

‘EXPLORATION OF THE ‘VALUE’ OF REAL TIME CODING BY CLINICIANS IN A CRITICAL CARE SETTING’

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in partial fulfilment of the requirements for the Degree of Master of Science in
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Declaration

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

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Summary

The 'value' of direct clinician coding in a Critical Care setting is examined in this study. The study environment was an Intensive Care Unit in a large University teaching Hospital. The patient's journey through this setting is currently captured by allocating codes retrospectively by designated coders, derived from clinical documentation. The proposed change in process infers responsibility onto the Clinicians for the coding of patients in the Intensive Care Unit. The methodology used was qualitative with semi-structured interviews. The target population was composed of those directly involved in the change process and those, whose departments would, as a result of this change in process, experience a knock on effect in their own areas. The study gives an understanding as to how coding fits into the complexity of healthcare. It explores how coding contributes to 'value' and what indeed is 'value' when talking in terms of healthcare. It examines who is best placed to code and the relationship between coding and 'value'. Finally it looks at how this would be measured. Findings reveal that concerns and perception of 'value' differ dependent on which stakeholders are spoken to, Clinicians identifying 'time' to complete coding as their major concern. The struggle between looking at 'value' in monetary terms as opposed to a clinical perspective is evident. Finally the study highlights the difficulties that can be associated when carrying out an evaluation study. The study culminates with recommendations for this ongoing change in process and evaluation of same making recommendations in areas such as research, communication, training, technological and cultural.

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Abbreviations

ICU-----Intensive Care Unit

SJH-----St James Hospital

IT-----Information Technology

ICD-----International Classification of Disease

ICIP---(New ICU System) Intellivue Clinical Information Portfolio

HDU-----High Dependency Unit

OECD-- Organisation for Economic Co-operation and Development

WHO-----World Health Organisation

HIPE-----Hospital In-Patient Enquiry

ICNARC---Intensive Care National Audit and Research Centre UK

ESRI -----Economic and Social Research Institute

Chapter 1 Introduction

1.1 Introduction

Healthcare systems globally are struggling with one common theme that of “*sustainable models for healthcare delivery*” (PricewaterhouseCoopers (2010) HealthCast 2020).

Increased pressure on the current systems in place is coming from the fact that globally people are living longer, chronic disease is on the increase, consumer’s demands are changing with more availability of information and medical technology and workforce costs are high (PricewaterhouseCoopers The World Health Report 2010). This will threaten the very ability to deliver Healthcare and certainly curb the quality and amount that can be delivered. What we all want is simply; quality care at an affordable price.

- How does coding of care fit into this complex picture if at all?
- Does it contribute to ‘Value’?
- What do we mean by ‘Value’?
- If coding adds Value then who is best placed to code?
- Is there a relationship between coding and ‘Value’?
- How can we measure this?

These are questions which this dissertation intends to explore when looking at a specific care setting that of ‘Intensive Care’ which although a small part of a patients journey through the acute Healthcare setting it is on fact a very important one clinically and from a financial perspective a very expensive one. The dissertation sets out to explore the perceived ‘Value’ of coding by clinicians directly as opposed to the current model of retrospective coding by non-clinicians. Along the way

reference is made as to the difficulty in defining and evaluating the ‘Value of IT’ in Healthcare.

1.2 Background to Coding In Healthcare

It stands to reason that you cannot manage (in terms of funding, assessment and measurement) any service or business unless you can quantify, categorise and cost it with other similar services. Coding in Healthcare is a means of defining/classifying the service. Casemix (which uses coding) is the comparison of activity and costs by hospital peer group and nationally by measuring individual hospital outputs. It is a management system that captures a picture of the workload and patient type attending a healthcare setting. Casemix involves the classification of patients into discrete classes within which patients share common clinical attributes and similar patterns of resource use. Ireland has since the early 1990’s been using Casemix as a budgetary framework.

1.3 The Study Hospital “St James Hospital”

St. James’s Hospital (SJH) Dublin is Ireland’s largest acute academic General Teaching Hospital and is divided into Clinical Directorates. The Clinical Directorate of interest to this study is that of ‘Orian’ which covers amongst other specialties such as Theatre and Sterile Services, that of Critical Care Services (incorporating the Intensive Care Unit, ICU).

1.4 The Intensive Care Unit

The General ICU is a clinical area which provides care for critically ill patients with potentially reversible conditions requiring organ support. It has a capacity of 15 beds and operates at a 97% capacity (2009). There are 5 Consultant Anaesthetists involved in the care of patients in the ICU in SJH.

1.5 Study Aim

The researcher set out initially with the aim of looking at 'Value' in relation to IT in Healthcare what it was and how you would go about measuring it. The topic in itself was too broad and ended up being narrowed down to looking at one particular aspect of automation in one particular Care setting - exploring the 'Value' of asking Clinicians to code their patients data in Real Time facilitated by use of IT. This represented a change from the current process of retrospective coding by coders and inferred responsibility for coding onto the Clinicians.

1.6 Study Objectives

To explore the concept of 'Value' in Healthcare both in a broad sense from the literature and with the participants in relation to this particular change.

To explore the field of Evaluation through literature in particular in relation to this concept in Healthcare I.T. but also in general as to evaluation studies that look at 'Value' and I.T.

To ascertain the 'Value' of Clinicians Coding ICD directly into a Point of Care System in a Critical Care Setting in Real time.

1.7 Motivation for the Project

The Study Hospital Management and Consultants in the Intensive Care unit are unified in that they want to deliver safe, quality care in the setting of ICU. How this is quantified in terms of the work they do for patients, the resources they need to deliver that care and the associated funding required is where it becomes more difficult. How can healthcare managers both at a local and regional level be sure that the costing models used are in fact reflective of the real cost of care in an ICU setting. This ability to accurately reflect the true cost of a quality driven ICU setting is becoming increasingly prevalent as resources become scarcer across all healthcare organisations. Accurate budgeting allows for realistic planning and efficient use of resources which in turn supports an environment of quality and high standard care for the patient accessing that care setting. The motivation for the study site was to capture the true cost of care in an ICU setting which they felt could only be done by involving the clinicians in direct coding of procedures and diagnosis of the patients in real time to facilitate the further application of groupings and costing models. An opportunity presented itself when the current clinical care system in ICU that of CareVue was being upgraded to look at implementing a

change to the process of coding and subsequent view of the data captured.

1.8 The Project Outline

The overall Project of upgrading the Intensive Care System in St James ICU could be said to have followed a Traditional Waterfall Model, encompassing in particular such elements as Design, Build and Changeover (Appendix A) once the milestone of Feasibility was overcome. This Project could be said to be in its Maintenance and Review stage currently. However wrapped up within these requirements to deliver on an upgraded ICU system was the desire to explore the feasibility of providing a way to facilitate capture of coding of the patient's journey at source (at the bedside) by those delivering the care. This narrower project aspect of direct clinician coding, could in its own right be viewed as a separate project although in this instance is integrated with the overall project of upgrading the existing ICU system. It is however evident that a 'systems development lifecycle' exists separately for this component of the overall project (Appendix B). Once feasibility was established and a requirements analysis carried out it became apparent that the design of the overall system would be affected and even further that a build of additional software would be required to meet the clinician's requirements of ease of use and data extraction requirements for those both in the ICU and beyond. Project management and change management are still very much to the fore given that this element of the project is now only at the step of getting Clinicians to code. This is represented diagrammatically in Figure 1 below; at time of completion of this dissertation the ICU Clinician Direct Coding is at Step 7.

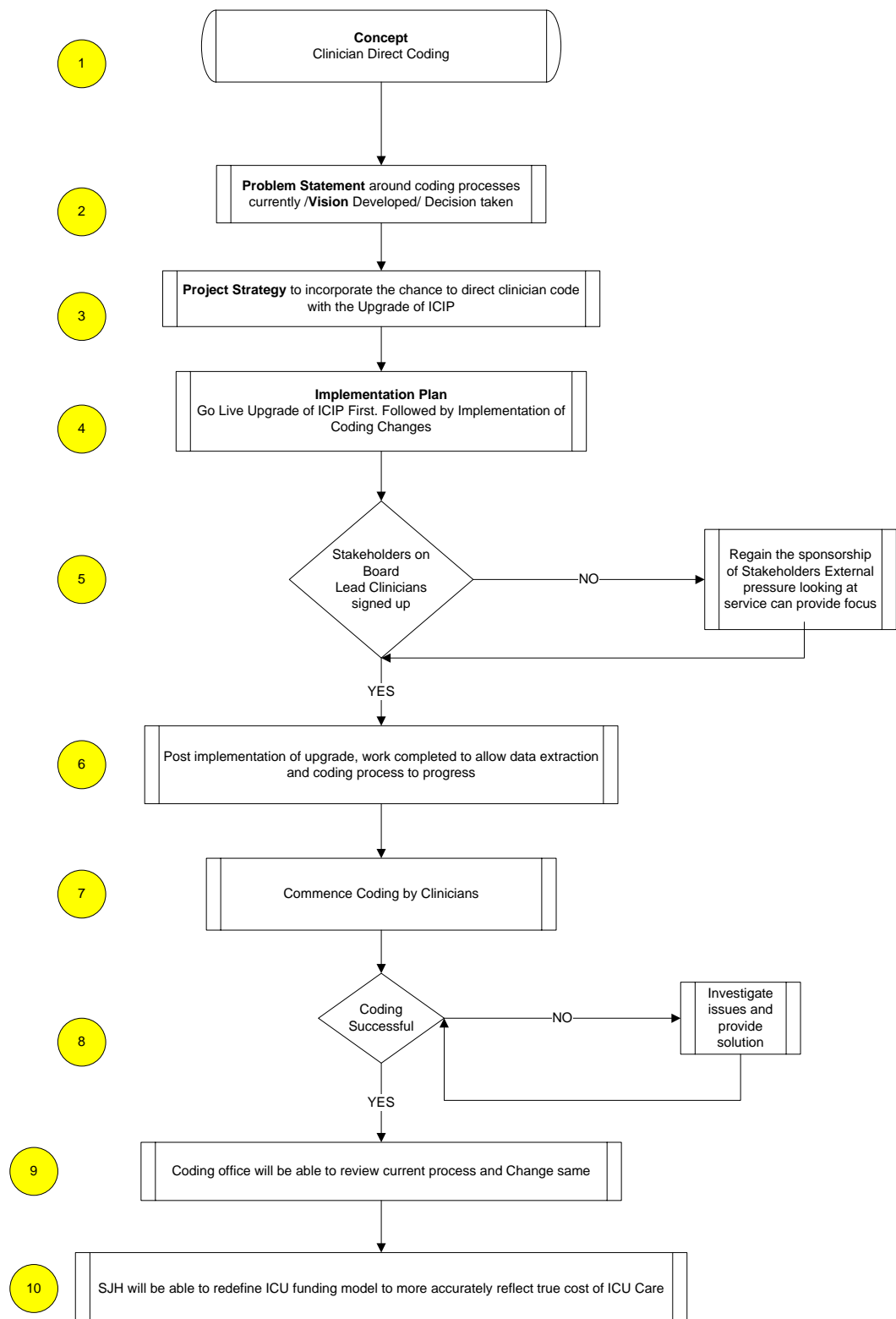


Figure 1 Project Outline

The Study Hospital is changing the process of coding from retrospective coding by coders in a coding office which has a turn around time of approximately 8 weeks in SJH to that of direct clinician coding of ICD codes in real time. St James Coding Workflow as approved by the Coding office pre the proposed change is represented

below in Figure 2.

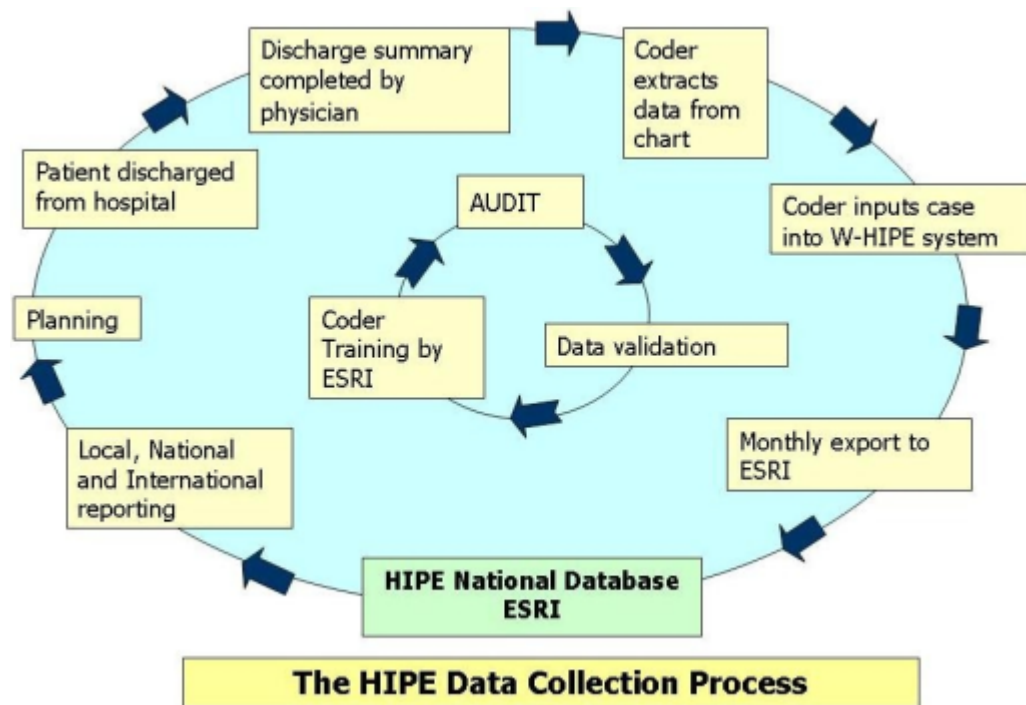


Figure 2 HIPE Data Collection Process (Source SJH Coding Office)

Both Inpatients and Day cases are coded in this way. The coder extracts the data when the patient is discharged. The coder gathers information from the Electronic Discharge Summary form and cross references this data with both the chart and the E.P.R. (Electronic Patient Record) where available. Other data sources are used for specific specialities for example the coder has access to Consultant Letters and other patient databases such as Paths Cancer System and Adam Database which are capturing specific patient groupings. In relation to the ICU patients the coding office gains access to the specific ICU chart and also validates this data with patient lists from both the Tracheostomy and the Ventilation lists held separately by specialists with the hospital. St James Hospital is working to have 100% coded within 8 weeks of discharge. The Figures 3 and 4 below are in simplistic terms showing both the current Coding process and the proposed coding process. It is evident from this that the major change in process involves the Clinicians capturing the outputs required which previously coders would have allocated.

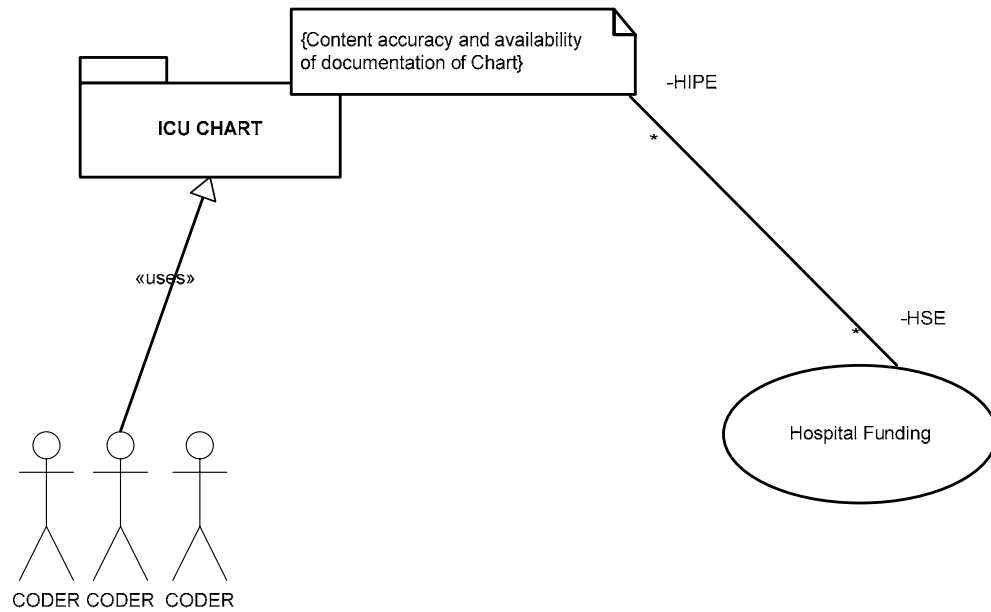


Figure 3 Overview of Current Coding Process

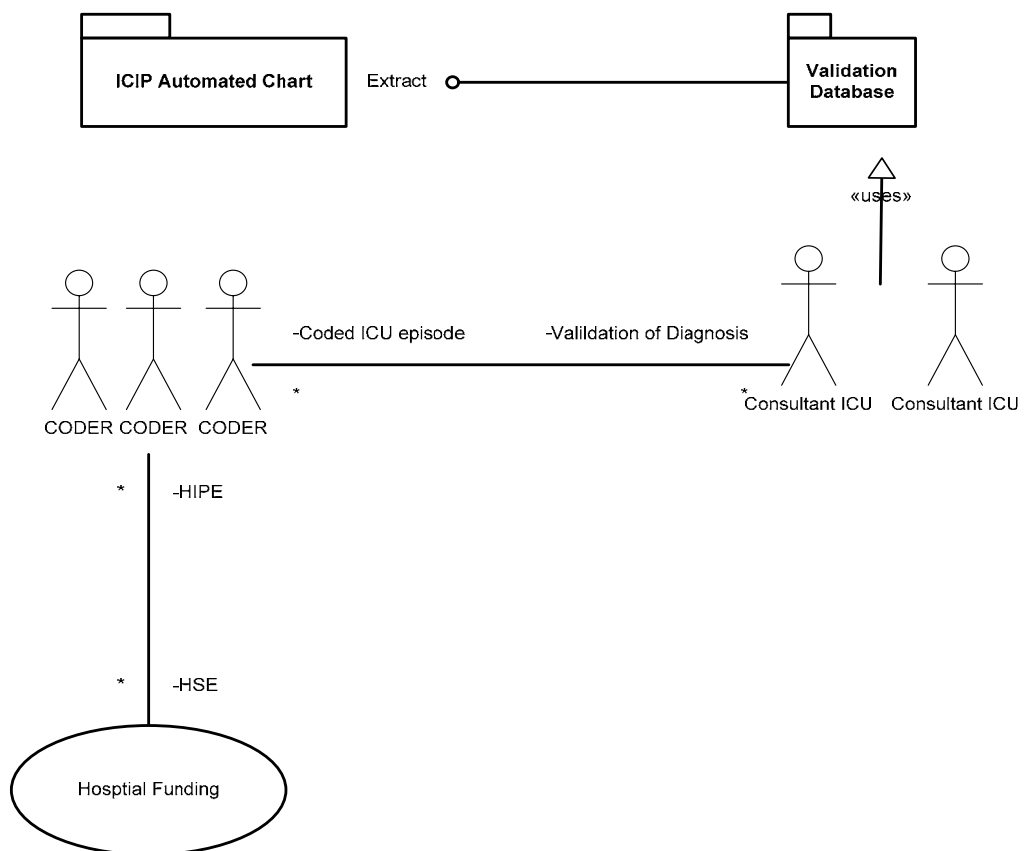


Figure 4 Overview of Proposed Coding Process

With the new proposed direct coding by clinicians the Nursing staff are not being asked to change what they record rather the new system will take what is recorded as part of care documentation and capture it as TISS 28 (Therapeutic Intervention Scoring System) scorings. This will encompass; Basic activities, Ventilation Support, Cardiovascular Support, Renal Support, Neurological Support and Specific Interventions both as Active treatments which are confined to ICU only and with the potential of these being captured as Non-active treatments which incorporate HDU (High Dependency units) and ICU (Graf 2002). This will be of particular importance should this system be used in the future in a HDU setting.

