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MEDICAL SYSTEMS

MEDICAL SYSTEMS WHITE PAPER

Intelligent Cardiovascular Information System (iCVIS)

iCVIS is the application of advanced Decision Support and health informatics to address the problems faced by today's cardiologist.

The challenge - better patient management and increased productivity

The concept driving the development of an iCVIS is the application of Decision Support and Evidence Based Medicine to enable cardiologists to seek to achieve improved patient outcomes and patient safety, as well as increased productivity and better use of scarce clinical resources.

Access to an iCVIS system enables cardiologists to interact with current trends in the practice of medicine. Major developments include personalised medicine, meaningful use, electronic medical records and the emergence of the informed patient, one who is aware of patient rights and has ready access to medical apps, Internet sites and legal assistance.

Use of the iCVIS in a clinical setting – The Clinical Portal

In a clinical setting, the Decision Support based approach of an iCVIS involves the use of a Clinical Portal. The portal allows the cardiologist to access an integrated single screen presentation of all relevant patient information in real time. The Clinical Portal can present the cardiologist with an overview of critical information including patient history, current symptoms and problem list, allergies and alerts, pathology results, diagnostic images and reports and current medications.

(An example of a screen "iCVIS Current Case List - Capacity" is at Fig 1. overleaf)

The use of the iCVIS by the cardiologist enables a problem solving approach to patient management. The iCVIS can facilitate the creation of a complete and comprehensive personalised treatment plan which is based on patient history, presenting systems and recognition of the complexity of co-morbidities such as the presence of diabetes.

Access to an iCVIS enables the cardiologist to incorporate the concept of personalised medicine into patient management. The iCVIS can suggest hypotheses and provide alternative treatment plans, review clinical pathways and conduct risk assessment of treatment options. These Decision Support based features are designed to seek to improve patient outcomes and to avoid unexpected re-admissions.

The iCVIS has the ability to link problem lists and clinical pathways to ensure that all necessary investigation is performed in the correct sequence and that test results are recorded and any follow up actions completed.

The iCVIS and improved Patient Management and Patient Safety

The use of an iCVIS can enable a comprehensive approach to patient management and can assist a medical professional to ensure a higher level of patient safety. An iCVIS approach involves the consideration of the overall welfare and safety of the patient through the complete treatment cycle, involving admission, diagnosis, treatment, discharge and ongoing care. For example, through access to the electronic medical record, the medical professional can use the iCVIS to enable an overview of the history of diagnostic imaging tests, so that a medical professional reviewing the overview can take steps to minimise patient exposure to radiation over the course of investigations and treatments.

The iCVIS can also assist in patient safety by providing a tracking system so that a medical professional can create and maintain an audit trail to detect and act on any missed test results that may have arrived after the patient has been discharged. The iCVIS can also be used to keep track of the patient by enabling the professional to record that scheduled follow up visits to GPs have been completed, medication reviews have been conducted, and imaging examinations have been completed before scheduled outpatient attendances.

The use of Decision Support and cross referencing between clinical pathways and symptoms can ensure that treatment steps are not overlooked by allowing the medical professional to require the system apply automatic check lists. An iCVIS can also be used by a medical professional to undertake background and consistency checks to ensure that, for example, the medications being prescribed are recommended by the Australian Medicines Handbook (AMH) guidelines for the condition being treated and that there are no unintended consequences of multiple medications being prescribed. A basic concept of the iCVIS is the importance of the iCVIS being kept up to date with changes to treating protocols, drug / dosage / interaction recommendations and information.

Benefits at a glance

Faster
iCVIS decision support saves significant time for the care team.

Safer
Clinical risk is continuously monitored; risk notifications are automatically pushed to the care team and escalated if not dealt with.

High quality decisions
Best practice clinical protocols guide patient assessments and treatment decisions.

High quality care
iCVIS workflow automation ensures the follow-on care tasks necessary to implement decisions are executed in a timely manner.
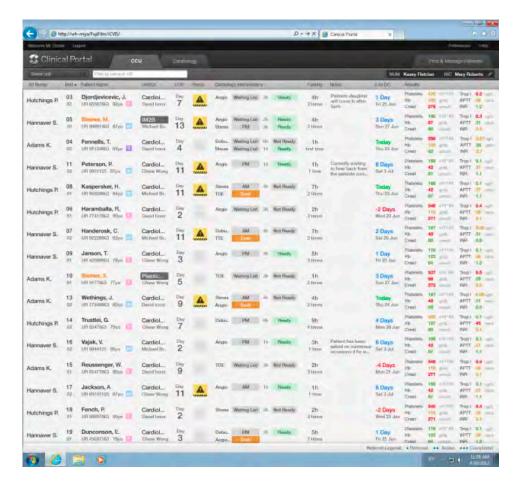
Quality outcomes
Evidence of better outcomes is self documented in the system.

