In the 16 years since the introduction of the Victorian State Trauma System (VSTS), preventable death and disability from major trauma has reduced significantly. Today, the VSTS is considered a world leader in integrated trauma systems, with several international jurisdictions implementing trauma systems based on the VSTS model.

The VSTS is co-funded by the Department of Health and Human Services and the Transport Accident Commission to ensure major trauma patients are managed optimally.

The objective of the VSTS is to reduce preventable mortality and improve the outcomes of severely injured patients by matching their needs to an appropriate level of treatment in a safe and timely manner.

The VSTS aims to ensure that as many major trauma patients as possible receive their definitive care at a major trauma service (MTS) or equivalent specialist trauma service (the Austin Hospital for spinal cord trauma and the Metropolitan Neurological services (MNS) for older patients with isolated head injuries).

This guideline is developed for all clinical staff involved in the care of trauma patients in Victoria. It is intended for use by frontline clinical staff that provide early care for major trauma patients; those working directly at the Major Trauma Service (MTS) as well as those working outside of a MTS.

These guidelines provide the user with accessible resources to effectively and confidently provide early care for critically injured patients. They provide up-to-date information for frontline healthcare clinicians. The guideline has followed the AGREE II methodology for guideline development and is under the auspice of the Victorian State Trauma Committee (VSTC).

There is clear evidence that the VSTS has been highly effective in improving the clinical management and outcomes of major trauma patients, with continued improvements achieved.

Key elements of the VSTS that underpin its success include:

- Coordination of pre-hospital and acute care services.
- Designation of two adult and one paediatric hospital as MTS hospitals, with all other potential trauma-receiving hospitals assigned a trauma designation according to clinical capacity.
- Defined triage guidelines for ambulance transportation of patients to MTS hospitals.
• Statewide system organisation and management of major trauma response through Adult Retrieval Victoria (ARV) and the Paediatric Infant Perinatal Emergency Retrieval Service (PIPER) for patients less than 16 years.
• A ministerial committee and subcommittees to oversee the trauma system and identify opportunities for continuous improvement.

Emphasis points:
• An integrated and inclusive trauma system, the VSTS commenced in 2000.
• The VSTS delivers a systemic clinical pathway for efficiently managing major trauma patients.
• The treatment of critically ill patients with multiple injuries requires a multidisciplinary, coordinated and integrated system of trauma care.
• Integrated trauma care systems have been shown to reduce preventable deaths.
• The introduction of the VSTS has been associated with a significant reduction in mortality and morbidity from major trauma.
• The designation of all 140 potential trauma-receiving hospitals reflects the clinical capabilities of each hospital.
• High compliance with major trauma guidelines and protocols ensures the right patient to the right level of care in the shortest time.
• The MTS hospitals are designed to provide specialised intensive care with the necessary multidisciplinary teams to manage critically injured patients.
• Clinical evidence indicates that patients with major trauma achieve better outcomes when definitive care is provided at an MTS or a specialist trauma service (the Austin Hospital for spinal cord trauma and the Metropolitan Neurosurgical Services (MNS) for older patients with isolated head injuries). The proportion of patients transferred directly to an MTS hospital or specialist trauma services has risen significantly since the VSTS began.
• Appropriate inter-hospital transfers are now consistently around 90 per cent and above.
• ARV or PIPER (for paediatric patients) is the first point of call to initiate retrieval and transfer of trauma patients.
• The VSTS is enhanced and strengthened by a statewide trauma education system that provides clinical and system education on the early management of major trauma patients.

The success of the VSTS and its impact on patient outcomes is a result of the work of all staff providing care to major trauma patients at every stage of the patient journey. Good early trauma care, appropriate and timely transfer and best practice in definitive care continue to improve outcomes for Victorian victims of major trauma.
2. Introduction

For some time, Victoria has been a significant leader in the development and implementation of innovations to improve the care and outcomes of major trauma patients. To achieve the world-class trauma system that exists in Victoria today, a ministerial taskforce was established in 1997 to provide advice to the State Government on a best practice model that would be responsive to the needs of major trauma patients. This taskforce undertook a review, with extensive consultation and provided recommendations for a comprehensive and integrated system of trauma management.

