adequate IT infrastructure;
- Appropriate time and location to complete data entry tasks;
- Clear documentation policy / procedure with regard to collection of birth notification.

In order to ensure that data is collected a hospital validation should be completed prior to data submission to GRO, HPO and HSE.

### *Introduction of Structured Induction and Training Programme*

Inadequate training and support is recognised as a factor for errors in computerisation of birth records (Weaver et al 2014). The lack of formal training of staff by the IT midwife and the inability of staff to amend computerised records is noted. Thus it is recommended that on appointment to the hospital and at regular intervals (e.g. every two years), staff should undergo a formal structured training programme to meet the needs of users collecting and entering healthcare data into computer systems. Training should be supplemented by super users at ward level who can assist or address staff queries at evening and weekends. This is supported by (Kristensen et al 1996)

### *Information Sessions on the use of Birth Notification Data*

The aim of this programme is to provide information on the importance of data quality, use and recipients of birth notification data and how this impacts on the patient, the hospital and funding. Relevant legislative requirements in relation to GDPR should also be addressed.

Information sessions should be supported by the development of hospital policy on the collection and dissemination of birth notification data which must be communicated to all relevant staff.

### *IT Infrastructure*

Analysis suggests that the number and location of computers is inadequate. To address user concerns regarding availability of hardware, an observational study should be carried out to evaluate the availability and location of computers. In order to enhance productivity, investment in IT infrastructure is required for example, introduction of work station on wheels (WoW) with wireless capability to allow data entry at the bedside. This will facilitate real time data capture and may reduce errors, omissions and inaccuracies as the person providing the treatment is also entering the data. The potential to improve internet access in a community setting should be assessed.

### *Appropriate time*

Where possible staff should be given appropriate time to complete the relevant data entry tasks preferably in a location where there they are unlikely to be interrupted. This is supported by research carried out by (Mark n.d.). In addition to the above, additional recommendations include: -

- Appointment of Data Quality Midwife
- Clinical Knowledge workshops
- Review of data entry process.
- Review of systems to ensure they meet data collection requirements.

### *Data Quality Midwife*

A midwife, working as a perinatal coordinator should be appointed with responsibility to check and correct errors, omissions and inaccuracies in the data items prior to data validation and extraction to the relevant stakeholders i.e. GRO and HPO. A study by (A. M. Craswell et al 2016) supports this as a solution to correct errors, omissions and inaccuracies prior to data validation and extraction to the relevant stakeholders. To increase awareness of the importance of data quality on the system, hospital staff should be provided with feedback received from GRO and HPO on a weekly basis.

### *Clinical Knowledge Workshops*

To address gaps in the understanding of clinical terms in the paper record, clinical workshops should be organised to communicate and update staff with regard to new tests, procedures, medications etc.

### *Review of Data Entry Process.*

Clerical staff expressed difficulty understanding clinical terms which is supported by (Kennedy 2016) as this can lead to errors in data entry. It is recommended that the data entry process is reviewed to facilitate accurate and complete documentation of records.

### *Future Research*

It is recommended that details of birth notification which failed GRO validation be documented over a three-month period. Support measures identified in the research such as education, training, information sessions etc. should be put in place and a re-measure carried out to determine if these measures have had a positive impact on data accuracy i.e. if there is a decrease in the number of failed validations.

### *Contribution to Research*

It is thought that this is the first research in this particular area carried out in Ireland. The analysis of data collected in this research adds to the existing body of evidence. It is hoped that this research may provide direction on how to improve data quality in the collection of birth notification data.

It is thought that this research may be of interest to those providing maternity services, health policy makers and perhaps recipients of birth notification data.



## References

- Ahman et al, E., Zupan, J. 2007. *Neonatal and perinatal mortality: country, regional and global estimates 2004*, World Health Organization.  
[http://apps.who.int/iris/bitstream/handle/10665/43800/9789241596145\\_eng.pdf?sequence=1&isAllowed=y](http://apps.who.int/iris/bitstream/handle/10665/43800/9789241596145_eng.pdf?sequence=1&isAllowed=y) Accessed 25th September 2018.
- Ahuja et al, S., Bacus K., Cohen B., Horon I., Howland R., Osterman M., Tretter E. n.d. "Report of the Birth Data Quality Workgroup. Centers for Disease Control and Prevention."
- Bennett. 1984. *A study of Spinoza's Ethics*. Indiana: Hackett Publishing Company .
- Brown, E. 1938. "Value of the Vital Statistics Data on birth and death certificates in county health work." *American Journal of Public Health* 1398-1402.
- Brumberg et al, HI, D Dozor, SG Golombeck. 2012. "History of the birth certificate: from inception to the future of electronic data." *Journal of Perinatology* 407-411.
- Brumini et al., G., Kovic I., Zombori D., Lulic I., Bilic-Zulle L., Petrovecki M. 2005. "Comparisons of physicians' and nurses' attitudes towards computers. ." *Studies in Health Technology and Informatics*. 116: 608-613.
- Bryman et al., A., Bell E. 2007. *Business Research Methods 2nd Edition*. New York: Oxford University Press.
- Buescher et al, K P Taylor, M H Davis, and J M Bowling. 1993. "The quality of the new birth certificate data: a validation study in North Carolina." *American Journal of Public Health* August; 83(8): 1163–1165. .
- Burton et al, Paul R, Natalie Banner, Mark J Elliot, Bartha Maria Knoppers, James Banks. 2017. "Policies and strategies to facilitate secondary use of research data in the health sciences." *International Journal of Epidemiology* 1729–1733.
- Chan et al., Brew S., de Lusignan S. 2004. "Community nursing needs more silver surfers: a questionnaire survey of primary care nurses' use of information technology." *BMC Nursing*.
- Chau et al, P.Y.K., Hu P.J.H. 2001. "Information technology acceptance by individual professionals: A model comparison approach." *Decision Sciences* 32(4) pp. 699-719.
- Chaudhry et al., B., Wang J., Wu S., Maglione M., Mojica W., Roth E., Morton SC., Shekelle PG. 2006. "Systematic review: impact of health information technology on quality, efficiency, and costs of medical care." *Annals of Internal Medicine*. May 16;144(10).
- Committee Opinion. 2015. "The Importance of Vital Records and Statistics for the Obstetrician-Gynaecologist." *The American College of Obstetricians and Gynaecologists* Number 639.
- Cook Carter et al, M., Corry M., Delbanco S. 2010. "Vision for a high-quality, high-value maternity care system." *Women's Health Issues* 7-17.
- Cooper et al., R., Viller., Burmeister J. 2004. "Observations in a maternity ward: usability considerations of EHRs in an interrupt driven environment." *School of Information Technology & Electrical Engineering*. Queensland.
- Cowan et al, D., Sands M., Rabizadeh S, Amos C., Ford C., Nussbaum R. 2007. "Electronic templates versus dictation for the completeness of Mohs micrographic surgery operative notes." *Dermatologic Surgery* 33(5)pp. 588-595.
- Craswell et al, A., Moxham L. 2016. "Does use of computer technology for perinatal data collection influence data quality." *Health Informatics Journal* Vol 22(2) pp. 293-303.
- Craswell et al, A., Moxham, L., Broadbent M. 2013. " Perinatal data collection: current practice in the Australian nursing and midwifery healthcare context. ." *Health Information Management Journal* (42) 11-17.
- Dattani et al, N., Datta-Nemdharry, P. MacFarlane, A. ,2011. "Linking maternity data for England 2005-6: methods and data quality." *Health Statistics Quarterly* 49 1-27.
- Davis. 1989. "Perceived Usefulness, Perceived Ease of Use and User Acceptance." *Management Information Systems Research Center Quarterly* 13(3), p. 319.
- Diers, D. 2007. "Finding midwifery in administrative data systems. ." *Journal of Midwifery and Women's Health* 52(2): pp.98-105.
- Eder et al, C., Fullerton J., Benroth R., Lindsay SP. 2005. "Pragmatic strategies that enhance the reliability of data abstracted from medical records." *Applied Nursing Research* 18: 50-54.

- Elliott et al, Briggs David, Morris Sara, de Hoogh Cornelis, Hurt Christopher, Jensen Tina Kold et al. 2001. "Risk of adverse birth outcomes in populations living near landfill sites." *British Medical Journal* 323 :363.
- Ellison et al, G., Richter L., de Wet T., Harris H., Griesel R., McIntyre J. 1997. "The reliability of hand-written and computerised records of birth data collected at Baragwanath hospital in Soweto." *Europe PMC Funders Group March* 20(1) pp. 36-40.
- Ellison et al, LM Richter, T de Wet, HE Harris, RD Griesel, and JA McIntyre. 1997. "Improving the accuracy of birth notification data: lessons from the Birth to Ten study." *The Southern African journal of epidemiology & infection* 12(3): 91-96.
- Fagernas et al, S., Odame J. 2013. <http://www.who.int/bulletin/volumes/91/6/12-111351.pdf>. Accessed September 27, 2018. <http://www.who.int/bulletin/volumes/91/6/12-111351.pdf>.
- Folkard et al., S., Lombardi DA. 2006. "Modeling the impact of the components of long work hours on injuries and "accidents" ." *American Journal of Industrial Medicine*. 49:pp. 953–963.
- Frost, FLOYD. 1984. "Birth Complication Reporting: The Effect of Birth Certificate Design." *American Journal of Public Health* 505-506.
- Garrib et al, A., Stoops N., Dlamini L., Govender T., Rohde J.,Herbst K. 2008. "An evaluation of the District Health Information System in rural South Africa." *South African Medical Journal* Vol. 98 No. 7.
- Ghosh et al, R., Ashworth D., Hansell A., Garwood K., Elliott P., Toledano M. 2016. "Routinely collected English birth data sets: comparisons and recommendations for reproductive epidemiology." *Archive Disease and Child Fetal Neonatal Edition* pp.451-457.
- Gibbs D. 1996. "For debate: 250th anniversary of source documentation verification." *British Medical Journal* 313-798.
- Gilchrist et al, A Memon. 2013. "PP53 Predictive Risk Modelling of Childhood Overweight or Obesity at age 10-11 years: An Epidemiological Analysis of National Child Measurement Programme and Birth Notification Data." *Obesity* Poster Presentation 12-13 September.
- Gissler et al, M., Shelley, J. 2002. "Quality of data on subsequent events in a routine Medical Birth Register." *Medical Informatics and the Internet in Medicine* 27(1): pp. 33-38.
- Gould et al. 1999. "Vital Records for Quality Improvement." *Pediatrics* 278-290.
- Greg et al., J.B., Stanage W.F., Johnson W. 1984. "Birth certificate data: How reliable ?" *South Dakota Journal Of Medicine* 21-22.
- Hahn et al, D., Wanjala P., Marx M. 2013. "Where is information quality lost at clinical level?" *Global Health Action* 6:21424.
- Hangsleben et al, k.l., Schamber N.L. 1985. "A computer-analyzed data collection system for nurse-midwifery services: two years' experience. ." *Journal of Nurse-Midwifery* 30(4) pp. 212-221.
- Healthcare Pricing Office, Health Service Executive. 2015. "Perinatal Statistics Report ." *Perinatal Statistics Report* 53.
- Hemminki et al, E., Teperi J., Tuominen K. 1992. "Need for and influence of feedback from the Finnish Birth Register to data providers." *Quality Assurance Health Care* 133-139.
- Hetzl. 1997. "History and organization of the vital statistics system." *National Centre for Health Statistics, Hyattsville*.
- Hilder et al, Alberman E. 1998. "Monitoring fetal and infant survival using regional birth notification data in north east London." *Journal of Epidemiological Community Health*. 1998 Apr;52(4): 253-8.
- Hospital, Coombe Women & Infants University. n.d. [www.coombe.ie](http://www.coombe.ie). Accessed September 30, 2018. [www.coombe.ie](http://www.coombe.ie).
- <http://www.europeristat.com/reports/european-perinatal-health-report-2010.html>. n.d. Accessed September 30, 2018. <http://www.europeristat.com/reports/european-perinatal-health-report-2010.html>.
- [https://www.datadictionary.nhs.uk/data\\_dictionary/classes/r/registrable\\_birth\\_de.asp?shownav=1](https://www.datadictionary.nhs.uk/data_dictionary/classes/r/registrable_birth_de.asp?shownav=1). n.d. Accessed October 1, 2018. [https://www.datadictionary.nhs.uk/data\\_dictionary/classes/r/registrable\\_birth\\_de.asp?shownav=1](https://www.datadictionary.nhs.uk/data_dictionary/classes/r/registrable_birth_de.asp?shownav=1).
- <https://www.hse.ie/eng/health/child/healthychildhood-news1.pdf>. n.d. Accessed October 2, 2018. <https://www.hse.ie/eng/health/child/healthychildhood-news1.pdf>.
2010. <https://www.marchofdimes.org/toward-improving-the-outcome-of-pregnancy-iii.pdf>. Accessed September 30, 2018. <https://www.marchofdimes.org/toward-improving-the-outcome-of-pregnancy-iii.pdf>.
- <https://www.ucc.ie/en/media/research/nationalperinatalepidemiologycentre/NPECPerinatalMortalityAnnualReport2015-.pdf>. n.d. Accessed October 1, 2018.

