

## Towards a Safer Culture: clinical pathways in acute coronary syndromes and stroke

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DEFINING AND IMPLEMENTING “best practice” in the care of patients is one of the major challenges facing modern medicine. Organised care of patients with stroke is known to improve outcomes,<sup>1</sup> yet only a small proportion of patients receive this care in Australia.<sup>2</sup> Similarly, the publication of national guidelines<sup>3</sup> and academic detailing<sup>4</sup> have had little or no effect on the use of drugs that are known to improve outcomes for patients presenting with acute coronary syndromes (ACS). Multifaceted interventions<sup>5</sup> that change the system of care may be the best way to translate research evidence into best practice.<sup>6</sup>

### Addressing the problem

Towards a Safer Culture (TASC) aims to develop a sustainable quality system (Box 1) to better translate guideline recommendations into clinical practice. Multidisciplinary teams implement clinical pathways for the initial management of ACS and stroke. The teams, facilitated by a project officer, monitor the process and outcomes indicators, then design interventions to improve patient outcomes. Expert working groups play an important role in incorporating evidence-based guidelines in the design of the pathways. These expert groups also define and revise minimum datasets, standardise data definitions, and advise on report format. Project and hospital steering committees support teamwork and clinical leadership.

The key tools used to implement TASC in participating hospitals are evidence-based clinical pathways and a measurement system to promote improvement in clinical practice. Pathways for ACS management were initially developed at the Nepean Hospital for the triage of chest pain.<sup>7</sup> Pathways for stroke management, modelled on the ACS pathways, were then developed at John Hunter Hospital. Project officers are employed at each hospital to facilitate the adaptation of the pathways for local use,

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### ABSTRACT

- Towards a Safer Culture (TASC) aims to provide a safer culture in hospital departments by introducing clinical pathways for the management of patients with acute coronary syndromes or stroke.
- Specific clinical pathways have been implemented for patients with different levels of risk to guide the most appropriate evidence-based medical care for each patient.
- Pathways facilitate continuity of care across different clinical departments by identifying gaps in care, and clarifying tasks and responsibilities.
- A multidisciplinary and interdepartmental approach to managing patients is seen as an effective way of effecting change.
- A system for “point-of-care” data acquisition, a centralised database and web-based reporting enable benchmarking for participating hospitals.
- A comprehensive range of educational/training strategies is used to facilitate multidisciplinary teamwork and promote clinical leadership.
- Phase 1 of TASC was successfully piloted at four hospitals in New South Wales, Victoria and Queensland. TASC is currently being rolled out to 29 hospitals in NSW and three hospitals in Western Australia.

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multidisciplinary teamwork, and routine data feedback. Clinical champions and executive sponsors are actively enlisted and supported to enhance these activities.

TASC pathway forms replace the handwritten medical record, improve documentation of clinical findings, and enable risk stratification to guide subsequent management, as described in an earlier article.<sup>7</sup> The forms are designed in a software program that enables data acquisition by scanning, optical character recognition and clinician verification (Box 2). Each participating hospital modifies the pathways to suit local circumstances, but ensures that a minimum dataset is collected, enabling comparison over time and with other hospitals.

Development of a sustainable culture of evidence-based medicine and clinical practice improvement requires effective leadership, development of team skills, and organisational structures to support multidisciplinary interaction.<sup>8</sup> The focus for change within TASC resided in local multidisciplinary teams, so a key strategy was to support team-building and empower clinicians to adopt leadership roles to

initiate practice improvement. The educational program included:

- a clinical pathways workshop;
- a physician leadership workshop;
- clinical risk management workshops; and
- a variance-analysis and root-cause-analysis workshop.

**Pathways for ACS management**

The key to establishing a system for triaging patients presenting with chest pain proved to be the adoption and application of risk-stratification algorithms,<sup>7</sup> as recommended by the national guidelines.<sup>3</sup> This enabled establishment of four distinct pathways of care, for which key process and outcome indicators could be measured (see Box 3).

To enhance the efficient but safe management of intermediate-risk patients, protocols for accelerated discharge<sup>8</sup> are promoted.