Improved patient flow
Delays and barriers are identified early and are easily mitigated.

> " iCVIS displays colourcoded, evidence-based recommendations that provide clinicians with immediate decisionmaking support. "
>
> Wayne Harris
> National Business Manager
> FUJIFILM Australia

Fig 1 (left): Example of a screen "iCVIS Current Case List - Capacity"

The iCVIS and increased productivity in the management of a cardiology practice

As well as benefits on patient management and patient safety, the use of an iCVIS is an enabler of increased productivity in the management of a cardiology practice through:

Improved billing: Missed and incomplete billing issues can be resolved as a by-product of the application of iCVIS by using Evidence Based Medicine best practice to ensure that all recommended tests are performed and are also captured in the billing cycle.

Intelligent computer based features aid productivity: Use of single sign on, proximity indicator and facial recognition features can eliminate keyboard waiting times; automatic transfer of data to reports can eliminate inaccurate rekeying; an iCVIS patient-centric approach, rather than silo based or technology based systems, can ensure consistency of record keeping on patients through links to the electronic medical record.

The iCVIS Clinical Portal can provide the cardiologist with a single point of presence, giving the same look and feel when using the system in a consulting room, public or private hospital, or at home. The implementation of the IHE Home Office Profile can provide a fully bi-directional integration, including ordering/scheduling of an imaging exam, status reporting for that exam, report creation and web-based imaging exam review integration.

Maximising patient throughput: Decision Support based algorithms in an iCVIS can provide cardiology department staff with the ability to dynamically manage multiple clinics and machines in multiple locations; provide dynamic work lists for rescheduling of urgent cases; monitor check lists of patient status and completion of fasting requirements.

Managing junior staff: A medical professional can use an iCVIS and Decision Support to monitor staff productivity and performance, assist in identification of errors and need for further training, monitor junior residents adherence to checklists, e.g. check patient status every four hours, provide input to peer review activities, highlight unintended outcomes, monitor reports prepared by technicians, conduct global analysis of reports for coherence by application of natural language programming (NLP), e.g. does the report make sense, is it internally consistent with previous reports on the same patient.

Patient Portal providing patient access to reliable information: Use of iCVIS to develop apps and provide secure Internet cloud-based access to patient portals; enable discussion of relevant information on disease management and lifestyle modification; facilitate secure links to Medicare and BUPA resources and links to Evidence Based Medicine reports.

iCVIS
Examples of clinical benefits of decision support and iCVIS

UK study

Decision Support systems significantly improved clinical practice in 68% of trials - seventy studies were included.

Title: "Improving clinical practice using clinical decision support systems: a systematic review of trials to identify features critical to success".

Authors: Kensaku Kawamoto, Caitlin A Houlihan, E Andrew Balas, David F Lobach.

Journal: BMJ, doi:10.1136/bmj.38398.500764.8F (Published 14 March 2005).

USA study

The use of physician Decision Support software based on appropriateness criteria eliminated three-fourths of inappropriate imaging exams for evaluating coronary artery disease (CAD).

These changes in test ordering were associated with greater intended changes in post-test medical therapy.

Title: "Impact of an Automated Multimodality Point-of-Order Decision Support Tool on Rates of Appropriate Testing and Clinical Decision Making for Individuals with Suspected Coronary Artery Disease: A Prospective Multicenter Study".

Authors: Fay Y. Lin, Allison M. Dunning, Jagat Narula, Leslee J. Shaw, Heidi Gransar, Daniel S. Berman, James K. Min.

Journal: J Am Coll Cardiol. 2013; doi:10.1016/j.jacc.2013.04.059. (Published 21 May 2013).

Corresponding author: James K. Min, Cedars-Sinai Heart Institute, Cedars-Sinai Medical Center, S. Mark Taper Building, Rm 1253, Los Angeles, CA 90048 Phone: 310-423-2707 Fax : 310-423-0811

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