CORDis EHR description and implementation at Barwon Health

CORDis EHR is an electronic Transcription System based on the FileMaker Pro (© FileMaker Inc.) database platform. This system has been developed by Dynamic Solutions with the assistance of Barwon Health.

The initial CORDis EHR vision began as an electronic discharge summary system providing clear, searchable discharge summaries that could be faxed to the GP at the click of a button. It also provides the necessary information for clinical audits and quality monitoring. Once this was successfully implemented the clinicians wanted more information to be stored, so CORDis EHR was expanded to collect and record clinical information from other systems, to provide the clinician with a single system providing a patient's history of care. CORDis EHR was then further expanded to enable the creation and transmission of Operation Notes, Out Patient Letters and PBS Prescribing.

The electronic health record now contains information required for medical record coding and provides the practitioner and manager with knowledge basis to assist in allocation of appropriate DRG and WEISS.

CORDis EHR was implemented at Barwon Health in late 2000 and is now used across all acute and sub-acute departments. It is a patient reference tool for many practitioners, providing information relating to the patients admission, diagnosis, management, investigations and medication profile. The system also contains the plan for post hospital follow-up.

CORDis EHR stands for Correspondence, Operating Records, Reports and Discharge Summary information system. The cost of the system is a small fraction of many other Clinical Information Systems. It's user friendliness makes it more immediately useable by clinicians, Health Information Managers and administrators throughout the hospital.

Comprehensive listings of messages sent, and acknowledgments received are one of the features of the quality monitoring of CORDis EHR. Reports are produced continuously and monitored daily to ensure information such as discharge summaries, operation notes and out patient letters have been successfully sent to the intended recipients.

The CORDis EHR transcription system links legacy databases within the Barwon Health Network, enabling many details relevant to patient care to be automatically populated into the CORDis EHR record. There is the potential to link many, if not all, computerised databases through a single front end,

accessible via the patient file. The application's ability to quickly interrogate data has created improved efficiency for clinicians and health information managers. Further, database linking eliminates the duplication of data entry. This reduces the time and effort involved in recording and producing correspondence from the Acute Health setting, to the community health services, including General Practitioners, Community Pharmacists and Domiciliary Services (outside the Barwon Health Network).

CORDis EHR has also been linked to modern hospital systems that communicate via the Health Level 7 (HL7) standard. CORDis EHR is compliant to Version 2.3.1 of the standard and has been implemented to receive Admission/Discharge notifications and radiology results via this interface. CORDis EHR also transmits discharge medication information in HL7 format. The installation of a separate HL7 gateway server is required before HL7 messages can be transmitted or received.

The transmissions from the application include discharge letters, operation notes, outpatient letters, and notification to community services (of client's acute admission and discharge). Transmissions can be faxed or printed and some can be emailed in an encrypted format for increased security.

The introduction of CORDis EHR at Barwon Health has had two major benefits, improved clinical care and substantial cost savings.

Clinical care has improved for patients because clinicians can access clinical data related to a patient's current and prior admissions "instantly" compared to the slow process of requesting a paper based medical record. Timeliness of such information can be critical when assessing a patient presenting to emergency that may be in an uncommunicative state.

The hospital to GP communication has improved markedly. Barwon research showed prior to implementing CORDis EHR the average time to completion was 2 to 10 weeks post discharge of the patient. Also the accuracy and legibility of the discharge summary was poor. The long delay of completion often meant that patients were visiting their GP's post discharge before the GP had any information about their episode of care. It was felt that this did not offer the best continuity of care.

The median time of completion post discharge was 5 hours in 2003 using CORDis EHR. The General Practitioners are generally receiving the discharge summary by fax on the day the patient is discharged from hospital and more importantly prior to the patient visiting the GP.

Major cost savings have also been achieved by faxing documents electronically. Faxing a document within CORDis EHR occurs at the click of a button and takes negligible time for the user, the cost of a local call fax is around 17 cents. Compare this to the cost of pre-printed duplicate Discharge Summary forms (15 cents each), envelopes (5 cents each) postage (40 cents each) and the labour cost for someone to fold the document, place it in the envelope and address it (50 cents) then a saving of around 88 cents per

document can be achieved. At Barwon Health over 33,000 documents were faxed via CORDis EHR in 2003 which equates to a saving of $29,000. The cost savings will be greater in 2004 as many of these documents are now being sent via encrypted email.

Timely completion of discharge summaries and the ability for medical record coders to interrogate CORDis EHR greatly reduces the time taken for coding of the discharge summary. This ultimately results in improved cash flow to the hospital.

CORDis EHR automatically copies the patient's previous co-morbidities, current procedures and investigations into the discharge summary. This results in time saving for doctors and also means these items are not missed when coding resulting in the maximum claim for services provided to the patient.

Further cost savings are also made because forms and envelopes do not need to be ordered and stored by purchasing departments and staff downtime when forms run out is eliminated. Filing costs are also reduced as Clinicians may not request a copy of the paper based medical record if they can access the information they require electronically.

A cost saving, that is difficult to quantify, is the cost saving resulting from saving clinician's time. Clinicians are often required to perform analyses and audits. With paper based records these analyses can be very time consuming and are subject to human error as the clinician can often be wading through hundreds of documents when performing an audit. CORDis EHR can produce many of these reports at the click of a button not only saving time but also providing a greater depth of detail. The ease of access to information about a patient's prior and current admission at or near to the point of care saves a great deal of time that previously required the retrieval of the patient's paper based medical record.

