PREPARATION FOR RETRIEVAL

1. Key messages

The Victorian State Trauma System provides support and retrieval services for critically injured patients requiring definitive care, transfer and management. This preparation for retrieval guideline provides advice on the initial management and transfer of major trauma patients who present to Victorian health services.

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 provides 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 front-line healthcare clinicians. The guideline is evidence based, has followed the AGREE methodology for guideline development and is auspiced by the Victorian State Trauma Committee.

Clinical emphasis points

- Adult Retrieval Victoria (ARV) is the single contact point for adult major trauma advice, critical care advice, critical care bed access and retrieval of critical care adult patients statewide.
- Paediatric Infant Perinatal Emergency Retrieval (PIPER) is the point of contact for paediatric major trauma advice and retrieval of critical care paediatric patients statewide.
- Final preparation of a patient for transfer should be made well ahead of the actual move, with conscious anticipation of clinical needs.
- The patient must be reassessed before transport begins, especially after being placed on monitoring equipment and the transport ventilator (if used).
- Checklists are a valid and effective way to ensure all key points are covered, risks anticipated and mitigated, and all clinical priorities are addressed.
- If unsure or in doubt about any aspect of preparation for retrieval, contact ARV.
- Contact retrieval services immediately if there is significant deterioration in clinical status or if the patient requires additional or unplanned interventions or treatment.
PREPARATION FOR RETRIEVAL

Careful Preparation for Retrieval Transport Improves Care & Reduces Risk

ENSURE PATIENT AIRWAY SAFETY
1. Assess airway stability for all patients
2. Secure endotracheal tube
3. Record size and lip length
4. Oro-gastric tube placed
5. CXR to confirm position of endotracheal tube

ENSURE OPTIMISED OXYGENATION
1. Observe respiratory rate and character
2. Measure $\text{SpO}_2$ and $\text{ETCO}_2$
3. Administer oxygen using the correct delivery device
4. Check ABG’s if indicated
5. Secure intercostal catheters if present

ENSURE IV ACCESS & MANAGEMENT
1. Insert two peripheral IV lines
2. Secure all lines – ensure injection ports are accessible
3. Prepare drug infusions in 50 ml syringes
   For advice on infusion concentrations call ARV
4. Record all IV fluids
5. Transduce all arterial and central lines

ENSURE COMPLETE PATIENT DOCUMENTATION
1. Complete ARV on-line or telephone referral
2. Provide copies of all patient charts
3. Investigation results – pathology & ECG
4. Imaging – films / scan / MRI
5. Please advise any ‘limitation of treatment’ orders

OTHER
1. Maintain body temperature
2. Consider indwelling catheter – maintain Fluid Balance Chart
3. Empty drainage bags prior to transport
4. Administer antiemetic and analgesia as required
5. Maintain spinal precautions if indicated

ALERT
It is important that you notify the ARV Coordinator of:
1. Significant deterioration in –
   - Conscious state
   - Respiratory status
   - Blood Pressure
   - Oxygenation
   - Heart Rate

2. Major clinical developments such as significantly abnormal diagnostic tests, new clinical signs etc

3. The need for major interventions prior to the retrieval team arriving (e.g., intubation, surgery etc)

1300 36 86 61 Statewide 24 hours
2. Introduction

Retrieval generally involves transferring patients with critical illness or life-threatening injury – situations where the patient requires the highest levels of clinical care and vigilance. Transfers are required when the needs of the patient exceed the resources of the hospital. Retrieved patients are often unstable, at the margin of physiological compensation, and in need of specialised investigation and intervention. They are often at that phase of an emergency presentation where diagnosis is incomplete, treatment is problem-focused and risk is high. This setting therefore requires special expertise, risk-averse processes and fail-safe systems characterised by anticipation, redundancy, rapid response and reliability. If executed poorly, the transfer of critically ill patients is potentially hazardous. It is important to focus on pretransfer stabilisation, the anticipation and management of hazards and the selection of the correct personnel and equipment.

Coordination

Retrieval is a coordinated process that provides specialised assessment and management, prior to and during transfer of critically ill patients from situations where resources or services are inadequate to a destination where definitive care can be provided.