For low- to intermediate-risk patients, clinical practice improvement initiatives focus on efficiency (minimising length of stay) and safety (secondary risk stratification: serial electrocardiography and cardiac biomarker monitoring followed by stress testing). All hospitals strive to reduce the rate of discharge of intermediate patients who have not completed secondary risk stratification. This has been difficult to achieve because of the additional resources required for stress testing, particularly on weekends.

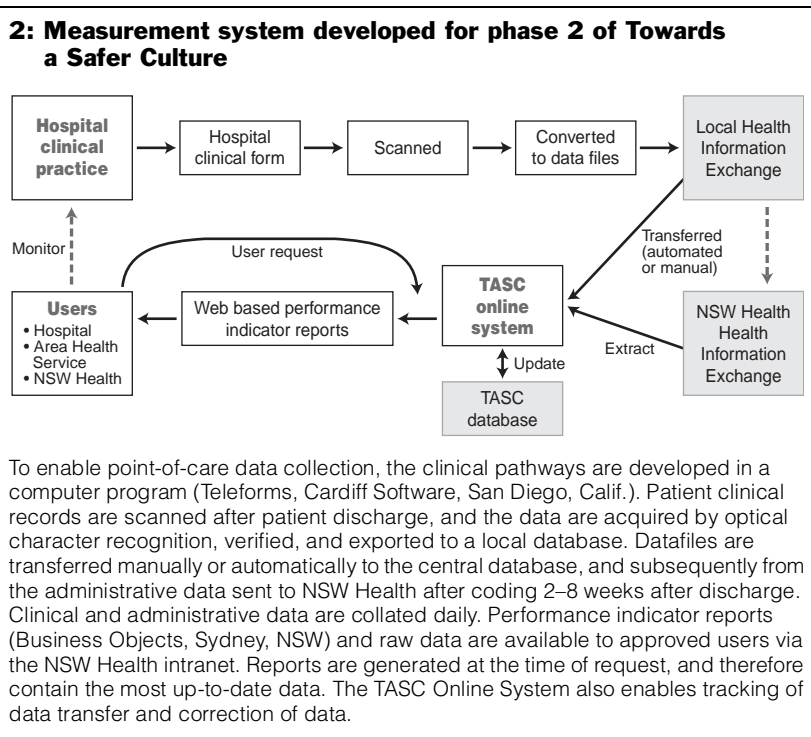
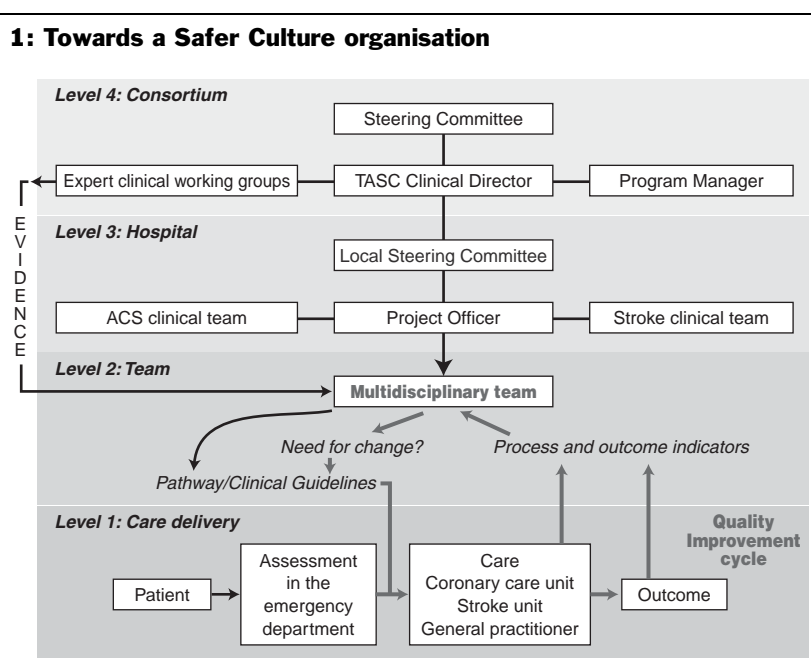
For high-risk patients and those with ST elevation myocardial infarction (STEMI), clinical practice improvement focuses on appropriate therapy and rapid revascularisation to reduce late myocardial infarction and readmissions.<sup>7</sup>

**Pathways for stroke management**

Because there were no agreed national stroke care guidelines when the program began, developing stroke pathways was more difficult than developing ACS pathways. From review of the available international evidence and practice guidelines,<sup>9-11</sup> the TASC stroke expert group achieved consensus that patient outcomes are likely to be improved by early implementation of coordinated multidisciplinary team care, application of complication-prevention strategies, and secondary prevention in the emergency department phase of stroke care. The key process and outcome indicators for stroke are shown in Box 4.