Chapter 2 Literature Review

2.1 Introduction

To gain a background understanding into the area of study before delving into the actual study it is necessary to take a closer look at Healthcare in particular ICU units and their structure in Ireland, the funding implications and how coding fits into funding of ICU's. Indeed what is coding and how is it used. Evaluation also forms part of what should be considered in particular when looking at any change in a Healthcare setting. As value is a component of the study it requires investigation, what exactly is meant when 'value' is referred to in a Healthcare setting. Finally change is explored as this piece of work is looking at a change in practice.

2.2 Healthcare in Ireland

Up to this year (2011) the model of Healthcare in Ireland has been that of 'Private Public mix'. In terms of health expenditure Ireland was spending per capita just over the OECD average in 2007 (OECD 2007), in real terms however it grew between the years of 2000-2007 by 6.4% above the then European average of 3.7%.

In GDP terms spend on Healthcare in Ireland rose from 7.5% in 2007 to 8.7% in 2008. The Irish Healthcare system is funded mainly by taxation which includes an income levy payment used for Healthcare spend. The OECD statistics for 2009 in Figure 5 below illustrate where Ireland is in terms of OECD average. Looking at the WHO figures for 2006 78.3% is funded by the government as previously alluded to through taxation with private health insurance accounting for 8.5% and out of pocket payments 12.5% (that is the patients pay themselves). In summary what these statistics are saying is that Healthcare cost in terms of any countries economic stance is substantial and growing.

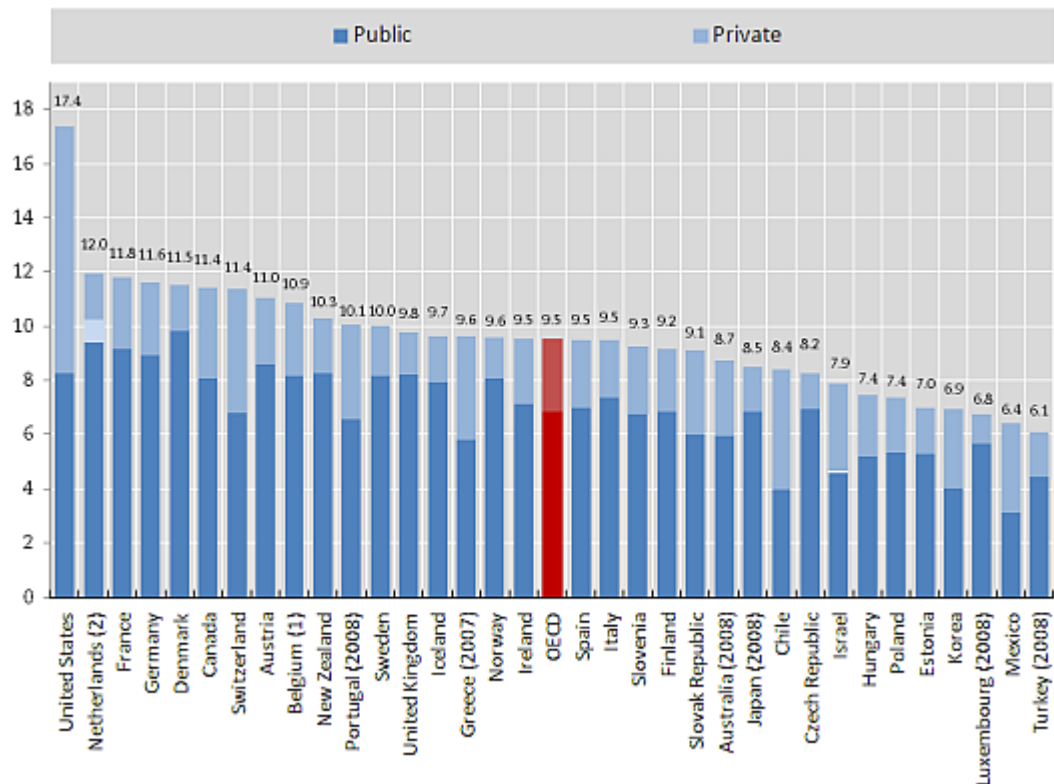


Figure 5 Total health expenditure as a share of GDP, 2009

Source OECD 2011

There is mounting pressure to reform the Irish Healthcare Model as it stands and indeed corresponding concern that we are heading towards a U.S. model of care rather than a European model. It remains to be seen as to what direction Ireland will embrace, but the mounting concern has resulted in a lot of reports and position papers being published as all the stakeholders wish to be heard. One such report being that of the Irish Medical Organisation (IMO) on ‘Universal Health Coverage’ as it appears to be favoured currently by our new Minister for Health. Every citizen will of course with interest follow this progression but the Hospital sector will be focusing in particular on how it receives its allocation of funding. The current model of funding incorporates an 80% case mix blend (rising to 90% in the study hospital this year). This is where information about the patients going through a hospital environment is coded by hospitals in a database called HIPE (Hospital In-Patient Enquiry). This information is as ‘activity data’ made available to our National Casemix Program that in turn uses this data as part of its budget modelling process which in real terms for the acute hospital sector translates to

budgetary

allocation. In this system there are what are considered to be winners and losers with the one cake (in budgetary terms) being sliced up and divided out amongst the various hospitals, reality being that a loss to one organisation can translate to a gain for your organisation. The loss to any one individual health care organisation can run into the millions so no small amount.

See below an extract from the Irish Medical Times February 16th 2011:

“Major ‘fines’ have been imposed on hospitals through the HSE’s Casemix adjustments mechanism, which will see Tallaght Hospital’s budget cut by €2.5 million” “Kerry Hospital welcoming a positive adjustment of €1,132,438”

2.3 What of ICU Units and their Funding?

An ICU can use up to 20% of the hospital budget (Moerer et al 2007) hence the need to focus in on this area of great expense. These same authors after examining costs in 51 ICU’s across Germany concluded that; reason for admission, severity of illness and sepsis were all directly related to increased cost. Most importantly and of interest to the Study Hospital they found that specialised and maximum care hospitals treat a higher number of the most expensive patients, those that are severely ill.

Funding currently is modelled in a way that makes it lucrative to care for many patients that are ‘not too sick’. A regional referral centre such as that of the study hospital does not receive all the funding associated with the patients they care for from other regions. This money goes back to the admitting hospital. The funds are in essence divorced from the patient.

Are all ICU’s equal in terms of the severity of illness they care for?

The answer quite simply is ‘no’. As the table below illustrates there are three levels of Critical Care.

Table 1 Levels of Intensive Care

Level III	ICUs providing comprehensive care of the critically ill patient including multidisciplinary and medical specialty care (e.g. neurosurgery, cardiothoracic surgery, multiple trauma etc.)
Level II	ICUs providing comprehensive care of the critically ill patient but requiring transfer for specialty care
Level I	ICUs providing initial resuscitation and stabilisation of the critically ill patient but usually (depending on the patient's critical illness and available resources) requiring transfer for comprehensive and specialty care.

Haupt et al (2003)

The Study Hospital delivers care at Level III. The governing bodies of Health Care namely the Department of Health, HSE (although plans for abolition of same) have been interested for a number of years in reforming the ICU services of the State. Started perhaps with the Hanley Report in 2003 which proposed that proper intensive care can only be provided in a Major, National or Supranational Hospitals. To achieve this standard beds in smaller ICU's will have to be closed (and have been) there is however no national plan as to how this will impact on the centres currently delivering care and the practicalities on how to get the patients to the care (retrieval services). This is of course not just a problem of beds and numbers, patients who fail to gain access to intensive care can quite literally die as a result. There is a marked increase in mortality as significant as; for every five patients turned away one more patient will die as discovered on a systematic review of the available literature by Sinuff et al in 2004.

How do you cost running an ICU?

Variables such as length of stay, severity of illness, complications, ventilation,

staffing and duration all have a bearing and there have been many studies looking at just this, calculating a basic daily ICU cost (Strijis et al 2011, Haupt et al 2003, Sinuff et al 2004, Tan et al 2008). There are indeed different ways of looking at funding which at a Policy Level can be from a 'Top Down Costing' approach which is easy for the population but inaccurate for individual cases **or** 'Bottom up Costing' which involves charging for every intervention which is a very difficult and time consuming approach. These approaches define the approach at a more macro level, below is a list of approaches that look more closely at the elements that need to be considered:

- (i) Payment related to length of ICU stay
- (ii) Costing specific interventions
- (iii) Costing individual organ supports required and duration of organ support (e.g. invasive ventilatory support, pressor circulatory support, continuous renal replacement therapy, parenteral and enteral nutritional support etc)
- (iv) Costing drugs like anti-microbials.
- (v) Payment on the basis of specific diagnoses (as per ICD-10) linked to an illness severity score or to the number of organ supports required
- (vi) Reimbursement should be linked to acceptable values for quality indicators and measures of outcomes. The best established model for measurement of outcome is the UK ICNARC (Intensive Care National Audit and Research Centre) audit. This is used in most hospitals in the UK and is beginning to be used by hospitals in Ireland.

The HSE are actively investigating option (iii) and gathering data for analysis for same from ICU's around the country. Ideally of course if many of the listed elements could be combined it would give a more rounded picture of cost. How does this fit into the study hospitals funding calculations?

2.3.1 The Hospital's Proposed Funding Model

$$F = A \times D \times C$$

F= Funding

A= Average Hospital Cost

D= Diagnosis Value (ICD-10 Admitting Diagnosis Secondary Diagnosis - Complications)

C= Complications Value (Age, Gender, LOS (Length of Stay), Special Drugs, Special Procedures.)

The **D** and **C** of this equation will make up a **DRG** (Diagnosis Related Group Appendix C).

The study hospital is ensuring that they will capture / chart all the data they need within the new ICU system. The new system will allow that capture to happen within the workflow of I.C.U. An extraction will then happen where this information will be removed from the systems database into what the site are calling their DRG Database. To achieve this a specialised program is being developed which they have coined the 'spider' which continually looks for the data defined and extracts same. These data sets are what the clinicians will review (through a clinical summary window) validate and code appropriately, this validated data is then passed through a grouper to get a DRG on each patient. The timing of this review by Clinicians will aim to be as near to real time as possible but will be dependent on delivery of the software and the ease of use as well as the support from the management team especially in the initial period of Go live. The coding office will also receive a Flat file with this data which should eventually negate the need for coding of I.C.U. patients by coders.

Getting down to patient level costing's the proposed calculations are:

$$\text{Cost Bed Day} \times \text{LOS} + \left(\frac{\text{Patient Specific costs} \times \text{Patient TISS Score}}{\text{Total TISS Score}} \right) + (\text{Costed Interventions})$$

Where a Cost of a Bed Day takes into account Fixed costs; Energy Telecoms and IT Equipment, Maintenance, Administrative Support and Cleaning. Patient Specific Costs takes into account; Salaries, Pharmacy, Blood Products, Consumables/Disposables, Laboratory and Radiology.

2.4 Point Of Care Technology

‘Point of Care Technology’ is a way to describe technology that is positioned as close to where care is being delivered to the patient supporting the clinical workflow. The system being upgraded in the Study Site would qualify as Point of Care Technology. The Study Site has had a Point of Care Clinical System in operation in its Intensive Care unit for over 10 years but this year at end of February 2011 it was upgraded from CareVue (Philips) to Intellivue Clinical Information Portfolio I.C.I.P. (Philips). The motivation for this upgrade was end of life for the old system. In addition to this substantial upgrade the Study Site saw the opportunity to capture more clinically relevant data directly and to involve the Clinicians in that process. Clinical Information systems such as this can act as a catalyst for Organisational and work process change (Callen et al 2008).

2.5 Coding

2.5.1 Introduction

What is coding? Is it as simplistic as allocating a number and then that codification simply allows sophisticated use of data, or is there more to it? A call for coding or classifying Healthcare has been evident for hundreds of years back to the era of the Lady of the Lamp:

"I am fain to sum up with an urgent appeal for adopting ... some uniform system of publishing the statistical records of hospitals. There is a growing conviction that in all hospitals, even in those which are best conducted, there is a great and unnecessary waste of life ... In attempting to arrive at the truth, I have applied everywhere for information, but in scarcely an instance have I been able to obtain hospital records fit for any purposes of comparison ... If wisely used, these improved statistics would tell us more of the relative value of particular operations and modes of treatment than we have means of ascertaining at present?"

Florence Nightingale in Notes on Hospitals, London: Longman, Green, Roberts,

Longman, and Green, 1863.

So the idea of a classification / coding system has been around a long time and various iterations have evolved but what of today - I.C.D. International Classification of Disease was developed by the World Health Organisation WHO in the early 1990's and continues to be updated and used today in all European member states and around the world in countries such as Australia, Canada, America and many more. The original remit of the classification was very much along the lines of what Florence envisaged and was what the first classification systems looked at, a means to look at Mortality and Morbidity through data collection. The data has since to date also been used for other purposes; epidemiological studies, management and clinical realms to varying degrees around the world.

2.5.2 ICD Codes and more

I.C.D. codes are on their 10th edition although work on the 11th edition is already underway by the W.H.O. Organisations involved in healthcare can contribute to any modifications or improvements they wish to be included in subsequent versions. The version of I.C.D. codes currently used in Ireland is ICD-10-AM (Australian Modified) coding also captured is A.C.H.I. (Australian Classification of Health Interventions) AR-D.R.G.'s (Australian Refined Diagnosis Related Groups) Appendix C.

This may at first appear confusing as we are now adding in modifications and groups but in essence the original classification remains intact with additional capture of data or capture of data in a more meaningful way for the country collecting it is what the modifications and interventions are all about. The modification that Ireland uses was developed by Australia and is currently being used elsewhere other than Ireland in countries such as New Zealand, Turkey and Slovenia.

Once the data is captured a way of grouping that data is where the A.R. - D.R.G.'s come into play. Grouping data is often coined as using a 'Grouper' and again there are many different types in use worldwide which fall into five

main class's of D.R.G. including Medicare D.R.G.'s, Refined D.R.G.'s, Severity D.R.G.'s, All Patient D.R.G.'s and all Patient Refined D.R.G.'s (Appendix C). In simple terms the purpose of a grouper is to group patients that are clinically and resource homogenous together. This was a concept that was developed by the Yale School of Management in the 1970's (Bardsley et al 1993). There have of late been other developments such as A.C.G.'s Adjusted Clinical Groupings and C.R.G.'s Clinical Risk Groupings (Appendix C). In essence all of the iterations of groupings are attempting to view data differently or include hither-fore excluded groupings (H.I.V.) or settings which were not part of the initial conception such as outpatients.

There is consensus on the Study Site that once the ICD codes are captured correctly, accurately and validated any 'Grouper' can then be applied dependent on the purpose of the analysis i.e. what the data is going to be used for and the political policy at any given time. Currently in use is the Australian grouper but there is a growing following that believes we should change to a German grouper both locally and nationally.

Another term that is used in relation to coding and those analysing the data is that of M.D.C.'s or Major Diagnostic Categories (Appendix C). Broad categories of disease into which the D.R.G.'s are coded, these cover the complete range of ICD codes and are (body) system based. It is another way of analysing the data sets.

All of the groupings mentioned allow data comparison to happen, but the data that is run through a grouper that is the data at the coded level crucially needs to be accurate and include all relevant data. The person allocating the codes must also interrupt the data in a standard way for the comparison to hold out any chance of being valid. As is often coined in statistics 'comparing apples with apples'.

So if coding in summary is

"....the translation of medical terminology, as written by the clinician, to describe a patient's complaint, problem, diagnosis, treatment or reason for seeking medical attention, into a coded format' which is nationally and internationally recognised....."

Then the overall goal must be that of ‘**do not lose in translation**’.

2.6 Casemix

2.6.1 Introduction

The codes that are allocated in I.C.D. are just that, codes, a numeric or alpha numeric system used to specify a classification or hierarchy. Classification systems facilitate standards in communication by standardising language. Whereas D.R.G.’s are designed for use by Health Care Managers rather than Clinicians and are currently being used to determine what is coined as ‘Casemix’ a way of looking at resource usage. Casemix is literally that looking at the mix of cases that hospitals have cared for the implications of this are great, currently this is how the allocation of budgets to Hospitals happens. At the moment the Study Hospital will have 90% of its budget this year allocated on Casemix from the previous year. It can have the consequence of a hospital finding itself with more or less money in a given year to run the same or indeed expanded services.

2.6.2 Process of Coding

The collection of coded data in Ireland is facilitated by a National Database called Hospital Inpatient Enquiry System (H.I.P.E.) and is reliant on coders or the H.I.P.E. office as it is sometimes referred to, to carry out all the coding of patient data this database is managed by the Economic and Social Research Institute (E.R.S.I.) on behalf of the HSE and the Department of Health.

Coders in Ireland are often from a Medical Records or Administrative background and learn the job in an apprentice type training with formalised training provided by the E.S.R.I. at Beginners, Intermediate and Advanced level. There is however a recent move to looking at competency based training.

We are not however in the situation of many other countries worldwide such as Australia, Canada and America where coders have generally completed a recognised Health Information Management Program. In those countries there is also a culture of involving the local coders at regional level in audits, coined

as re-abstractors, coders are involved in re looking at data and its quality nation wide (Bidie 2009). Coding Standards can vary, dependent on many factors relating to the coders themselves, data availability and their interpretation of same.

2.6.3 Training for Coders

The ESRI have a training and support remit for staff involved in the process of coding in Ireland. There is approximately 250 staff involved with coding in Ireland coding 1.4 million records from 60 Hospitals. The training provided is currently unaccredited and consists of various modules/delivery systems:

- Basic (3 Modules)....5 and 1/2 days in total (Initial day online training).
- Intermediate Training...3 days in total
- Speciality Workshops
- Refresher Courses
- Updates
- Newsletter production ...Coding Notes
- Continued Education- Hospital based training, Regional Workshops, Hospital Visits

The ESRI have made a call to have this training accredited and to widen the base of training to take in amongst other things Clinician Coding Courses.

This need for training to be accredited and a standardisation of training has not gone unnoticed by the international community at large. England's NHS connecting for Health partnered with the Institute for Health record and Information Management (IHRIM), this also became the awarding body (NHS in Scotland and Northern Ireland were also collaborated with). The outcome of this was A National Clinical Coding Qualification to become an Accredited Coder.

They have started to look at putting modules into an e-learning environment and to date have an introduction to coding and anatomy and physiology modules available online. This highlights the fact that many coders when starting out have no knowledge of Anatomy or Physiology and yet are translating clinical documentation

and terminology into codes.

The World Health Organisation Family of International Classifications (WHO-FIC) education committee worked with the International Federation of Health Records Organisation (IFHRO) in developing an international training and certification program to improve coding practice (Appendix D). The goal for this collaboration was to improve the 'value' of health data both nationally and internationally and to establish recognition as to coder's status. They have also in the development of the curriculum and training modules (Appendix D) recognised the need to train up Clinicians and Managers as well as those wholly employed in the area of coding. The course is accessible to all Online is very interactive and informative the researcher is now halfway through completing same and would estimate that it would take about 40 hours to complete for those with Medical knowledge. The course structure and modules undertaken distinguishes very clearly between those with and without medical knowledge.