Movement ‘up the chain of care’

The approach aims to deliver the same or higher level of clinical care than that available at the point of referral, ensuring the patient is not exposed to any reduction in the quality of clinical care despite the inherent risks of the transport environment.

Need for retrieval systems

The need for retrieval is related to the limitations of health facilities, the geography of populations as well as the patient’s injuries. Rural communities have a right to equitable and timely access to critical care medicine; however, it is recognised that there is often an urban–rural divide in regard to the accessibility of healthcare generally and to specialised critical care in particular. Key clinical ‘gap’ areas exist at both urban and rural and regional levels regarding trauma, neurosurgery, cardiac, neonatal and paediatric critical care. Advances in medicine and technology are unavoidably concentrated in major metropolitan centres, increasing the need for critical patient transport (such as coronary percutaneous procedures and interventional radiology such as angio-embolisation) to an MTS, and paediatric tertiary and quaternary care hospitals. Given that such divides exist and that critical care transfer is inevitable, retrieval medicine aims to ensure quality of care in transfer in distinction to the somewhat ad hoc approach to irregular critical care transfers that otherwise may be the case in less systemised approaches.

The retrieval of injured patients from a referring health facility has the primary objective of improving patient outcomes through the coordinated support and timely transfer of major trauma patients by highly capable transfer teams, to an appropriate trauma service.
3. Retrieval coordination

**ARV is a single contact point for major trauma advice (adult and paediatric), adult critical care advice, critical care bed access and retrieval of critical care adult patients statewide.**

ARV provides a centralised hub for communication and coordination for the trauma retrieval system with the dispatching of appropriately qualified personnel and a transport-appropriate platform. Ideally, interhospital transfers should be initiated with a single telephone call, followed by ready acceptance of the transfer, timely arrival of transport and an uncomplicated journey to the receiving hospital.

**ARV encourages early consultation and activation. Contact ARV on 1300 368 661.**

Preparation for retrieval is the responsibility of both the referring health facility and retrieval specialists, facilitated by effective communication and handover procedures. This may include updating information regularly to identify changes in patient condition and requirements.

The transfer of critically ill patients is improved by the use of appropriately trained specialist retrieval teams, such as ARV and PIPER. Staff on these teams are specially trained in the process of retrieval, have access to high standards of transfer equipment and ensure that the patient is properly assessed prior to transfer.

The process of patient retrieval either by helicopter, fixed-wing aircraft or by road vehicle requires effective coordination, communication and organisation between hospital staff, ARV coordinators, the retrieval team and receiving hospital. Additionally, the patient’s condition needs to be accurately assessed and treated. It needs to be stabilised as much as possible, with preparation of appropriate equipment, medication administration and invasive line management prior to the arrival of the retrieval team.

Specifically trained personnel are required for the transport of neonates, infants and young children by Paediatric Infant Perinatal Emergency Retrieval (PIPER) teams.

4. Choice of transport vehicle

This is influenced by a range of factors and will be facilitated by ARV and Ambulance Victoria coordination staff. Factors include:

- nature of trauma
- possible clinical impact of the transport environment
- urgency of intervention
- location of patient
- distances involved
- number of retrieval personnel and volume of accompanying equipment
- road transport times and road conditions
- weather conditions and aviation restrictions for airborne transport
- aircraft landing facilities
- range and speed of vehicle.
5. Process of transfer

Pre-transport communication and coordination

- Telephone or videoconference the referral, gather a history, conduct and exam, check vital signs and initiate investigations.
- Accept the transfer. Discuss the patient with referring and receiving senior medical staff and agree that transfer is feasible and beneficial and should proceed.
- Provide stabilisation advice and institute any additional management.
- Agree on the required medical and/or nursing attendants during transport.
- Decide on the appropriate mode and timing of transportation. Factors to consider include
  - patient condition, age and size
  - urgency of transfer
  - medical interventions anticipated
  - personnel and other resource availability
  - time of day
  - weather and/or traffic conditions
  - geographical considerations.
- Make a decision regarding the required monitoring, equipment and medication.

