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BUILDING CARDIOLOGY CENTERS OF EXCELLENCE



## Web-based Referral and Triage System Saves Lives, Time and Money

### Improving Access to Cardiac Services for Patients Referred with Acute Coronary Syndrome from Remote Hospitals

Central Queensland, Australia

#### Highlights

##### **Systematic, Coordinated Referral, Prioritization and Scheduling of Acute Coronary Syndrome Patients.**

To develop a centralized, coordinated system for the referral, prioritization, management and scheduling of patients with ACS from non-tertiary facilities, staff from within the Queensland Central Area Health District's tertiary facilities implemented a computer-based solution linked to a Web-based referral interface. The Web-based referral system links eight referral sites with two tertiary centers and is utilized by the Queensland Clinical Coordinating Centre (Queensland Ambulance Service) for the transportation of patients from rural centers.

##### **Average Transfer Time Decreased from 3.7 days to 1.8 days.**

The Queensland Clinical Coordinating Centre (Queensland Ambulance Service) accesses up-to-date information regarding the priority, medical needs and transportation requirements of patients as entered by referring and tertiary facilities. One tertiary facility experienced a decrease from 3.7 days to 1.8 days in average time to transfer.

##### **Enhanced Education at Referral Sites.**

Through the entry of specific clinical data into "Form 1" of the referral system, referring-site clinicians have gained a greater understanding of the requirements for cardiac assessment and the ACS guidelines used within Australia. The clinical details entered into this form are reviewed by the Cardiac Consultants at the tertiary facilities to more clearly identify the condition and priority of the patient being referred.



*The Prince Charles Hospital – Brisbane*

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### Improved Communication and Collaboration Between and Within Hospitals throughout the Queensland Central Area.

The ACS system enables clear and rapid information exchange between tertiary and referral hospitals, addressing the need for easier and faster assessment and transfer of acute referrals. The collaborative approach taken by all sites to implement this system has reduced the waiting time for referrals and has improved the clinical communication between facilities.

### Managing the Referral of Remote Patients: A Cooperative Effort

In 2004, staff from within the Queensland Central Area Health District's tertiary facilities, The Prince Charles Hospital (TPCH) and Royal Brisbane Women's Hospital (RBWH), collaborated to improve the referral and triage of acute coronary syndrome (ACS) patients from regional, rural and remote areas.

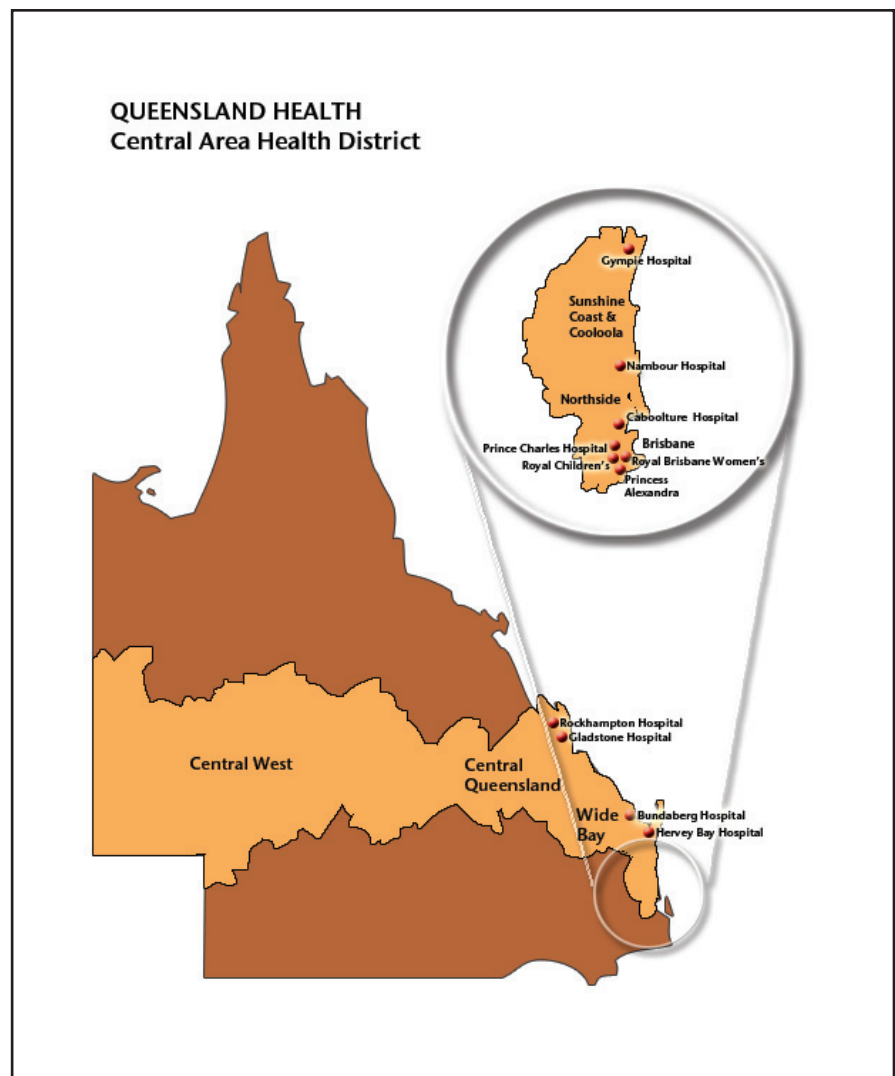
Led by TPCH Director of Cardiology Dr. Darren Walters, the team created a centralized, coordinated system to streamline the referral, assessment and transfer process.