- <https://www.ucc.ie/en/media/research/nationalperinatalepidemiologycentre/NPECPrenatalMortalityAnnualReport2015-.pdf>.
- [https://www.welfare.ie/en/Pages/Registering\\_Birth.aspx](https://www.welfare.ie/en/Pages/Registering_Birth.aspx). n.d. Accessed October 1, 2018.
- [https://www.welfare.ie/en/Pages/Registering\\_Birth.aspx](https://www.welfare.ie/en/Pages/Registering_Birth.aspx).
- Hurty J.N. 1910. "The Bookkeeping of Humanity." *JAMA* 1157-1159.
- Kaneko et al, Jacques Niyonkuru, Ndereye Juma, Térance Mbonabuca, Keiko Osaki & Atsuko Aoyama. 2017. "Effectiveness of the Maternal and Child Health handbook in Burundi for increasing notification of birth at health facilities and postnatal care uptake." *Global Health Action* Vol. 10, Iss. 1.
- Kennedy. 2016. "The Importance of a Role-Specific, In-Patient Ward Clerk Education Programme." *Hospital Topics* 94, 3-4, pp. 43-48.
- Kristensen et al, J1, Langhoff-Roos J, Skovgaard LT, Kristensen FB. 1996. "Validation of the Danish Birth Registration." *Journal of Clinical Epidemiology* 893-7.
- Kuh et al., D., Shlomo BY., Susser E. 2009. "A Life Course Approach to Chronic Disease Epidemiology." *Oxford Scholarship Online* Oxford Scholarship Online.
- Lafond et al, A., Field R. 2003. *The PRISM: introducing an analytical framework for understanding performance of routine health information systems in developing countries*. Measure Evaluation pp21, Potomac, USA: Mpekwani Sun.
- Lai et al., T. Y.Y. Leung, G.M., Wong, I. O. L, and Johnston, J.M. 2004. 2004. "Do doctors act on their self-reported intention to computerise? A follow-up population based survey in Hong Kong. ." *International Journal of Medical Informatics* (973), pp. 415-431.
- Lain et al, S., Hadfield, R.M. Raynes- Greenow, C.H., Ford J.B. Mealing, M.N., Algert, C.S., Roberts, C.L. 2011. "Quality of data in perinatal population health database: a systematic review. ." *Medical Care* 50(4) pp. 7-20.
- Lambrecht et al., J.J., Redmann, D.H, and Stitt-Gohdes,. 2004. "Learning the Ropes: On-the-Job Experiences of Computer Users." *nformation Technology, Learning and Performance Journal*, Vol. 22:2.
- Langhoff-Roos et al, J1, Krebs L, Klungsøyr K, Bjarnadottir RI, Källén K, Tapper AM, Jakobsson M, Børdahl PE, Lindqvist PG, Gottvall K, Colmorn LB, Gissler M. 2014. "The Nordic medical birth registers--a potential goldmine for clinical research." *ACTA Obstetrica et Gynecologica* 132-137.
- Lee. 2008. "Nursing Information: users' experience of a system in Taiwan one year after its implementation." *Journal of Clinical Nursing* 17, pp. 763-771.
- Lilienfield et al, AM, Parkhurst E, Patton R, Schlesinger ER. 1951. "Accuracy of supplemental information on birth certificates." *Public Health* 191-204.
- Lium et al., JT., Laerum H., Schulz T., Faxvaag A. 2006. "From the front line, report from a near paperless hospital: Mixed reception among health care professionals." *Journal of American Medical Informatics Association* 13 (6), pp. 668-675.
- Lucyk et al, K., Tang K., Quan H. 2017. "Barriers to data quality resulting from the process of coding health information to administrative data." *BMC Health Services Research* 17:766.
- Lydon-Rochelle et al. 2005. "The reporting of pre-existing maternal medical conditions and complication of pregnancy on birth certificates and in hospital discharge data." *American Journal of Obstetrics and Gynecology* 125-34.
- Lydon-Rochelle et al, Mona T, abVictoria, L.Holt, cfVickyCárdenas,cJennifer C.NelsongdThomas. R.Easterling, CarolynGardellaMD, William M.CallaghanMD,. 2005. "The reporting of pre-existing maternal medical conditions and complications of pregnancy on birth certificates and in hospital discharge data." *American Journal of Obstetrics and Gynecology* 125-134.
- Mahon et al., P.Y., Nickitas D.M., Nokes K.M. 2010. "Faculty perceptions of student documentation skills during the transition from paper-based to electronic health records systems. ." *Journal of Nursing Education* 49 (11), pp. 615-621.
- Maresh et al, M., Beard RW., Combe D., Dawson AM., Gillmer M., Smith G. 1983. "Selection of an obstetric data base for a microcomputer and its use for on-line production of birth notification forms, discharge summaries and perinatal audit." *British Journal of Obstetrics and Gynaecology* 90: pp. 227-231.
- Mark, Gloria. n.d. *Gallup* <https://news.gallup.com/businessjournal/23146/too-many-interruptions-work.aspx>. <https://news.gallup.com/businessjournal/23146/too-many-interruptions-work.aspx>.

- Martin et al, J.A., Wilson, E.C., Osterman MJK. (2013). 2013. "Assessing the quality of medical and health data from the 2003 birth certificate revision: Results from two states. *National vital statistics reports*; vol 62 no 2."
- Mathews et al., TJ., Curtin S. 2015. "When are babies born: morning, noon, or night? Birth certificate data for 2013." *U.S. Department of Health and Human Services*.
- Meaney et al, Waldron M, Corcoran P, Greene RA, Sugrue. 2016. "Planned Home Births in Ireland Annual Report ." *National Health Service Executive Home Birth Service* 8.
- Melnik et al, T., Guldal C., Schoen L., Alicandro J., Henfield P. 2015. "Barriers in Accurate and Complete Birth Registration in New York State." *Maternal Child Health* 19: 1943-1948.
- Mikkelsen et al., L., Lopez A., Phillips D. 2015. *Why birth and death registration really are "vital" statistics for development*. Human Development Reports, United Nations Development Programme.
- Mills et al., J., Francis K., McLeod M., Al-Motlaq M. 2014. "Enhancing computer literacy and information retrieval skills: A rural and remote nursing and midwifery workforce study. ." *Australian College of Nursing* pp. 283-289.
- Montgomery et al, T., Lewis A., Hammes L. 1962. "Live Birth Certificates." *California Medicine* Vol 96 (No 3) pp. 191-195.
- Mundy et al, S., Young D. 1993. "Consultant attitudes on the impact of computers: Users compared with non-users." *Journal of Management in Medicine* 7(4) p.34.
- National Perinatal Reporting System, Healthcare Pricing Office. 2015. "Birth Notification Form ." Accessed September 30, 2018. [www.hpo.ie](http://www.hpo.ie).
- . n.d. *Birth Notification Form, 2015*. . Accessed September 30, 2018. <http://www.hpo.ie>.
- Nayer et al, U., Stangl AL., De Zaluondo B., Brady LM. 2014. "Reducing Stigma and Discrimination to Improve Child Health and Survival in Low- and Middle-Income Countries: Promising Approaches and Implications for Future Research." *Journal of Health Communication* MAY 6 (19)(SUP 1) 142-163.
- Northam et al, S., Knapp, T.R. 2006. "The reliability and validity of birth certificates. ." *ournal of Obstetrics, Gynaecology and Neonatal Nursing* 35(1): pp 3-12.
- NPRS. 2015. [http://www.hpo.ie/nprs/nprs\\_documentation/NPRS\\_Instruction\\_Manual\\_Mar\\_2015.pdf](http://www.hpo.ie/nprs/nprs_documentation/NPRS_Instruction_Manual_Mar_2015.pdf). March. Accessed September 27, 2018.
- [http://www.hpo.ie/nprs/nprs\\_documentation/NPRS\\_Instruction\\_Manual\\_Mar\\_2015.pdf](http://www.hpo.ie/nprs/nprs_documentation/NPRS_Instruction_Manual_Mar_2015.pdf).
- Parahoo. 2014. *Nursing Research. Principles, Process and Issues*. London: Palgrave Macmillan.
- Pare et al., G., Sicotte C., Jaques H. 2006. "The Effects of Creating Psychological Ownership on Physicians' Acceptance of Clinical Information Systems. ." *Journal of the American Medical Informatics Association* 13(2), pp. 197-2050.
- Perry et al, IJ and Lumey LH. 2004. "Fetal growth and development: the role of nutrition and other factors." *Oxford University Press* Ch.15.
- Poon et al, E., Jha A., Christino M., Honour., Ferandopulle R., Middleton B., Newhouse J., Leape L., Bates D., Blumenthal D., Kaushal R. 2006. *Assessing the level of healthcare information technology adoption int the United States: a snapshot*. Accessed September 30, 2018.
- <https://bmcmmedinformdecismak.biomedcentral.com/articles/10.1186/1472-6947-6-1>.
- Reiling. 2008. "The Registration of Births." *Journal of the American Medical Association* 2220.
- Remenyi et al., D., Money A. 2004. *Research Supervision for Supervisors and their Students*. United Kingdom: Academic Conferences Limited.
- RMNCH+A Strategy. 2014. "India's Reproductive, Maternal, Newborn, Child, And Adolescent Health (RMNCH+A) Strategy." [https://www.mchip.net/sites/default/files/RMNCH+A\\_in\\_India.pdf](https://www.mchip.net/sites/default/files/RMNCH+A_in_India.pdf).
- Robertson, H. 1996. "Poor Knowledge and misunderstandings: perinatal data validity and workplace change in midwifery." *International Journal for Quality in Healthcare* (4): pp. 391-397.
- Ross. 2009. "Electronic Medical Records: The Promises and Challenges. ." *Journal of PeriAnesthesia Nursing* 24(5), pp.327-329.
- Saunders et al., M., Lewis P., Thornhill A. 2003. *Research Methods for Business Students 5th Edition*. London: Financial Times/Prentice Hall.
- Schwartz. 1970. "Medicine and the Computer: the promise and problems of change." *New England Journal of Medicine* (283) ppp. 1257-1264.
- Shapiro et al, S, Schachter J. 1952. "Birth Registration Completeness United States." *Public Health Rep* 513-524.
- Sharma et al., B., Hildingsson I., Christensson K. 2018. "The association of teaching-learning methods and self confidence of nurse-midwives,. A survey form one provence in India." *Women and Birth*.

- Sims et al., S., O'Donnell M. 2014. "Identifying families most likely to have missing paternal details in birth registrations using linked data." *Journal of family studies* 163-177.
- Smith, S. 2014. "Quality of Medical Data From The Birth Certificate." *Public Health Reports* 97-99.
- Strachan et al, DP & Sheikh, Aziz. 2004. "A life course approach to respiratory and allergic diseases. A life course approach to chronic disease epidemiology." *Oxford University Press* 240-259.
- Strauss et al., A., Corbin J. 1990. *Basics of qualitative research: Grounded theory procedures and techniques*. Newbury Park, CA: Sage Publications.
- Tang et al, K., Lucyk K, Quan H. 2017. "Coder perspectives on physician-related barriers to producing high-quality administrative data: a qualitative study." *Canadian Medical Association Journal* 5(3) pp. 617-622.
- Taylor et al., S., Todd P. 1995. "Understanding Information Technology Usage: A Test of Competing Models." *Information Systems Research* 6(2) pp. 144-176.
- Terpi J. 1993. "Multi method approach to the assessment of data quality in the Finnish Medical Birth Registry." *Journal of Epidemiology of Community Health* 47:pp.242-247.
- n.d. *The National Maternity Hospital, Holles Street, Dublin 2*. Accessed September 30, 2018. [www.nmh.ie](http://www.nmh.ie).
- Times, The Irish. n.d. [www.irishtimes.com/news/health/x-ray-report-found-in-penneys-among-HSE-data-breaches](http://www.irishtimes.com/news/health/x-ray-report-found-in-penneys-among-HSE-data-breaches). Accessed September 30, 2018. [www.irishtimes.com/](http://www.irishtimes.com/).
- UNICEF, United Nations Children's Fund. 2013. "EVERY CHILD'S BIRTH RIGHT; Inequities and trends in birth registration." *UNICEF, New York*.
- van Walraven et al, Laupacis A., Seth R., Wells G. 1999. "Dictated versus database-generated discharge summaries: a randomised control trial." *Canadian Medical Association Journal* 160(3)pp. 319-326.
- Venkatesh et al, V., Morris M., Davis G.B., Davis F.D. 2003. "User acceptance of information technology: Toward a unified view." *MIS Quarterly* 27(3) pp. 425-478.
- Vermeulen et al., J., Peersman W., Quadvlieg L., Fobelets M., De Clerq G., Swinnen E., Beeckman K. 2018. "Development and validation of the Midwife Profiling Questionnaire assessing women's preferred care professional and knowledge of midwives legal competences." *Sexual & Reproductive Healthcare* (16) pp.23-32.
- Weaver et al, SJ., Dy S.M. Rosen M.A. 2014. "Team training in healthcare: a narrative synthesis of the literature." *British Medical Journal, Quality & Safety* 23(5) pp. 359-372.
- Wilshier et al, Karen and Everard, Narelle. 2014. "Birth notification - the vital link." *Australian Nursing and Midwifery Journal* Vol. 21, No. 8,.
- Woolbright LA, Harshbarger DS. 1995. "The revised standard certificate of live birth: analysis of medical risk factor data from birth certificates in Alabama, 1988-92." *Public Health Rep.* Jan-Feb;110(1):59-63.
- Zozus et al, M., Pieper C., Johnson C., Franklin A., Smith J., Zhang J. 2015. "Factors Affecting Accuracy of Data Abstracted from Medical Records." *PLOS ONE* OCTOBER.