Ensuring patient readiness for transfer

Final preparation of the patient should be made before the actual move, with conscious anticipation of clinical needs. Patients should be appropriately resuscitated and stabilised prior to transfer in order to reduce the physiological disturbance associated with movement and reduce the risk of deterioration during the transfer\textsuperscript{\textregistered}. Examples include giving appropriate doses of muscle relaxants or sedatives, replacing near-empty inotropic and other intravenous (IV) solutions with fresh bags, and emptying drainage bags.

The patient must be reassessed before transport begins, especially after being placed on monitoring equipment and the transport ventilator (if used). Transport preparations must not overshadow or neglect the patient’s fundamental care. An example of a brief check on the patient is listed below.

- Airway is secured and patent.
- Ventilation is adequate; respiratory variables are appropriate.
- All equipment alarms are switched on.
- The patient is haemodynamically stable.
- Vital signs are displayed on transport monitors and are clearly visible to transport staff.
- PEEP/CPAP (if set) and FiO\textsubscript{2} levels are correct.
- All drains (urinary, wound or underwater seal) are functioning and secured.
- The underwater seal drain is not clamped.
- Venous access is adequate and patent.
- Blood products and IV fluids are available.
- IV drips and infusion pumps are functioning properly.
- The patient is safely secured on a trolley.
- The charge status of all electrical equipment has been checked.

6. Patient preparation

Airway

Ensure patient airway safety
Assess airway stability for all patients.
Secure the endotracheal tube (ETT). Ensure the tapes are firm and intact. If there is a suspected head injury the tapes should not occlude venous drainage, preventing increases in intracranial pressure (tapes may need to be tied above the ears and secured with tape).
Record the length and diameter. Ensure a chest x-ray has been performed at the current ETT length.
Insert the orogastric tube. Ensure it is not secured to the ETT (so is independently secure) and aspirate prior to transport.

It is preferable to replace hard (extrication) cervical collars with a Philadelphia collar to minimise the risk of a pressure injury. A cervical collar must remain in situ during transfer to a MTS, regardless of spinal clearance.

Breathing

Ensure optimised oxygenation
Observe the patient’s respiratory rate and its character.
Measure the oxygen saturation (SpO₂) and end-tidal carbon dioxide (ETCO₂).
Administer oxygen using the correct delivery device.
Check arterial blood gases. If a head injury is suspected, ensure the partial pressure of carbon dioxide (PaCO₂) is between 35 and 40 mmHg. This will optimise cerebral perfusion.
Secure an intercostal catheter (ICC) if present. Ensure the dressing is dry and intact and drainage system is functioning and not clamped/kinked.

Ventilation considerations:
- If a head injury is suspected and the patient is receiving positive pressure ventilation, maintain PEEP levels below 10 cm of water to minimise the impact of increased intrathoracic pressures on intracranial pressure.
- If there are known or suspected chest injuries ensure the tidal volume is 4–6 mL/kg to prevent an acute lung injury.
- Avoid high peak inspiratory pressures.
- If a flail segment is involved, consider early ventilation and utilise PEEP levels higher than usual.
Circulation and C-spine

Ensure IV access and management
Insert a minimum of two large-bore peripheral IV lines. Secure all lines, ensuring the injection ports are accessible. Attach a rapid infuser pump line and fluid for transfer. Record all IV fluids. Ensure accurate documentation of all blood products administered. Transduce/monitor all arterial and central venous lines. Ensure lines are anchored appropriately and transducers are aligned with the phlebostatic axis.

Documentation

Ensure complete patient documentation
Provide copies of all medical and nursing clinical notes and charts. Include all investigation results – pathology and ECG. Check the coagulation status and platelet count for all trauma patients. Provide digital copies of all imaging – films, scans, MRI. Advise of any ‘limitations of treatment’ orders. Include the contact details of next of kin. Include contact numbers for staff at the referral centre. Ensure patient belonging/valuables are documented and included with the transfer.

Alert

It is important that you notify the ARV coordinator of significant deterioration in:
- conscious state
- blood pressure
- heart rate
- respiratory status
- oxygenation
- major clinical developments such as significantly abnormal diagnostic tests or new clinical signs
- the need for major interventions prior to the retrieval team arriving (for example, intubation and surgery).