In essence, the expert group designing the pathways aimed to initiate many of the important components of stroke unit care in the emergency department setting. These included:

- standardised assessment of stroke severity using a simple and reproducible stroke scale;<sup>12</sup>



To enable point-of-care data collection, the clinical pathways are developed in a computer program (Teleforms, Cardiff Software, San Diego, Calif.). Patient clinical records are scanned after patient discharge, and the data are acquired by optical character recognition, verified, and exported to a local database. Datafiles are transferred manually or automatically to the central database, and subsequently from the administrative data sent to NSW Health after coding 2–8 weeks after discharge. Clinical and administrative data are collated daily. Performance indicator reports (Business Objects, Sydney, NSW) and raw data are available to approved users via the NSW Health intranet. Reports are generated at the time of request, and therefore contain the most up-to-date data. The TASC Online System also enables tracking of data transfer and correction of data.

- identification of potential high-risk stroke patients using the stroke severity assessment tool;
- early computed tomography (CT) scanning, with urgency based on risk stratification;
- early implementation of acute therapies and preventive strategies, particularly for high-risk patients; and
- attention to detail in stroke care to minimise complications (eg, early swallowing assessment by medical or nursing staff and interventions for fever and hyperglycaemia).

### 3: Key indicators for management of acute coronary syndromes in the emergency department

Process indicators	Outcome indicators
<b>ST elevation myocardial infarction</b>	
■ Time to thrombolysis or PTCA	■ Late MI and recurrent ischaemia
■ Primary aspirin, $\beta$ -blocker, heparin use	■ In-hospital death
■ Coronary angiography rate	■ Hospital length of stay
■ PTCA and CABG rates	
<b>High risk</b>	
■ Primary aspirin, $\beta$ -blocker, heparin use	■ Late MI and recurrent ischaemia
■ Coronary angiography rate	■ In-hospital death
■ PTCA and CABG rates	■ Hospital length of stay
<b>Intermediate risk</b>	
■ Admission rate	■ Early readmission rate
■ Complete 8 h monitoring and biomarker assays	■ "Missed MI"
■ Exercise test before discharge	■ Hospital length of stay
<b>Low risk and non-cardiac chest pain</b>	
■ Admission rate (low)	■ Hospital length of stay (< 4 h)

PTCA = percutaneous transluminal coronary angioplasty. CABG = coronary artery bypass grafting. MI = myocardial infarction.

Building on the successful application of risk stratification in the ACS pathways, the expert group reviewed a range of tools to assist clinicians in the risk assessment of patients presenting with stroke symptoms. The Scandinavian Stroke Scale<sup>12</sup> was chosen for its simplicity, inter-rater reliability (especially between nurses and doctors), and the availability of supportive training tools.

Participating hospitals strive for early radiological investigation of high-risk patients. In one rural hospital, this enabled early identification and transfer of two patients with intracranial haemorrhage; these patients may have languished without prior agreement for early investigation. For low-risk patients (those with certain transient ischaemic attack [TIA]), a specific outpatient clinic for early follow-up within 14 days was established at John Hunter Hospital. This intervention reduced the overall TIA admission rate by 38%, while overall bed utilisation was reduced by 21%.

#### Participants

In phase 1 (November 2000 to November 2002), four hospitals participated: John Hunter Hospital and Nepean Hospital, NSW; Townsville Hospital, QLD; and Frankston Hospital, VIC. The program was coordinated by a multidisciplinary national steering group and supported by local multidisciplinary teams (Box 1).