# Appendix 1 – Notification of Birth Form – To Registrar of Births

## Notification of Birth - To: The Registrar of Births

TYPE OF BIRTH (Live = 1, Still = 2)	1 <input type="checkbox"/>	PLACE OF BIRTH (Hospital = 1, BBA = 2, Domiciliary = 3)	2 <input type="checkbox"/>	NAME AND _____
SENSITIVE CASE (YES = 1, NO = 2)	3 <input type="checkbox"/>	HOSPITAL NO.	4 _____	ADDRESS OF _____
		CASE NO.	7 _____	HOSPITAL _____

**INFANT'S DETAILS**

DATE OF BIRTH (DD/MM/YYYY) 16 \_\_\_\_\_

TIME OF BIRTH \_\_\_\_\_

IF MULTIPLE BIRTH ORDER OF BIRTH No. \_\_\_\_\_ 24 of \_\_\_\_\_ 25

FORENAME(S) \_\_\_\_\_

SURNAME \_\_\_\_\_ 26 \_\_\_\_\_

SEX (Male = 1, Female = 2, Indeterminate = 3) 27 \_\_\_\_\_

BIRTHWEIGHT 28 \_\_\_\_\_ GRAMMES

PERIOD OF GESTATION 32 \_\_\_\_\_ WEEKS

**FATHER'S DETAILS**

FORENAME(S) \_\_\_\_\_

SURNAME \_\_\_\_\_

BIRTH SURNAME \_\_\_\_\_

FORMER SURNAME(S) \_\_\_\_\_

BIRTH SURNAME OF FATHER'S MOTHER \_\_\_\_\_

ADDRESS \_\_\_\_\_

COUNTY \_\_\_\_\_ 34 \_\_\_\_\_

COUNTRY \_\_\_\_\_ 37 \_\_\_\_\_

NATIONALITY \_\_\_\_\_ 41 \_\_\_\_\_

OCCUPATION \_\_\_\_\_ 45 \_\_\_\_\_

DATE OF BIRTH (DDMMYYYY) 47 \_\_\_\_\_

PPS NUMBER 55 \_\_\_\_\_

**MOTHER'S DETAILS**

FORENAME(S) \_\_\_\_\_

SURNAME \_\_\_\_\_

BIRTH SURNAME \_\_\_\_\_

FORMER SURNAME(S) \_\_\_\_\_

BIRTH SURNAME OF MOTHER'S MOTHER \_\_\_\_\_

ADDRESS \_\_\_\_\_

COUNTY \_\_\_\_\_ 64 \_\_\_\_\_ 67 \_\_\_\_\_

COUNTRY \_\_\_\_\_ 68 \_\_\_\_\_

NATIONALITY \_\_\_\_\_ 72 \_\_\_\_\_

OCCUPATION \_\_\_\_\_ 76 \_\_\_\_\_

DATE OF BIRTH (DDMMYYYY) 78 \_\_\_\_\_

PPS NUMBER 86 \_\_\_\_\_

CIVIL STATUS (Married = 1, Single = 2, Widowed = 3, Separated = 4, Divorced = 5, Civil Partner = 6, Former Civil Partner = 7, Surviving Civil Partner = 8) 95 \_\_\_\_\_

DATE OF PRESENT MARRIAGE/CIVIL PARTNERSHIP (DDMMYYYY) 96 \_\_\_\_\_

DATE OF LAST BIRTH (live or still) (DDMMYYYY) 104 \_\_\_\_\_

NO. OF PREVIOUS LIVE BIRTHS 112 \_\_\_\_\_

CHILDREN STILL LIVING 114 \_\_\_\_\_

STILLBIRTHS 116 \_\_\_\_\_

SPONTANEOUS ABORTIONS 118 \_\_\_\_\_

**PERINATAL DEATH**

TYPE OF DEATH (Early Neonatal = 1, Stillbirth = 2) 120 \_\_\_\_\_

WAS AUTOPSY PERFORMED (Yes = 1, No = 2) 121 \_\_\_\_\_

AGE AT DEATH 122 \_\_\_\_\_ DAYS 123 \_\_\_\_\_ HOURS

PLACE OF DEATH 125 \_\_\_\_\_

IF STILLBIRTH, DID DEATH OCCUR BEFORE LABOUR (1) DURING LABOUR (2) NOT KNOWN (3) 128 \_\_\_\_\_

**CAUSE OF DEATH**

MAIN DISEASE OR CONDITION IN FOETUS OR INFANT \_\_\_\_\_ 129 \_\_\_\_\_

OTHER DISEASES OR CONDITIONS IN FOETUS OR INFANT \_\_\_\_\_ 134 \_\_\_\_\_

**For Registrar's Use Only: Complete A or B**

**A: Computerised Offices:** If notification is to be entered electronically, enter the system notification in the space below

**B: Non-Computerised Offices:** If the notification is not being entered electronically, then the information in the section below should be completed and this form should then be forwarded to the Central Statistics Office.

DATE OF REGISTRATION (DDMMYYYY) 139 \_\_\_\_\_

ENTRY NO. IN REGISTER (for live births only) 147 \_\_\_\_\_ 150 \_\_\_\_\_

151 \_\_\_\_\_

Registrar's Stamp

Signature of Registrar

**CONFIDENTIAL:** This form is required for registration and statistical purposes only and will be treated as strictly confidential. It should be filled in by the person requiring the birth to be registered and given to the registrar in accordance with the Vital Statistics Regulations.

Signature \_\_\_\_\_ Date \_\_\_\_\_ BNF01/2014

## Appendix 2 – Notification of Birth Form – To Director of Public Health

Notification of Birth - To: Director of Public Health and Medicine			
TYPE OF BIRTH (Live = 1, Still = 2)	PLACE OF BIRTH (Hospital = 1, BBA = 2, Domiciliary = 3)	NAME AND _____	
SENSITIVE CASE (YES = 1, NO = 2)	HOSPITAL NO. _____	CASE NO. _____	ADDRESS OF _____
INFANT'S DETAILS		HOSPITAL _____	
DATE OF BIRTH (DD/MM/YYYY)	15 _____	MOTHER'S HEALTH	
IF MULTIPLE BIRTH	ORDER OF BIRTH No. _____ of _____	ANTENATAL CARE THIS PREGNANCY (Hospital / Obstetrician = 1, G.P. Only = 2, Combined = 3, None = 4, Midwife Only=5) 118 _____	
FORENAME(S) _____	TIME OF BIRTH _____	DATE OF FIRST VISIT TO DOCTOR DURING PREGNANCY (DDMMYYYY) 119 _____	
SURNAME _____	SEX (Male = 1, Female = 2, Indeterminate = 3) 25 _____	DATE OF FIRST VISIT TO HOSPITAL DURING PREGNANCY (DDMMYYYY) 127 _____	
BIRTHWEIGHT 26 _____ GRAMMES	PERIOD OF GESTATION 30 _____ WEEKS	WAS MOTHER IMMUNE TO RUBELLA (Yes = 1, No = 2, Not Known = 3) 135 _____	
FATHER'S DETAILS		METHOD OF DELIVERY (Spontaneous = 1, Breech ± Forceps = 2, Forceps = 3, Vac. Extraction = 4, Caesarean Sec. = 5, Other = 6) 136 _____	
FORENAME(S) _____	SURNAME _____	MAIN MATERNAL DISEASE OR CONDITION AFFECTING FOETUS OR INFANT _____	
BIRTH SURNAME _____	FORMER SURNAME(S) _____	_____ 137 _____	
BIRTH SURNAME OF FATHER'S MOTHER _____	ADDRESS _____	OTHER MATERNAL DISEASES OR CONDITIONS AFFECTING FOETUS OR INFANT _____	
_____ COUNTY _____ 32 _____	COUNTRY _____ 35 _____	_____ 142 _____	
NATIONALITY _____ 39 _____	OCCUPATION _____ 43 _____	INFANT'S HEALTH	
DATE OF BIRTH (DDMMYYYY) 45 _____	DATE OF BIRTH (DDMMYYYY) _____	TYPE OF FEEDING (Artificial = 1, Breast = 2, Combined = 3) 147 _____	
MOTHER'S DETAILS		WAS BCG ADMINISTERED (Yes = 1, No = 2) 148 _____	
FORENAME(S) _____	SURNAME _____	MAIN DISEASE OR CONGENITAL MALFORMATION AFFECTING INFANT _____	
BIRTH SURNAME _____	FORMER SURNAME(S) _____	_____ 149 _____	
BIRTH SURNAME OF MOTHER'S MOTHER _____	ADDRESS _____	OTHER DISEASES OR CONGENITAL MALFORMATIONS AFFECTING INFANT _____	
_____ COUNTY _____ 53 _____	COUNTRY _____ 56 _____	_____ 154 _____	
NATIONALITY _____ 60 _____	OCCUPATION _____ 64 _____	HOSPITAL	
DATE OF BIRTH (DDMMYYYY) 66 _____	DATE OF BIRTH (DDMMYYYY) _____	WAS ADMISSION BOOKED (Yes = 1, No = 2) 159 _____	
CIVIL STATUS (Married = 1, Single = 2, Widowed = 3, Separated = 4, Divorced, = 5, Civil Partner = 6, Former Civil Partner = 7, Surviving Civil Partner = 8) 74 _____	DATE OF PRESENT MARRIAGE/CIVIL PARTNERSHIP (DDMMYYYY) 75 _____	DATE OF MOTHER'S ADMISSION (DDMMYYYY) 160 _____	
DATE OF LAST BIRTH (live or still) (DDMMYYYY) 83 _____	NO. OF PREVIOUS LIVE BIRTHS 91 _____	DATE OF MOTHER'S DISCHARGE (DDMMYYYY) 168 _____	
CHILDREN STILL LIVING 93 _____	STILLBIRTHS 95 _____	DATE OF INFANT'S DISCHARGE (DDMMYYYY) 176 _____	
SPONTANEOUS ABORTIONS 97 _____	PERINATAL DEATH	WAS INFANT TRANSFERRED TO OTHER HOSPITAL FOR MEDICAL REASONS (Yes = 1, No = 2) 184 _____	
TYPE OF DEATH (Early Neonatal = 1, Stillbirth = 2) 99 _____	WAS AUTOPSY PERFORMED (Yes = 1, No = 2) 100 _____	IF 'YES', NAME OF HOSPITAL _____	
AGE AT DEATH 101 _____ DAYS 102 _____ HOURS	PLACE OF DEATH _____ 104 _____	_____ 185 _____	
IF STILLBIRTH, DID DEATH OCCUR BEFORE LABOUR (1) DURING LABOUR (2) NOT KNOWN (3) 107 _____	CAUSE OF DEATH	GENERAL PRACTITIONER ATTENDED BY MOTHER	
MAIN DISEASE OR CONDITION IN FOETUS OR INFANT _____	OTHER DISEASES OR CONDITIONS IN FOETUS OR INFANT _____	G.P.'s NAME AND ADDRESS _____	
_____ 108 _____	_____ 113 _____	GENERAL PRACTITIONER TO ATTEND INFANT FOR IMMUNISATIONS	
		G.P.'s NAME AND ADDRESS _____	