2.6.4 Challenges with Coding

In Australia there is a Coders creed which is referenced in many articles about coding: 'Clinical Coders Creed'

- Clinical Documentation
- Communication with Clinicians
- Coding Standards
- Conventions
- Classification experience
- Common Sense
- sCience of medicine

(NCCH)

In essence it sums up all the aspects of consideration at what, at first glance, would appear to be as easy as allocating appropriate numbers.

Closer to home the 'NHS Acute Health Clinical Costing Standards' make reference under Standard 8 to Data Integrity and in particular draws our attention to the issues that can be encountered with Clinical Coding such as:

- Records Missing
- Not all relevant data being recorded
- Patient's notes incomplete
- Notes not readily accessible for coding
- Accuracy and completeness of Coding
- Primary diagnosis missing
- Differences in interrupting codes

There are also recommendations made pertaining to cooperation and communication between Coders and Clinicians with an awareness of the importance of the data quality and the impact on Finance.

A workforce survey carried out by Deirdre Murphy in the ESRI last year of clinical coders in Irish Healthcare settings also turned up these issues with 73% quoting 'Illegible' or 'Incomplete Medical records', 73% 'Medical Records unavailable', 72% 'Primary diagnosis not identified in the chart' and 69% stating that 'secondary diagnosis, complications and co-morbidities were not identified in the chart' (Coding Notes October 2010).

There are many challenges that exist to achieve coding of an ICU chart represented diagrammatically below in Figure 6.

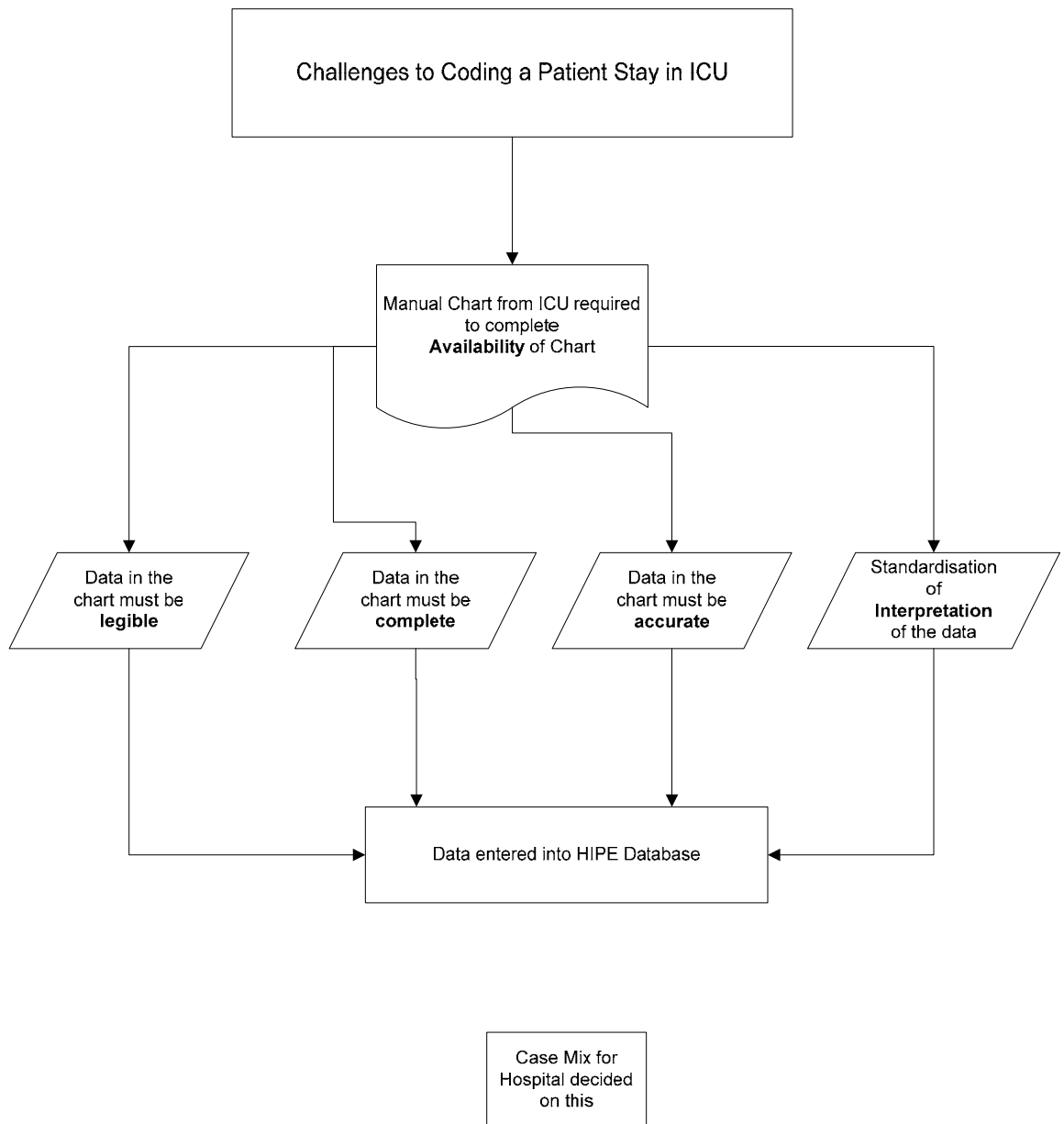


Figure 6 Challenges to Coding an ICU Patient.

Now that we have an appreciation as to what coding is and the difficulties that can arise in the coding process and indeed what training is available. It does bring us to the point of ‘who’ is best placed to code rather than who currently codes and what if any role does the Clinician have. Who should Code?

2.6.5 Coding practice outside of Ireland

All coding is based on documented care, Belgium is very advanced in how it sees this documentation of care with a Hospital Minimum Summary (Résumé Hospitalier minimum: RHM) captured on every patient since 2007 (amalgamating the three previous separate summaries of Clinical, Finance and Nursing into one). This simplifies what data is used for coding purposes.

Belgium uses this information with All Patient Defined D.R.G.'s for resource consumption and resource allocation calculation at National Level. The production of the minimum clinical data set is stressed not only by governmental policy but also by their own professional body (Order of Physicians) who are not happy with extended access to Clinical files by a coding department as they feel there are confidentiality issues and that ownership with regard to capturing the correct code lies with the Clinician.

In Germany, the attending hospital clinician is legally responsible for documentation of the hospital inpatient / outpatient admissions in Germany and in some instances actual coding, increasingly so in the I.C.U. Units. Where clinicians do not code there are coders. There is however a vision of the Coders role expanding to include that beyond the interpretation of codes and repetitive data entry to that of continuing education, quality of documentation, audit and review. Even to that of 'Information Managers' with emphasis on data extraction, as well as mapping this data to other data sets. This vision would also advocate participating with other European countries in this venture, allowing international D.R.G.'s comparison to be one step closer as was presented by Weber in 2004.

Rather than just looking at our European neighbors and making inferences about 'Best Practice' lets take a look at the literature. Does the literature hold the key as to who is best positioned to code or how accuracy is to be addressed?

2.6.6 What does the literature say with regard to who should code?

A study conducted by Nouraei et al 2009 in ENT services Charing Cross London on coding in the specialist area of Otolaryngology concluded that there was a large degree of error in coding and as a result loss of revenue to the department, they also felt that as this data was used to ascertain resourcing and a picture of clinical practice that double reading should be introduced even with the additional cost implications. They felt the cost would be recouped by the additional funding secured for more accurate reporting on activity. An important distinction however is that this double readings needs to be clinician led as experienced with the double reading of mammograms (which has proven to be economically viable). These authors are looking for coding to gain the contribution that only a clinician can give although not going as far as to suggest that they take responsibility for it.

Hong et al (2009) looked at the level of agreement between coders in the area of Injury data and concluded that all coding by coders 'is not perfect' (concurring with the London study above). They recommend that this discrepancy between coders should be addressed to improve quality and value of coding given that the data as it currently stands is used for injury surveillance and prevention (in Vietnam). They did not however go as far as to suggest that clinicians should take over the role of coding or become involved.

Nearer to home a study carried out by King P. in 2003 (as part requirement for a Masters) in an Acute Hospital Environment in Ireland carried out a study of records being coded by Doctors and by coders and looked for anomalies such as under and over coding and the impact on the resultant DRG groupings. Records numbering 27 were looked at and 7 records did not match, representative of 25% of the total. A further breakdown of these records showed that 2 were coded more accurately by the coders and 4 more accurately by the doctors with one inconclusive.

It was evident with further investigation that information overlooked by both parties was present in the chart. However and more significant was that coders that coded patients incorrectly was as a result of information being omitted from the chart. The outcome for the patients was that in some cases a significant impact on the patients overall DRG was seen, what is however not apparent is the cost in financial terms for the hospital and in research terms now those patients are incorrectly categorised. This is certainly significant if an inference was made that this high level of incorrect coding existed throughout the hospitals coding process. This study made recommendations, amongst which included, more of an input from the medical staff whilst identifying a training and communication element to facilitate this to happen.

More studies concluded a type of partnership between the Coders and the Clinicians. When exploring the accuracy of coded data Ceratti et al (2008) did just that. They looked for differences between what was held in the Medical record as to what was coded and hence billed. They concentrated on two particular grouping of patients. They make reference to Quan et al 's work that talks about the fact that coders can only take what the Clinicians have recorded rather than making their own inferences from data such as Laboratory results thereby highlighting the importance that the doctor includes as much detail as possible in the discharge documentation. Ceratti at al's study goes on to unearth both under and over coding, they attributed some of this error to the need for ongoing training and collaboration between the coders and the clinicians to improve the accuracy of what is coded.

Training again came up in a study carried out in Rome by Lorenzoni et al, on diagnosis and procedures coded in a hospital specialising in vascular, plastics and dermatology which showed that training with feedback had a positive effect on the quality of coded data.

Soo et al in (2009) also echoed recommendations of Education (Training) Validation and Communication needing to play a greater role in coding. as did (King et al 2001) making direct reference to the complexity of the coding guidelines and limited clinician training and identifying these as contributing factors to the quality of the coding captured.

Cheng et al (2009) talks about the consequences of mis-coding with regard to funding, hospital performance measurements, surveillance and epidemiology. There is also reference made to the educational and knowledge level of coders having an impact on the quality of coding. However as an overall conclusion they ascertain that the quality of the clinical documentation is the core issue when talking of quality and that this should be the focus of resources to get that right and coding quality will follow. They also make recommendations that we have come across in the literature before that of more education and joint communication between the coding department and clinicians.

2.6.7 Summary re ‘Who’ should Code

So is the answer all in the training and communication which seems to dominate the literature so far, maybe not, Misset et al in (2008) was a study of particular interest as they looked at the reliability of coding between different I.C.U. Physicians in France where physicians treating the patient carry out the coding as a mandatory requirement. It was by the authors own admission a small sample size, methods between coders varied, the quality of the medical documentation was not controlled and they were also only looking at a very narrow spectrum of diagnosis that of shock and sepsis. Nevertheless they did find that reliability was poor between what the physicians coded and what the external reviewers coded, despite the fact that the physicians had been trained. The authors saw this as a first stage of further research looking into the possibility of automating coding in databases. On the preface that computers are more accurate than humans.

The current worldwide

coding practice combines all sources of

data even if

there are many and they vary in type from manual charts to database sets to laboratory results. Mikkelsen and Aasly found in a study conducted in 2001 that running parallel systems of electronic and manual /paper documentation can in itself introduce inconsistencies. This would seem to suggest that a master should be decided on when coding data from documentation and not left to coders to make that judgment call.

If you accept that data is the issue and its availability as well as accuracy plays a role in good quality coding then you will agree with a study by Zafar et al who makes reference to the fact that the business of health revolves around the accessibility and use of clinical data (and that the Health Care professionals serve patient better in terms of quality and safe care if they have the information they need at hand) therefore it makes perfect sense to have this information available in electronic form.

This idea of having a 'system' is also supported by Amarasingham et al, who in attempting to develop an instrument that captures performance of an I.C.U. system drew conclusions that a quality system can improve quality of care and that automation does reduce the burden of Data collection and simplifies data extraction .

It is hard to ignore that the basis for all this effort seems to be about funding and money given that the cost of running an ICU is high and can be as high as 0.5%-1% of Gross Domestic Product. (Kelley 2004).

Is hospital data however only to be concerned with cost and funding it appears not (Michel et al. 2009). Here the authors lay out the increased importance of administrative and coded data as it increasingly informs policy and clinical management as well as contributing to population health. This of course lays a heavier burden on the data being correct and validated as it is now forming the foundation of many decisions that will shape clinical excellence as well as financial viability.

2.6.8 What of the Future?

The future will be moving in the direction of what many term ‘Patient Level Costing’ but which some have been know to coin “The money will follow the Code / Patient”.

Patient Level Costing is trying to narrow down the true cost of processing a patient taking into account all the costs both Direct such as Critical Care, Diagnostic Imaging, Theatre, Wards, Pharmacy, Therapies and Pathology and Indirect Costs such as Hospital Operations and Estates (cleaning Energy Building insurance) whilst also taking into consideration the Overhead costs (HR, IT).

The Study Hospital is aiming to gain a more realistic reflection of what it actually costs to care for patient in an I.C.U. setting by introducing this process change and subsequent data grouping.

Wiley M in 2005 makes reference to ‘Ownership’ which is something that needs to be strengthened in the current process of coding and that this will in the end drive Quality.

“Optimum Data Quality Standards can only be achieved where all involved in Data reporting coding collection are facilitated in taking ownership of the data they return”

Wiley goes on to say that transparency of the data also needs to increase as it is only when your ‘work’ is visible to others that you truly care what it is saying.

2.6.9 Conclusion

So it would be fair in summation to say that coding in Healthcare is here to stay it is evolving all the time and that regardless of what classification

systems are used the concerns of data quality and timely information remains. The debate as how best to achieve the goal of real time coding will I suspect continue to rage for some time yet but given the reliance on this information to reimburse either clients or providers of Healthcare as well as inform policy it will remain high up on agendas for change. Amongst all the references to finance one would be forgiven if other uses of coding in the areas of disease management, population health and research were forgotten even if only temporarily.

2.7 Evaluation

2.7.1 Introduction

What is Evaluation and why are we interested in it when talking about Information Technology and Health Care?

To evaluate something conjures up an image of judging, calculating and measuring the importance, quality or value of something. It is something we do everyday, in simplistic terms we evaluate the food we eat and the people we meet. With that in mind the most generic goal when evaluating something is to provide 'feedback' for the various Stakeholders in a manner that will help us/them decide on whether an intervention has in-fact achieved what it set out to achieve or in the every day example given whether we will eat a certain food again or build meaningful relationships with particular people.

When looking at the use of technology in Healthcare there appears to be concern that the impact of technology on this industry is not quite living up to expectations..... *"There is little evidence to date of the effects and effectiveness of health technologies in normal services. Thus evaluation is needed"* (Shaw2002)

When carrying out an evaluation of Information Technology in a Health care setting you must consider the interaction of all the players. Health care settings are multidisciplinary in nature and can be quite hierarchical in nature. They consist of highly trained intelligent people who in essence are concerned with the care of the patients first and foremost and at times can seem disinterested in the technology.

Evaluation in itself can

take many slants such as formative or

summative the latter more concerned with proving goals are being met and the former with why these goals are not being met. There is however a dearth of literature around evaluation the need for it and indeed how best to achieve that through the use of 'frameworks' these are worthy of taking time to understand.

“frameworks help in making evaluation of new systems to be deployed or newly deployed to assess organisations readiness, make the necessary midcourse correction i.e. to reduce risk and be prepared to deal with the currently identified unintended consequences of cope should they occur”

(Sittig et al 2008)

2.7.2 Evaluation Frameworks What They Are And Which Ones Are To Be Used?

The frameworks in evaluation all have one thing in common they attempt to give direction on how to structure an evaluation. They differ in that they all look to do this around different dimensions or perspectives. The TEAM methodology has three dimensions that of Role, Time and Structure whereas the CHEATS Framework looks at double that amount: Clinical, Human, Organisational, Educational, Administrative, Technical and Social dimensions (Shaw 2002, Grant et al 2002). Others focus on Information Technology and Information Handling with intended use to be focused on using the evaluation as a risk management tool. Identifying the areas of concern by looking at multiple cases of failure and success as proposed by the 'Heeks Design Reality Gap Model' (Heeks 2006).

Balanced score cards have also been put forward as a basis for evaluation with Kaplan and Norton's 'Balanced Score Card' to be used when evaluating from multiple perspectives, technologies efficiency, effectiveness and transformational potential (Protti 2002)

When looking at evaluation there is a recognition that as Kaplan (2001) acknowledges R.C.T.'s (Randomised Control Trials) are still seen as the gold standard but this is qualified by saying that this method is

excellent when looking at the outcome of clinical issues but not when looking to see if systems are used and how.

Evaluations should incorporate the cognitive, cultural, contextual, social and organisational issues to help understand key questions such as clinician use and non-use of systems. Kaplan puts forward a framework that incorporates 4C's; Communication, Care, Control and Context. These areas are put forward as important and interrelated when looking at conducting evaluation. (Kaplan 2001).

With so many it makes it becomes difficult to know what to use, evaluation would of course be more streamlined if a standardised approach was to be agreed on a country wise remit. Work funded by the European Science Foundation known as the HIS-EVAL workshop took place in Innsbruck in 2004 and resulted in a Declaration:

*“Health Information Systems are intended to improve the functioning of health professionals and organisations in managing health and delivering healthcare. Given the significance of this type of intervention and the intended beneficial effects on patients and professionals it is morally imperative to ensure that the optimum results are achieved and any unanticipated outcomes identified. The necessary process is **evaluation** and this should be considered an essential adjunct to design and implementation of information systems”.*

Ammenwerth et al 2003

The workshop also came up with 4 observations and 12 recommendations which have been endorsed by Informatics groups such as I.M.I.A. (International Medical Informatics Association) E.F.M.I. (European Federation of Medical Informatics) A.M.I.A. (American Medical Informatics Association). The outcome of this workshop was in the spirit of a starting point for Europe to give it a mechanism to use when looking at evaluation of Health information systems in a collaborative way.

Reporting of evaluation studies no matter which methodology is used has also moved forward in the form of STARE-HI again endorsed by the aforementioned

Informatics Groups. This comprehensive list of principles can also be used for Study planning (Talmon et al 2008) as well as Research. It interestingly includes such items as unexpected observations and unexpected events during a study as well as strengths and weaknesses.

So where is evaluation in the realm of Health care and IT going; it still has a long way to go;

“The quality of published evaluation studies on IT interventions in health care is still insufficient in some aspects” (de Keizer et al 2008).

Lapointe et al (2011) in exploring frameworks to assess the actual impact of Healthcare I.T. advocates accounting for and appropriately measuring impacts that look at the issues from all the Stakeholders perspectives. As each stakeholder group is focusing on different outcomes e.g. Healthcare professionals are more concerned with quality of care and health outcomes whereas Managers are more concerned with costs and performance.

2.7.3 Summary of Evaluation

In summary Evaluation is not easy there are many methodologies / frameworks and many time periods over which evaluation can take place.