Implementing a Web-based system has improved patients' access to tertiary cardiac services and decreased transfer time dramatically. The ACS system has also led to numerous additional benefits, including increased transparency of decision-making, better compliance with guideline-based treatment, greater customer satisfaction, and improved communication both between and within hospitals.

"Queensland Health's Central Area Health District has two major tertiary facilities based in the southeast corner of the state," says Senior Project Officer Evon Greener. "The remoteness of many hospitals within Queensland is one of the biggest challenges we have. The provision of timely medical advice, treatment and/or transfer of patients diagnosed with ACS is paramount."

### Problems with an All-Manual System

Before implementing the Web-based ACS system, transferring patients was an entirely manual process. When a patient at a remote hospital presented symptoms of ACS, staff at the facility were required to complete a form, and the referring physician would write a letter summarizing the patient's condition and requesting that Cardiac Specialists review the case. The physician's



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letter and form would then be faxed to the tertiary facilities in Brisbane.

Problems experienced with the manual method were:

- **Limited clinical detail** provided for tertiary facilities to accurately review and prioritize the condition of the patient.
- **Numerous phone calls** requesting additional information or patient updates.
- Some referrals would be faxed to both facilities, resulting in **duplication of effort** at the tertiary facilities, not only for the Cardiac Clinician but also bed management and administration services.
- Incorrect dialing of fax numbers resulting in **delays** for treatment or transfer of patients.

“The big concern with fax technology,” says Evon. “Is that if a referral site accidentally dialed a wrong number, the fax would not get through to the Consultant. Only the next day when the hospital rang and asked about the status of that particular patient’s referral would the problem be discovered.”

The transparency made possible by the Web-based technology has eliminated these inefficiencies.

### GOALS OF THE ACS COMMITTEE

- Establish a centralized, coordinated management system for ACS Referrals.
- Increase the ability to meet target time to transfer in accordance with established ACS guidelines.
- Improve remote patient referral and access to tertiary facilities.
- Educate medical staff at referral centers in the clinical assessment of patients with ACS.
- Improve patient outcomes.

### ELECTRONIC ACS REFERRAL: HOW IT WORKS

1. Remote referral hospital enters ACS data into the Web-based ACS Referral system.
2. The ACS Coordinators at either tertiary hospital reviews the information in ACS and escalates the referral to the relevant Cardiac Consultant. The referral is updated with the new status as a means of communicating with the referral hospital and other tertiary hospital
3. The Consultant then clinically assesses the referral either on-line in ACS or from the optional ACS printed report.
4. Once accepted, the site ACS Coordinator updates the referral with a new status, including priority of the referral. The Coordinator also completes any clinical notes and advises the referring site to commence transport arrangements, etc., all through the ACS system Referrals Update form.
5. The system also auto-generates an Accepted or Rejected Status email to the referral hospital as an additional form of communication.
6. Furthermore, patients Accepted by TPC are linked to the Pending List of the CardioStar CardioSchedule module, providing an additional level of patient flow and improved processes.

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### Web-based System Yields Speed, Safety, Knowledge

After determining the scope and specifications of the ACS Project, work commenced with LUMEDX to develop the database and referral interface needed.

The system went live with two pilot sites in December 2006, and its benefits quickly became apparent: patients could be transferred to Brisbane for treatment much faster utilizing the ACS system.