RNF01/2014

# Appendix 3 – Notification of Birth Form – To Healthcare Pricing Office

**Notification of Birth – To: National Perinatal Reporting System, Healthcare Pricing Office (HPO)**

TYPE OF BIRTH (Flow # 5/11/07)		PLACE OF BIRTH (Hospital = 1, SSA = 2, Domestic = 3)		NAME AND ADDRESS OF HOSPITAL	
[REDACTED]		[REDACTED]		[REDACTED]	
<b>INFANT'S DETAILS</b>		<b>MOTHER'S HEALTH</b>			
DATE OF BIRTH (DDMMYYYY) 14		ANTENATAL CARE THIS PREGNANCY (Hospital/Outpatient = 1, G'D Only = 2, Local = 3, None = 4, Multiple Only = 5)		11	
TIME (HH:MM) 14     :		DATE OF FIRST VISIT TO DOCTOR DURING PREGNANCY (DDMMYYYY)		118	
IF MULTIPLE BIRTH		DATE OF FIRST VISIT TO HOSPITAL DURING PREGNANCY (DDMMYYYY)		125	
ORDER OF BIRTH 85     55     46     28		WAS MOTHER IMMUNE TO RUBELLA (Yes = 1, No = 2, No Record = 3)		34	
SEX (Male = 1, Female = 2, Unknown = 3)		METHOD OF DELIVERY (Spontaneous = 1, Breech = Foreign = 2, Foreign = 3, Vag. Extractor = 4, Caesarean Sect. = 5, Other = 6)		130	
WEIGHT (KG) 25           GRAMMES		MAIN MATERNAL DISEASE OR CONDITION AFFECTING FETUS OR INFANT		135	
LENGTH (CM) 49           INCHES		OTHER MATERNAL DISEASES OR CONDITIONS AFFECTING FETUS OR INFANT		140	
<b>FATHER'S DETAILS</b>		<b>INFANT'S HEALTH</b>			
COUNTY 21		TYPE OF BIRTH (Cesarean = 1, Breech = 2, Cordless = 3)		145	
CITY/TOWN 34		WAS BCG ADMINISTERED (Yes = 1, No = 2)		147	
NATIONALITY 33		MAIN DISEASE OR CONGENITAL MALFORMATION AFFECTING INFANT		148	
OCCUPATION 42		OTHER DISEASES OR CONGENITAL MALFORMATIONS AFFECTING INFANT		153	
DATE OF BIRTH (DDMMYYYY) 41		<b>HOSPITAL</b>			
<b>MOTHER'S DETAILS</b>		WAS ADMISSION BOOKED (Yes = 1, No = 2)		158	
COUNTY 22		DATE OF MOTHER'S ADMISSION (DDMMYYYY)		159	
CITY/TOWN 22		DATE OF MOTHER'S DISCHARGE (DDMMYYYY)		167	
NATIONALITY 45		DATE OF INFANT'S DISCHARGE (DDMMYYYY)		175	
OCCUPATION 44		WAS INFANT TRANSFERRED TO OTHER HOSPITAL FOR MEDICAL REASONS (Yes = 1, No = 2)		180	
DATE OF BIRTH (DDMMYYYY) 62		IF YES, NAME OF HOSPITAL		181	
CIVIL STATUS (Married = 1, Single = 2, Widowed = 3, Separated/Divorced = 4, Civil Partner = 5, Former Civil Partner = 6, Never in Civil Partnership = 7)		<b>GENERAL PRACTITIONER ATTENDED BY MOTHER</b>		[REDACTED]	
DATE OF PRESENT MARRIAGE/CIVIL PARTNERSHIP (DDMMYYYY) 71					
DATE OF LAST BIRTH (as a wife) (DDMMYYYY) 57					
NO. OF SIBLINGS					
LIVE BIRTHS 90					
CHILDREN STILL LIVING 92					
SIBLINGS 94					
SPONTANEOUS ABORTIONS 96					
<b>PERINATAL DEATH</b>					
TYPE OF DEATH (Sudden Neonatal = 1, Stillbirth = 2)					
WAS AUTOPSY PERFORMED (Yes = 1, No = 2)					
GREAT RATE 101           DAYS 100           HOURS					
PLACE OF DEATH 134					
DISEASE (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41) (42) (43) (44) (45) (46) (47) (48) (49) (50) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (85) (86) (87) (88) (89) (90) (91) (92) (93) (94) (95) (96) (97) (98) (99) (100) (101) (102) (103) (104) (105) (106) (107) (108) (109) (110) (111) (112) (113) (114) (115) (116) (117) (118) (119) (120) (121) (122) (123) (124) (125) (126) (127) (128) (129) (130) (131) (132) (133) (134) (135) (136) (137) (138) (139) (140) (141) (142) (143) (144) (145) (146) (147) (148) (149) (150) (151) (152) (153) (154) (155) (156) (157) (158) (159) (160) (161) (162) (163) (164) (165) (166) (167) (168) (169) (170) (171) (172) (173) (174) (175) (176) (177) (178) (179) (180) (181) (182) (183) (184) (185) (186) (187) (188) (189) (190) (191) (192) (193) (194) (195) (196) (197) (198) (199) (200) (201) (202) (203) (204) (205) (206) (207) (208) (209) (210) (211) (212) (213) (214) (215) (216) (217) (218) (219) (220) (221) (222) (223) (224) (225) (226) (227) (228) (229) (230) (231) (232) (233) (234) (235) (236) (237) (238) (239) (240) (241) (242) (243) (244) (245) (246) (247) (248) (249) (250) (251) (252) (253) (254) (255) (256) (257) (258) (259) (260) (261) (262) (263) (264) (265) (266) (267) (268) (269) (270) (271) (272) (273) (274) (275) (276) (277) (278) (279) (280) (281) (282) (283) (284) (285) (286) (287) (288) (289) (290) (291) (292) (293) (294) (295) (296) (297) (298) (299) (300) (301) (302) (303) (304) (305) (306) (307) (308) (309) (310) (311) (312) (313) (314) (315) (316) (317) (318) (319) (320) (321) (322) (323) (324) (325) (326) (327) (328) (329) (330) (331) (332) (333) (334) (335) (336) (337) (338) (339) (340) (341) (342) (343) (344) (345) (346) (347) (348) (349) (350) (351) (352) (353) (354) (355) (356) (357) (358) (359) (360) (361) (362) (363) (364) (365) (366) (367) (368) (369) (370) (371) (372) (373) (374) (375) (376) (377) (378) (379) (380) (381) (382) (383) (384) (385) (386) (387) (388) (389) (390) (391) (392) (393) (394) (395) (396) (397) (398) (399) (400) (401) (402) (403) (404) (405) (406) (407) (408) (409) (410) (411) (412) (413) (414) (415) (416) (417) (418) (419) (420) (421) (422) (423) (424) (425) (426) (427) (428) (429) (430) (431) (432) (433) (434) (435) (436) (437) (438) (439) (440) (441) (442) (443) (444) (445) (446) (447) (448) (449) (450) (451) (452) (453) (454) (455) (456) (457) (458) (459) (460) (461) (462) (463) (464) (465) (466) (467) (468) (469) (470) (471) (472) (473) (474) (475) (476) (477) (478) (479) (480) (481) (482) (483) (484) (485) (486) (487) (488) (489) (490) (491) (492) (493) (494) (495) (496) (497) (498) (499) (500) (501) (502) (503) (504) (505) (506) (507) (508) (509) (510) (511) (512) (513) (514) (515) (516) (517) (518) (519) (520) (521) (522) (523) (524) (525) (526) (527) (528) (529) (530) (531) (532) (533) (534) (535) (536) (537) (538) (539) (540) (541) (542) (543) (544) (545) (546) (547) (548) (549) (550) (551) (552) (553) (554) (555) (556) (557) (558) (559) (560) (561) (562) (563) (564) (565) (566) (567) (568) (569) (570) (571) (572) (573) (574) (575) (576) (577) (578) (579) (580) (581) (582) (583) (584) (585) (586) (587) (588) (589) (590) (591) (592) (593) (594) (595) (596) (597) (598) (599) (600) (601) (602) (603) (604) (605) (606) (607) (608) (609) (610) (611) (612) (613) (614) (615) (616) (617) (618) (619) (620) (621) (622) (623) (624) (625) (626) (627) (628) (629) (630) (631) (632) (633) (634) (635) (636) (637) (638) (639) (640) (641) (642) (643) (644) (645) (646) (647) (648) (649) (650) (651) (652) (653) (654) (655) (656) (657) (658) (659) (660) (661) (662) (663) (664) (665) (666) (667) (668) (669) (670) (671) (672) (673) (674) (675) (676) (677) (678) (679) (680) (681) (682) (683) (684) (685) (686) (687) (688) (689) (690) (691) (692) (693) (694) (695) (696) (697) (698) (699) (700) (701) (702) (703) (704) (705) (706) (707) (708) (709) (710) (711) (712) (713) (714) (715) (716) (717) (718) (719) (720) (721) (722) (723) (724) (725) (726) (727) (728) (729) (730) (731) (732) (733) (734) (735) (736) (737) (738) (739) (740) (741) (742) (743) (744) (745) (746) (747) (748) (749) (750) (751) (752) (753) (754) (755) (756) (757) (758) (759) (760) (761) (762) (763) (764) (765) (766) (767) (768) (769) (770) (771) (772) (773) (774) (775) (776) (777) (778) (779) (780) (781) (782) (783) (784) (785) (786) (787) (788) (789) (790) (791) (792) (793) (794) (795) (796) (797) (798) (799) (800) (801) (802) (803) (804) (805) (806) (807) (808) (809) (810) (811) (812) (813) (814) (815) (816) (817) (818) (819) (820) (821) (822) (823) (824) (825) (826) (827) (828) (829) (830) (831) (832) (833) (834) (835) (836) (837) (838) (839) (840) (841) (842) (843) (844) (845) (846) (847) (848) (849) (850) (851) (852) (853) (854) (855) (856) (857) (858) (859) (860) (861) (862) (863) (864) (865) (866) (867) (868) (869) (870) (871) (872) (873) (874) (875) (876) (877) (878) (879) (880) (881) (882) (883) (884) (885) (886) (887) (888) (889) (890) (891) (892) (893) (894) (895) (896) (897) (898) (899) (900) (901) (902) (903) (904) (905) (906) (907) (908) (909) (910) (911) (912) (913) (914) (915) (916) (917) (918) (919) (920) (921) (922) (923) (924) (925) (926) (927) (928) (929) (930) (931) (932) (933) (934) (935) (936) (937) (938) (939) (940) (941) (942) (943) (944) (945) (946) (947) (948) (949) (950) (951) (952) (953) (954) (955) (956) (957) (958) (959) (960) (961) (962) (963) (964) (965) (966) (967) (968) (969) (970) (971) (972) (973) (974) (975) (976) (977) (978) (979) (980) (981) (982) (983) (984) (985) (986) (987) (988) (989) (990) (991) (992) (993) (994) (995) (996) (997) (998) (999) (1000)					



# Appendix 4 – Notification of Birth Form – Hospital Copy

Notification of Birth - Hospital Copy			
TYPE OF BIRTH (Live = 1, Still = 2)	PLACE OF BIRTH (Hospital = 1, BBA = 2, Domiciliary = 3)	NAME AND	
SENSITIVE CASE (YES = 1, NO = 2)	HOSPITAL NO.	ADDRESS OF	
	CASE NO.	HOSPITAL	
<b>INFANT'S DETAILS</b>		<b>MOTHER'S HEALTH</b>	
DATE OF BIRTH (DD/MM/YYYY) 15		ANTENATAL CARE THIS PREGNANCY (Hospital / Obstetrician = 1, G.P. Only = 2, Combined = 3, None = 4, Midwife Only = 5) 118	
IF MULTIPLE BIRTH ORDER OF BIRTH No. 23 of 24		DATE OF FIRST VISIT TO DOCTOR DURING PREGNANCY (DDMMYYYY) 119	
FORENAME(S)		DATE OF FIRST VISIT TO HOSPITAL DURING PREGNANCY (DDMMYYYY) 127	
SURNAME		WAS MOTHER IMMUNE TO RUBELLA (Yes = 1, No = 2, Not Known = 3) 135	
SEX (Male = 1, Female = 2, Indeterminate = 3) 25		METHOD OF DELIVERY (Spontaneous = 1, Breech ± Forceps = 2, Forceps = 3, Vac. Extraction = 4, Caesarean Sec. = 5, Other = 6) 136	
BIRTHWEIGHT 26 GRAMMES		MAIN MATERNAL DISEASE OR CONDITION AFFECTING FOETUS OR INFANT	
PERIOD OF GESTATION 30 WEEKS		OTHER MATERNAL DISEASES OR CONDITIONS AFFECTING FOETUS OR INFANT	
<b>FATHER'S DETAILS</b>		<b>INFANT'S HEALTH</b>	
FORENAME(S)		TYPE OF FEEDING (Artificial = 1, Breast = 2, Combined = 3) 147	
SURNAME		WAS BCG ADMINISTERED (Yes = 1, No = 2) 148	
BIRTH SURNAME		MAIN DISEASE OR CONGENITAL MALFORMATION AFFECTING INFANT	
FORMER SURNAME(S)		OTHER DISEASES OR CONGENITAL MALFORMATIONS AFFECTING INFANT	
BIRTH SURNAME OF FATHER'S MOTHER		<b>HOSPITAL</b>	
ADDRESS		WAS ADMISSION BOOKED (Yes = 1, No = 2) 159	
COUNTY 32		DATE OF MOTHER'S ADMISSION (DDMMYYYY) 160	
COUNTRY 35		DATE OF MOTHER'S DISCHARGE (DDMMYYYY) 168	
NATIONALITY 39		DATE OF INFANT'S DISCHARGE (DDMMYYYY) 176	
OCCUPATION 43		WAS INFANT TRANSFERRED TO OTHER HOSPITAL FOR MEDICAL REASONS (Yes = 1, No = 2) 184	
DATE OF BIRTH (DDMMYYYY) 45		IF 'YES', NAME OF HOSPITAL	
<b>MOTHER'S DETAILS</b>		GENERAL PRACTITIONER ATTENDED BY MOTHER	
FORENAME(S)		G.P.'s NAME AND ADDRESS	
SURNAME		GENERAL PRACTITIONER TO ATTEND INFANT FOR IMMUNISATIONS	
BIRTH SURNAME		G.P.'s NAME AND ADDRESS	
FORMER SURNAME(S)			
BIRTH SURNAME OF MOTHER'S MOTHER			
ADDRESS			
COUNTY 53			
COUNTRY 56			
NATIONALITY 60			
OCCUPATION 64			
DATE OF BIRTH (DDMMYYYY) 66			
CIVIL STATUS (Married = 1, Single = 2, Widowed = 3, Separated = 4, Divorced = 5, Civil Partner = 6, Former Civil Partner = 7, Surviving Civil Partner = 8) 74			
DATE OF PRESENT MARRIAGE/CIVIL PARTNERSHIP (DDMMYYYY) 75			
DATE OF LAST BIRTH (live or still) (DDMMYYYY) 83			
NO. OF PREVIOUS LIVE BIRTHS 91			
CHILDREN STILL LIVING 93			
STILLBIRTHS 95			
SPONTANEOUS ABORTIONS 97			
<b>PERINATAL DEATH</b>			
TYPE OF DEATH (Early Neonatal = 1, Stillbirth = 2) 99			
WAS AUTOPSY PERFORMED (Yes = 1, No = 2) 100			
AGE AT DEATH 101 DAYS 102 HOURS			
PLACE OF DEATH 104			
IF STILLBIRTH, DID DEATH OCCUR BEFORE LABOUR (1) DURING LABOUR (2) NOT KNOWN (3) 107			
<b>CAUSE OF DEATH</b>			
MAIN DISEASE OR CONDITION IN FOETUS OR INFANT 108			
OTHER DISEASES OR CONDITIONS IN FOETUS OR INFANT 113			
Signature		Date	
		BNF01/2014	

## Appendix 5 –Maternity Patient Registration Form

# Maternity Patient Registration Form

<p>Please post this completed form to: Appointments Office</p> <p><small>Hospital details removed to protect identity.</small></p>	<p>Please complete this form using <b>black ink and BLOCK CAPITALS</b></p>
--	--

### TO AVAIL OF FREE PUBLIC MEDICAL HEALTHCARE

You **MUST** attach a copy of Photographic I.D. **PLUS** a copy of **ONE** of the following:

A current valid medical card, utility bill or other proof of address, P60, a work permit or visa, or a statement from your employer stating your contract of employment.

**DOCUMENTS WILL BE SHREDDED ONCE CHECKED SO PLEASE DO NOT SUBMIT ORIGINALS**

**PLEASE NOTE THAT FAILURE TO COMPLY WITH THE ABOVE MAY RESULT IN CHARGES FOR YOUR CARE**

**ALL INVOICES MUST BE PAID IN FULL WHEN LEAVING THE HOSPITAL**

#### Maternity Patient Booking Category and PPS Details:

Have you booked with another hospital for **this** pregnancy?  Yes  No

Which category of patient do you wish to register as?  Semi-Private  Public

If you are a **public** patient, which category of care are you opting for?  Consultant Obstetrician\*  Domino Midwives \*

What is your PPS Number?

\*Please refer to the Patient Information section of [www.coombe.ie](http://www.coombe.ie) for details relating to each category of care.

#### Clinical Information:

What is the date of the first day of your last menstrual period?

Have you been a patient of this hospital before?  Yes  No

If you have been a patient of this hospital before, can you remember your hospital number?

What was your address at the time of your last stay at this hospital?

#### Personal Details:

Title:  Surname:  First Name:

Date of Birth:  Country of Birth:

Have you been ordinarily resident in Ireland for the last year?  Yes  No

Current address:

County:  Eircode:

Mobile telephone number:  Home telephone number:

For Office Use Only - Date of Receipt:

Initials:

Marital Status:

Single

Married

Separated

Divorced

Widowed

Civil Partnership\*

Surviving Civil Partner\*

\*Civil Partnership does not apply to co-habiting couples.

What is your spoken language?

What is your religion?

What is your occupation?

If you are married, what is your Maiden Name (name before marriage)?

Next-of-Kin Details:

Title:

Surname:

First Name:

Gender: Male

Female

Relationship to you:

Current address:

County:

Eircode:

Mobile telephone number:

Home telephone number:

Health Insurance Information (if applicable):

Name of Insurance Company:

Plan Type:

Name of Policyholder:

Policy Number:

Policy Expiry Date:

Medical Card Details (NOT GP CARD) (if applicable):

Medical Card Number:

Expiry Date:

Health Amendment Act Card (if applicable):

Do you have a Health Amendment Act Card? Yes

No

If yes, have you attached a copy? Yes

No

General Practitioner's (GP) Details:

Name of GP:

GP's Contact Telephone Number:

GP's Address:

Information required for Civil Registration of the Birth (information regarding Father and Mother of expectant baby):

Date of Marriage (if married):

Father's Occupation:

Birth Surname of Mother's Mother:

Birth Surname of Father's Mother:

Father's PPS Number:

Father's Country of Birth:

Father's Former Name if Different to Birth Name:

Patient's Signature:

Date:

# Privacy Notice

This form must be read, signed and returned with the Maternity Patient Registration Form.

Please complete this form using **black ink** and **BLOCK CAPITALS**

The General Data Protection Regulation (GDPR) applies to the processing of personal data. The HOSPITAL NAME HAS BEEN REMOVED committed to complying with its legal obligations in this regards. The hospital collects and processes your personal data relating to you in order to support our legitimate interests in managing our business and providing services to you.