The essence of what evaluation is must not be lost; it is one of measure with ‘feedback’. Of course it helps to know what you are measuring. In other words have goals / objectives been set at the outset so that as a researcher you can go and measure if indeed these have been realised. There is an acknowledgement that the healthcare environment is one of complexity with achieved outcomes dependent on who you are and what you perceived or agreed were the goals / objectives at the outset. Evaluation outcomes can change as a project matures and change dynamics start to play a role. Healthcare needs to decide what to measure / evaluate. I would venture they need to take a step back first and decide what indeed are key to performance and represent ‘Value’ for the patients, clinicians and organisation (all stakeholders). This brings to the fore what is indeed perceived as ‘value’ in Healthcare and more specifically in this instance the relationship between value and

IT.

2.8 Value

2.8.1 Introduction

“Sometimes what counts can’t be counted and what can be counted doesn’t count”

Albert Einstein.

Value what does it mean in Healthcare? As a concept does it differ dependent on who you are, from whose perspective you are coming from? There is no standard definition for ‘value’ in this context Michael Porter pioneered the concept of a ‘**value chain**’ in the 1980’s; it looked at where value gets added along the businesses delivery chain as is illustrates in Figure 7 below.

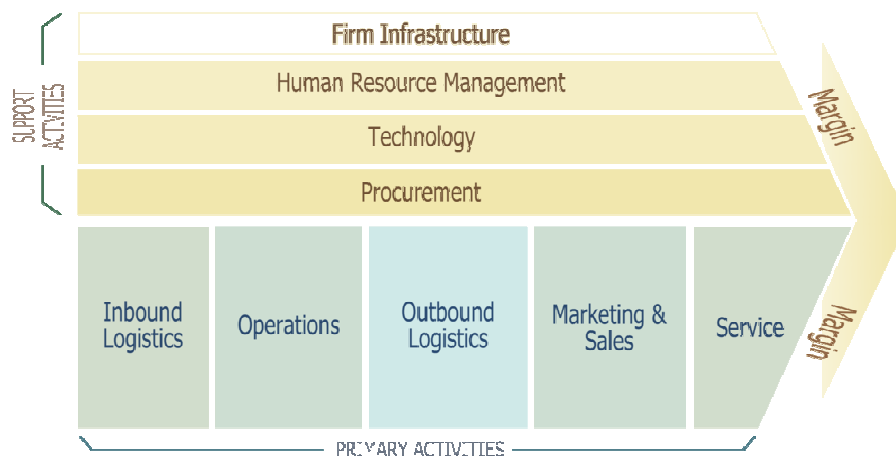


Figure 7 - Michael Porters Value Chain

If we picture for a moment Health Care as a Business we would conceptually see the ‘patient’s health’ as the ‘product’. In this model the core business of Healthcare is that of Patient Health with support activities ensuring that the core business needs are meet. We are concerned here in particular with the patient in Intensive Care and

the Coding of the Care episode in that setting. Using Porters original document where does the critical care patient and coding process fit. The Inbound logistics are the Critical Care Referrals whether they are **Acute** - by way of Emergency, Transfer from other Wards, Hospitals and Community Services or **Elective** - Clinics. The Operations are the Intensive Care Unit itself and the Outbound logistics incorporate Coding. The Marketing and Sales aspect could be described as to the relationships with Government and Payers, and Services the ability to deliver a better service in which Healthcare can be defined through improved quality for the patient. In the above diagram the technology and human factors act as support activities. But is it as simple as viewing the patient as a product and seeing their progression along a virtual conveyor belt?

2.8.2 Other ways of viewing Value

Value can also be looked at in terms of 'Tangible' and 'Intangible' benefit / value. In this context intangible value of coding by clinicians could be seen as: incorporation of better information, catching up to standard practice and stakeholder satisfaction.

Risks to achieving this added value being that of the Project Management, Technology itself and most importantly the Change Management Process. Tangible Value here could be seen in financial terms given the change in coding process. However tangible value is normally measured in harder economic measures such as return on investment (ROI), Benefit Cost Analysis and Alignment Value (AV) (Appendix E) where this process changes in line with strategic and operational plans. Given that many of these financial tools look only at the money side of 'value' other measurement tools have started to be used by Healthcare Organisations.

The Balanced Score Card (BSC) which was developed by Kaplan and Norton (1996) and which was mentioned under evaluation frameworks is one such tool and seems to have become the preferred way in which Healthcare organisations measure the effectiveness of their operational and strategic plans. In essence what this allows an organisation to do is look at its performance outside of the narrow confines of financial measures having identified Key Performance Indicators which are then

monitored against expected outcome targets. This can potentially give ‘value’ a voice and transparency outside of the traditional financial measures if it is identified and defined as part of the indicators chosen.

As healthcare is complex so too is the very concept and definition of ‘Value’. The Institute of Medicine in 2008 convened a Workshop on *Value in Health care- Accounting for Cost, Quality, Safety, Outcomes and Innovation* over a two day period as part of its Learning Healthcare System Workshop series. Leaders, researchers and policy makers convened to explore this very complex idea of ‘Value’. It was very clearly stated however that the purpose of the workshop was not to define ‘Value’ but rather to look at the central issues around ‘Value’. Common themes to emerge from this mammoth piece of work are represented in the Table 2 Below:

Table 2 Value in Health Care: Common Themes

<i>Urgency:</i> The urgency to achieve greater value from health care is clear and compelling.
<i>Perceptions:</i> Value means different things to different stakeholders, so clarity of concepts is key.
<i>Elements:</i> Identifying value in health care is more than simply the right care for the right price.
<i>Basics:</i> Improving value requires reliable information, sound decision principles, and appropriate incentives.
<i>Decisions:</i> Sound decision principles centre on the patient, evidence, context, transparency, and learning.
<i>Information:</i> Information reliability derives from its sources, methods, transparency, interpretation, and clarity.
<i>Incentives:</i> Appropriate incentives direct attention and rewards to outcomes, quality, and cost.
<i>Limits:</i> The ability to attain system value is likely inversely related to the level of system fragmentation.
<i>Communication:</i> System-level value improvement requires more seamless communication among components.

Providers: Provider-level value improvement efforts depend on culture and rewards focused on outcomes.
Patients: Patient-level value improvement stems from quality, communication, information, and transparency.
Manufacturers: Manufacturer-level regulatory and purchasing incentives can be better oriented to value added.
Tools: Continually improving value requires better tools to assess both costs and benefits in health care.
Opportunities: Health system reform is essential to improve value returned, but steps can be taken now.

Institute of Medicine 2008

These findings support the view that ‘Value in itself is complex to define, capture and measure given the very broad spread of stakeholders and that there are many issues to be considered. Given the very close association with finance ‘Value’ has unfortunately become synonymous in many circles as a code word for ‘Cuts’.

2.9 Change

2.9.1 Introduction

Change - It is said that the only person that welcomes change is a wet baby!

Machiavelli's (1531) analysis on the establishment of new systems is as follows:

"It must be remembered that there is nothing more difficult to plan more doubtful of success, nor more dangerous to manage, than the creation of a new system. For the initiator has the enmity of all who would profit by the preservation of the old institutions and merely lukewarm defenders in those who would gain by the new one"

2.9.2 Change and Information Systems

According to Sheaff and Peel (1995) a new system can bring about 4 major changes in an organisation:

- Work Roles in an organisation can change (Bock 1982). Information systems may increase stress on individuals.
- Helps decision making and brings about more informed decisions, this can lead to conflict, in particular decisions of a financial nature (Carper et al 1983)
- If an organisation is not rich in “information culture” expectations may not meet reality
- Introduction of new information systems may mean that restructuring within the organisation may take place or new departments may be created or more personnel may be acquired.

Lewin (1969) suggests that behaviour in an institutional setting is not a static habit or pattern, but a dynamic balance of forces working in opposite directions within the social-psychological space of an institution. He goes on to identify three stages in accomplishing changes in behaviour ‘unfreezing’ ‘movement’ and ‘refreezing’ by increasing the number of driving forces, decreasing the number of resisting forces and using a combination of same.

An organisation and its people influence shape and alter the nature and use of information systems which in turn influence and alter the nature operation and culture of an organisation. A cyclical process, change within an organisation is often identified as one of four types allowing for some overlap: Operational, Strategic, Cultural and Political. This implementation of a new Critical care system embraces all of these as does the narrower aspect of Coding by Clinicians.

The introduction of any new technology can experience resistance to the changes brought about by this innovation. According to Bocji et al (2003) some reasons for staff resistance to the implementation of new technology are that there may be social uncertainty, lack of understanding, threat to power and loss of control, perceptions that costs outweigh

benefits and fear of failure. Before

change is introduced it requires the agreement and acquiescence of staff, according to the above authors this could be achieved by ensuring early participation and involvement of staff, raising expectations of benefits, building in user friendliness to the system, developing a reliable system to ensure support of various stakeholders and finally bring about agreement through negotiation. Appropriate training and education are also important in implementation (Bocij P., Chaffey D., Greasley A., Hickie S. (2003))

2.9.3 The Management of Change

There are many theories around change and its management but if you are looking for strategies on how to manage change on a day to day basis there is usefulness in Everett Rodgers (1995) 'Innovation Diffusion Theory' when implementing technological innovations such as that of information systems and components of same. The theory examines the process by which innovation is communicated through social channels in a particular group or organisation over time. Innovation in this case technical is viewed as a social change.

Several stages are identified:

The Knowledge Stage

This is a stage in which communication of the impending change is essential.

The Persuasion Stage

Here Rodgers (1995) emphasises the importance of the degree of similarity of the change agent and the prospective adopters of the innovation as a critical ingredient for successful diffusion. Further Literature has emphasised the importance of peer trainers in augmenting training providing individual assistance, attending to different learning styles and addressing practical issues

(Whitman et al (1997))

The Decision Stage

Is a stage that according to Rodgers (1995) 60% may be an acceptable level of adoption at the time of implementation. The remainder may require more time and training to be convinced and executing 100% acceptance may be unrealistic.

The Implementation Stage

This is where continued support to reinforce attitudes and behaviours by creating additional training opportunities and encouraging peer support and easy access to technical consultation is of uppermost importance.

The Confirmation Stage

The key message here is support of the users using whatever multiple means such as positive feedback and continued opportunities to learn.

2.9.4 Physicians and Change

Role changes are areas in which the most IT gains can be made. For true transformation and reform of Healthcare we have to:

“involve the clinicians at the coal face and integrally involve them in the design application and adaptation of their practices behaviors to make things work in a new way”.

(Westbrook et al 2010)

This may prove challenging as technology is perceived as interfering with the traditional role of Physicians (Lorenzi et al 1995). This

research by Lorenzi (1995) gives reasons as to why in acceptance of new systems physicians fail; these include issues of interest here such as:

- Failure to present adequate support
- Lack of user friendly interfaces
- Concern re what is being collected
- Lack of collection as to the most important information
- Failure to include marketing to Physicians in implementation
- Inadequate training
- Leadership that is respected by the Physicians

Physician's reaction and indeed resistance to information systems can be very high indeed if they perceive that no "value" is added to their work. (Leonard et al 2002).

Physicians need to receive training that focuses on conveying that once data is recorded it can be used for many things and is visible in more than one place therefore accuracy / quality of the data is paramount. There can be repercussions of poor documentation, to help this, physicians need to understand what the data will be used for and a conveyance of responsibility needs to occur. (Cuvo et al 2008). The aforementioned online training tool developed in collaboration with the WHO-FIC and IFHRO recognized this and included the use of data in their modules. The literature has been broad and wide in its stretch looking at many aspects relevant to this piece of work. Changing any process can be difficult but if the outcome can demonstrate a 'benefit' 'value' the effort becomes worthwhile and engagement more likely.

Chapter 3 Research Methodology

3.1 Introduction

This Chapter will portray the research methodology that was used to undertake the study, the data collection method used and ethical considerations as well as validity and reliability issues.

3.2 Methodology

The methodology chosen was that of ‘Qualitative Research’ to examine the research questions posed by the study. It was surmised to be the best methodology available within the timescale of the study and in particular given the type of issues being examined. The data gathered was qualitatively analysed with an interpretation of the results and the literature reviewed, resulting in recommendations for further work in this area and specific challenges to be addressed in this change process.

3.3 Research Design

3.3.1 Goals

To interview a sample of all the clinicians affected by this change both pre and post the implementation i.e. a longitudinal study. The study aimed to

include all consultants (5) and 10 junior doctors and a cross section of the nursing staff using stratified sampling. Further into the study it was realised that only senior Clinicians i.e. Consultants were going to be asked to participate in the change with regard to direct coding and this therefore negated the need to interview junior doctors. The Nursing staff were also later excluded as they were not changing practice and were also involved in a 'Work to Rule' and therefore unavailable for the study. Managers from Coding, IT and Finance were included as the study progressed and it became evident that their opinion would contribute to the study's findings.

In total 7 hospital staff were interviewed (3 senior managers and 4 out of a target of 5 senior clinicians) pre the introduction of the proposed change. An opportunity arose to interview an expert from abroad who was present in the Intensive care unit on one of the researcher's visits to help facilitate the site in setting up the specialised I.T. component of the coding / grouping and clinicians view. This was the eight interview conducted and although not in the true spirit of the investigation of Pre a change it did add to the researcher knowledge of what was happening from a more European perspective in the realm of Coding , I.C.U. and Clinician involvement.

3.3.2 Method

Semi Structured Interviews both pre and post the proposed change were planned. However as Project Dates for the Go Live of the new System were delayed and it took more than 9 weeks to complete interviews pre the change, it became necessary to review the feasibility of interviewing post a change that was now only to be introduced in July/August 2011 given the academic deadline of this piece of work. It was decided instead to give recommendations to further study in this area with a particular focus on this change in process as opposed to a post implementation series of interviews with conclusions.

The Interviews were transcribed along with field notes that were recorded directly after the interviews. The data was then analysed for emergent themes and cross correlated with literature in this area.

Data was collected through Semi-structured Interviews. The time it took to conduct these interviews was a reflection of the seniority of the staff involved and the

difficulty in scheduling time where both the Interviewer and Interviewee were available.

3.3.3 Interview Structure

The design of the Interview Questions was based on Wessel et al 2006 (Table 3 below) which gives some structure to the Interviews carried out with general themes to be covered but remaining true to the idea of semi-structured Interviews.

The advantage of this meant that similar themes (see questions Appendix F) were addressed by all those Interviewed and therefore subsequent coding was facilitated.

Period	Aspect
Warming up	The Organisation (vision, goal, structure, business activities) The Interviewee (Professional background, tasks, work) Terminology classification
Exploration of present aspects PRE	Relevance IT and other tools Context of work (colleagues) Preconditions, Limitations, Problems
Exploration of future aspects POST	Expectations and needs Wishes on new tools and instruments Additional ideas

Period	Aspect
Finish	Summarisation (by the interviewer) Feedback on completeness Benefit for the interviewee Acknowledgement and leave taking

Table 3 Guidelines for Interview Questions

3.3.4 Guidelines for Interviews

The Interviews were recorded and later transcribed by the Interviewer. The Interviews took place in so far as possible in an area where there was a reasonable level of peace and quiet and where the Interviewees had chosen.

The Interviews were from 12 minutes to 45 minutes in duration not including the time taken over the introduction of the researcher and the project as well as the process of consent.

3.3.5 Accompanying consent and information sheet to participants

Participation was voluntary this was strengthened verbally by a discussion at the start of each Interview as to the purpose and reason for the study and that opting out at any stage was possible with no penalty. This was reinforced with an information sheet and the signing of a consent form (Appendix G) of which a copy was kept by both the participants and the Interviewer and which also gave the participant details on how to contact the researcher should the need arise.

3.3.6 Other Correspondence

This would have taken the form of both e-mail and letters over the duration of the study. All the participants were initially contacted by e-mail (Appendix H) with a standard introduction /information re the current study. This 1st correspondence happened only after a series of meetings over two months on site with the project coordinator who supplied the contact details for the target sample. Subsequent e-mails facilitated the scheduling of interviews. A letter was specially drawn up for the CEO of the Hospital to ensure consent was obtained prior to commencing the study (Appendix I)

3.3.7 Administration of Interviews

Administration for the interviews with the Managers was conducted directly with the participants. Interviews with the consultants were finally administered through the secretarial service for the Consultant Anaesthetists given that Clinical commitments and schedules changed over time and that not all Consultants were using the hospital e-mail service.

3.4 Validity

Authors agree that validity is about whether a measurement instrument measures what it is supposed to measure. In the case of this study whether the semi-structured interviews measured what they were supposed to measure. The interviews pre the envisaged change were to measure the perceived value this change would bring about. The researcher acknowledges that on the journey to examine 'value', change and its paradigm were also captured however in semi structured interviews the very fact that they are not structured allows the participants to talk around subjects and to explore feelings as opposed to necessarily the confinement of perhaps a questionnaire to facts, therefore a broader and deeper exploration resulted around the area of 'value' that painted a more detailed picture than just whether or

not there was a perception of ‘value’ being added to the process of coding as a result of this change.

3.5 Reliability

In literary terms conjures up consistency and predictability. As a research instrument it is the extent to which an instrument yields the same results on repeated measures. A reliable instrument is therefore one which yields the same results if the behaviour / opinion is measured again with the same scale. The dependability on which an instrument measures an attribute that it is supposed to measure (LoBiendo & Haber 1998). In simple terms if the same instrument were to be applied in a month’s time the results /outcomes should be practically identical (Oppenheim, 1992). These concepts are simpler in quantitative research and analysis. However the series of Interviews carried out in this instance by the same researcher and using the same semi-structured themes did over a nine week period have outcomes that were similar enough to allow theming and inferences to be drawn.

3.6 Pilot

Given the small sample size participants were not used to conduct a pilot with. However the researcher did hone her interview skills and the initial draft of questions by practicing on senior colleagues in the Health Service which did help enormously, even in the area of technical equipment checks.

3.7 Ethical Considerations

The findings will be kept confidential for a year to facilitate the ongoing change process in the hospital this was one of the conditions of permission attached to carrying out the study. The findings will be presented back to the participants and the hospital in a manner identified as most convenient to them either in person or electronically. Confidentiality will be maintained at all times with regard to identity of the participants, as the researcher used audio taping these will not be identifiable

unless prior written permission has been given. The researcher will seek written permission for specific reuse in papers talks etc., only after the initial year has elapsed. An informational sheet and consent form was used with all participants .All participants were over 18 years of age and participation was voluntary. The researcher has no conflict of interest and is pursuing this research as part requirement to obtain an academic qualification.

The need to obtain ethical approval from the Hospital concerned was discussed with the Hospital concerned and the researcher received confirmation that college (TCD) ethical approval would suffice as there was no patient involvement.

To be compliant with the Data Protection Act and Guidelines the researcher did undertake to:

- Obtain and process the Information fairly
- Keep it for the specified use only
- Disclose only as agreed
- Keep it safe and secure
- Retain it for no longer than is necessary

3.8 Ethic Committee

A proposal, information sheet and consent form for participants were all made available to the Ethics committee along with the defined application form (Appendix J). Ethical Approval was obtained by the Ethical Committee after confirmation that the CEO of SJH had given permission that the study could go ahead and after minor changes to the information sheet for participants had been undertaken by the Interviewer.

3.9 Sample Target and Eligibility

The sample target changed as the study evolved. This proved challenging with regard to the interviews and the type of questions asked. This was helped however by using the model pertained to earlier by Wessal et al and by the fact that the interviews were only semi structured.

Sampling Strategy

All of those to be affected directly by the change in the process of coding were contacted to participate 4 out of a total of 5 took part. All managers perceived to be affected by the change over time were also targeted 3 out of a total target of 3 took part.