The Review of the Trauma and Emergency Services 1999 (RoTES) report led to the VSTS being established in 2000. The ROTES Report found that improvements to reduce trauma morbidity and mortality could be achieved by enhancing trauma patient management at all stages. The RoTES report made more than 100 recommendations, which provided a framework for an integrated system of care for major trauma patients.

Today, implementation of these recommendations is substantively complete. Since its implementation the VSTS has continued to evolve and adapt to improve the delivery of trauma care. The system is subject to a process of continuous improvement through outcomes measurement, monitoring, analysis and reform. Information from the Victorian State Trauma Registry is regularly used to review system performance and inform system improvements, new policy initiatives and trauma prevention project work.

3. Definition of major trauma

In the absence of an internationally recognised standard definition of major trauma, Victoria applies the following operational definition of major trauma in injured patients:

- Death after injury.
- Admission to an intensive care unit for more than 24 hours, requiring a period of mechanical ventilation.
- Serious injury to two or more body systems.
- An Injury Severity Score (ISS) over 12, or
- Urgent surgery for intracranial, intrathoracic or intra-abdominal injury, or for fixation of pelvic or spinal fractures.

4. Key features of the Victorian State Trauma System

- Two adult and one paediatric hospital have been designated as MTS hospitals: The Alfred, the Royal Melbourne and the Royal Children’s Hospital. MTS hospitals have dedicated trauma teams comprising clinicians with a range of specialist expertise, to receive major trauma patients and manage the initial response.
- Statewide system organisation and management of major trauma response is coordinated through ARV and PIPER.
- Triage and transfer protocols prescribe specific physiological and anatomical criteria, and how major trauma patients should be transferred across the trauma system.
- The Ministerial Advisory Committee, the State Trauma Committee and its subcommittees oversee the VSTS and provide advice on policy development, funding, system performance and quality management, comprehensive governance model.
The Victorian State Trauma Registry was established in 2001 to monitor the effectiveness of the VSTS. The Registry is funded by the department and the Transport Accident Commission (TAC). Trauma data is collected for the 140 hospitals and healthcare facilities that can manage major trauma patients in Victoria. The Registry collects data to assess trends in patient characteristics, management and outcomes. Reports based on VSTR data are published annually.

The trauma advice and referral telephone line is coordinated by ARV and provides clinical support and advice to clinicians managing major trauma patients. It also coordinates the referral and transfer of patients to the MTS hospitals.

The Trauma Case Review Group (CRG) provides advice on transfer policy, analysis and best practice management of major trauma patients. The focus of the CRG is to improve the quality of major trauma care by reviewing major trauma cases that fall outside of the Victorian major trauma guidelines and where the patient journey is not considered optimal. The CRG process is now an embedded feature of the VSTS that aims to improve compliance with major trauma guidelines through review and feedback to health services.

5. Victorian State Trauma System outcomes

The VSTS is one of the most highly regarded integrated trauma systems in the world, providing excellence in major trauma patient care. While patients managed by the system continue to grow, significant gains have been made in trauma management and the outcomes of major trauma patients following the introduction of the VSTS.

Today, approximately 80% of all major trauma patients receive their definitive care at an appropriately designated trauma service within the Victorian State Trauma System and more than 90% of road trauma cases are managed at an MTS. In 2015–16 the adjusted relative risk of in hospital death following major trauma had not changed since 2011-12 (State of Victoria, Department of Health and Human Services, 2017). Patients are spending less time in hospital and more patients are able to be discharged home rather than to inpatient rehabilitation. Over the past five years there has also been a significant reduction in adjusted relative risk of in-hospital mortality.

Evidence from the Victorian State Trauma Registry also confirms that functional and health status outcomes of major trauma are continuing to improve, with research indicating that despite an increase in the number of hospitalised road transport trauma patients, the burden of disability (as defined by disability adjusted life years) has reduced indicating that the increase in lives saved under the VSTS has not resulted in an overall increase in road trauma survivors living with permanent disability.

A retrospective review of Registry data from 2008-2014 has also identified a significant reduction in traumatic brain injury from motor vehicle accidents over this period. The cause of this decline is considered multi-factorial, including the very high percentage of road trauma patients managed at MTS hospitals, road accident prevention measures and safer vehicle design.