## Information we collect and use:

To allow us to provide our services to you, we collect and process various categories of personal information, which may include:

- Personal details about you, such as date of birth, address, next of kin, contact details.
- Notes and reports about your health needs/results of investigations such as x-rays and laboratory tests.
- Relevant information from other health and social care professionals, your carers or relatives.

## Your rights:

You have certain legal rights concerning your information and the manner in which we process it, which includes:

- A right to get access to a copy of your personal information.
- A right to request us to correct inaccurate information or incomplete information.

## Disclosing information:

We will only disclose your information to third parties with your consent, however, the law stipulates that in certain circumstances personal information (including health information) may be disclosed, for example, in the case of infectious diseases or child protection.

## Research/Clinical Audit:

Anonymised data is used as a basis for clinical audit and for research purposes. The HOSPITAL NAME HAS BEEN REMOVED is a teaching hospital, we work closely with HOSPITAL NAME HAS BEEN REMOVED. All research projects are approved by the HOSPITAL NAME HAS BEEN REMOVED Research Ethics Committee.

Your health records may be accessed for screening by authorised researchers to assess if you are suitable for participation in a research project. If your information is selected for use in research you will be contacted to ask for your specific consent in relation to that research.

See our website HOSPITAL NAME HAS BEEN REMOVED for further information contained in our Privacy Statement including how to apply to access a copy of your medical records.

I have read and understand the nature of the data collected by the *Combe Women & Infants University Hospital*, the purposes for which the data may be used, the persons to whom data may be disclosed and my rights in relation to access to and correction of my personal data.

Patient's Signature :

Date:

--	--	--	--	--	--

# Notification of Births Act, 1907

---

## NOTIFICATION OF BIRTHS ACT 1907

### CHAPTER XL.

An Act to provide for the early Notification of Births. [28th August 1907.]

Be it enacted by the King's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:

Provisions for the earlier notification of births. **1.**—The provisions of this section shall have effect in the area of any local authority in which this Act is adopted by that authority in accordance with the provisions of this Act—

- (1) In the case of every child born in an area in which this Act is adopted it shall be the duty of the father of the child, if he is actually residing in the house where the birth takes place at the time of its occurrence, and of any person in attendance upon the mother at the time of, or within six hours after, the birth, to give notice in writing of the birth to the medical officer of health of the district in which the child is born, in manner provided by this section.
- (2) Notice under this section shall be given by posting a prepaid letter or postcard addressed to the medical officer of health at his office or residence, giving the necessary information of the birth within thirty-six hours after the birth, or by delivering a written notice of the birth at the office or residence of the medical officer within the same time; and the local authority shall supply without charge addressed and stamped postcards containing the form of notice to any medical practitioner or midwife residing or practising in their area, who applies for the same.
- (3) Any person who fails to give notice of a birth in accordance with this section shall be liable on summary conviction to a penalty not exceeding twenty shillings: Provided that a person shall not be liable to a penalty under this provision if he satisfies the court that he had reasonable grounds to believe that notice had been duly given by some other person.

(4) The notification required to be made under this Act shall be in addition to and not in substitution for the requirements of any Act relating to the registration of births; and any registrar of births and deaths, whose sub-district or any part thereof is situate within any area in which this Act is adopted, shall at all reasonable times have access to notices of births received by the medical officer of health under this Act, or to any book in which those notices may be recorded, for the purpose of obtaining information concerning births which may have occurred in his sub-district.

(5) This section shall apply to any child which has issued forth from its mother after the expiration of the twenty-eighth week of pregnancy, whether alive or dead.

(6) Any expenses incurred by a local authority in the execution of this Act shall be paid as part of the expenses of that authority in the execution of the Acts relating to public health, and in the case of a rural district council shall be paid as general expenses.

Adoption of Act, and definition of local authority. **2.—**(1) A local authority may by resolution adopt this Act in their area, and the provisions set out in the schedule to this Act shall have effect with respect to the resolution of adoption.

(2) A resolution of adoption shall not take effect until the consent of the Local Government Board has been obtained thereto.

(3) It shall be the duty of any local authority by whom this Act is adopted, as soon as the consent of the Local Government Board is given to the resolution of adoption, to bring the provisions of this Act to the attention of all medical practitioners and midwives practising in their area.

(4) In this Act, the expression "*local authority*" means the council of a borough (including the council of a metropolitan borough and the mayor, aldermen, and commons of the city of London in common council assembled), and the council of an urban or a rural district, and the council of a county (other than the county of London) who may adopt the Act either for their whole county or for any county district therein:

Provided that—

(a) where the Act is adopted by the council of a county the county medical officer of health shall be substituted for the medical officer of health of the district, and the expenses of the execution of the Act shall be paid as general county expenses or special county expenses, as the case requires; and

(b) if, where the Act has been adopted by the council of a county for any county district, the council of the district, or, where the Act has been adopted by the council of a county district for their district, the council of the county, subsequently apply to the Local Government Board to be made the authority for the purposes of this Act, the Board may, if they think fit, make an order declaring that the Act shall take effect as if it had been adopted by the council of the county district instead of the council of the county, or by the council of the county instead of the council of the county district, as the case may be, and on any such order being made the Act shall take effect in accordance with the order.

(5) In London, the medical officer of health of every metropolitan borough (including the city of London) in which this Act is in force for the time being shall send weekly to the London County Council, in a form prescribed by the Local Government Board, a list of all notices of birth received by him under this Act during the past week.

Power of Local Government Board to put Act in force in the area of any local authority. **3.** The Local Government Board may by order declare that this Act shall be in force in the area of any local authority who have power to adopt the Act, although it has not been so adopted, if they think it expedient, having regard to the circumstances of the area, and in that case the order of the Local Government Board shall have the same effect for the purpose as a resolution of adoption duly passed by the local authority of the area and assented to by the Local Government Board.

Application to Scotland. **4.** In the application of this Act to Scotland—

60 & 61 Vict. c. 38.

- (1) The expression "*Local Government Board*" means the Local Government Board for Scotland;
- (2) The expression "*sub-district*" means parish or district;
- (3) The expression "*local authority*" and the expression "*council*" mean the local authority under the Public Health (Scotland) Act, 1897, and subsection four of section two shall not apply;
- (4) An offence may be tried before the sheriff or before any magistrate of a royal, parliamentary, or police burgh officiating under the provisions of any local or general Police Act; and an offender failing to make payment of a penalty shall be liable to imprisonment in terms of the Summary Jurisdiction Acts.

- Application to Ireland      **5.** In the application of this Act to Ireland, the Local Government Board for Ireland shall be substituted for the Local Government Board, and the expression "*sub-district*" means a registrar's district under the Acts relating to the registration of births.
- Short title.            **6.** This Act may be cited as the Notification of Births Act, 1907.

SCHEDULE.

Resolution of Adoption.

Section 2 .

1. A resolution of adoption must be passed at a meeting of the council.
2. One calendar month at least before the meeting of the council special notice of the meeting and of the intention to propose the resolution shall be given to every member of the council.
3. A resolution of adoption after being passed shall be published by advertisement in some one or more newspapers circulating within the area of the council by whom the resolution is passed, and otherwise in such manner as the council thinks sufficient for giving notice thereof to all persons interested.
4. A copy of the resolution of adoption shall be sent to the Local Government Board.
5. The resolution of adoption shall come into operation at such time, not less than one month after the first publication of the advertisement, as may be fixed by the Local Government Board.



## Appendix 7– Notification of Births Act 1915

# Notification of Births (Extension) Act, 1915

### NOTIFICATION OF BIRTHS (EXTENSION) ACT 1915

#### CHAPTER 64.

An Act to extend the Notification of Births Act, 1907, to Areas in which it has not been adopted, and to make further provision in connection therewith for the Care of Mothers and Young Children. [29th July 1915.]

BE it enacted by the King's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:

Extension of Notification of Births Act, 1907. 7 Edw. 7. c. 40.      1.—(1) The Notification of Births Act, 1907 (in this Act referred to as the principal Act), shall, on and after the first day of September, nineteen hundred and fifteen, extend to and take effect in every area in which it is not already in force, and in the case of an area for which it could be adopted either by the council of an urban or rural district, or by the county council, shall take effect as if it had been adopted by the council of the district.

(2) Where by virtue of this Act the principal Act comes into force in any county district in which it is not already in force, the medical officer of health shall send duplicates of any notices of birth received by him under that Act to the county medical officer of health as soon as may be after they are received.

(3) Where by virtue of this Act the principal Act comes into force in any area in which it is not already in force, it shall be the duty of the local authority to bring the provisions of the principal Act to the attention of all medical practitioners and midwives practising in the area.

Arrangements for attending to mothers and young children. 54 & 55 Vict. c.      2.—(1) Any local authority within the meaning of the principal Act (whether a sanitary authority or not) may, for the purpose of the care of expectant mothers, nursing mothers, and young children, exercise any powers which a sanitary authority has under the Public Health Acts, 1875 to 1907, or the Public Health (London) Act, 1891, as the case requires.

(2) Any expenses incurred in the exercise of these powers shall be defrayed in the same manner as expenses of the local authority are defrayed under the principal Act.

Any such powers may be exercised in such manner as the authority direct by a committee or committees which shall include women and may comprise, if it is thought fit, persons who are not members of the authority. Any such committee may be empowered by the authority by which it is appointed to incur expenses up to a limit for the time being fixed by the authority, and, if so empowered, shall report any expenditure by them to the authority in such manner and at such times as the authority may direct. A committee appointed for the purposes of this section shall hold office for such period not exceeding three years as the authority by which it is appointed may determine.

Application to  
Scotland and  
Ireland.

**3.—**(1) In the application of this Act to Scotland—

8 Edw. 7. c. 63.

(a) subsection (2) of section one shall not apply: Provided that the Local Government Board for Scotland may, if they think fit, by order, authorise any two or more local authorities to act together for the purposes of the principal Act and this Act, and may prescribe the mode of such joint action and of defraying the costs thereof;

(b) the following subsection shall be substituted for subsection (1) of section two:—

(1) Any local authority within the meaning of the principal Act may make such arrangements as they think fit, and as may be sanctioned by the Local Government Board for Scotland, for attending to the health of expectant mothers and nursing mothers, and of children under five years of age within the meaning of section seven of the Education (Scotland) Act, 1908;

(2) In the application of this Act to Ireland—

(a) subsection (2) of section one shall not apply;

(b) the following subsection shall be substituted for subsection (1) of section two:—

(1) Any local authority within the meaning of the principal Act may make such arrangements as they think fit, and as may be sanctioned by the Local Government Board for Ireland, for attending to the health of expectant mothers and nursing mothers, and of children under five years of age;

(c) the provisions for the extension of the principal Act shall not apply as respects any rural district; and

(d) the expression "*medical officer of health*" means, for the purposes both of this Act and the principal Act, as respects any district for which there is a medical superintendent officer of health that officer, and elsewhere the medical officer of health of the dispensary district.

Short title and repeal.

4.—(1) This Act may be cited as the Notification of Births (Extension) Act, 1915, and the principal Act and this Act may be cited together as the Notification of Births Acts, 1907 and 1915.

(2) The enactments mentioned in the Schedule to this Act are hereby repealed (except as respects rural districts in Ireland) to the extent specified in the third column of that Schedule.

SCHEDULE.

Section 4 .

Session and Chapter.	Title.	Extent of Repeal.
7 Edw. 7. c. 40.	The Notification of Births Act, 1907.	In section one, the words "in which this Act is adopted by that authority in accordance with the provisions of this Act," in subsection (1) the words "in an area in which this Act is adopted," and in subsection (4) the words "whose sub-district or any part thereof is situate within any area in which this Act is adopted."  Subsections (1) (2) and (3) of section two, and in subsection (4) the words "who may adopt the Act either for their whole county or for any county district therein."  Section three.  The Schedule.

## Appendix 8 - Study on Maternity Systems Birth Notification Data Questionnaire

### Study on Maternity Systems Birth Notification Data

Dear Colleague,

I am interested to learn about your experience entering patients' information on the hospital computer systems that contribute to details of births at the hospital. Your help and support would be greatly appreciated. This questionnaire is anonymous and confidential. Individuals cannot be identified from particular responses. There is free text space at the end for comments. There are no right or wrong answers, it is your views, opinions and beliefs that I am interested in. You are free to decline the survey. Please return completed questionnaire in the attached envelope to the designated collection box. If you have any queries before, during or after completing the questionnaire, please contact

Anne Clarke, IT Midwife, mobile 0864107217 or email [aclarke@XXXX.ie](mailto:aclarke@XXXX.ie)

Thank you for your time.

#### **Please answer the following:**

1. What is your occupation here at the hospital?
  - Delivery Suite/Theatre Clerk
  - Central Appointments Clerk
  - Clinical Midwife Manager
  - Staff Midwife
  - Staff Nurse
  - Student Midwife
  - Agency Midwife
  
2. Do you know how patient information you enter into the hospital computer is used?
  - Yes
  - No

If Yes, please enter what the information is used for:

3. Do you know who receives computerised details of a birth?
  - Yes
  - No

If yes, who receives it?

4. Do you think the information entered on the computer accurately matches paper maternity records?  
(Please circle one)

Yes

No

Uncertain

5. What is your understanding of what happens to patient information after you enter it onto the IPMS or K2 maternity system?