3.10 Analysis

Nvivo Software (software used for qualitative analysis) was used for a 30 day (free) trial on first few interviews (Appendix K). It helped raise awareness as to the language used and the repetitiveness of words highlighted the need to review notes and re visit elements such as Body Language tone etc.

The researcher read, read and reread as by own acknowledgement it was easy to have preconceived ideas as to themes due to reading of literature and familiarity of process as well as experience to date in Health Service's (25 years). Words eventually became codes then themes, too many initially then sub-themes married into larger themes to create resultant study themes. Coding was used extensively (see legend below)

“Coding can be thought about as a way of relating our data to our ideas about these data” (Coffey Atkinson 1996)

Coding Legend (Version 20)

Clinicians were denoted by (C) and Managers by (M) under the following emergent themes. Those grouped together became one as similarities very evident. One left

underlined to give an example of a theme that were dropped.

D=Demographics

I= information given regarding this change in practice

U= use of ICU codes Now

FU= Future use of ICD codes

PU= Personnel Use of ICD Codes

Q=Quality

NI=Need for Improvement

R=Role

KC=Knowledge of codes currently captured

CO=Concerns

RD=Retrieval of Data

AD=Analysis of Data

T=Training

CM=Coping Mechanisms

V=Value

V0=Value to Organisation

VP=Value for Patient

VC=Value for the Clinician

FA=Financial Awareness

WFA=Beyond Unit / Organisation

Chapter 4 Results

4.1 Introduction

The results for the pre implementation of the change from retrospective coding of ICD codes by coders in an ICU setting to that of Direct Clinician Coding start with looking at the target sample themselves then moves onto analyzing the themes that arose other than that of the direct 'Value' inference such as:

- Information re change of coding Process
- General use of ICD codes
- Personal/Professional Use of ICD Codes
- Quality of current Data
- Retrieval of current Data
- Analysis of current Data
- View on whether this is a role that belongs with Clinicians
- Concerns
- Financial Awareness
- Training Skill Set / Preparation to carry out this new role

Then finally looking at:

- Benefit/Value to the Patient
- Benefit/Value to the Organisation
- Benefit/Value to the Clinicians

4.2 Target Sample

4.2.1 General Attributes

All of the participants were Clinicians at Consultant level or Managers in their respective departments. They were all in post between 9-20 years. Other contributions were made from the Project Manager and an external expert resource.

4.2.2 Age

The age range of the participants was between 39 and 55 years of age.

4.2.3 Work Area

For the Consultants all had work commitments in the area of Intensive Care Medicine. The Managers were responsible for areas such as Finance, IT and Coding. The External expert had a clinical background (unit manager of several ICU's in Germany) and now works in IT.

4.2.4 Employment Status

All were employed by St James Hospital (apart from the external person) on a permanent basis and as previously mentioned the shortest time in post was 9 years.

4.3 Themes

4.3.1 Information given re the change in coding process

No information was given to those involved in this change of practice or to the department that will be most affected (Coding). One participant was a promoter and knew that this change was spoken about in principle but was still unaware as to how this change would work, start or the duration of the project. Given that this was the case clarity was sought around this with the Project Manager which revealed that this was partly due to the fact that how it would indeed work was unclear to all involved in the Project and was only now on progression since GO LIVE of the Clinical system and the involvement of an external resource to program the final stages was it becoming apparent as to how this would appear to the clinicians to allow completion of coding and how the data would then be mined for various purposes and made available to other departments in the hospital.

4.3.2 General use of ICD Codes

Words such as evaluate, measure, categorise and specify used to describe the collection of data on diagnosis and disease with respect to ICD codes. Knowledge on the Clinicians side as to what then happens to this data was vague across the board although reference was made to comparison with other ICU sites. Whilst there was acknowledgment of a link to finance this was quickly followed up by a categorical statement that there was no impact on service or planning and that in fact there is no understanding as to what is being done with the data in particular at the organisational level. Outside of the Clinicians group there was acknowledgement that it supports casemix and the public private mix collection of data and the financial implications of same.

One clinician made a very positive statement with regard to the use of this data (in an appropriate way organisationally) to manage resources and the case to management for more resources “you can’t argue with numbers!”

4.3.3 Personal / Professional Use of Coded Data

One interviewee had used the data from a research perspective but identified a large gap given that there was non-capture of Pharmacy Data. This was identified by one of the Managers as a large identified gap in the organisation which was hopefully going to be looked at in the near future.

One interviewee had used the data for research but this was at Registrar and Intern level not at Consultant level. One Interviewee had used it for costing of patients although acknowledging that not all data that would be required for a true reflection of cost was available. Another interviewee had used the data in putting forward a case for funding but could see the future application for

Training Validation / Opportunities (S.J.H. as a training site for Consultant Anaesthetists) and in the realm of Benchmarking,

Three Interviewees answered negatively; one had used data on another site for a resource business case and one had used HIPE data but qualified this statement with “coding has no impact on day to day work in how we plan our service and look after our patients” this interviewee went on to say that to get necessary funds for I.C.U. you have to look after lots of well people! This was a direct reference to the current model of funding for ICU’s in Ireland.

4.3.4 Quality

On interviewing it became apparent that the Study site has internal and external validation processes, benchmarking and targets in place for the quality of coding. I will however qualify that statement that these are not on an ongoing basis and follow a more ad hoc approach such as targeting the validation of certain procedures such as ventilation. This is achieved by cross referencing against Specialist nurse lists or indeed by grouping diagnosis and then comparing with other databases (such as the cancer database on site) held to collect specific data on particular conditions. There was an element of frustration expressed around the ability to code ventilation and truly capture the different levels of care for different clinical situations. Staff in the coding office use an e-book to guide coding as Appendix L shows. Knowledge of these quality processes was not evident when the researcher interviewed outside the realm of coders.

Responses such as “Feel” “Suspect” that coding is inaccurate up to “20%” and “doubt” it is validated were common responses.

All the interviewees felt there was a need for improvement with only one qualifying the call for an improvement with a confession that they have no idea as to what currently happens.

Quality issues raised by the coding office such as data

availability and accuracy are reflected in the literature.

One interviewee held the belief that we could be recording all of this data for the sake of it! as what does it mean and what if anything happens as a result.

4.3.5 Retrieval of Data

Only one clinician had in recent years tried to access this type of data and did so “with great difficulty” describing the experience further as “tedious” and “laborious” Other interviewees on the Management side had more direct access to the data set but made reference to the data being retrospective in nature. This made it difficult to use in planning service now.

4.3.6 Analysis of Data

The interviewees that had accessed coded data were asked about who had then analysed the data, it was analysed by the individual themselves with partnership of the coding office, IT was accredited involvement in 3 out of the 4 cases.

4.3.7 View on whether this is a role that belongs with Clinicians

This question only has

applicability to the clinicians

interviewed. The target population was spilt evenly as to where they saw this. There was a further division with the “YES” camp quoting time needed whilst recognizing the need for this to be done by a Nurse or Doctor. The “NO” camp was also divided with one interviewee seeing this as clerical work where audit and secretarial duties could be thrown in. Seeing their role as distinctly being that of a “diagnostician and treating”. The other interviewee from the “NO” camp although not seeing this as part of their role is prepared to “try” qualifying that statement with they do not believe they are the best person for the job quoting the need for someone more “diligent and “disciplined” however would become more motivated if money transpired as a result of the work.

4.3.8 Concerns

Clinicians:

Who will care! Lots of data giving information on which no action will be seen. The impact on workload in particular the time element was quoted by all participants. It was identified that there was a distinct possibility that once the data is captured it could be used as a “cost cutting tool” this is a finding that is also present in the literature.

Overwhelmingly all reported no time to complete coding.

Managers:

The skill set of those now doing coding and those proposed to carry out coding was identified as a concern. Again the literature looks at this. The ‘value’ must be linked to a financial model. At the moment funding based on coding favours as previously

mentioned looking after lots of well patients.

Gaps identified as sometimes clinicians cannot themselves commit to a diagnosis in particular instances and all procedures and treatments are not recorded.

Currently there are three data sources Electronic (ICIP), Paper Discharge to other areas in the hospital (ICU paper chart orange) and the Hospital chart not convinced this will change as a result of the ICIP direct coding.

Coding for Ventilated patients only has two divisions those that are ventilated for above and below 96 hours (this is due to change this year).

With regard to Ventilation both groups interviewed made reference to “patient drinking tea” (translating as a non ICU patient as not ventilated if able to drink tea!) in regional centres as opposed to the complexity of the Study Site I.C.U.

All interviewed knew about funding in these instances; that the money goes back to the referring centre and is not received by S.J.H. who has incurred the cost of looking after the patient. In essence S.J.H. is looking after them free. It was also identified that this also has implications with regard to freeing up space in the unit when referring centres will not accept patients back.

4.3.9 Financial Awareness

All of the Managers interviewed were aware of the financial implications of coding. Only half of the clinicians were aware with one positive response saying yes whilst admitting no understanding. Awareness beyond the unit and hospital and in the broader context of the world was good on the managers side but not on the clinicians side with only one exception. This exception was clarified by the fact that this clinicians had worked previously in an environment where true devolved budgeting had been in operation. Nowhere however was consideration given by those interviewed as to the collection of patient morbidity mortality etc and this data being

looked at from a world wide perspective.

4.3.10 Training Skill Set Preparation to carry out this new role

Only the clinicians asked questions relating to this.

None of the clinicians interviewed had received training to date. Only one felt they had an understanding of it. When questioned further on the issue they varied from feeling that they would “probably” need instruction although “can’t imagine it’s that difficult” to planning to rely on “Intuition” and indeed one interviewee planned to use the internet and “Google” or “Pub med” as an expert resource as well as communication with other colleagues. Only one identified a definite need for training.

The Coding office very much recognise that even with training from the ESRI and internal mechanisms to keep abreast and up to date such as workshops, forums and specialists communication directly with coders it still remains a challenge to code and did on occasion necessitate talking directly with the doctors concerned.

Another interviewee painted the future of coding as part of a “Corporate Informatics Department” combining all the expertise in the Coding office and the Management Information office as well as those involved in audit taking ownership for the quality of coding and its future extraction and use.

One particular interviewee felt that the management of the service was reactive rather than proactive and that experience to date has shown that focus becomes intent only when the coroner’s office is involved and that then action is and has been seen to date.

4.3.11 Benefit/Value to the Patient

Clinicians view:

Overwhelmingly none in the short term and only one interviewee acknowledging that perhaps in the longer term clinical outcomes nationally and internationally compared could validate and improve practice.

Managers view:

Saw a role in trending, planning and the potential of a full 'Clinical Data Set'.

4.3.12 Benefit/Value to the Organisation

Clinicians View:

Although the financial gain was mentioned by more than one interviewee this was underlined with a concern that given the current processes for funding it will not be realised. Audit was mentioned as was accreditation and improved accuracy of coding. The validation and benchmarking also featured in the responses along with planning of service. One interviewee stated there would be no gain qualified by the admission that they had no knowledge as to how the current system worked and where "coding" fits.

Managers View:

The expectations here were towards funding in the form of casemix and patient level costing.

Expecting to gain status as a 'Real' ICU with funding following (as opposed to a pretend one where patients are drinking tea). Research and Clinical efficiency also featured along with Academic gain and future proofing SJH as a training centre. An interesting perspective by one interviewee was that patients are the nearest thing to "product" and that these changes will help ensure a quality product. It was also indicated that visibility and transparency of the coding to more people will lead to ownership.

4.3.13 Benefit/Value to the Clinicians

Clinicians View:

It will benefit the Clinicians in that “Numbers” “You can’t argue with Numbers” in the context of looking for additional resources. It will justify their position and measure and cost what they do. It will validate practice and assist in research.

Managers View:

Management also identified research as a benefit.

Two of the four Clinicians interviewed very strongly stated that there would be no value to clinicians at all despite maybe giving an indication of work, the potential leverage for resources given the current climate is “all forlorn” and that administratively even given the data there will be no action.

External Interviewee:

It is appropriate at this point to bring in what the external interviewee contributed to some of the themes identified. I.C.I.P. is in 12 locations in Germany representing about 30 Intensive Care units of Varying Specialties.

The flow of work in Germany with regard to coding is as follows:

The Clinical Unit codes this is then sent to a Grouper which is sent to the Hospital Information System (HIS) which generates a Bill for the Insurance Companies. The person who is overall responsible for coding is the CEO of each hospital. The majority of ICU’s now have automated coding. The knock on effect for the coding offices was that they no longer coded ICU patients. When asked about the ‘Value’ component of this change in practice the first and most beneficial aspect was identified as the “Billing is correct” now money is received for all treatments and the amount of money generated is much higher. The second ‘Value’ add was identified as Time and not as I initially thought was to be identified as time for the coders but in fact time back for the Clinicians. This was clarified with further questioning and understood when the process of coding previously eluded to

involved clinicians coding for 1 ½ - 2 hours manually. This time has now been a gain back to the bedside. As a result the Clinicians viewed this as a “Big Step Forward”

4.4 Conclusion

The findings of the interviews revealed that it was the initiative, vision and motivation of a few that believed in this project even when the absolute essence of what they were trying to achieve was not wholly within their grasp that drove this project forward. The implication this had on those involved directly with the process change (Consultants) and those whose department processes would ultimately be changed (Coding office) was that information was scanty and perhaps all aspects needed to implement this change to the coding process were not addressed. Two that come to the fore are that of the ‘**time**’ the consultants will have to carry out this work and whether or not they will have the ‘**knowledge**’ required to do so. Further if this were to be successful will it result in change where funding is concerned both at Organisational level and allocation of the Operational Budget and at National level. SJH do not want to be in a position of collecting more data for the sake of it. As one clinician put it “who will care” lots of data giving information on which no action will be seen.

Chapter 5 Discussion

5.1 Introduction

The researcher set out to look at ‘value and whether IT can add value in the realm of Healthcare, along this journey to accommodate an academic piece of work it was narrowed to look at one particular change to one aspect of data capture in Healthcare in one acute care setting. This in itself highlights the complexity of Healthcare, the difficulties that can arise when evaluation studies are attempted and the level of

resources required to carry out even a small piece of work. The choice to talk to participants involved in the proposed change was a difficult one, would semi structured interviews answer the area of interest given the researchers lack of experience with this type of research and the inaccessibility and seniority of the target population. There was the added complexity of moving project deadlines, delayed 'Go Lives', 'Work to Rules' all outside the realm of the researcher control resulting in the target population having to evolve and post implementation interviews not being held resultant from this it was decided instead that recommendations for future work on this project and in this area would be the conclusion of the Study.

5.2 Limitations of the Study

The study did not get to complete Post Implementation interviews as was initially envisaged. The fall out from this was that the ability to evaluate if the change in process had in fact added 'value' was lost. The researcher had never conducted interviews for research purposes before and had never analysed qualitative data before. A more experienced interviewer may well have approached the design and execution of the study differently.

The target population was small and in one environment only, a comparative study with two separate target populations would perhaps have yielded a richer data set and could possibly have protected against the challenge of the project timelines and the subsequent effect on the post implementation interviews.

5.3 Overview of the Research Questions In Light of the Findings

5.3.1 How does coding fit into the complex picture of simple quality care?

The question of where does coding and more specifically ICD coding fit into the complex picture of healthcare has certainly been addressed when looking at how coding when captured and grouped can contribute to patient level costing's, more specifically here within an ICU environment. How ICU's are funded and what they cost in terms of the business of healthcare both in human and financial terms is evident both in the literature and in the interviews conducted accentuated by the concern as to how ICU 's are viewed and funded both at an organisational and national level. An understanding as to how the process of coding happens in different settings in different countries was also realised both from the literature reviewed , understanding the coding process in an Irish acute healthcare environment and information from those interviewed that are charged with capturing this information.

The interviews however painted a picture of healthcare professionals whom whilst very dedicated in their role as clinician's when diagnosing and treating were less informed as to how the very documentation of this has an impact far from the bedside. The same challenges, that were identified internationally in the literature, present practical difficulties in Irish Healthcare such as the accuracy, completeness and availability of the medical chart to allow for coding to take place.

The ultimate challenge being to ensure what has happened in terms of care and outcome is accurate, in particular now, given that there is increasing evidence that this is informing policy and clinical management as well as population health. There is a movement towards the source of data were possible to become automated allowing more real time capture and easier analysis, a small note of caution however is that where there is more than one source of information a master must be decided upon.

5.3.2 Does coding contribute to 'value'? What do we mean by 'value'?

To answer this the researcher looked first at the very meaning of ‘value’ this proved difficult to grab hold of in any concrete fashion never quite shaking off the financial connotations. Value can indeed be quite reliant on whom you are speaking with in other words stakeholders views differ. Lapointe et al 2011 in the literature confirms this as an aspect to be taken into consideration when evaluating a concept. This was very apparent in the interviews with the managers and clinicians viewing the ‘value’ of coding in an ICU setting somewhat differently. They were unified in that they to varying levels had an appreciation that there was a financial impact on what data coding provided although this was very much qualified in that they were sceptical as to whether this would in fact realise change in the current funding model and be felt on the ground in the unit. It did become apparent that the ‘value’ of coding is an essential element of patient level costing. SJH is striving not to continue doing what was always done but to look at new ways of viewing the same data sets when they are extracted in a format that allows analysis to become meaningful both from a practice and management perspective. In this way the contribution of coding to the ‘value’ in this case the health of the patient will be worth the effort in effecting change.

5.3.3 If coding adds value who is best placed to code?

The literature supports the overall need to somehow improve the accuracy of coding that is captured.

Studies identify strongly inaccuracies with regard to coding making reference to inconsistency between coders and the need for clinician input although in the main they do not infer the need for overall responsibility to be placed on the clinician. There is also a school of thought that leans toward automation to reduce the burden of data collection and to simplify data extraction. A large body of evidence whilst recognising the challenges in this area make recommendations in the area of training and communication as a means in which to build a culture of the importance of accurate good quality documentation. The interviews revealed that some believe it is

those nearest to the bedside actually delivering care that as part of clinical documentation they should be coding. Those who are in this position do not wholly agree although it must be said that by far the largest objection was in terms of time to complete same.

5.3.4 Is there a relationship between coding and value?

Measuring the relationship between coding and value is one that some studies have carried out in terms of accuracy of coding and indeed the financial consequences and perhaps knock on effect on allocation of resources. It is however harder when viewing 'value' as a non financial entity and taking the stance of 'value' being that of the patients health. Here although some research does focus in the use of the coded data provided in terms of population health planning both at a National and International level this was not evident as knowledge when interviewing the clinicians. There is also the purely clinical care aspect when diagnosis groups are reviewed against outcomes and clinical practice changes as a result, again more of a connect between what is recorded at this units level and these changes would need to be apparent to those involved in recorded the data. The Health community as a whole need to have confidence in the accuracy of the data on which they will be making inferences and policy care changes placing a very great onus on coding being accurate.

This will remain a challenge until there is a partnership approach as is suggested in the literature that nurtures a culture wanting this data to be accurate and understanding the implications of what this data is going to be used for. Being involved and helping shape the use of the information derived from the data should drive this. It was identified on site that transparency of this data will infer ownership and improve quality this was also identified in the literature. However as with all change be cognisant as to undesired effects (Sheaf and Peel 1995) the work roles can change and this can lead to stress as was evident in the interviews especially as there

were differing opinions as to whose roles it will be to capture these codes and an insistence that there is no time. Decision making, even evidence based informed decision making can lead to conflict in particular those of a financial nature here the study site is attempting to evoke change in policy at to how national centres are viewed and funded. There is a very real fear particularly amongst those now expected to collect this data that there will be no action. This fear is perhaps fuelled by the organisation not being rich in an 'information culture', think back to the reference from the interviews that action was and is on an ongoing basis seen if the coroner is involved reflective of a reactive rather than a proactive management style. Restructuring is also inevitable to varying degrees with the introduction of new information systems this can require both process change and role change. This is an area that needs to be actively managed to realise the changes being aimed at and to maximise the potential of redirecting talent i.e. coders being more involved in continuing education, quality of documentation, audit and review.

