AN INTENSIVE INVESTMENT IN DATA

ABSTRACT

Introduction
Bedside workstations and a new clinical database were introduced into the Intensive Care Unit (ICU) at the Geelong Hospital in late 2004. At the same time, a Health Information Manager (HIM) was appointed as ICU Data Manager with the intent to:

i. Review clinical documentation and educate ICU staff in order to optimise diagnosis related grouping (DRG) of ICU patients
ii. Improve HIM understanding of ICU processes
iii. Contribute to the development of the new clinical database for ICU
iv. Improve recording of ventilation hours
v. Optimise processes of data collection for submission to the Australia and New Zealand Intensive Care Society Adult Patient Database as mandated by the DHSV.

Results
The HIM reviewed the ICU documentation and found it to be comprehensive and clinically relevant, but largely “coder unfriendly”. Education sessions were held for ICU medical and nursing staff and the database developed to include lists of keywords to act as prompts in clinical record keeping. The staff have been encouraged to document using problem and intervention lists in order that clinical terms can be interpreted for coders and real-time bedside recording of ventilation hours can occur. The HIM has helped ICU staff to become accustomed to working with “smart cards” to access and enter patient information via the new database at the bedside. Clinicians enter their own notes directly into the system and nurses are able to view and enter nursing standards. A help screen, giving definitions of data to be included in the Australian and New Zealand Intensive Care Society’s (ANZICS) adult patient database, has also been incorporated.

Discussion
The ICU Data Manager facilitates two-way information exchange between Health Information Services (HIS) and clinicians in the Intensive Care Unit. We have demonstrated that this has benefits for both ICU and HIS. The new database has been developed to meet clinical needs and incorporates features that make clinical documentation more “coder-friendly”. This assists the capture of relevant ICD-10 AM codes and correct DRG assignment. The use of bedside workstations, accessed by “smart cards”, has been well accepted by staff. We believe that our experience may be applicable to other health services.
AN INTENSIVE INVESTMENT IN DATA

Introduction

Barwon Health’s Intensive Care Unit (ICU) is a 19 bed tertiary unit. There are approximately 1400 admissions per year.

In late 2004 bedside workstations and a new clinical database were introduced into the unit. At the same time I was appointed ICU Data Manager with roles in coding and auditing of ICU cases, casemix education, improving the recording of ventilation hours and contributing to the collection of data for the Australian and New Zealand Intensive Care Society (ANZICS). In this paper, I will describe the workstations and features of the database, particularly those into which I have had some input, and will outline some of my impressions of being a Health Information Manager (HIM) in ICU.

A HIM in ICU

Prior to commencing in ICU, I worked for many years in a quiet office in Health Information Services (HIS) with a close group of HIMs. Coding was the priority of all around me. ICU is very different to what I was used to! It may be quiet but can be frantic. There is constant patient movement in and out of the unit and checking documentation for all patients before they’re discharged to the wards is a struggle. There are large numbers of staff with new people commencing frequently. Patient care is the priority of all those around me and as much as I try to find times when documentation can be clarified or casemix explained, there can be frequent interruptions.

ICU can be challenging but I feel my role is beneficial to both HIS and ICU. I am learning more about the care of critically ill patients and can pass relevant information onto the other HIMs, increasing their knowledge. Clinicians have become more aware of coding and its use in casemix funding and their own research.

Auditing ICU coding is a part of my role. I’ve been interested to note that conditions considered almost “routine” in post-operative cardiothoracic patients impact on Diagnosis Related Group (DRG) assignment to that “with complication”. Examples of these are electrolyte imbalances such as hypokalaemia and atelectasis. Their routine occurrence explains why they are often poorly documented. Clinicians consider them expected outcomes of cardiothoracic surgery rather than complications. Coders see them as conditions that have impacted on the patient’s stay, needing to be coded if treated or monitored.

I have been working to improve accuracy in the recording of ventilation hours on the ICU database. In the past doctors entered these on discharge but they
are now entered in real time by nursing staff. Accurate hours make it possible to compare the ICU database with the number of hours reported to the Victorian Admitted Episodes Dataset (VAED). The Victorian Department of Human Services collects morbidity data on all admitted patients from Victorian public and private acute hospitals and this data forms the Victorian Admitted Episodes Dataset. VAED data is used for health services planning, policy formulation, casemix funding and epidemiological research.\(^1\)

As a part of the casemix funding model used in Victoria, hospitals receive co-payments according to the number of hours patients have been ventilated and our ventilation funding is very sensitive to accurate reporting of hours. The complexities of counting ventilation hours and idiosyncrasies with data entry onto the VAED field contribute to numerous discrepancies. The effort of crosschecking the ICU database with the VAED has proved to be worthwhile, not only in terms of optimising ventilation co-payments but also in regards to ICU research on ventilator acquired pneumonia.

Our Deputy Director of ICU, Dr. Peter Stow, has supported me in my role. He has been responsible for development of our ICU database, “SLIC”. I’ve appreciated his willingness to incorporate features that assist both ventilation accuracy and coding staff to interpret clinical data.

**SLIC – A Unique ICU data base**

SLIC (Sequel Intensive Care) is our ICU bedside clinical information system. Its main clinical features enable:

- Password protected medical notes to be entered in “real time”.
- Nurses to access and enter nursing standards
- Incorporation of “mini databases” eg. ICU Liaison Nurse, MET calls, CVC lines
- Morbidity, mortality and statistical reporting
- Interface of ADT information from the main hospital patient information system.
- Data collection for the ANZICS adult patient database

More specifically, features that assist in coding and ventilation recording accuracy include:

**The Problem List**

I reviewed many ICU medical notes and found frequent usage of clinical signs and symptoms that “hinted” at problems but were unable to be coded. We developed lists of diagnostic terms that could be coded and incorporated them into the database. Doctors are encouraged to write clinically meaningful notes and use the problem list to interpret the notes for coding purposes.