The clinicians also save a considerable amount of time that they used to spend talking to GPs. When the patient presented to the GP, and the GP had not yet received the discharge summary, the GP would often call the clinician to get a verbal summary of the patient's episode of care taking up both clinicians valuable time.

Time saving for clinicians and ease of information sharing with other hospital staff are the main benefits of CORDis EHR.

CORDis EHR Users

There are over 100 users of CORDis EHR within Barwon Health..

Modules:

CORDis EHR is made up of number of modules, the main ones listed below followed by a brief explanation of each.

Core System - Discharge Summary
Used in 100% acute and subacute departments, excluding emergency. The discharge summary contains information such as diagnosis, co-morbidities, progress notes, complications, investigations, procedures, medications and a follow up plan. The data is entered periodically during a patient visit and upon discharge the discharge summary is faxed to the GP at the click of a button and printed copy is forwarded to medical records.

Operation Notes
All operation notes are entered into CORDis EHR, either dictated by the clinician and typed by an audio typist or entered directly by the clinician. These operation notes are fully searchable assisting in any analysis that may be required. The operation notes are either printed and posted to the patient's GP or faxed at the click of a button from within the CORDis EHR application itself. Time savings are achieved by allowing the users to create templates for common operations performed and share these templates with other users. Addressing of the operation note, patient demographics, and admission information details are automatically entered which also saves time and eliminates the risk of data entry error.

Adverse and Sentinel Events
All discharge summaries require the clinician to complete this section before they can transmit the Discharge Summary ensuring that these statistics are kept.

Outpatient letters
Outpatient Letters are entered into CORDis EHR, either dictated by the clinician and typed by an audio typist or entered directly by the clinician. These outpatient letters are fully searchable assisting in any analysis that may be required. The outpatient letters are either printed and posted to the patient's GP or faxed at the click of a button from within the CORDis EHR application itself. Time savings are achieved by allowing the users to create templates for common letters that they send and share these templates with other users. Addressing of the operation note and patient demographics are automatically entered which also saves time and eliminates the risk of data entry error.

PBS prescribing
With the development of PBS Geelong Hospital became the first hospital in Victoria to start electronic prescribing using PBS. The PBS module allows the clinician to prescribe discharge medications in a PBS compliant format electronically. Medications are easily selected from the medication database and the scripts is printed onto preformatted PBS forms. These are then signed by the clinician and forwarded to Pharmacy for dispensing. CORDis EHR also transmits the discharge medications via HL7 back to the pharmacy dispensing system (Merlin) which saves the pharmacist time entering data and reduces the chance of human error.

The PBS Prescriber maps brand name medications to generic medications so the user can enter either but the prescriber only lets them prescribe the

generic medication. The PBS Prescriber is aware of medications requiring authority numbers and if such a medication is prescribed in a quantity requiring authority the user is alerted to this and prompted to obtain the authority. The PBS Prescriber will not allow printing of the prescription until the authority number is obtained and entered into the system. This feature alone saves the pharmacist a considerable amount of time by eliminating the need for them to chase up authority numbers and doctors at the time of dispensing. It also ensures that clinicians are aware of the legislative requirements of prescribing these medications.

Reports
A variety of reports is used to for quality measures including, complications, sentinel, adverse and incident reporting. Virtually any report is possible with CORDis EHR and new reports can be developed to suit differing needs.

Mortality Summaries
Used by the death audit committee.

TraineeLog
The Traineelog is a database file intended for the use of surgical trainees to record operations and procedures performed during their rotation at the hospital. The fields in the TraineeLog are designed to meet the minimum data set required by the Royal Australasian College of Surgeons. At the end of the trainee's rotation the trainee can export this data to a file of various formats that they can take with them and can use as examples of experience gained.

A further standalone version of the Traineelog was created (TraineeLogRT) which can be installed onto a standalone PC (a computer not attached to the hospitals computer network). The trainee's data is then easily imported into TraineeLogRT and allows the trainee to continue to enter data about operations and procedures performed at other hospitals without the need to be connected to CORDis EHR system.

A "lite" version of TraineeLogRT was created using FileMaker Mobile which runs on handheld devices such as Palm Pilot and Windows CE capable devices such as the Compaq Ipaq. This allows the clinician to enter data whilst on the move and then upload it to TraineeLogRT at a later time.

Both the TraineeLog and TraineeLogRT have various reports and analysis functions that the trainee may require.

Customised Functionality
The rapid development time of FileMaker Pro and the local (Melbourne) availability of CORDis EHR developers means virtually any customisation required to the CORDis EHR system can be achieved in a short time frame at a reasonable cost.

Some Examples of customisations created for Barwon Health are:
- Various audit forms used in clinical trials
- Patient Questionnaires

- Resident and Registrar handover sheets
- Hospital in the home running sheets
- Various Mental Health questionnaires/forms (Suicide risk assessments, Mental state examinations, Family meeting logs, Weekly reviews).
- Inguinal Hernia Pathway
- Mortality and death audit reports
- Oncology day stay records
- Automatic tagging of patients on clinical trials
- Community Assessment Risk Team forms and logs
- Adverse drug reaction recording and submitting to ADRAC
- Reporting of Pharmacist Intervention and Medication Incidents
- Patient observation charts

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