5.3.5 How can we measure this?

Now that the relationship between coding and value is established how do we go about measuring this? The literature confirmed that this is an area fraught with complexity. The interviews confirmed that 'value' can be in the eye of the beholder and that to even establish the concept of value in healthcare there needs to be an understanding of the relationship of the variables being looked at in this instance coding and the use of same.

Healthcare in Ireland given the pressures both on finances and resources are having to embrace new ways of viewing the business of healthcare and the delivery of same. Evaluation frameworks can help in this regard by giving more specific targets against which progress can be viewed incorporating many stakeholders' views. Evaluation needs to become an integral part of any project in particular with projects where business benefits have been identified – have they in fact been realized. It was unfortunate in this study that project timelines have precluded the post implementation view of whether or not real time coding by clinicians have equated to 'value' It would however be important that this

‘value’ aspect is understood by all involved in the process change as it was not always evident on interviewing the participants what the ultimate aim of realising ‘value’ was and how this could be built on both from a clinical and financial aspect.

5.3.6 Aim of the Study

The very aim of the study was to look at the ‘value’ of asking Clinicians to code their patient’s data. Given the time line of the study and they are only now carrying out the coding. It is too early to examine whether this change in process has indeed added ‘value’. The researcher did however gain an insight into what the consultants and managers involved in this process change perceived the ‘value’ to be.

5.3.7 Results received in light of Research

In summary the interviews showed that clinicians find themselves in an environment where it is difficult to gain the resources to meet the care requirements for the patients. This is partially governed internally by hospital management and externally by the model of reimbursement that exists. There seemed to be by some a clear understanding that accurate statistics are required to speak to the resource requirements but this was qualified on two points one being that the current economic environment is not conducive to the allocation of extra funding and the other that the model of reimbursement is in itself flawed.

Chapter 6 Future Recommendations and Conclusion

6.1 Research

The researcher would recommend the post implementation interviews being carried out to fully explore the outcome of this process change. Hospital management have now supported this initiative with protected hours for a consultant to complete the coding (addressing one of the areas of great concern that came through consistently

on interview) therefore data will be available for analysis to be included in patient level costing. The evaluation of the success of this concept of Clinician coding could lead to inferences across the organisation and indeed other healthcare settings even those not in the sphere of Acute care settings and therefore warrants the effort to carry out this piece of work. Any evaluation that does take place needs to stay true to the very concept of evaluation 'measure and feedback'. Tell those involved what you doing and bring transparency to the process.

6.2 Training

Hospital coders who all undergone training and experienced support from the ESRI still had to contact Clinicians concerned in some instances and cross check records from other data sources such as other data bases as well as the patient's charts. This would strongly support the view that Clinicians need to be more involved in the actual coding. One is drawn back to the level of knowledge the clinicians admitted to having in the area of coding. Knowing the clinical diagnosis and complications a patient may be experiencing and the treatment required does not automatically mean you are going to be able to capture the codes that reflect this to a wider audience. Although the clinicians do not seem to believe this is going to be too difficult. There is however an element of training to use tools of any trade, coding being no exception in particular when consistency is important as is the case here. Looking at the paradigm of change the literature would strongly advise that inadequate training can contribute to failure in the instance of introducing new technology as is the case here but also inadequate training will place increased stress on already stressed clinicians. The end game here is accurate coding this cannot be achieved if the clinicians being asked to do this are not capturing the codes in a unified standard manner that stays true to the classification being used i.e. that of ICD. I would recommend that training is given more of a focus and is carried out in collaboration with the coding department who it is envisaged will be using the clinicians coding to replace what they currently capture. In the short to medium term the coders can be utilised in a continuing education role in a more formalised way than is evident currently. In the longer term it is perhaps prudent to look at what courses are now available online, to review same and make recommendations as to their suitability for both coders and clinicians that will be involved in coding, given that the

replication of this change process if successful could find itself outside the walls of ICU in the future.

6.3 Communication

The commitment and motivation to carrying out any task is more likely to be met when those involved in the process are well informed as to the purpose and implications their actions may have. This brings us to the communication element, at a very basic level those involved in the change process and those whose department workflow will be affected need to be communicated with and allowed to contribute both in thought and actions to make this change a reality. At a much more ambitious level an approach similar in vein to that of that taken with hygiene and risk over the recent years in Healthcare is needed, where responsibility is inherently everybody's (the inference here being that all clinicians become responsible for accurate timely documentation) and the impact of non-compliance is understood by all. When specifically looking at Change and Clinicians there are many challenges, some of which are currently being met by the study site such as having a peer respected champion /leader and a user friendly interface, I would however recommend that the marketing side of the change be racketed up.

Make the clinicians aware as to what 'value' add there is for them (it was evident from the interviews that this is not fully understood) that once data is accurately recorded it can have many uses including needs from their stance as stakeholders. Take cognisance of the NHS Acute Health Clinical Costing Standards and see the benefit in Clinicians, Coders and Finance coming together and working towards common goals.

6.4 Technological

Any recommendations here would be to learn from what has worked from a technology perspective. The idea that documenting care in the case of the nurses automatically populated severity indicators and in the case of the consultants not being required to search on an individual patient basis but rather the relevant information being extracted and presented in a summary style view awaiting action from them works to meet the goal of ease of use. This trend towards simplification continued on in the extract then made available to the coding office is where IT can become part of a process rather than imposing a different way to do business. Where possible this could be a template of how to roll out further capture of data in real time at the bedside by those best qualified to record care, diagnosis and complications – the clinicians.

6.5 Culture

The organisation need to make good use of this data resultant from the process change and communicate same, this will help build an ‘information culture’. As a result of this change there will be expectations, these need to be met in order for there to be continued and further buy in. Stakeholders who see this happening will embrace further change and continue to support this change even become champions in other projects. I would go back to Rodgers ‘innovation diffusion theory’ and the importance of recognizing the social channels through which change happens.

6.6 Conclusion

This study exploring the issue of ‘value’ in relation to a process change in the area of coding and the direct involvement of Clinicians in an acute specialised area, has given a window into the challenges that exist when changing any process. It has confirmed that whilst Healthcare is complex so is the very description of ‘value’ in

what it can mean to various stakeholders. It has explored the complexity of evaluation studies and how even small studies such as this require great effort and rigid control to deliver on what was originally set out to be measured. Carrying out research in a live healthcare environment from a project management perspective has been likened to 'Extreme Project Management' and this was experienced first hand in this case with unexpected challenges arising throughout the study. The study has explored the very issue of what was being changed, should clinicians be responsible and involved in directly coding their patients? Taking a logical stance who is better placed or qualified to document findings, actions and diagnosis then those at the bedside. It could be argued that all information is diluted the further down a chain of communication you are, this would further lend to the argument that those nearest the process should be involved in it. Going one step further on a practical approach this change even on a business footing makes sense, delivering value for money in that it will:

- Negate the need to have the volume of chart movements necessary for the older process
- Address the time lag with completion of coding which was identified by management at interview as not lending itself to using information for planning of services.
- It will result in improved quality of coding and if as the literature has shown undercoding will be improved it should result in better financial return for the hospital.
- It will provide more real time data on this specific expensive element of a patient's journey through the hospital allowing the hospital to apply new ways of calculation of costs which could both result in organisational change on allocation of resources and indeed influence national policy.
- It will allow resources in the coding office to be viewed differently in terms of role.

But moreover it will provide a very rich 'clinical data set' that could be used to improve and inform practice whilst ensuring that the data provided for international comparison is accurate.

The study hospital is not just trying to improve on a process they are using this

change and the data as a result of same to contribute to the reinvention of the model of costing of ICU care nationally. The good use of IT is allowing this to be facilitated and could well serve as a template on how IT can add 'value' to all the stakeholders in healthcare. As with all pioneers it takes a lot of faith in your ability to deliver that drives one forward. It can be more challenging however to bring along a following and those necessary to realise the dream. On a final note therefore I would like to reiterate that change is a team and ongoing effort and that areas such as training and communication cannot be neglected even when you personally know that there will be a 'value add' to what is being changed.

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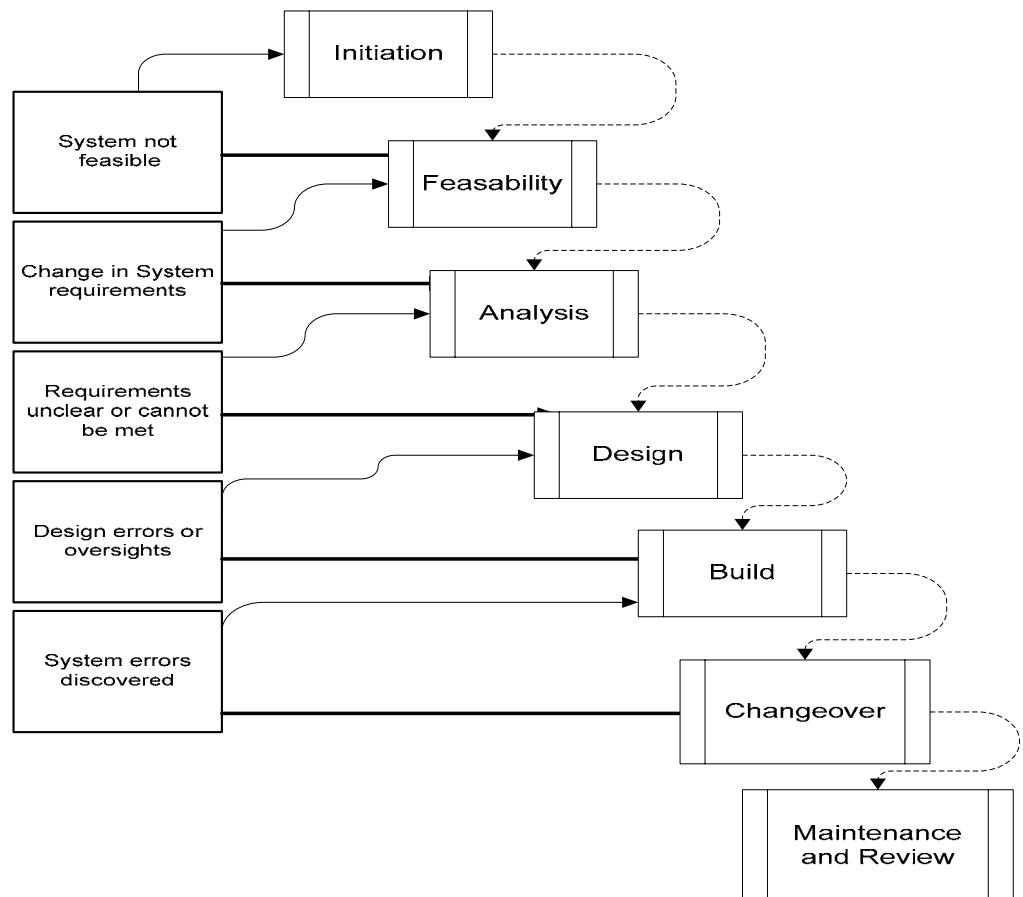
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Appendix A Traditional Waterfall Model of Information Systems

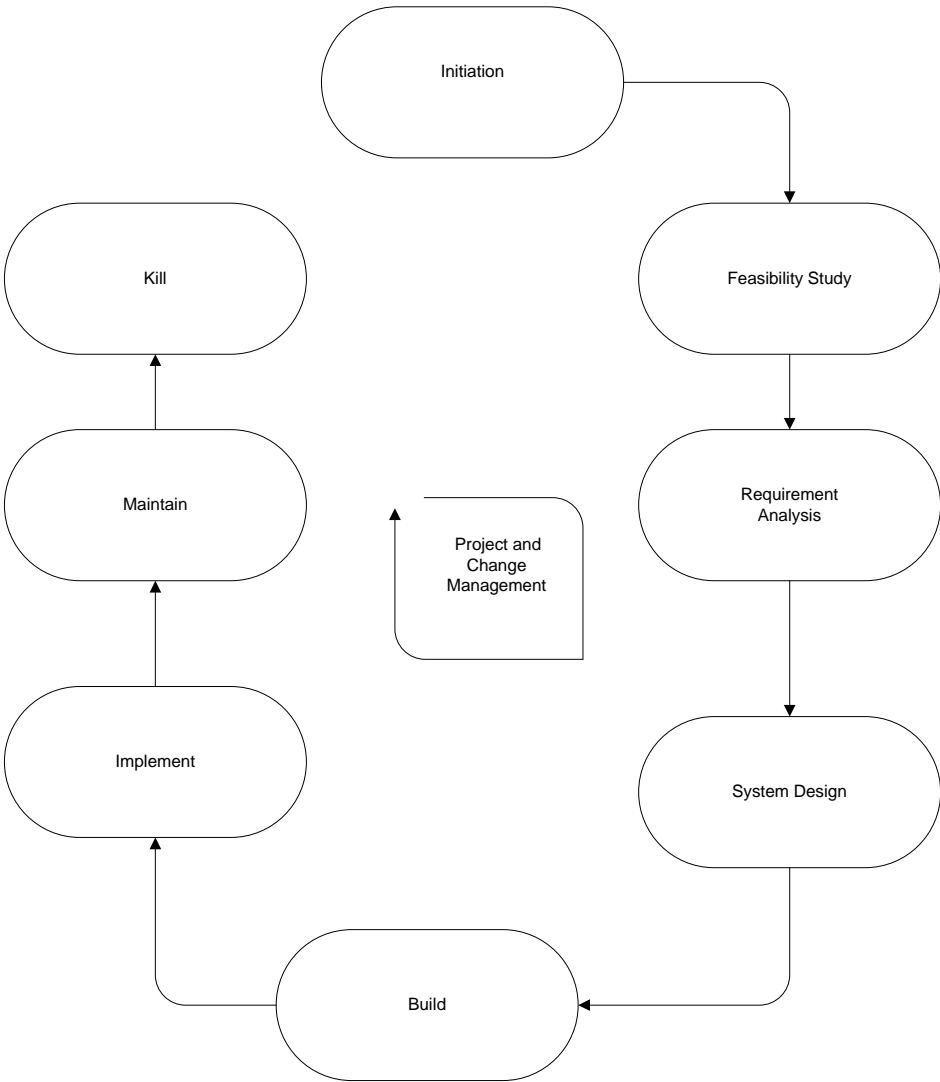
The Traditional Waterfall Model of information Systems Development



The methodology in the ICIP Project to develop an extraction of data followed this approach . Seeing that the ICIP system itself needed a bespoke development to allow the extraction of data for Diagnosis validation and DRG allocation as well as providing information to the internal coding office.

Appendix B The Systems Development Life Cycle

The Systems Development Life Cycle



ICIP is implemented but now it is a case of implementing the extract validation component which still requires a lot of Change Management

Appendix C Groupers

GROUPERS

D.R.G.'s originated in the United States and have been going through a process of evolution over the last 20 or more years to capture different populations left out of the first classification or to suit particular settings world wide. The Health Care Financing Administration HCFA have been responsible in the USA for updates and revisions of the original DRG's.

There are 5 main classes which are Medicare D.R.G.'s Refined D.R.G.'s Severity D.R.G.'s All patient D.R.G.'s and All patient refined D.R.G.'s

Medicare D.R.G.'s

These were developed by Yale University and were intended to capture in the acute hospital setting all types of patients. They have been in use since the 1980's they are used for Medicare payments in the United States

Refined D.R.G.'s

Again Yale were involved in here in the revision of the use of complications and co-morbidities from the original DRGs in particular where a secondary diagnosis was present. All secondary diagnoses that had a complication or co-morbidity were assigned a complexity level which could be moderate major or catastrophic. The purpose was to help streamline the capture of more complex cases.

Severity DRGs

This was a revision that looked at the reevaluation of the complications and co-morbidities used in the DRG's but from a perspective of looking at each individual diagnoses rather than aggregate groupings. This lead to merging in some areas of the DRG's and new categories in other areas.

All Patient DRG's

This was an attempt to be more inclusive to all patient types as the name implies. It was work that was undertaken in 1987 to include identified areas such as neonatal and HIV groupings of patients that were not catered for in the previous groupings but in fact ended up affecting change in areas of paediatric, multiple trauma, cystic

fibrosis transplant and many other specialised areas such as that of ventilation.

All Patient refined DRG's

This piece of work builds on what had gone on before in the All patient DRG's but refined same by adding four subgroups.

Severity DRG's

This is where the levels of severity take into account the complications and co-morbidities of a secondary diagnosis but does not assume all have a similar impact on resources.

Major Diagnostic Grouping's

This is way of grouping according to the principle diagnosis and is generally associated with a single organ or etiology

Australian Classification of Health Interventions ACHI

This is a multiaxial classification, encompassing a means of capturing body system, site and procedure.

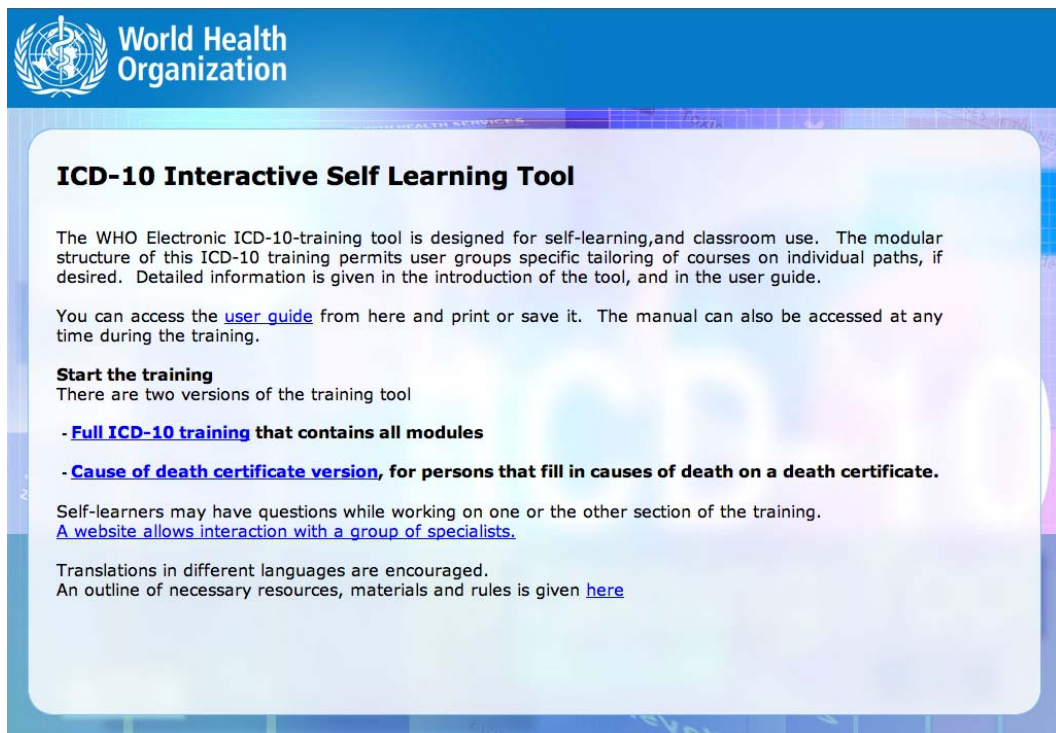
Adjusted Clinical Group ACG


Developed by John Hopkins University in Baltimore USA as a means of categorising patients into clinically cogent groups that will tell us about expected or actual consumption of healthcare.