6. How often do you use the K2 maternity system? ((Please circle one))

At least daily

At least weekly

At least monthly

Never

7. I think sometimes errors in computerising records happen because of the following (tick all that apply)

- Difficulty understanding clinical terms in the paper maternity chart
- Inadequate information technology (IT) training  Lack of IT confidence
- Inadequate IT support
- Inability to rectify mistakes  Lack of computer skills
- Lack of computer experience
- Too easy to tick the wrong answer in the drop down answers
- Other. If other, please state reason:

8. Did you receive training on the K2 maternity system?

- Yes
- No (Go to question 10)

9. Who did you receive K2 maternity system training from? (tick all that apply)

- Administration manager
- Colleague - on the job training
- Clinical Midwife Manager
- Staff midwife
- Clinical skills facilitator
- IT Midwife
- Other: please state who:

10. Do you feel that the IT training you received prepared you in to input accurate information? (Please circle one)

Strongly agree      Agree      No opinion      Disagree      Strongly disagree

11. Are there areas in your job where you feel that your IT training did not prepare you for?

- Yes
- No

If Yes, please indicate what areas:

12. Are there any practical barriers to computerising records?

- 
- Computers not available when needed
- Staff required to log in and out takes too long
- K2 maternity system difficult to use
- Poor internet access in the community setting
- Too busy
- Delay in getting access to paper maternity chart
- Other
- No

13. What would be your preferred format for IT training to better prepare you for your job? (tick all that apply)

- Mandatory in-service education programme
- Study days
- Printed manuals
- Skills Workshop
- One to one
- Tutorials online
- Other

If other, Please indicate preference:

14. Do any of the following affect how you add to the computerised maternity records? (Tick all that apply)
- Limited time
  - Difficulty accessing paper maternity charts
  - Interruptions
  - Slowness of computer system
  - Incomplete information in paper maternity chart
  - Information found in multiple places in the paper maternity chart
  - Illegible and unreadable handwriting in the paper maternity chart
  - Errors and inconsistency in the computerised maternity records
  - Sometimes different medical terms mean the same thing (e.g. PET, Pre-eclampsia and Pre-eclamptic Toxaemia are the same condition. Also Placental abruption, Abruptio Placenta and accidental haemorrhage are the same condition)

15. Have you ever come across errors or omissions in the computerised maternity records?

- Yes
- No

If Yes : How often would this occur:

- Frequently
- Sometimes
- Rarely

If Yes, how did you deal with the error or omission?

- Left the computerised record unchanged
- Amended the computerised record myself
- Asked a midwife for clarification
- Ask clerical staff to amend
- Other:

If other, please indicate what action you took:

16. What are your working hours?

- Full time
- Part time

17. What shifts do you mainly work?
- Days
  - Nights
  - Rotation days/nights
18. For Clerical staff only: I am working as a clerk at this hospital for (tick one)
- Less than 1 year
  - 1-2 years
  - 3-5 years
  - 6-10 years
  - More than 10 years
19. For Midwives only: I am practicing as a registered midwife for (tick one)
- Less than 1 year
  - 1- 2 years
  - 3-5 years
  - 6-10 years
  - More than 10 years
20. For Nurses only: I am practicing as a registered nurse for (tick one)
- Less than 1 year
  - 1- 2 years
  - 3-5 years
  - 6-10 years
  - More than 10 years

**For clerical staff, nurses and student midwives who use K2 maternity system:**

21. I always ask a midwife in delivery suite/theatre/postnatal ward to check the information I have entered on the K2 maternity system.
- Yes
  - No

**There is a space below for your additional comments or suggestions. On completion of the questionnaire, please place in the envelope attached and place in the designated box.**

**Enter comments or suggestions here:**



# Appendix 9 –National perinatal Reporting System

## Uses of NPRS data

- ◆ Provision of national statistics on changes in perinatal events over time e.g. perinatal mortality
- ◆ Input into future planning of maternity services
- ◆ Input into population health profiles
- ◆ Research
- ◆ Clinical Audit.

NPRS data is also used to inform and answer questions such as:

- ◆ How is the birth rate changing from year to year?
- ◆ What is the age profile of mothers giving birth?
- ◆ What is their maternal parity (total number of previous live births and stillbirths)?
- ◆ What is the rate of caesarean section in Ireland?
- ◆ How many stillbirths occur each year? What were the causes of death? What was the mother's age profile and maternal parity?
- ◆ What is Ireland's breastfeeding rate?
- ◆ What is the average birthweight of babies born in Ireland?
- ◆ How many home births were attended by domiciliary midwives in a specified period?

## Quality and Reporting



Data are processed using in-house NPRS software which checks all incoming data. Data quality is reviewed at all stages of the process. Subsequent data validation reviews are carried out to further ensure high quality. Support and training of hospital based NPRS staff enhances this data quality. These data are used to compile the national perinatal dataset.

### Access to NPRS Data

Annual *Perinatal Statistics Reports* are available at [www.hpo.ie](http://www.hpo.ie) - HIPE and NPRS Reports, and the HPO provide NPRS data on request.

**Perinatal Statistics Report 2015**

**Latest Publication**

**Perinatal Statistics Report 2015**

All previous annual reports from 1999 onwards are available to download on the NPRS section of the HPO website and General Information on NPRS is available at [www.hpo.ie](http://www.hpo.ie)

Requests for NPRS Data can be submitted via email to [info@hpo.ie](mailto:info@hpo.ie)

For further information on NPRS please contact:

Ms. Sheelagh Bonham  
Healthcare Pricing Office (HPO)  
National Finance Division, HSE  
Brunel Building, Heuston South Quarter  
St John's Road West, Dublin 8, D08 X01F  
[www.hpo.ie](http://www.hpo.ie)  
Tel: 01-7718426

## NATIONAL PERINATAL REPORTING SYSTEM

Healthcare Pricing Office  
Brunel Building  
Heuston South Quarter  
St. John's Road West  
Dublin 8

Tel: +353-1-7718426  
[www.hpo.ie](http://www.hpo.ie)



## CONFIDENTIAL

All information provided to the NPRS is strictly confidential.



Feidhmeannacht na Seirbhíse Sláinte  
Health Service Executive

## National Perinatal Reporting System



The National Perinatal Reporting System (NPRS) is the principal source of national data on perinatal events. NPRS was established in the 1980's and managed in the Department of Health. Between 1999 and 2013 the Economic and Social Research Institute managed the system on behalf of the Department of Health and the Health Service Executive.

From January 1, 2014 the system is managed by the Healthcare Pricing Office ([www.hpo.ie](http://www.hpo.ie)).

Information on every birth in the Republic of Ireland is submitted to the NPRS by trained hospital administrative staff and all practicing self employed community midwives. The information collected includes data on pregnancy outcomes (with particular reference to perinatal mortality and important aspects of perinatal care), as well as descriptive social and biological characteristics of mothers giving birth. The time frame to which the information relates is from 22 weeks gestation to the first week of life.

### Data Collection

All births are notified and registered on a standard four-part Birth Notification Form (BNF) which is completed where the birth takes place, either at the hospital or elsewhere by the attending midwife.

Part 1 of the BNF is sent to the Registrar of Births and subsequently to the Central Statistics Office.

Part 2 is sent to The Director of Public Health and Medicine and Medical Officer of Health in the mother's area of residence.

**Part 3 of the form is sent to the HPO, in either electronic or paper format, and processed using custom-designed data entry software for NPRS data.**

Part 4 is retained by the hospital or midwife for their own records.



## Type of data collected

### Administrative Data

- ◆ Hospital number; case number (unique to hospital of birth)
- ◆ Type of birth indicator (live birth or stillbirth)
- ◆ Place of birth (hospital, domiciliary or born before arrival)
- ◆ Date of last birth (live birth or stillbirth - if applicable)
- ◆ Type of death indicator (early neonatal death or stillbirth - if applicable)
- ◆ Place of death (if applicable)
- ◆ Type of antenatal care received including dates of first visit to doctor or hospital during pregnancy
- ◆ Type of feeding (artificial, breastfeeding or combined)
- ◆ Pre-booked admission indicator, including dates of mother's admission and discharge and date of infant's discharge

- ◆ Infant transferred indicator, including hospital to which infant was transferred (if applicable).

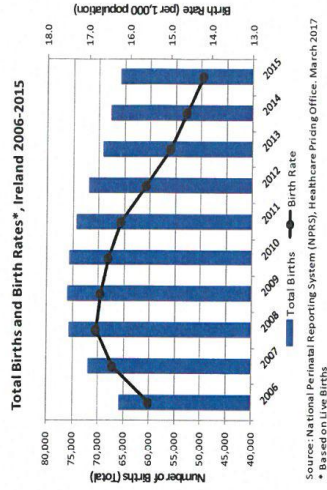
### Clinical Data includes;

- ◆ Infant's birthweight and period of gestation
- ◆ Mother's obstetric history
- ◆ Autopsy indicator (if applicable)
- ◆ When stillbirth occurred (before or during labour)
- ◆ Main cause of death and one secondary cause of death
- ◆ Mother's immunity to rubella status
- ◆ Method of delivery
- ◆ If infant received BCG or not

### Demographic data includes;

- ◆ Sex of infant
- ◆ Multiple birth indicator (singleton, twins, triplets etc)
- ◆ Father's age, county of residence, nationality and occupation
- ◆ Mother's age, county of residence, nationality and occupation

## Births in Ireland



The figure above illustrates the trend in births and birth rates recorded from 2006 to 2015. In 2006 the NPRS reported 65,810 births with a birth rate of 15.5 per 1,000 population compared to 65,869 births and a birth rate of 14.2.0 per 1,000 population in 2015.

## Appendix 10-Participant Information Leaflet

### Participant Information Leaflet

#### Title of study

'Errors, Inaccuracies and Omissions in Electronic Birth Notification Data and User Perception of Patient Data Entry in to Electronic Hospital System'

Dear Colleague,

You are being invited to take part in a research study. However, before you decide whether or not to take part, it is important that you fully understand what the research is about and what you will be asked to do. It is important that you read the following information in order to make an informed decision and if you have any questions about any aspects of the study that are not clear to you, do not hesitate to contact me. Please make sure that you are satisfied before you decide to take part or not.

Thank you for your time and consideration of this invitation.

#### Purpose of the research study.

I am interested to learn about your experience entering patients' information onto the hospital REMOVED maternity computer systems that contribute to details of births at the hospital. Sometimes errors happen when information is computerised or it can be inaccurate or left out of the computerised record altogether. By answering some simple questions you will assist me to try to find out what the reasons for this are and what the solutions could be to prevent these things happening. It will approximately 5 minutes of your time. The questionnaire is anonymous and there is free text space at the end for comments. You are free to decline the survey, however if you find time to complete it and return to the designated collection box I would be most grateful. Thank you for your time.

#### Why as a Participant/Respondent have I been asked to take part in this study?

Any clerk working in central appointment, admission office, delivery suite/theatre, any midwife/nurse or student midwife, has the potential to computerise information on REMOVED maternity system for women and infants attending the hospital and therefore are being invited to participate.

#### Voluntary Participation

Participation in this study is voluntary and the surveys are anonymous. Consent to participate is implied on voluntary completion and return of the questionnaire. Once the survey has been submitted there is no opportunity to withdraw from the study.

#### During the study

Anonymous questionnaires will be distributed to all clinical areas in the hospital. The survey should take 5 minutes approximately to complete.

should take 5 minutes approximately to complete. At your earliest convenience, please complete the survey, place in the enclosed envelope and place in the completed questionnaire box.

### **Potential Harms/Risks**

None anticipated

### **Potential Benefits**

The information obtained from this study has the potential to identify any training/education needs for the people entering the information onto the **Removed** maternity systems in order to improve communication to people receiving information about births occurring in the hospital.

### **Confidentiality**

The surveys are anonymous therefore your identity will remain confidential. The hospital in which you work will not be identified. The electronic copy of the data will be held on a dedicated computer at the **Name Removed** and available only to those involved with the analysis of the data. Access will be controlled using specific user ids and passwords (which will be changed frequently). No unauthorized person will have access to the data. All paper copies of information, including, data collection and personal information will be kept in a locked office. This office will be at the **Name Removed** under the administration of the research investigator.

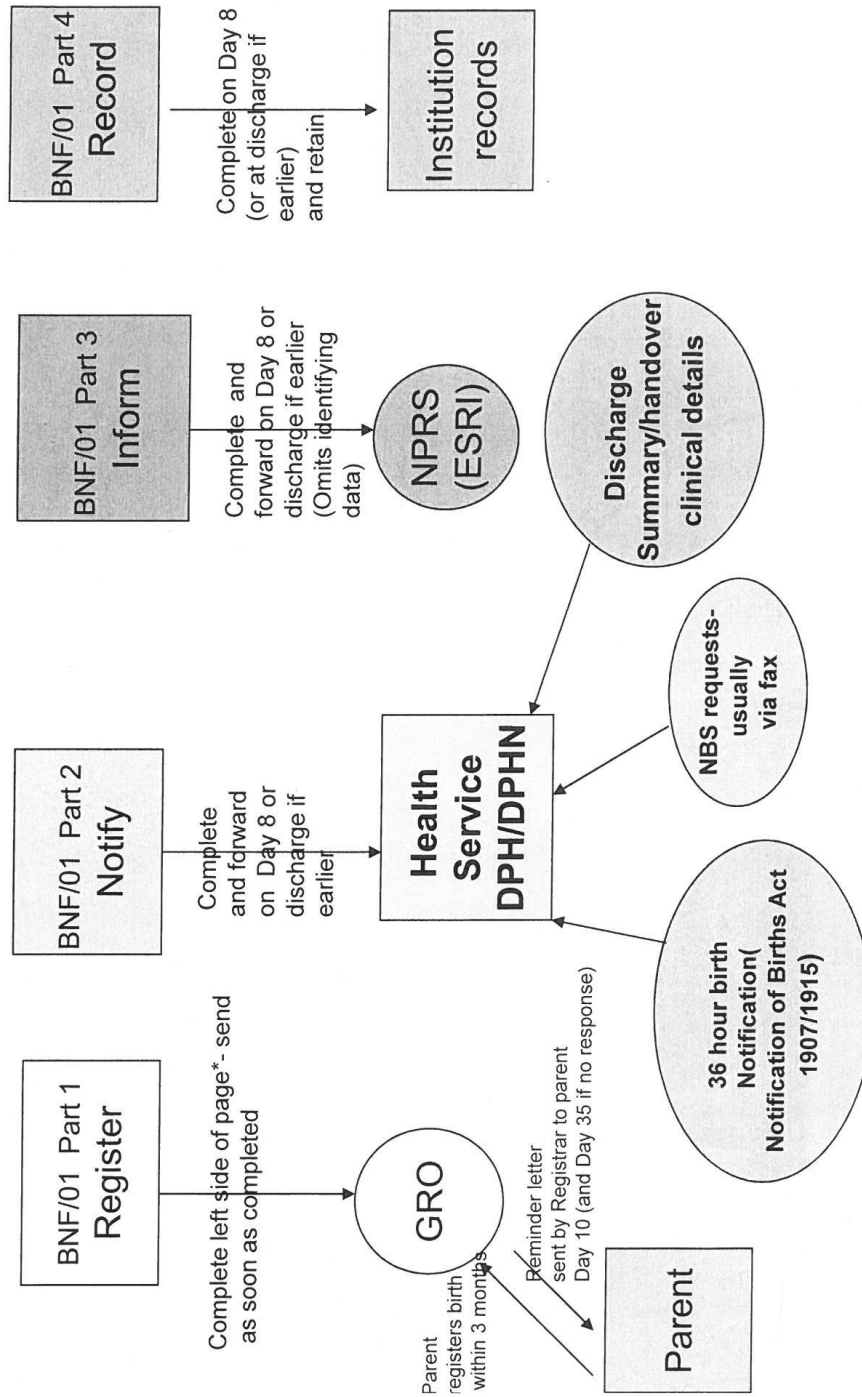
### **Further information**

You can get more information or answers to your questions about the study, your participation in the study, and your rights, from the researcher below:

**Anne Clarke**  
Information Technology (IT) Midwife  
Contact details **Removed to Protect Anonymity**

# Appendix 11- Birth Notification and Associated Procedures in Ireland

Table 1 Birth notification and associated procedures in Ireland



\*Sections 1-5

## Appendix 12- Application to Research Ethics Committee

### STANDARD APPLICATION FORM

For the Ethical Review of  
Health-Related Research Studies, which are not Clinical Trials of Medicinal Products For  
Human Use  
as defined in S.I. 190/2004

DO NOT COMPLETE THIS APPLICATION FORM  
IF YOUR STUDY IS A CLINICAL TRIAL OF A MEDICINAL PRODUCT

Title of Study: 'Errors, Inaccuracies and Omissions in Electronic Birth Notification Data and  
User Perception of Patient Data Entry in to Electronic Hospital System'

Location:

Application Version No: \_\_\_\_\_ 1 \_\_\_\_\_

Application Date: 20/06/2018

For Official Use Only – Date Stamp of Receipt by REC:


TABLE OF CONTENTS

MANDATORY /OPTIONAL

SECTION A INFORMATION	GENERAL MANDATORY*
SECTION B DESCRIPTORS	STUDY MANDATORY*
SECTION C PARTICIPANTS	STUDY MANDATORY*
SECTION D PROCEDURES	RESEARCH MANDATORY*
SECTION E PROTECTION	DATA MANDATORY*
SECTION F BIOLOGICAL MATERIAL	HUMAN (OPTIONAL)
SECTION G	RADIATION (OPTIONAL)
SECTION H DEVICES	MEDICAL (OPTIONAL)
SECTION I PRODUCTS / COSMETICS / FOOD AND FOODSTUFFS	MEDICINAL (OPTIONAL)
SECTION J INSURANCE	INDEMNITY AND MANDATORY*
SECTION K RESOURCE IMPLICATIONS, FUNDING	COST AND AND PAYMENTS MANDATORY*
SECTION L ETHICAL ISSUES	ADDITIONAL (OPTIONAL)

This Application Form is divided into Sections.

\*Sections A, B, C, D, E, J and K are **Mandatory**.

A2 (c) For multi-site studies, please name each site where this study is proposed to take place, state the lead co-investigator for each of these sites and state if you have got an outcome from the relevant research ethics committee(s).

Site:	Lead Co-Investigator for each site:	Research Ethics Committee Outcome
REMOVED TO PROTECT IDENTITY OF HOSPITAL	N/A	

A2 (d) For multi-site studies, please provide details of the Lead Co-Investigators at each site.

A4. Lead contact person who is to receive correspondence in relation to this application or be contacted with queries about this application.

Name: Anne Clarke

Position: IT Midwife

Organisation:

Address for Correspondence:

Tel (work

Tel (mob.): E-mail:

A5 (a) Is this study being undertaken as part of an academic qualification?  Yes

If answer is No, please delete remaining questions in Section A

A5 (b) If yes, please complete the following:

Student Name(s): Anne Clarke

Academic Course: Master of Science in Health Informatics

Academic Institution: Trinity College, Dublin

A5 (c) Academic Supervisor(s):

Title  Ms

Name: Mary Sharp

Qualifications: B.Sc (Comp), M.A., CEng FIEI, F.I.C.S. FRAMI Chartered Engineer

Position: Assistant Professor

Dept: Computer Science

Organisation: Trinity College, Dublin

Address: Trinity College, Dublin

## SECTION B STUDY DESCRIPTORS



SECTION B IS MANDATORY

**B1. What is the anticipated start date of this study?**

July 2018
-----------

**B2. What is the anticipated duration of this study?**

The MSc in Health Informatics by research course commenced in September 2016.

The literature review and methodology chapters have been completed. The Data collection will be of one month's duration, to be completed in August 2018. The findings will be written up and presented in thesis form in September 2018.

**B3. Please provide a brief lay (plain English) description of the study. Please ensure the language used in your answer is at a level suitable for use in a research participant information leaflet.**

The purpose of the study is to ascertain why 'Errors, Inaccuracies and Omissions in Electronic Birth Notification Data and User Perception of Patient Data Entry to Electronic Hospital System'

Midwives/student midwives/nurses and clerical staff will be asked to complete a questionnaire. The purpose of the questionnaire is to ascertain what level of knowledge and understanding staff have on the importance of accurate data entry. The researcher hopes to ascertain if staff are aware of their role in electronic birth notification and the impact of errors, inaccuracies and omissions in data entry. The researcher hopes to find out why there are errors and what factors contribute to errors, inaccuracies or omissions in electronic birth notification data entry.

**B4. Provide brief information on the study background.**

Notification of births is a legal requirement for the hospital. All live births and stillbirths of infants must be notified to the Registrar of Births (GRO) and the Director of Public Health and Medicine (Health Service Executive) (HSE) within 36 hours of the birth. Details of the birth are also notified to the National Perinatal Reporting System (NPRS), Healthcare Pricing Office (HPO).

The Hospital sends birth notifications electronically to the stakeholders above every 24 hours. These notifications are updated and resent to the stakeholders seven days after the birth.

In the case of a live birth, there are 66 data items that require completion on the birth notification form (BNF) and in the case of a perinatal death; there are 73 data items that require completion. (Appendix 1 Version BNF01/2003)

When the data is received at GRO, HSE and HPO, the data items have to pass validation tests. If there are errors, inaccuracies or omissions in data, an error report via email is sent to the hospital for clarification and correction. The clarification or corrections are made by clerical or midwifery staff and the data is resent to the stakeholders.

Here is how the data items required for birth notification are collected at the **Hospital**:

- Central appointments clerical staff working in OPD or midwife working in private clinic enters demographic information at registration stage onto the Patient Management System (IPMS).
- Midwife/student midwife enters data onto K2 maternity system during the antenatal booking history taking.
- Clerical staff transcribe data from the healthcare record onto K2 maternity system to complete the Labour Ward Registerable Births questionnaire.
- Midwife/student midwife/nurse completes the Postnatal Discharge –Mother & Baby questionnaire on K2 maternity system.

The researcher has used business objects report tool at the **hospital** to monitor data quality for BNF for some of the data items for the year 2017 and error reports received from stakeholders. The Business Object tool is a legacy system in use at the hospital since 2003. The business object designer designs the universe using the identical fields and answers available from K2 maternity system. End users can then upload data from the universe (K2) for creating reports. The version of business objects in use at the hospital is 6.1.021.2262.

For the purposes of this study, the researcher has reviewed the following data items:

- Main disease or congenital malformation affecting infant
- Date of Mother's Discharge
- Date of Infant's Discharge

Following a literature review on possible errors, inaccuracies and omissions on birth notification data, the researcher used a Business Objects report tool, available at the hospital, to generate a report with the number of infants diagnosed/suspected of having congenital malformations in 2017. There were 380 live births where the infants had congenital malformations, born at the hospital in 2017. Of these, 162 or 42.6% were not reported to the stakeholders due to data entry errors. This is despite the fact that there is a question and answer available for this field to be entered correctly in K2 maternity system. This data therefore will not appear on BNF and will not be notified to the stakeholders above.

Another area of inaccuracies identified by the researcher and via error reports received from the stakeholders can be the dates of discharge for mother and infant. Accurate data for these data items are a requirement for calculating duration of stay in hospital for mother and infant following the different types of delivery.

The researcher is hoping to identify the reasons for the errors, inaccuracies and omissions and to make recommendations to enhance data quality leaving the hospital.

**B5. List the study aims and objectives.**

The aim of the study is to determine the understanding and knowledge of the system users and their role in birth notification in order to achieve accuracy in data leaving the hospital.

**Study Objectives**

- To identify why errors, inaccuracies and omissions occur.
- If errors, inaccuracies and omissions exist, to identify what they are and what are the contributing factors.
- To capture midwives/student midwives/nurses and clerical staffs views of data entry into IT systems.
- To establish what influences midwives/ nurses or clerical staff when collecting and entering perinatal data.
- To identify what measures may be required to enhance data quality.

**B6. List the study endpoints / measurable outcomes (if applicable).**

To identify why errors, inaccuracies and omissions occur and what measures need to be put in place to enhance data quality leaving the hospital.

**B7. Provide information on the study design.**

The study involves retrospective reviewing of data entries for mothers and infants using a business objects report tool available at the **Hospital**. In addition to this, a quantitative descriptive methodology by use of an anonymous questionnaire (Appendix 2) will be used to capture the midwifery, nursing and clerical staff experience of recording birth notification data. A Participant Information Leaflet will accompany each questionnaire (Appendix 3).

**B8. Provide information on the study methodology.**

A list of infants who were diagnosed or suspected with congenital malformations prior to and after the birth has been obtained from the K2 maternity system using Business Objects Report tool.

The questionnaire data will be collected on a standardised case report form and then converted to an electronic form once the study is completed. Study subjects will be anonymised using a study identity number. Individual staff will not be identifiable.

**B9. Provide information on the statistical approach to be used in the analysis of your results (if appropriate) / source of any statistical advice.**

N/A
-----

**B10 (a) Please justify the proposed sample size and provide details of its calculation (including minimum clinically important difference).**

Any midwife/student midwife/nurse and clerical staff who have potentially entered electronic data for these women and infants will be invited to participate. Questionnaires will be distributed to midwives/student midwives/nurses and clerical staff. Allowing for rotation of staff and staff attrition it is anticipated that approximately 50 questionnaires will be returned.

**B11. How many research participants are to be recruited in total?**

430 (Midwifery, Nursing, central appointment and delivery suite/theatre clerks)

**B12 (a) How many research participants are to be recruited in each study group (where applicable)? Please complete the following table (where applicable).**

Answer	
<b>Registered Midwives/Nurses</b>	
<b>Delivery Suite /Theatre Clerical staff</b>	
<b>Central Appointments</b>	

Clerical Staff	
----------------	--

**B12 (b) Please provide details on the method of randomisation (where applicable).**

N/A
-----

**B13. How many research participants are to be recruited at each study site (where applicable)? Please complete the following table.**

Site:	Number of Research Participants at this site:

**SECTION C STUDY PARTICIPANTS**

SECTION C IS MANDATORY

**C1 PARTICIPANTS – SELECTION AND RECRUITMENT**

**C1.1 How will the participants in the study be selected?**

Any Registered Midwife/Nurse/Student Midwife or clerical staff member who has the potential to enter data for women attending the hospital for maternity care will be invited to participate.

Stages of data entry:

- Patient Management System (ipms) at registration for maternity care in outpatient department (OPD), private clinic or community services (DOMINO).
- Antenatal booking history (OPD, private clinic, semi-private clinic and community services)
- Labour Ward Registerable births in delivery suite or theatre
- Postnatal discharge- Mother & Baby – postnatal wards

**C1.2 How will the participants in the study be recruited?**

Anonymous questionnaires will be distributed to OPD, private clinic, semi-private clinic, community services and postnatal wards. The researcher will then visit at an

appropriately agreed time to provide further information to potential study subjects about the study. The subjects will then choose to self-select to participate in the research. Completed forms will be placed in sealed envelopes addressed to the researcher and placed in sealed box at the place of work.

**C1.3 What are the inclusion criteria for research participants? (Please justify, where necessary)**

Any registered midwife/ student midwife/ nurse or clerical staff member who has the potential to enter electronic data for women and infants attending the hospital for maternity care will be invited to participate.

**C1.4 What are the exclusion criteria for research participants? (Please justify, where necessary)**

Exclusion criteria:

- Any registered midwife/student midwife/nurse or clerical staff who does not enter data on the systems outlined in C1.1.

**C1.5 Will any participants recruited to this research study be simultaneously involved in any other research project?** Not to the researcher's knowledge

## **C2 PARTICIPANTS – INFORMED CONSENT**

**C2.1 (a) Will informed consent be obtained?**

No, as it is an anonymous questionnaire, no staff member will be identified. Consent will be implied by completion of the anonymous questionnaire.

**C2.1 (c) If yes, please outline the consent process in full. (How will consent be obtained, when, by whom and from whom etc.)**

N/A

**C2.2 (a) Will participants be informed of their right to refuse to participate and their right to withdraw from this research study?**

Yes they can refuse to participate in the study. As the questionnaires will be anonymous, once forms are completed and submitted they are unable to withdraw from the study.

## SECTION C IS MANDATORY

### C1 PARTICIPANTS – SELECTION AND RECRUITMENT

#### **C1.1 How will the participants in the study be selected?**

Any Registered Midwife/Nurse/Student Midwife or clerical staff member who has the potential to enter data for women attending the hospital for maternity care will be invited to participate.

Stages of data entry:

- Patient Management System (ipms) at registration for maternity care in outpatient department (OPD), private clinic or community services (DOMINO).
- Antenatal booking history (OPD, private clinic, semi-private clinic and community services)
- Labour Ward Registerable births in delivery suite or theatre
- Postnatal discharge- Mother & Baby – postnatal wards

#### **C1.2 How will the participants in the study be recruited?**

Anonymous questionnaires will be distributed to OPD, private clinic, semi-private clinic, community services, delivery suite, theatre and postnatal wards. The researcher will then visit at an appropriately agreed time to provide further information to potential study subjects about the study. The subjects will then choose to self-select to participate in the research. Completed forms will be placed in sealed envelopes addressed to the researcher and placed in sealed box at the place of work.

#### **C1.3 What are the inclusion criteria for research participants? (Please justify, where necessary)**

Any registered midwife/ student midwife/ nurse or clerical staff member who has the potential to enter electronic data for women and infants attending the hospital for maternity care will be invited to participate.