Each team included senior administrators; medical, nursing and allied health staff representing the emergency department, general medicine, cardiology and neurology; and consumers from local support groups. Staff from other

disciplines joined when their input was required. Local teams sought guidance from the national ACS and stroke expert working parties on clinical issues such as risk stratification, application of clinical guidelines to pathway design, and minimum dataset indicators.

In phase 2 (2003 to present), 29 hospitals in 12 area health services in NSW are participating. TASC is a joint initiative of the NSW Institute for Clinical Excellence and the Royal Australasian College of Physicians (RACP) in collaboration with the Australasian College of Emergency Medicine.

#### Challenges in implementation

TASC aimed to initiate changes in the system of care through an innovative clinical pathway system for cardiac and stroke patients, with a focus on risk management. Success of the program will ultimately be determined by prolonged uptake of the pathways, use of the measurement system, and finally, demonstrated improvement in patient outcomes.

With regard to pathway uptake, clinicians accepted the pathways because they help to classify patients presenting at the emergency department according to their risk of developing complications, and hence guide further investigations and appropriate treatment. Identification of clinical champions willing to lead the adoption of the pathways in their departments was critical to successful uptake. The champions often became involved because they were encouraged by the ease of data capture directly from the pathway forms and the potential to obtain timely data.

Many difficulties were encountered in implementing the clinical pathways. These included:

- difficulties in engaging senior clinicians and persuading them to participate (eg, engaging a cardiologist or neurologist in the program);
- concurrent projects that reduced the time clinicians could devote to the program;
- difficulties in engaging junior medical staff because of their high turn-over, limited free time and heavy clinical loads; and
- problems in finding a common meeting time across disciplines.

The ability of project officers and executive sponsors to overcome these barriers determined the speed of pathway adaptation and implementation.

Many hospitals found that the process of pathway adaptation identified misallocation of resources. This has led to the creation of liaison nursing positions, provision of additional after-hours medical registrars, and the availability of weekend exercise stress tests for ACS patients and after-hours CT scanning for stroke patients. These successes have helped to attract new clinical champions and hospitals.

Developing an effective measurement system for timely data feedback proved more difficult, and the system is only now starting to work effectively. From the outset of phase 1, retrospective chart audit as a means of data capture was rejected by the steering committee, as it was deemed to be

too time-consuming and unsustainable in the long-term. Thus, we chose to use form-reading software to facilitate data collection into a local database. In phase 1, this worked successfully, but each hospital lacked the personnel to automate reports for timely feedback of data. Significant problems were encountered with the transmission to and merging of the data into a central database. The involvement of three states with different computer systems further hindered this process, because data in administrative data-sets could not be obtained electronically. This experience aided in the design of the current data collection and reporting system, which was developed during 2003 for use in phase 2 of TASC (Box 2).

A consequence of the problems in central collation of data was that, although we were able to demonstrate local examples of improved care, we have not been able to confirm that these changes occur across all participating hospitals. We anticipate that the recent completion of our data collection system will enable this analysis.

Involving consumers effectively in healthcare has been challenging. TASC provided an opportunity for healthcare professionals and consumers to explore how the role of consumers in healthcare might be developed. It revealed how the perspective of former patients can be useful for planning systems of care. Participation by former patients helped identify effective methods to involve consumers, their families and carers in making decisions about their care. They also helped to facilitate provision of additional resources to improve care and to evaluate the program. In October 2002, the Nepean Hospital TASC consumer group won the “Minister’s Award” at the NSW Health Baxter Quality Improvement Awards ceremony for their entry “Consumers Designing Healthcare” in recognition of their strategic role in TASC.

**Key lessons**

A multidisciplinary and interdepartmental approach to managing patients has clearly been seen as an effective way of effecting change. Teams are not a “one type fits all”, and team functioning is not consistent over time, so it requires constant reinvigoration. We found that this needs to be supported by the organisation, by allocating team participation time to clinicians. Cultivation of the physician-administrator relationship is also important. Inadequate recognition and support for effective leadership is a major barrier to effecting changes within the clinical setting. Enthusiastic and energetic lead physicians attract clinicians’ interest in participating in the team, and are pivotal in the consultation process with key clinicians and management. Local ownership is crucial for promoting enthusiasm for pathway use.