Despite the workflow changes that moving to an electronic system necessitated, "We had uniformity within six months," says Evon. "People saw the value of the system almost right away. Instead of waiting in line for somebody to review a patient, fit them into already busy schedules in theaters or wait for beds to become available in hospitals, we now had two facilities seamlessly looking [for available beds, schedule openings, etc.], with referral sites having the added benefit of seeing a holistic view of what was happening at these facilities."

### Advanced Software Supports Clinical Accuracy, Quicker Response Time, Improved Care and Contained Costs

The ACS system has enabled diverse improvements in the care of patients identified with Acute Coronary System within Queensland Health, including greater efficiency in their quality of care.

For example, the ACS software includes a TIMI score calculator. "The calculator can quickly determine the score of the patient, whether the patient is a STEMI or Non-STEMI. Regardless of the level of cardiac knowledge at a referring hospital, the ACS module calculation provides

## BENEFITS

### Referral Hospitals

- Overall process improvements for the referral of ACS patients.
- More effective communications with tertiary hospitals.
- Reduced phone calls required to get referrals assessed.
- Elimination of lost faxed referrals.
- Reduced time for assessment outcomes.
- Reduction in waiting times to transfer.
- More timely advice on patient management plans.

### Tertiary Facilities

- Reduced phone calls received and made to multiple hospitals regarding referrals.
- Referral hospital identifies relevant clinical history along with the clinical story prior to submitting a referral for assessment.
- Improved response times by tertiary facilities.
- Improved time frame for formulating patient management plans.

## PROJECT OUTCOMES

- Improved levels of clinical information for ACS referrals.
- Reduction in average time to transfer of patients with ACS.
- Enhanced education of Medical Officers in remote hospitals.
- Improved knowledge of the ACS guidelines.
- Improved coordination due to the involvement of QCC (Queensland Ambulance Service).
- Greater customer satisfaction (based on user survey).

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a more accurate assessment of the risk score to the patient,” Evon says.

Another benefit is enhanced education of Medical Officers in the remote hospitals. The module includes Form 1, the detailed clinical form. Form 1 has helped referring sites without expert cardiac knowledge achieve a far better understanding of the requirements for ACS clinical assessments, as well as an improved knowledge of ACS guidelines. Further, when Form 1 is completed, patients are more easily prioritized and action can be taken to get the patient transferred according to priority and the clinical detail contained within the form.

The Critical Care Coordinating Centre (Queensland Ambulance Service) also uses the ACS system to manage transport of patients from remote areas. In emergency cases, patients can be airlifted in as little as two hours.

Says Margaret Dahl, TPCP ACS Coordinator, “The response time TPCP advertises to a referral hospital is one hour from the time a referral has been submitted. The number of telephone calls between tertiary and referral hospitals has been reduced, as the ACS system features a Referral Summary and Update screen allowing all hospitals 24-hour access to and for updates.” The new system has also eliminated the duplication of work resulting from referral hospitals forwarding case information to both TPCP and RBWH simultaneously.

Because the referral system is now automated, patients move up the waiting list more rapidly, minimizing costs and length of stay. The TPCP has evidenced the average transfer time has decreased from 3.7 days to 1.8 days, so the time a patient sits in a bed in a referral site waiting to be transferred is reduced substantially.

Delivering real-time clinical and administrative information across the region has given both referral and tertiary hospitals more time to formulate patient management plans. Caregivers can now work truly collaboratively, easily communicating between sites and adjusting patient treatment when necessary. Thus patients get the best quality care with minimal delay regardless of location.

**About LUMEDX:** With over 600 heart center clients worldwide, LUMEDX is the market leader in fully integrated cardiovascular information and imaging systems and the No. 1 independent integrator of cardiology information solutions. LUMEDX offers the most proven, comprehensive package of clinical information tools, cardiovascular products, and services to help medical institutions enhance quality of patient care, reduce costs, streamline workflow, increase patient volume, and grow revenue.

### LUMEDX SOLUTIONS AT THE PRINCE CHARLES HOSPITAL

- Apollo Advance™ Clinical Data Repository
- ACS Web Referral System
- CardioSchedule™ Real-Time Patient & Resource Scheduling
- HL7 ADT Interface
- HIS Interface



555 Twelfth Street, Oakland, CA 94607  
Tel 800.966.0699 • Fax 510.419.3699  
sales@lumedx.com • www.lumedx.com