<table>
<thead>
<tr>
<th>Clinical notes</th>
<th>Problem List</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cr. 232. Oliguria</td>
<td>Acute renal failure</td>
<td>CVVHDF</td>
</tr>
</tbody>
</table>
The problem list details the treatment given for each problem, assisting coders to determine whether or not the criteria for coding the condition have been met. A completed problem list appears on the daily notes and the ICU discharge summary. A coded problem list can be printed out in HIS if desired.

Interventions List

The nurse caring for the patient enters significant interventions undertaken in ICU in real time.

<table>
<thead>
<tr>
<th>Time/date</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>20:00 9/6/07</td>
<td>Cease ventilation</td>
</tr>
<tr>
<td>08:10 8/6/07</td>
<td>Intubation</td>
</tr>
<tr>
<td>08:10 8/6/07</td>
<td>Ventilation</td>
</tr>
<tr>
<td>08:10 8/6/07</td>
<td>CVC</td>
</tr>
</tbody>
</table>

I routinely check that ventilation start and finish times have been accurately entered onto SLIC and complete a tick box on a “ventilation review” screen when I’m satisfied.

The ICU Discharge Summary shows the interventions list, ventilation hours and the completed tick box. Coders do not need to count ventilation hours when they see a completed tick box, saving valuable coding time. Coded interventions can also be printed out in HIS if desired.

Clarification of medical notes for coding purposes

As a HIM with a coding background, I am able to identify clinical notes that may need interpretation for coders. SLIC enables me to obtain clarification “on line” while the patient is still in ICU. Doctors are alerted that a “documentation query” exists when they access the patient’s notes and can enter their response.

A tick box on the ICU discharge summary alerts coders that some clinical information has already been clarified. This can be printed out for inclusion in the record if required to justify coding decisions.

Audit Reports

We have developed several reports to assist in maintaining data quality on SLIC. These are:

a. Cardiothoracic surgery without ventilation. Identifies cardiothoracic patients whose interventions lists are missing ventilation times
b. Patients intubated but not extubated. Identifies patients whose intervention lists are missing extubation times
c. **Ventilation audit report.** Details patients who have been ventilated and their total hours of ventilation.

d. **Incomplete discharge summary data.** Details patients whose medical notes have not been fully completed on SLIC.

An additional report helps HIS to organize workflow in the coding of complex cases. At Barwon Health, coding workload is divided according to terminal digit colours. The report lists, in terminal digit order, patients admitted to ICU, their ICU admitting diagnoses, length of ICU stay and ventilation hours.

While these features are of assistance to coding staff once the patient has been discharged, SLIC’s capacity to allow real time data entry during the patient’s illness is its strength. This is achieved at the bedside through the use of workstations and smart card technology.

**SunRay™ THIN CLIENT WORKSTATIONS**

Managing critically ill patients demands access to information from many sources. In the past, staff used 4 PC’s located in a central work area and these were always in great demand. ICU Management wanted ready access to information at the patient’s bedside and real time data entry and the decision was made to develop our own system.

SunRay™ thin client workstations were installed at the end of each bed and in other locations in ICU. These are fed from centralized servers and are accessed by smart cards. Each staff member in ICU has his/her own card that is embedded with a chip containing individual user details.

The smart card is inserted into a workstation and a unique user name and password are entered. Applications are accessed as desired. When the smart card is withdrawn and inserted into another workstation, the applications that were previously open are available with the re-entry of a single password. There is no need to log on and off each application or each workstation.

There are several advantages to this system:

a. Information from many different sources is available at the patient’s bedside eg
   - ICU database (incl. drug, medical and nursing protocols)
   - Pathology and echocardiographs
   - Clinical references
   - Internet
   - Hospital patient information system.

b. Real time data entry is possible at the bedside.

c. It is time saving in that there is no waiting for a PC.

d. Each application needs to be opened only once and is available anywhere with single log in.

e. Staff can move efficiently from bed to bed eg. on ward rounds

f. Smart cards ensure secure access to patient data

g. The workstations are space efficient.
We have found the system to be fast, secure and user friendly and workstations are slowly being introduced throughout the hospital. At present, the cards are embedded with only user name and password, but the system has the potential to be developed in the future to incorporate features such as digital signatures, electronic prescribing and HIC prescriber and provider numbers.

**Discussion**

The SLIC database, SunRay™ workstations and smart card technology have revolutionized data access and collection in the Intensive Care Unit of Barwon Health. As ICU Data Manager, I have had the opportunity to be a part of these changes and contribute to the development of the database in ways that make clinical documentation more coder friendly and the recording of ventilation hours more accurate. The future looks equally exciting as the possibilities of electronic prescribing and digital signatures are explored and smart card technology is introduced throughout the hospital.

\(^1\text{Department of Human Services website}\)
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Catherine is a Health Information Manager working as Intensive Care Unit Data Manager and previously for many years in Health Information Services at Geelong Hospital. She has extensive experience in coding and casemix related issues, including past roles as an NCCH coding educator and member of the Victorian Coding Committee. Her current role has given her an insight into medical record documentation from the viewpoint of those who work with critically ill patients who are the first priority and whose problems do not always “fit” as nicely into codes as coders would like them to!

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