The educational program emphasised the importance of engaging clinicians from all relevant areas for the program to be successful. Sponsorship by the RACP was an important strategy for engaging doctors within the teams.

The role of the local multidisciplinary team in actively reviewing the process of care has been seen as constructive. TASC relied on committed clinicians defining and explain-

ing what they did for the relevant patient group, and then reviewing the evidence to implement it most effectively. The multidisciplinary team meetings to discuss concerns and improve communication between the emergency and cardiology, neurology, pathology and radiology departments were also constructive.

A post-program survey of 295 TASC staff showed very strong support for the multidisciplinary approach,<sup>13</sup> with most respondents overwhelmingly or strongly agreeing with the following statements:

- *Multidisciplinary-based care is an effective process for care delivery* (94%); and
- *Team-based care plays an important role in my current clinical activities* (91%).

We learned that discrete quality improvement projects are more likely to be sustainable when they are integrated into mainstream activities with central funding. For example, in

<b>4: Key indicators for stroke care</b>	
<b>Process indicators</b>	<b>Outcome indicators</b>
<b>All stroke</b>	
<ul style="list-style-type: none"> <li>■ Admission rate by stroke severity</li> <li>■ Time to clinical assessment</li> <li>■ Time to CT scanning</li> <li>■ Time to emergency department separation</li> <li>■ Severity assessment completion rate</li> <li>■ Identification of high risk categories</li> <li>■ Completion of swallow assessment</li> <li>■ Commencement of interventions for fever and hyperglycaemia</li> </ul>	<ul style="list-style-type: none"> <li>■ Discharge dependency level</li> <li>■ In-hospital death</li> <li>■ Hospital length of stay</li> <li>■ Stroke complications during stay</li> <li>■ Pneumonia</li> <li>■ Pressure areas</li> <li>■ Deep venous thrombosis</li> <li>■ Urinary tract infection</li> </ul>
<b>Ischaemic stroke</b>	
<ul style="list-style-type: none"> <li>■ Commencement of antithrombotic therapy in the emergency department</li> <li>■ Identification of patients potentially eligible for acute therapies</li> </ul>	<ul style="list-style-type: none"> <li>■ In-hospital death and dependency rates</li> <li>■ In-hospital complication rates</li> <li>■ Length of stay</li> </ul>
<b>Intracerebral haemorrhage</b>	
<ul style="list-style-type: none"> <li>■ Identification of cases requiring possible neurosurgical intervention</li> <li>■ Commencement of blood pressure lowering according to pathway</li> </ul>	<ul style="list-style-type: none"> <li>■ In-hospital death and dependency rates</li> <li>■ In-hospital complication rates</li> <li>■ Length of stay</li> </ul>
<b>Transient ischaemic attack</b>	
<ul style="list-style-type: none"> <li>■ Admission rate by risk category</li> <li>■ Commencement of antithrombotic therapies in the emergency department</li> </ul>	<ul style="list-style-type: none"> <li>■ Stroke rate in patients admitted with TIA</li> <li>■ Re-presentation rate in patients discharged after TIA</li> </ul>
<p>CT = computed tomography. TIA = transient ischaemic attack.</p>	

phase 2, we developed the measurement system in partnership with NSW Health, and the TASC Online System is now being considered for use in other clinical areas.

### Future directions

TASC offers a system for integrated evidence-based medicine and clinical practice improvement. The system is facilitated by multidisciplinary teams and routine feedback of data. The program supports these teams and clinical leadership through the provision of evidence-based tools and processes for local adaptation and implementation, a comprehensive education strategy, and project officers to provide support.

Lessons learned during phase 1 have been useful in informing the roll-out of TASC to 29 hospitals in New South Wales and three hospitals in Western Australia. The RACP began collaborating with the Western Australian Department of Health to pilot a stroke TASC program in a metropolitan and district hospital in Perth in 2003.<sup>14</sup> The imminent implementation of computerised medical records has the potential to accelerate the uptake of TASC processes. By establishing a quality system that overcomes barriers to quality improvement, the TASC program has the capacity to improve safety and clinical outcomes for patients who present with either of two high-cost, high-volume conditions.

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