Other

Maintain body temperature
Hypothermia contributes to poor outcomes for trauma patients. Warm the patient to achieve normothermia.

Insert an in-dwelling catheter
Be mindful of potential bladder injuries – maintain a strict fluid balance chart.
Empty drainage bags prior to transport
Ensure clear documentation of fluid loss.

Administer antiemetic

Maintain spinal precautions if indicated
In a major head injury, ensure the bed is tilted to 20–30 degrees to reduce intracranial pressure.

Stabilise or splint fractures
Pelvic injuries should be stabilised with a pelvic binder or bed sheet. If an unstable pelvic fracture is suspected, treat it with strict spinal precautions and do not log roll; use a Jordan frame or spinal board for transfers.
If limb immobilisation devices are applied, ensure there are no areas of potential pressure injury.

Check lab results and modify treatment if needed

Check all limbs for potential compartment syndrome
Maintain neurovascular observations, elevate the affected limb and consider fasciotomy if circulation is compromised.

Ensure all open wounds are cleaned and covered
Be mindful that trauma patients are highly susceptible to infection and severe sepsis.
Impaled objects should not be removed but stabilised for transport to ensure no further movement or manipulation of the object is likely during transit.

Ensure adequate analgesia is in progress prior to transport

Notify the patient’s family or next of kin of the trauma transfer and ensure all patient property is identified and secured.
7. Guideline Implementation

These guidelines are designed to push for quality improvement using evidence-based practice across the entire care pathway. They aim to achieve consistent advancement in people’s health and lead to access of good-quality care.

Putting these guidelines into practice benefits everyone; this includes the staff directly involved in patient care, those involved in managing the health facility, local healthcare organisations and members of the public. It can help to monitor service improvements, demonstrate that high-quality care is being provided and also highlight areas for improvement.

One of the most difficult aspects of working with guidelines is how best to implement them into routine daily practice. Many of us provide patient care according to usual routines (‘how it’s always been done’) instead of looking at developments and change in practice to reflect the latest evidence-based research. Barriers to implementation can include organisational constraints, such as a lack of time, obstructive opinions of key people who may not agree with the evidence or do not want to change their practice, and lack of leadership to effect change. Additionally, there may be a perceived poor sense of competence by staff who question their skills.

In order for change to be effective there must be an identified need, a willingness to adapt and promote current practices, a driving force behind it and acceptance from all levels, be it individual, team or organisational. For these guidelines to be successfully implemented, the following is recommended.

**High-level support and clear leadership**

Successful implementation plans have a person on the board, such as a medical director, who drives the implementation agenda forward as well as a clear implementation policy approved at the highest level.

**A nominated lead for the organisation**

One person should be identified who is responsible for driving the education and development of these guidelines into practice. They should be involved in coordinating, disseminating and monitoring the implementation as well as for arranging educational events to promote the use of these guidelines in the workplace. The responsibility for this could be included into an existing role such as that of the clinical governance manager or anyone involved in quality assurance.

**A multidisciplinary forum**

The multidisciplinary forum should have decision-making powers and report to the chief executive or senior managers of the organisation. New guidelines should be reviewed after they are published and their relevance to the organisation assessed. A clinical lead for each guideline should be identified and steps taken to disseminate to the appropriate personnel. Implementation is most effective if a wide range of disciplines are involved in the forum.

**A local policy**

Organisations should have a clear, structured policy in place for implementing new guidelines. This policy should be endorsed at the highest level of management and be available for all.

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Preparation for Retrieval

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**What can you do as an individual?**

Become a project champion. One way to begin implementation in your workplace is to take the initiative and volunteer to represent your department. Review these guidelines and compare them with the current ones you have in place. Note any changes to practice that need to be addressed in order to standardise your organisation with current best practice.

In staff meetings, bring up the idea of implementation and seek feedback from other staff members on the best way to do this. Collaborate with colleagues across all boards and emphasise the importance of team communication and cohesion. Print handouts, send out links to workmates and arrange for flowchart posters to be placed in relevant areas.