Clinical Risk Grouping CRG.

This is grouping the data coded in a format that uses risk rating as its parameters

Appendix D WHO-FIC IFHRO Collaboration Online ICD



 **World Health Organization**

ICD-10 Interactive Self Learning Tool

The WHO Electronic ICD-10-training tool is designed for self-learning, and classroom use. The modular structure of this ICD-10 training permits user groups specific tailoring of courses on individual paths, if desired. Detailed information is given in the introduction of the tool, and in the user guide.

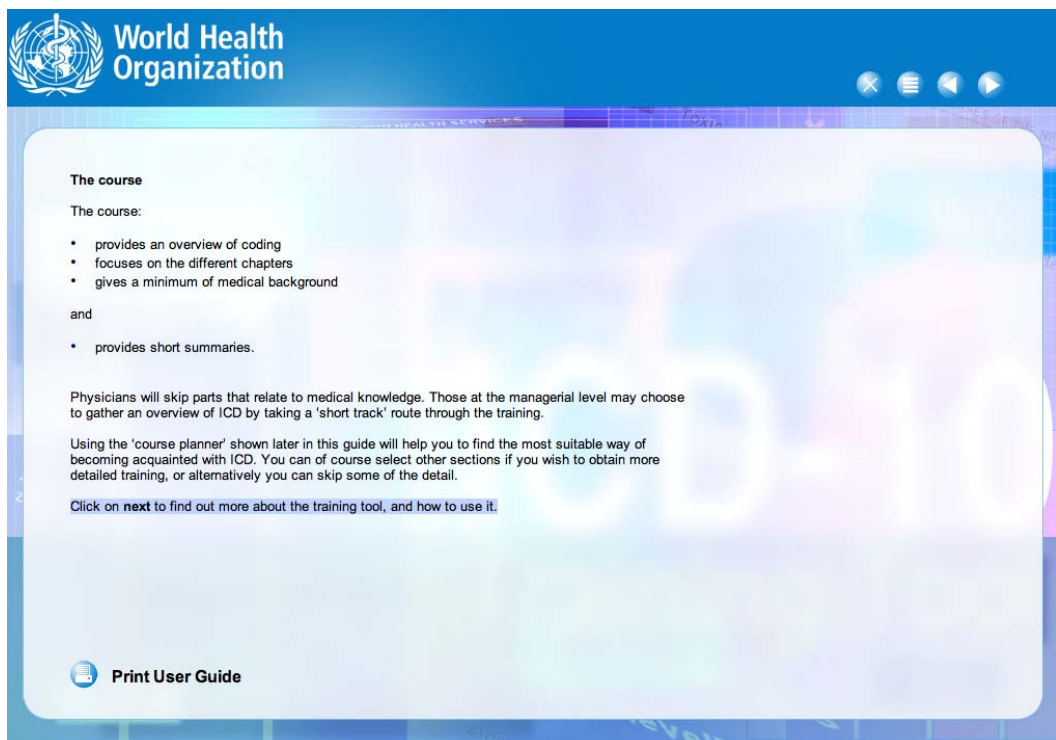
You can access the [user guide](#) from here and print or save it. The manual can also be accessed at any time during the training.


Start the training
There are two versions of the training tool





- **Full ICD-10 training that contains all modules**
- **Cause of death certificate version, for persons that fill in causes of death on a death certificate.**

Self-learners may have questions while working on one or the other section of the training.
[A website allows interaction with a group of specialists.](#)

Translations in different languages are encouraged.
An outline of necessary resources, materials and rules is given [here](#)



 **World Health Organization**

The course

The course:

- provides an overview of coding
- focuses on the different chapters
- gives a minimum of medical background


and

- provides short summaries.

Physicians will skip parts that relate to medical knowledge. Those at the managerial level may choose to gather an overview of ICD by taking a 'short track' route through the training.

Using the 'course planner' shown later in this guide will help you to find the most suitable way of becoming acquainted with ICD. You can of course select other sections if you wish to obtain more detailed training, or alternatively you can skip some of the detail.

[Click on next to find out more about the training tool, and how to use it.](#)

 **Print User Guide**

Overview of Modules of the WHO-FIC Curriculum and training developed with
IFHRO

MODULES	CONTENT
<u>Knowledge of Basic Medical Science</u>	Encountered in cause of death statements, the structure and function of the Human Body and the nature of Disease. Medical terminology, Basic Anatomy, Basic Physiology. Concept of aetiology and risk factors. Basic Pathology
<u>Classification</u>	Why? – What is it
<u>How to select</u>	Intent: to provide sufficient instruction and experience on how to apply selection rules
<u>How to code</u>	Intent: to provide detailed instruction and experience on how to apply coding rules and assign codes
<u>The International Classification of Disease (ICD)</u>	Intent: To develop and understanding of the ICD and to develop the knowledge and skills that are necessary to assign valid codes for the causes of death
<u>General uses of underlying cause of Death data</u>	Intent: To explain the purposes for which underlying cause of death data are collected and how they are used
<u>Quality Assurance</u>	Intent: To raise awareness
<u>Statistical Representation</u>	To introduce to statistics and the appropriate use of same
<u>Certification</u>	Achieved at the end of successfully completing the modules

Appendix E Financial Terminologies

- Return on Investment (RoI)

An indication of the returns provided by an information system. Calculated by dividing the benefit by the amount of the investment. Expressed as a percentage

- Benefit Cost Analysis

A cost benefit analysis finds, quantifies, and adds all the positive factors. These are the benefits. Then it identifies, quantifies, and subtracts all the negatives, the costs. The difference between the two indicates whether the planned action is advisable. The real trick to doing a cost benefit analysis well is making sure you include all the costs and all the benefits and properly quantify them.

- Alignment Value

Ensuring that the identified values for the organisation are aligned with the intended change. To look at improving the business value of Information technology new systems change.

Appendix F Questions used for Interviews

QUESTIONS FOR SJH ICU UNIT FOR THE PARTICIPANTS OF THE STUDY

Period	Aspect
Warming up	The Organisation (vision, goal, structure, business activities) The Interviewee (Professional background, tasks, work) Terminology classification
Exploration of present aspects PRE	Relevance IT and other tools Context of work (colleagues) Preconditions, Limitations, Problems
Exploration of future aspects POST	Expectations and needs Wishes on new tools and instruments Additional ideas
Finish	Summarisation (by the interviewer) Feedback on completeness Benefit for the interviewee Acknowledgement and leave taking

Wessel et al 2006

Organisational Questions

General questions to address both the organisational goals / Business-Care priorities and those of the Intensive Care Unit.

Interviewee Questions

1. Gender

Male

Female

2. Age

3. Profession / Background.....Since _ _ _ _ (yyyy)

4. Place of employment /industry.....Since _ _ _ _ (yyyy)

5 Positions occupied.....

General Open ended questions:

- To include the knowledge as to why they have asked to participate in this study?
- What information they were given around the reasons for real time coding and its benefits?
- How did you react to this announcement?
- What concerns did you have?

More specific questions around the issue of coding itself

PRE Implementation

What is your understanding of the uses of ICD coding both from an organisational perspective and in the broader world?

Are you aware of the financial implications of coding for the hospital?

Given the current process for retrospective coding by non-clinicians did you feel that this needed to be improved upon?

Have you any concerns re the current quality of coding?

Do you know if the coding data is currently validated of quality and completeness?

Have you been prepared / trained in ICD coding and how best to allocate the appropriate codes/procedures in patients with multiple complexity such as

that experienced with ICU patients?

Do you currently have confidence to use the coding data in its current form?

Have you ever had reason to use coding information about the patients in this clinical setting of ICU?

If so in what context....business planning / research / clinical support

If you have used this coding information how did you retrieve this information?

How long was the turn around time to receive same?

When the information was retrieved?

Did you carry out analysis on the data yourself?

Was this analysis in isolation of other clinical markers that would have useful to have included e.g. age to produce more meaningful statistics?

Have you concerns re how this will impact on your workload?

What do you perceive the benefits to you as a clinician in recording this data in real time and having direct access to same will be?

Are there other benefits that you can identify that are expected as a result of this change being introduced?

What "value" does coding give to the Patient /Health Care professionals / Organisation both in the short term and the longer term?

Do you see this recording as part of your role?

Do you have concerns over the current quality of coding in the hospital with

regard to the critical care patients?

Have you any concept as to how many codes are currently captured for patients in the critical care setting re diagnoses and procedures?

POST Implementation

Have your concerns from pre implementation been realized?

Your perceived benefits have they been realised?

Has this change impacted on your workflow?

Do you find the information being available now directly in a richer context have resulted in any changes to either the process or delivery of care or use of the data? (research)

Is there a significant difference in the time it takes to retrieve the information required around patients and their coding elements now as opposed to pre this change?

Do you find yourself using the data where previously you did not?

If so in what context?

Does the coding deliver “value” to the patients/ Health Care professionals/ Organisation both in the short term and in the longer term?

Do you feel that the quality of coding is better when carried out by clinicians directly as opposed to retrospectively being captured by non-clinicians?

Does the new process allow for validation of the quality and completeness of the coding data?

Do you find the allocation and retrieval of coding user friendly?

Do you need to know the code or does it use natural language processing?

Have you any concept as to how many codes are captured in the critical care setting re diagnoses and procedures captured?

Do you currently have confidence in using the coding data?

Do you feel that this new process is more efficient and effective? Elaborate

Does the availability of the codes in real time facilitate safer care?

Additional Questions for the Managers

How does ICD coding fit into the organisational business activities?

Who instigated this change to direct Clinician coding?

Is there an overall lead/ Plan?

How did you react to this announcement?

What concerns did you have?

Is this a change you could perceive as extending beyond ICU?

If so what will the impact be on 'roles' (Clinicians, Coders, Finance)

Are there educational / resource implications?

Do you currently have concerns over the data captured for ICD coding in the area of ICU?

Questions for the external Expert

Clarity sought around the role within SJH Project

Current Job Title and responsibilities

Experience with Coding and ICIP

Who Codes ICD codes in ICU's in Germany?

Do you feel that coding is more accurate if done by clinicians?

The attending Physician is legally responsible for documentation and coding in Germany. Do you think this has contributed to clinician ownership?

When using 'systems' to enter ICD codes are clinicians involved in developing pick lists?

What 'value' does direct coding give to the:

- Patient
- Clinician
- Organisation
- Wider World

When introducing capture of ICD coding into a system (ICIP) how did you communicate the impending change?

Have you experienced any resistance from the clinicians?

If so how was it dealt with?

How have you addressed the quality of what is being entered?

Are you aware of any comparison studies around the quality of coding or other aspects pre and post implementation of direct coding?

Is do what have the finding's been

Why do this?

Where you have previously been involved in this (direct coding in a critical care area) what were the goals/objectives/benefits that were identified?

Have these been realised?

Where there any unexpected results/impacts as a result of introducing this change?

Has the change impacted on the clinician's workflow?

If yes how?

What have the greatest Benefits and Challenges been?

What is the data that is captured used for?

What validations checks are carried out on the entered data?

Appendix G Consent form

INFORMED CONSENT FORM

LEAD RESEARCHER:

BACKGROUND OF RESEARCH:

I am currently in my final year of a Masters in Healthcare Informatics in Trinity College Dublin. I have worked in the field of Informatics in Healthcare over the last 10 years and have a particular interest in the “value” of Information technology and the measurement of same. This study will involve looking at the pre and post practice of allocation of ICD coding going from a retrospective model by coders to a real time model of clinicians coding and the “value” that this will deliver. The area of evaluation of information technology in Healthcare is complex yet necessary given that investment is costly and must increasingly demonstrate the deliver “value” to all the stakeholders including that of the patient, organisation and health care professionals.

I hope that by completing this piece of research that I will gain a better understanding of the field of evaluation of IT and its contribution to “value” in the realm of Healthcare.

PROCEDURES OF THIS STUDY:

In this particular study I am hoping to interview those that are affected by the change proposed in the main ICU setting. Ideally all the Medical Staff and a cross section of the nursing staff. The commitment will be that of a half hour interview both pre and post the implementation.

Feedback will be given in person or in writing which ever are the preferred methods identified by the participants (this will be clarified at interview).

PUBLICATION:

I have been requested to keep the findings of this study confidential for the initial year period of this year to facilitate the organisation in realizing the change process. After this period and with further consultation from the host Site St James hospital I

would like to be able to disseminate the study's findings if they are of interest to the wider healthcare environment. Individual results will be aggregated anonymously and research reported on aggregate results.

DECLARATION:

I am 18 years or older and am competent to provide consent. I have read, or had read to me, this consent form. I have had the opportunity to ask questions and all my questions have been answered to my satisfaction and understand the description of the research that is being provided to me.

I agree that my data is used for scientific purposes and I have no objection that my data is published in scientific publications in a way that does not reveal my identity.

I freely and voluntarily agree to be part of this research study, though without prejudice to my legal and ethical rights.

I understand that I may refuse to answer any question and that I may withdraw at any time without penalty.

I understand that my participation is fully anonymous and that no personal details about me will be recorded.

I have received a copy of this agreement.

PARTICIPANT'S NAME:

PARTICIPANT'S SIGNATURE:

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

RESEARCHERS CONTACT DETAILS:

INVESTIGATOR'S SIGNATURE:

Appendix H E-mail Making Initial Contact with Target Population

Dear,

I have been given your contact details by Fran Hegarty in connection with a Research Project I am carrying out as part requirements for my Masters in Health Informatics in TCD. The Objective of the project is to "Examine the allocation of ICD 10 codes in a "Point of Care System" in an Intensive Care Unit by Clinicians in Real Time and what that means in terms of "Value" realised for the Patient, Clinicians and the Organisation".

I intend using semi-structured Interviews pre and post this change in SJH with key clinicians (ICU Intensivists) and Nursing staff.

I would like if at all possible to schedule a meeting with you over the coming days/weeks

and if you are agreeable also to interview you on that day with regard to the proposed changes.

If you require any clarity or have any questions please do not hesitate to contact me I am available on this e-mail address or indeed on my Mobile Number of

.....

Looking forward to hearing from you.

Dairín Hines.

Appendix I Letter to CEO and response received

To whom it may concern,

I am proposing to carry out a piece of research in St James Hospital more specifically in the main I.C.U. with the objective of:

Examining the allocation of ICD 10 codes in a “Point of Care System” in an Intensive Care Unit by Clinicians in Real Time and what that means in terms of “Value” realised for the Patient, Clinicians and the Organisation.

The motivation for this research is in part fulfilment for the “Masters in Health Informatics” that I am currently completing in Trinity College Dublin, but also in the pursuit of an area of professional interest to myself that of “Value” realised when using systems in Healthcare.

My background is that I have been working in the area of Healthcare for the last 25 Years and specifically Health Informatics for the last 10 years.

To achieve the above objective I would need to interview a sample of the clinicians affected by the change both pre and post the implementation i.e. a longitudinal study.

I would have initially felt that this included both the Medical Staff and the Nursing staff only but on further examination I believe it may be useful to interview both the C.F.O. and the H.I.P.E. Manager to gain an understanding from their perspective.

The methods I would employ would be that of semi structured interviews pre and post the change. These will be transcribed along with field notes that will be recorded directly after the interviews. The data will then be analysed for emergent themes and cross correlated with literature in this area.

On preliminary discussions with Fran Hegarty and Mary O’Connell on site I have agreed to keep the findings of this study private for the initial year to facilitate the change process in St James Hospital and I have agreed this with Trinity College.

When interacting with all participants an information sheet, a consent form and the fact that participation is voluntary with an “opt out” (no penalty) at any point will be paramount in my communication with participating staff.

I have received Ethical approval from Trinity College for the proposed study but can

of course not proceed with same unless I receive permission at C.E.O. level. I look forward to hearing positively with regard to this request as I believe it is a piece of work that will in the first instance benefit the people in St James that are driving this new process and will in the long term help with the understanding and communication of this change to the persons affected whilst gaining a better insight to the gains to be made.

Yours sincerely,
Dairín Hines.



OSPIDÉAL NAOMH SÉAMAS
ST. JAMES'S HOSPITAL



Ospidéal Naomh Séamas, Sráid Shéamais, Baile Átha Cliath 8.
St. James's Hospital, James's Street, Dublin 8.
+353 1 410 3000 www.stjames.ie

Dairín Hines
Informatics Nurse
Children's University Hospital,
Dublin 1

11th March 2011.

Re: Research Proposal

Dear Ms Hines,

I have met with our C.E.O., Mr Ian Carter with regard to your research proposal. I am pleased to be able to tell you that he has approved the project and is happy for you to proceed.

I attach a confirmation e-mail from the CEO to myself confirming this

Kind Regards

Fran Hegarty
Principal Physicist
ICIP Project Manager



Appendix J Ethics Proposal / Informational Sheet/ Confirmation to proceed

School of Computer Science and Statistics Research Ethical Application Form

Part A

Project Title: The Value of Real Time Coding in an ICU Setting
 Name of Lead Researcher (student in case of project work): DAIRÍN HINES
 TCD E-mail: hines.d@tcd.ie Contact Tel No.: (086) 2512854
 Course Name and Code (if applicable): Masters in Healthcare Informatics
 Estimated start date of survey/research: End January 2011

I confirm that I will (where relevant):

- Familiarize myself with the Data Protection Act and guidelines http://www.tcd.ie/info_compliance/dp/legislation.php
- Tell participants that any recordings, e.g. audio/video/photographs, will not be identifiable unless prior written permission has been given. I will obtain permission for specific reuse (in papers, talks, etc.)
- Provide participants with an information sheet (or web-page for web-based experiments) that describes the main procedures (a copy of the information sheet must be included with this application)
- Obtain informed consent for participation (a copy of the informed consent form must be included with this application)
- Should the research be observational, ask participants for their consent to be observed
- Tell participants that their participation is voluntary
- Tell participants that they may withdraw at any time and for any reason without penalty
- Give participants the option of omitting questions they do not wish to answer if a questionnaire is used
- Tell participants that their data will be treated with full confidentiality and that, if published, it will not be identified as theirs
- On request, debrief participants at the end of their participation (i.e. give them a brief explanation of the study)
- Verify that participants are 18 years or older and competent to supply consent.
- If the study involves participants viewing video displays then I will verify that they understand that if they or anyone in their family has a history of epilepsy then the participant is proceeding at their own risk
- Declare any potential conflict of interest to participants.
- Inform participants that in the extremely unlikely event that illicit activity is reported to me during the study I will be obliged to report it to appropriate authorities.

Signed: [Signature]
 Lead Researcher/student in case of project work

Date: 1st January 2011

Part B

Please answer the following questions.		Yes/No
Has this research application or any application of a similar nature connected to this research project been refused ethical approval by another review committee of the College (or at the institutions of any collaborators)?		No
Will your project involve photographing participants or electronic audio or video recordings? <u>Interview Audio</u>		Yes
Will your project deliberately involve misleading participants in any way?		No
Is there a risk of participants experiencing either physical or psychological distress or discomfort? If yes, give details on a separate sheet and state what you will tell them to do if they should experience any such problems (e.g. who they can contact for help).		No
Does your study involve any of the following?	Children (under 18 years of age)	No
	People with intellectual or communication difficulties	No
	Patients	No

Research Project Proposal

Prepared for:

Ethics Committee Trinity College 2011

Prepared by:

Dairin Hines

Student on the Healthcare Informatics Masters Program

Date:

16 January 2011

Proposal number: One

Proposal Objective

To examine the allocation of ICD 10 codes in a Point of Care System in an Intensive Care Unit by Clinicians in Real Time and what that means in terms of “Value” realised for the Patient, Clinicians and the Organisation.