#### **C1.4 What are the exclusion criteria for research participants? (Please justify, where necessary)**

Exclusion criteria:

The researcher is hoping to identify the reasons for errors, inaccuracies and omissions and to make recommendations to enhance data quality leaving the hospital.

**B5. List the study aims and objectives.**

The aim of the study is to determine the understanding and knowledge of the system users and their role in birth notification in order to achieve accuracy in data leaving the hospital.

**Study Objectives**

- To identify why errors, inaccuracies and omissions occur.
- If errors, inaccuracies and omissions exist, to identify what they are and what are the contributing factors.
- To capture midwives/student midwives/nurses and clerical staffs views of data entry into IT systems.
- To establish what influences midwives/ nurses or clerical staff when collecting and entering perinatal data.
- To identify what measures may be required to enhance data quality.

**B6. List the study endpoints / measurable outcomes (if applicable).**

To identify why errors, inaccuracies and omissions occur in electronic birth notification data and user perception of patient data entry in to electronic hospital system and what measures need to be put in place to enhance data quality leaving the hospital.

**B7. Provide information on the study design.**

The study involves retrospective reviewing of data entries for mothers and infants using a business objects report tool available at the **Hospital**. In addition to this, a quantitative descriptive methodology by use of an anonymous questionnaire (Appendix 2) will be used to capture the midwifery, nursing and clerical staff experience of recording birth notification data. A Participant Information Leaflet will accompany each questionnaire (Appendix 3).

**B8. Provide information on the study methodology.**

The questionnaire data will be collected on a standardised case report form and then converted to an electronic form once the study is completed. Study subjects will be anonymised using a study identity number. Individual staff will not be identifiable.

**B9. Provide information on the statistical approach to be used in the analysis of your results (if appropriate) / source of any statistical advice.**

N/A
-----



Information pertaining to this will be included in the Participation Information Leaflet (Appendix 3)

**C2.3 (a) Will there be a time interval between giving information and seeking consent?**  Yes

**C2.3 (b) If yes, please elaborate.**

The information sheet and questionnaires will be left in appropriate areas in OPD, private clinic, semi-private clinic and postnatal wards. Each registered midwife/nurse/clerical staff will decide if they wish to partake in the study.

### **C3 ADULT PARTICIPANTS (AGED 18 OR OVER) - CAPACITY**

**C3.1 (a) Will all adult research participants have the capacity to give informed consent?**  Yes

If answer is Yes, please delete remaining questions in Section C3

### **C4 PARTICIPANTS UNDER THE AGE OF 18**

**C4.1 (a) Will any research participants be under the age of 18 i.e. Children?**  No

### **C5 PARTICIPANTS - CHECKLIST**

**C5.1 Please confirm if persons from any of the following groups will participate in this study. This is a quick checklist to assist research ethics committee members and to identify whether study participants include persons from vulnerable groups and to establish what special arrangements, if any, have been made to deal with issues of consent. It is recognised that not all groups in this listing will automatically be vulnerable or lacking in capacity. Please refer to the HSE's National Consent Policy, particularly Part 3, Section 5.**

**Committees are particularly interested to know if persons in any of these groups are being targeted for inclusion, as per the inclusion criteria.**

**(a) Healthy Volunteers**  No

(b) Patients  No

- Unconscious patients  No
- Current psychiatric in-patients  No
- Patients in an emergency medical setting  No

(c) Relatives / Carers of patients  No

(d) Persons in dependent or unequal relationships  No

- Students  No
- Employees / staff members  Yes
- Persons in residential care  No
- Persons highly dependent on medical care  No

(e) Intellectually impaired persons  No

(f) Persons with a life-limiting condition  No  
(Please refer to guidance manual for definition)

(g) Persons with an acquired brain injury  No

**C5.2 If yes to any of the above, please comment on the vulnerability of the research participants, and outline the special arrangements in recognition of this vulnerability (if any).**

N/A

**C5.3 Please comment on whether women of child-bearing potential, breastfeeding mothers, or pregnant women will be included or excluded in this research study.**

N/A

## SECTION D RESEARCH PROCEDURES

SECTION D IS MANDATORY

**D1 (a) What activities, procedures or interventions (if any) are research participants asked to undergo or engage in for the purposes of this research study?**

The subjects are asked to read the participation information sheet, complete a questionnaire and place completed questionnaires into a sealed envelope addressed to the researcher and placed in a sealed box provided in their place of work.

**D1 (b) What other activities (if any) are taking place for the purposes of this research study e.g. chart review, sample analysis etc?**

Retrospective review of data entries on K2 maternity system using Business objects reporting tool

**D2. Please provide details below of any potential harm that may result from any of the activities, procedures, interventions or other activities listed above.**

None anticipated

**D3. What is the potential benefit that may occur as a result of this study?**

- As errors, inaccuracies and omissions exist, to identify why they are occurring and what are the contributory factors.
- To identify barriers to accurate recording of electronic data entry into K2 maternity systems and IPMS.
- To identify any training/education needs for the people entering the data.
- To identify what measures may be required to enhance data quality.
- To reduce clinical risk to the woman, infant and hospital through accurate and timely data entry.
- To improve communication to stakeholders receiving birth notification data from the hospital.
- To fulfil the legal requirements for the hospital in relation to providing accurate and timely birth notification data.
- To enhance data quality for research and audit for clinical care and outcomes.

**D4 (a) Will the study involve the withholding of treatment? No**

**D4 (b) Will there be any harms that could result from withholding treatment?**  Non  
 Applicable

**D5 (a) How will the health of participants be monitored during the study, and who will be responsible for this?**

Not Applicable

**D5 (b) How will the health of participants be monitored after the study, and who will be responsible for this?**

Not Applicable

**D6 (a) Will the interventions provided during the study be available if needed after the termination of the study?**

**D6 (b) If yes, please state the intervention you are referring to and state who will bear the cost of provision of this intervention?**

Answer

**D7. Please comment on how individual results will be managed.**

Non Applicable

**D8. Please comment on how aggregated study results will be made available.**

- i) It is anticipated that the findings of this study will be presented to the multidisciplinary team at the **Hospital**.
- ii) Submission to peer reviewed journals.
- iii) Oral presentations at conference.
- iv) Submission of a Thesis to Trinity College, Dublin

**D9. Will the research participant's general practitioner be informed that the research participant is taking part in the study (if appropriate)?**

**D10. Will the research participant's hospital consultant be informed that the research participant is taking part in the study (if appropriate)?**

## SECTION E DATA PROTECTION

SECTION E IS MANDATORY

### E1 DATA PROCESSING - CONSENT

**E1.1 (a) Will consent be sought for the processing of data?**

**E1.1 (b) If no, please elaborate.**

No "Personal data" will be collected from any staff member so participants will not be identifiable from the results of the study as the questionnaires are anonymous.

**E2 DATA PROCESSING - GENERAL****E2.1 Who will have access to the data which is collected?**

Only the researcher investigator and the research supervisor.

**E2.2 What media of data will be collected?**

Data will be collected as Microsoft Excel files, password protected.

**E2.3 (a) Would you class the data collected in this study as anonymous, irrevocably anonymised, pseudonymised, coded or identifiable data?**

Anonymous and coded

**E2.3 (b) If 'coded', please confirm who will retain the 'key' to re-identify the data?**

The research investigator.

**E2.4 Where will data which is collected be stored?**

Information will be collected on a study form that is assigned a specific number. Data will be entered electronically into a secure computer. All paper copies of information, data collection and personal information will be kept in a locked office. This office will be at the **Hospital** under the administration of the research investigator.

**E2.5 Please comment on security measures which have been put in place to ensure the security of collected data.**

The electronic copy of the data will be held on a dedicated computer at the **Hospital** and available only to those involved with the analysis of the data. Access will be controlled using specific user ids and passwords (which will be changed frequently). No unauthorized person will have access to the data. All paper copies of information, including, data collection and personal information will be kept in a locked office. This office will be at the **Hospital** under the administration of the research investigator.

**E2.6 (a) Will data collected be at any stage leaving the site(s) of origin?**

No

**E2.7 Where will data analysis take place and who will perform data analysis (if known)?**

Analysis of the data will be on site in the **Hospital** by the research Investigator.

**E2.8 (a) After data analysis has taken place, will data be destroyed or retained?**

Destroyed

**E2.8 (b) Please elaborate.** Completed questionnaires will be shredded after use.

**E2.8 (c) If destroyed, how, when and by whom will it be destroyed?**

Physical data will be destroyed by the researcher, shredded and disposed of in confidential waste bins throughout the hospital as per hospital guidelines. Digital information will be permanently be deleted from the appropriate section of the computer memory on which it is stored.

**E2.8 (d) If retained, for how long, for what purpose, and where will it be retained?**

Non Applicable

**E2.9 Please comment on the confidentiality of collected data.**

All data obtained in the course of the study will be treated confidentially and stored securely in the appropriate manner.

**E2.10 (a) Will any of the interview data collected consist of audio recordings / video recordings?**  No**E2.10 (b) If yes, will participants be given the opportunity to review and amend transcripts of the tapes?**

Non Applicable

**E2.11 (a) Will any of the study data collected consist of photographs/ video recordings?**  No**E3 ACCESS TO HEALTHCARE RECORDS****E3.1 (a) Does the study involve access to healthcare records (hard copy / electronic)?**  Yes

If answer is No, please delete remaining questions in Section E3

**E3.1 (b) If yes, please elaborate.**

Electronic data entries in K2 maternity system will be reviewed using Business Objects reporting tool.

**E3.1 (c) Who will access these healthcare records?**

THE RESEARCH INVESTIGATOR

**E3.1 (d) Will consent be sought from patients for research team members to access their healthcare records?**  No

If answer is Yes, please delete remaining questions in Section E3

**E3.2 (a) Who or what legal entity is the data controller in respect of the healthcare records?**

**E3.2 (b) What measures have been put in place by the data controller which may make access to healthcare records permissible without consent?**

Confidentiality is a term of contract for staff in the. As a registered midwife, there is a code of conduct regarding confidentiality to be adhered to.

**SECTION F HUMAN BIOLOGICAL MATERIAL**

**F1 BODILY TISSUE / BODILY FLUID SAMPLES - GENERAL**

**F1 1 (a) Does this study involve human biological material?**  No

**SECTION G RADIATION**

**G1 RADIATION - GENERAL**

**G1.1 (a) Does this study/trial involve exposure to radiation?**  No

## SECTION H MEDICAL DEVICES

H1 (a) Is the focus of this study/trial to investigate/evaluate a medical device?  No

## SECTION I MEDICINAL PRODUCTS / COSMETICS / FOOD AND FOODSTUFFS

### I.1 NON-INTERVENTIONAL TRIALS OF MEDICINAL PRODUCTS

I1.1 (a) Does this study involve a medicinal product?  No

### I.2 COSMETICS

I2.1 (a) Does this study involve a cosmetic?  No

### I.3 FOOD AND FOOD SUPPLEMENTS

I3.1 (a) Does this study involve food or food supplements?  No

## SECTION J INDEMNITY AND INSURANCE

SECTION J IS MANDATORY

**J1 Please confirm and provide evidence that appropriate insurance/indemnity is in place for this research study at each site.**

Insurance is in place in **Hospital** via the national Clinical Indemnity Scheme.

**J2 Please confirm and provide evidence that appropriate insurance/indemnity is in place for this research study for each investigator.**

Insurance is in place in **Hospital** via the national Clinical Indemnity Scheme.

**J3.1 Please give the name and address of the organisation / or individual legally responsible for this research study?**

Trinity College, Dublin



**J3.2 Where an organisation is legally responsible, please specify if this organisation is:**

A pharmaceutical company  No

A medical device company  No

A university  Yes

A registered charity  No

Other  No If yes, please specify:

**J3.3 Please confirm and provide evidence of any specific additional insurance / indemnity arrangements which have been put in place, if any, by this organisation / or individual for this research study?**

N/A

## SECTION K COST AND RESOURCE IMPLICATIONS, FUNDING AND PAYMENTS

SECTION K IS MANDATORY

### K1 COST AND RESOURCE IMPLICATIONS

**K1.1 Please provide details of all cost / resource implications related to this study (e.g. staff time, office use, telephone / printing costs etc.)**

N/A

### K2 FUNDING

**K2.1 (a) Is funding in place to conduct this study?**

No

**K2.1 (b) If no, has funding been sought to conduct this study? From where? Please elaborate.**

No

**K2.1 (c) If yes, please state the source of funding (industry, grant or other), the name of the funder, the amount of funding and duration of funding.**

Non Applicable

<b>(industry, grant or other):</b>
Answer
<b>Name of Funder:</b>
Answer
<b>Amount of Funding:</b>
Answer
<b>Duration of Funding</b>
Answer

**K2.1(d) Please provide additional details in relation to management of funds.**

N/A

**K2.1(e) Is the study funded by a 'for profit' organisation?**  No

**K2.2 (a) Do any conflicts of interest exist in relation to funding or potential funding?**  
 No

### **K3 PAYMENTS TO INVESTIGATORS**

**K3.1 (a) Will any payments (monetary or otherwise) be made to investigators?**  No

### **K4 PAYMENTS TO PARTICIPANTS**

**K4.1 (a) Will any payments / reimbursements (monetary or otherwise) be made to participants?**  No

### **SECTION L ADDITIONAL ETHICAL ISSUES**

**L1 (a) Does this project raise any additional ethical issues?**  No

If answer is No, please delete remaining questions in Section L.

**L1 (b) If yes, please identify any particular additional ethical issues that this project raises and discuss how you have addressed them.**

N/A

## Appendix 13 – Ethical Approval

### Hospital Details Removed

Ms Anne Clarke  
Information Technology Midwife

20th August 2018

**Re: Study No. 14 – 2018 - Errors, Inaccuracies and Omissions in Electronic Birth Notification Data and User Perception of Patient Data Entry to Electronic Hospital System?**

Dear Ms Clarke,  
thanks a lot for your response in relation to your study entitled '**Errors, Inaccuracies and Omissions in Electronic Birth Notification Data and User Perception of Patient Data Entry to Electronic Hospital System?**'. Your study is now fully approved by the Research Ethics Committee **Hospital name removed**.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Jan Miletin', with a stylized flourish above the name.

**Professor Jan Miletin (IMC 241348)  
Consultant Neonatologist  
Chairman of the Research Ethics Committee**

cc. *Ms Mary Sharp (Mary.Sharp@scss.tcd.ie), Assistant Professor, Trinity College, Dublin*