VSTS stakeholders including the Department of Health and Human Services, the TAC, Ambulance Victoria and ARV are committed to ensuring the VSTS remains one of the world’s most effective trauma systems. Integral to the success of the VSTS is the quality data captured by the Victorian State Trauma Registry. The registry enables constant trauma
system monitoring, which drives continued improvements and ensures the VSTS’s status as a national and international leader in trauma care.

6. Resources


## AGREE II Score Sheet: VSTS guideline

<table>
<thead>
<tr>
<th>Domain</th>
<th>Item</th>
<th>AGREE II Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope and purpose</td>
<td>1. The overall objective(s) of the guideline is (are) specifically described.</td>
<td>7 Strongly Agree</td>
</tr>
<tr>
<td></td>
<td>2. The health question(s) covered by the guideline is (are) specifically described.</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>3. The population (patients, public, etc.) to whom the guideline is meant to apply is specifically described.</td>
<td>X</td>
</tr>
<tr>
<td>Stakeholder involvement</td>
<td>4. The guideline development group includes individuals from all the relevant professional groups.</td>
<td>X</td>
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<tr>
<td></td>
<td>5. The views and preferences of the target population (patients, public, etc.) have been sought.</td>
<td>X</td>
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<td></td>
<td>6. The target users of the guideline are clearly defined.</td>
<td>X</td>
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<tr>
<td>Rigor of development</td>
<td>7. Systematic methods were used to search for evidence.</td>
<td>X</td>
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<tr>
<td></td>
<td>8. The criteria for selecting the evidence are clearly described.</td>
<td>X</td>
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<td></td>
<td>9. The strengths and limitations of the body of evidence are clearly described.</td>
<td>X</td>
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<tr>
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<td>10. The methods for formulating the recommendations are clearly described.</td>
<td>X</td>
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<tr>
<td></td>
<td>11. The health benefits, side effects and risks have been considered in formulating the recommendations.</td>
<td>X</td>
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<td></td>
<td>12. There is an explicit link between the recommendations and the supporting evidence.</td>
<td>X</td>
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<td></td>
<td>13. The guideline has been externally reviewed by experts prior to its publication.</td>
<td>X</td>
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<td></td>
<td>14. A procedure for updating the guideline is provided.</td>
<td>X</td>
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<tr>
<td>Clarity of presentation</td>
<td>15. The recommendations are specific and unambiguous.</td>
<td>X</td>
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<tr>
<td></td>
<td>16. The different options for management of the condition or health issue are clearly presented.</td>
<td>X</td>
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<td></td>
<td>17. Key recommendations are easily identifiable.</td>
<td>X</td>
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<tr>
<td>Domain</td>
<td>Item</td>
<td>AGREE II Rating</td>
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<td></td>
<td>1 Strongly Disagree</td>
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<tr>
<td>Applicability</td>
<td>18. The guideline describes facilitators and barriers to its application.</td>
<td>X</td>
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<tr>
<td></td>
<td>19. The guideline provides advice and/or tools on how the recommendations can be put into practice.</td>
<td>X</td>
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<td></td>
<td>20. The potential resource implications of applying the recommendations have been considered.</td>
<td>X</td>
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<td></td>
<td>21. The guideline presents monitoring and/or auditing criteria.</td>
<td>X</td>
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<tr>
<td>Editorial independence</td>
<td>22. The views of the funding body have not influenced the content of the guideline.</td>
<td>X</td>
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<tr>
<td></td>
<td>23. Competing interests of guideline development group members have been recorded and addressed.</td>
<td>X</td>
</tr>
<tr>
<td>Overall Guideline Assessment</td>
<td>1. Rate the overall quality of this guideline.</td>
<td>1 Lowest possible quality</td>
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<tr>
<td>Overall Guideline Assessment</td>
<td>2. I would recommend this guideline for use.</td>
<td>Yes</td>
</tr>
</tbody>
</table>

X
8. References


8 Victorian State Trauma Registry Special Focus Report. Review of the Case Review Group Indicators – Addendum to Report. April 14, 2014. VSTORM.

9 Victorian State Trauma System and Registry Report 2014-15 (published by the Department of Health and Human Services)


11 Victorian State Trauma System and Registry Report 2014-15 (published by the Department of Health and Human Services)