If you have a clinical educator at your site, inform them of the current updates and discuss ways they can influence training and provide moulage-based simulation scenarios. Often training with the staff you work with on a regular basis can help to foster communication and a real sense of teamwork.

Speak with your organisation about placing access to the *Victorian trauma guidelines* on your intranet to allow easy access to the site.

Visit <www.trauma.reach.vic.gov.au>, which will be updated regularly. It contains learning modules and moderated remote tutorials.

As always, your feedback is encouraged. If you have any comments or suggestions, or would like to share how you have adopted these guidelines into your practice, we would appreciate your thoughts.
**Trauma Victoria**

The Victorian State Trauma System (VSTS) facilitates the management and treatment of major trauma patients in Victoria. The VSTS aims to reduce preventable death and permanent disability and improve patient outcomes by matching the needs of injured patients to an appropriate level of treatment in a safe and timely manner.

The system works to have the right patient delivered to the right hospital in the shortest time.

One of the best ways to facilitate this is to provide an education resource to all clinicians. Trauma Victoria is a statewide education initiative directed towards clinical staff (doctors, nurses, allied health, paramedics) that provide early patient care for major trauma outside of a MTS.

Guidelines are in place to support awareness of key aspects of the trauma system and early trauma care and include specialist trauma transfer guidelines.

A web-based learning management system provides modules to support each of the principle guideline areas. Skills tutorials on key trauma procedural interventions will also be accessible.

Moderated remote tutorials will be offered in the future. Clinicians will join a multisite, multiparty videoconferenced meeting room for tutorials and discussions on relevant trauma subjects. It will allow local practitioners to tap into specialised clinical knowledge and to develop their learning to the fullest extent.

Regional simulation and team training will also be supported via a remote expert facilitator and will involve regional and subregional simulation trainers. It will build capacity among simulation trainers to enhance local trauma team training programs.

Facilitated visits will also be arranged whereby medical, nursing and allied health staff may be placed for brief rotations with a MTS in order to increase their experience and familiarity in major trauma management. The aim is also to promote the development of clinical relationships between organisations.
## AGREE II score sheet – preparation for retrieval guideline

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<thead>
<tr>
<th>Domain</th>
<th>Item</th>
<th>AGREE II Rating</th>
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<tbody>
<tr>
<td></td>
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<td>1 Strongly Disagree</td>
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<tr>
<td>Scope and purpose</td>
<td>The overall objective(s) of the guideline is (are) specifically described.</td>
<td>X</td>
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<td>The health question(s) covered by the guideline is (are) specifically described.</td>
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<td>The population (patients, public, etc.) to whom the guideline is meant to apply is specifically described.</td>
<td>X</td>
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<tr>
<td>Stakeholder involvement</td>
<td>The guideline development group includes individuals from all the relevant professional groups.</td>
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<td>The views and preferences of the target population (patients, public, etc.) have been sought.</td>
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<td>The target users of the guideline are clearly defined.</td>
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<td>Rigor of development</td>
<td>Systematic methods were used to search for evidence.</td>
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<td>The criteria for selecting the evidence are clearly described.</td>
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<td>The strengths and limitations of the body of evidence are clearly described.</td>
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<td>The methods for formulating the recommendations are clearly described.</td>
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<td>The health benefits, side effects and risks have been considered in formulating the recommendations.</td>
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<td>There is an explicit link between the recommendations and the supporting evidence.</td>
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<td>The guideline has been externally reviewed by experts prior to its publication.</td>
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<td>A procedure for updating the guideline is provided.</td>
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<td>Clarity of presentation</td>
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<td>The different options for management of the condition or health issue are clearly presented.</td>
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<td>Key recommendations are easily identifiable.</td>
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<td>Applicability</td>
<td>The guideline describes facilitators and barriers to its application.</td>
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<td>The guideline provides advice and/or tools on how the recommendations can be put into practice.</td>
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<td>The potential resource implications of applying the recommendations have been considered.</td>
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<td>The guideline presents monitoring and/or auditing criteria.</td>
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<td>Rate the overall quality of this guideline.</td>
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References