To carry out this piece of work I am reviewing the literature to examine the evaluation frameworks that are out there and what could be used to evaluate IT in Healthcare settings in terms of value and whether or not this differs from other industries. My initial focus was just on evaluation but now the possibility has arisen to carry out a piece of research in a live setting this focus has narrowed down to looking at the value of clinicians coding ICD codes in a point of care system.

Goals

To interview a sample of all the clinicians affected by this change both pre and post the implementation i.e. a longitudinal study. I will be aiming if at all possible to include all 5 consultants and 10 junior doctors and a cross section of the nursing staff using stratified sampling.

Method

Semi Structured Interviews both pre and post the proposed change.

These will be transcribed along with field notes that will be recorded directly after the interviews. The data will then be analysed for emergent themes and cross correlated with literature in this area.

Ethical Issues

The intensive Care Unit in question is that of St James Hospital Dublin and I have been asked to keep the findings confidential for a year to facilitate the ongoing change process in the hospital. The findings will be presented back to the participants and the hospital in a manner identified as most convenient to them either in person or electronically. Confidentiality will be maintained at all times with regard to identity of the participants, as I plan to use audio taping these will not be identifiable unless prior written permission has been given. I will seek written permission for specific reuse in papers talks etc. only after the initial year has elapsed. An informational sheet and consent form will also be used with all participants examples of which I have provided along with this application.

All participants will be over 18 years of age and participation will be voluntary. I have no conflict of interest and am pursuing this research as part requirement to obtain an academic qualification.

I have discussed the need to obtain ethical approval from the Hospital concerned and have received confirmation that college ethical approval will suffice as there is no patient involvement.

To be compliant with the Data Protection Act and Guidelines I will:

- Obtain and process the Information fairly
- Keep it for the specified use only
- Disclose only as agreed
- Keep it safe and secure
- Retain it for no longer than is necessary

Name of the project /Title of the project

This is a moving feast at the moment it is looking like:

“The Value of Real Time Coding in an ICU setting”

I have however many iterations on this and reserve the right to change this title.

INFORMATION SHEET FOR PARTICIPANTS

This research is being carried out as part requirement to complete a Masters in Healthcare Informatics in Trinity College Dublin.

The researcher has worked in a Healthcare realm for the last 25years but in an Informatics Role in the last 10 of those years.

I have no conflict of interest in completing this study that I am aware of as it is being carried out of my own volition in a workplace setting to which I have no affiliation or relationship of any sort prior to this research. I am not in receipt of any incentives to complete this work other than as a course requirement for my Masters.

The relevance of this piece of work is to start to explore the evaluation of information technology specifically Healthcare and the “value” that is delivered to stakeholders as a result of this technology being brought on board.

This study’s focus is narrowed down to looking at the proposed change from retrospective ICD coding to real time coding ICD by clinicians in an ICU setting within a Point of Care Technology System.

Participation is voluntary and you have the right to withdraw and to omit individual responses without penalty.

The expected duration of participation is a half hours interview both pre and post implementation (this is an estimated duration).

The risks for the participant are only in that it will require the commitment of two time periods. The benefits are that the findings will be made available to all participants and this may provide valuable in managing the change itself or indeed in communicating the change to others.

The debriefing can either be facilitated in person or in writing each participant may chose the method more convenient.

Preservation of participation and anonymity in analysis, publication and presentation of resulting data findings will be observed.

During the course of analysing the data should any direct quotations be used the context of these quotations will be verified for their contextual appropriateness.

Ethics Approval E-Mail

fromResearch Ethics research-ethics@scss.tcd.ie
toDairin Hines <hinesd@tcd.ie>

ccResearch Ethics <research-ethics@scss.tcd.ie>

date23 March 2011 12:09

subjectRE: Hines - E252

mailed-byscss.tcd.ie

Signed byscss.tcd.ie

hide details 23 Mar

Dear Dairin,

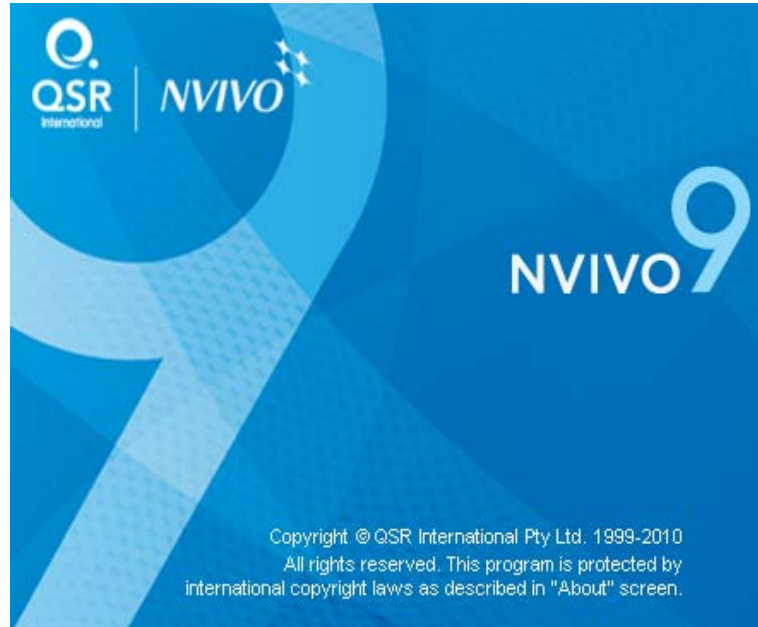
Thank you for these documents. You may now proceed with this study.

We wish you success in your research.

Kind regards

Gillian

Appendix K NVIVIO Software used for qualitative data analysis



Appendix L E-Book example in area of Ventilation

569 Ventilatory support

□ 1006 Bi-level positive airway pressure [BiPAP] [airway pressure release ventilation] [pressure control ventilation] by endotracheal tube /tracheostomy
Continuous positive airway pressure [CPAP] by endotracheal tube /tracheostomy
Intermittent mandatory ventilation [IMV]
Invasive ventilation
Mechanical ventilation
Positive end expiratory pressure [PEEP]
Pressure support ventilation [PSV]
Synchronous intermittent mandatory ventilation [SIMV]

Includes: endotracheal:

- intubation

- respiratory assistance

mechanical ventilation by:

- endotracheal tube (ETT)

- nasal

- oral

- tracheostomy

weaning of intubated (endotracheal tube/tracheostomy) patient by any method

Code also when performed:

- tracheostomy:

- percutaneous (41880-00 [536])

- permanent (41881-01 [536])

- temporary (41881-00 [536])

Excludes: continuous negative pressure ventilation [CNPV] (see block [570])

intermittent positive pressure breathing [IPPB] (see block [570])

intermittent positive pressure ventilation [IPPV] (see block [570])

noninvasive ventilatory support (see block [570])

13882-00 Management of continuous ventilatory support, ≤ 24 hours

13882-01 Management of continuous ventilatory support, > 24 and < 96 hours

13882-02 Management of continuous ventilatory support, ≥ 96 hours

570 Noninvasive ventilatory support¹

¹ Extracted from NCCH eBook, July 2008, Respiratory System.

□1006

Bi-level positive airway pressure [BiPAP]

Continuous positive airway pressure [CPAP]

Intermittent mask CPAP

Intermittent positive pressure breathing [IPPB]

Intermittent positive pressure ventilation [IPPV]

Noninvasive mask ventilation [NIMV]

Noninvasive pressure ventilation [NIPV]

Includes: ventilatory support by:

- face mask
- mouthpiece
- nasal mask/pillows/prongs
- nasal/nasopharyngeal tube

Excludes: that by:

- endotracheal intubation (see block [569])
- tracheostomy (see block [569])

92209-00 Management of noninvasive ventilatory support, ≤ 24 hours

92209-01 Management of noninvasive ventilatory support, > 24 and < 96 hours

92209-02 Management of noninvasive ventilatory support, ≥ 96 hours²

1006 VENTILATORY SUPPORT

DEFINITION

Ventilatory support is a process by which gases are moved into the lungs by a device that assists respiration by augmenting or replacing the patient's own respiratory effort. Ventilatory support can be administered via noninvasive or invasive devices.

Continuous ventilatory support (CVS), invasive ventilation

CVS or invasive ventilation refers to the application of ventilation via an *invasive artificial* airway. For the purpose of this standard, invasive artificial airway is that provided via an endotracheal tube (ETT) or a tracheostomy tube. With CVS, the patient receives continuous variable degrees of assistance to meet respiratory requirements in an uninterrupted continuous fashion.

Invasive artificial airways

An **endotracheal tube** can be placed orally or nasally. Nasal placement is preferred when one is avoiding cervical spine hyperextension, such as with neck injuries or when oral surgery is planned. However, nasal tubes make suctioning of the trachea more difficult because they are

² Extracted from NCCH eBook, July 2008, Respiratory System.

usually narrower and longer than oral tubes. The ETT requires nonsurgical placement. It is usually employed prior to a surgically-placed tracheostomy tube.

With prolonged ventilation, or when prolonged ventilation is expected, a **tracheostomy** tube is placed surgically in the anterior cervical trachea to prevent damage to the larynx and to provide improved pulmonary toiletry. A tracheostomy may also be used initially to provide a patent airway and for possible ventilatory assistance when there is compromise of the upper airways such as in facial trauma, burns, pharyngeal tumours or epiglottitis. Patients with a **tracheostomy** often have a tracheal tube inserted which keeps the tracheostomy open and allows for the attachment of the mechanical ventilatory device.

Noninvasive ventilation (NIV)

Noninvasive ventilation refers to all modalities that assist ventilation without the use of an ETT or tracheostomy. For the purpose of this standard, noninvasive devices include: face mask, mouthpiece, nasal mask, nasal pillows, nasal prongs, nasal tubes and nasopharyngeal tubes.

Types/modes of ventilatory support

1. Continuous Positive Airway Pressure (CPAP) – see blocks [569] and [570]

CPAP is used in spontaneously breathing patients and for artificial maintenance of positive airway pressure after passive exhalation is complete. CPAP can be administered **noninvasively** (face mask, nasal mask or nasopharyngeal tubes for neonates) or **invasively** (endotracheal tube or tracheostomy tube).

When CPAP is administered by ETT or tracheostomy, a code from block [569] *Continuous ventilatory support* should be assigned rather than a code from block [570] *Noninvasive ventilatory support*.

Neonatal patients may receive CPAP via **nasopharyngeal intubation** attached to a mechanical ventilator designed for neonates or a suitably equipped multipurpose ventilator set in the CPAP mode. In such cases, assign the appropriate code for NIV from block [570] *Noninvasive ventilatory support*.

2. Bi-level Positive Airway Pressure (BiPAP) – see blocks [569] and [570]

BiPAP is a form of ventilatory support that provides respiratory assistance throughout the breathing cycle. Both inspiratory and expiratory pressure support the patient's breathing efforts. BiPAP operates in two pressure modes. The first is continuous positive airway pressure (CPAP), or provision of a constant pressure. The second is a spontaneous mode, cycling between inspiratory and expiratory pressures (bi-level) in response to the patient's breathing efforts. BiPAP is designed to work with mask ventilators (**noninvasive**); however, it can also be administered **invasively**.

When BiPAP is administered by ETT or tracheostomy, a code from block [569] *Continuous*

ventilatory support should be assigned rather than a code from block [570] *Noninvasive ventilatory support*.

3. Intermittent Positive Pressure Breathing (IPPB)
Intermittent Positive Pressure Ventilation [IPPV]
Noninvasive Mask Ventilation [NIMV]
Noninvasive Pressure Ventilation [NIPV] – see block [570]

These forms of ventilatory support are primarily used to deliver aerosolised medications or to combat early respiratory failure or atelectasis. Treatment sessions are intermittent, usually consisting of 10 to 20 minutes, four to six times per day. These ventilators are most commonly used with a mouthpiece or tight fitting mask.

Note: Do not code IPPB when it is used only to deliver medication.

4. Controlled Mechanical Ventilation
Intermittent Mandatory Ventilation (IMV)
Synchronised Intermittent Mandatory Ventilation (SIMV) – see block [569]

Using these forms of ventilation, **patient breath rate and volume is set on the ventilator ie controlled mechanically**. This information is recorded on the ICU chart as 'machine respiratory rate' or 'intermittent machine ventilation rate'. Controlled mechanical ventilation is always administered by ETT or tracheostomy, that is, it is **always invasive**.

5. Continuous Negative Pressure Ventilation (CNPV) – 92041-00 [568]

Not widely used today, CNPV is a form of ventilation where negative pressure is applied on the outside of the patient's chest; this pressure expands the lungs to facilitate airflow.

Classification

1. Code first the ventilatory support (see also *Calculating the duration of CVS*)

13882-00 [569] *Management of continuous ventilatory support, ≤ 24 hours (see note f below)*

13882-01 [569] *Management of continuous ventilatory support, > 24 and < 96 hours*

13882-02 [569] *Management of continuous ventilatory support, ≥ 96 hours*

92209-00 [570] *Management of noninvasive ventilatory support, ≤ 24 hours*

92209-01 [570] *Management of noninvasive ventilatory support, > 24 and < 96 hours*

92209-02 [570] *Management of noninvasive ventilatory support, ≥ 96 hours*

a. When both CVS and NIV are used for treatment (not weaning – *see note d below*), code each type separately. Use the appropriate duration extension on each

code to indicate how many hours the patient received each type of ventilatory support.

b. Subsequent periods of the same type (invasive or noninvasive) of ventilation, when used for treatment (not weaning – *see note d below*) should be added together. For example, if a patient is on CVS for the first day of their admission, then on CVS again on the fourth day of their admission, the CVS hours should be added together to arrive at the correct CVS code.

c. For the purpose of calculating the duration of ventilatory support:

- hours of ventilatory support should be interpreted as **completed cumulative hours**
 - a period of ≥ 1 hour between cessation and then restarting ventilatory support should be accounted for in the duration, ie continue counting the duration
 - removal and immediate replacement of airway devices (tubes, masks) should be accounted for in the duration, ie continue counting the duration.
- (See also *Calculating the duration of CVS*)

d. **Do not code methods of weaning** (eg CPAP, IMV) from ventilatory support separately. Weaning is included in calculating the length of time that a patient is on ventilatory support. There may be several attempts to wean the patient off the ventilator. Weaning may include changing the type of ventilation from CVS to CPAP or BiPAP; include the duration of CPAP or BiPAP weaning in the cumulative hours for the CVS.

e. **Do not code ventilation** when the patient brings their own ventilatory support devices (eg CPAP machine) into hospital and the patient operates the device.

f. The ventilatory support that is provided to a patient **during surgery** is associated with anaesthesia and is considered an integral part of the surgical procedure. The patient may remain on ventilatory support for some hours while recovering following surgery. Ventilation of ≥ 24 hours post surgery should not be coded in these cases.

Ventilatory support should be coded when:

- it is initially performed for **respiratory support** prior to surgery and is then **continued during surgery and post surgery** (even if ≥ 24 hours post surgery).
- it is **initiated during surgery** and **continues** after surgery (in recovery, ICU, ward or for further surgery) for **> 24 hours post (initial) surgery**.

Note: The duration of ventilatory support should be counted from the time of intubation (*see Calculating the duration of CVS*). In cases where ventilatory support has been initiated **during surgery** and has met the above criteria for coding then the duration begins from the time of (initial) intraoperative intubation.

2. Method of delivery

a. Assign an additional code if tracheostomy is performed with continuous ventilatory support:

41880-00 [536] *Percutaneous tracheostomy*

41881-00 [536] *Open tracheostomy, temporary*

41881-01 [536] *Open tracheostomy, permanent*

b. Do not code any method of intubation for ventilatory support.

c. Do not code any noninvasive airway (eg mask, nasal prong).

Calculating the duration of CVS

For the purposes of calculating the duration of continuous ventilatory support:

BEGIN calculation of the duration of CVS with one of the following:

- ***Initiation of ventilatory support***

Endotracheal intubation (and subsequent initiation of continuous ventilatory support)

For those patients who have an ETT for continuous ventilatory support, begin counting the duration at the time of intubation.

For patients who begin receiving continuous ventilatory support by ETT and subsequently have a tracheostomy performed, begin counting the duration at intubation. The duration continues through the time in which the tracheostomy is used.

OR

- ***Tracheostomy*** (and subsequent initiation of continuous ventilatory support through a tracheostomy)

Patients with a tracheostomy often have a tracheal tube inserted which keeps the tracheostomy open and allows for the attachment of the mechanical ventilatory device. Begin counting the duration of continuous ventilatory support at the point when the continuous ventilatory support is begun.

OR

- ***Admission of a ventilated patient***

For those patients who are admitted with continuous ventilatory support in place, begin counting the duration at the time of admission. (See also *'Transferred intubated patients'*.)

END with:

- ***Extubation*** (eg removal of ETT), **or**

- ***Cessation of CVS after any period of weaning***, **or**

- ***Cessation of CVS for patients with a tracheostomy*** (after any period of weaning)

The tracheal tube used with tracheostomy patients may not be withdrawn for days after discontinuation of continuous ventilatory support to assure respiratory competence or to provide pulmonary toiletry. In some circumstances (eg neuromuscular diseases), the tracheal tube may be left in place indefinitely after continuous ventilatory support is discontinued. Therefore, the duration would end with the cessation of continuous ventilatory support, **or**

- ***Discharge, death or transfer*** of a patient on continuous ventilatory support (see also *'Transferred intubated patients'*), **or**

- ***Change of episode type***

In cases where the episode 'care type' changes (eg acute to rehabilitation), counting the duration should cease when

the episode ends and counting recommences for the subsequent ventilatory period during the new episode type.

Intubation without ventilation

Intubation can be performed without an associated ventilatory support system when it is necessary to keep the airway open. For example, children may be intubated but not ventilated for diagnoses such as asthma, croup or epilepsy and adults may be intubated in cases of burns or other severe trauma.

In cases of intubation without ventilation, no matter what the age of the patient, a code or codes from the list below should be assigned:

- 22007-00 [568] *Endotracheal intubation, single lumen*
- 22008-00 [568] *Endotracheal intubation, double lumen*
- 90179-02 [568] *Nasopharyngeal intubation*
- 92035-00 [568] *Other intubation of respiratory tract*
- 22007-01 [568] *Management of endotracheal intubation, single lumen*
- 22008-01 [568] *Management of endotracheal intubation, double lumen*
- 90179-05 [568] *Management of nasopharyngeal intubation*
- 90179-06 [568] *Management of tracheostomy*
- 92035-01 [568] *Management of other intubation of respiratory tract*

Transferred intubated patients

Transferred intubated and ventilated patients

When a ventilated (by ETT or tracheostomy) patient is transferred, both the transferring and

receiving hospitals assign the code for the appropriate hours of CVS. If the patient has a tracheostomy then this should be coded at the hospital where it was performed. Do not code the ventilation/intubation if it is for < 1 hour prior to transfer

Transferred intubated (without ventilation) patients

When an intubated (by ETT or tracheostomy) patient is transferred, the following guidelines apply:

1. The transferring hospital assigns the appropriate code for intubation (block [568]) or tracheostomy (block [536]), if these procedures were performed at the transferring facility.
2. The receiving hospital assigns the appropriate code for management of intubation (block [568]).³

³ Extracted from NCCH eBook, July 2008, Respiratory System.