While the QAS has attempted to contact all copyright owners, this has not always been possible. The QAS would welcome notification from any copyright holder who has been omitted or incorrectly acknowledged.

All feedback and suggestions are welcome. Please forward to: Clinical.Guidelines@ambulance.qld.gov.au

Disclaimer

The Digital Clinical Practice Manual is expressly intended for use by QAS paramedics when performing duties and delivering ambulance services for, and on behalf of, the QAS.

The QAS disclaims, to the maximum extent permitted by law, all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages and costs incurred for any reason associated with the use of this manual, including the materials within or referred to throughout this document being in any way inaccurate, out of context, incomplete or unavailable.


This work is licensed under the Creative Commons Attribution-NonCommercial-NoDerivatives V4.0 International License

You are free to copy and communicate the work in its current form for non-commercial purposes, as long as you attribute the State of Queensland, Queensland Ambulance Service and comply with the licence terms. If you alter the work, you may not share or distribute the modified work. To view a copy of this license, visit http://creativecommons.org/licenses/by-nc-nd/4.0/deed.en

For copyright permissions beyond the scope of this license please contact: Clinical.Guidelines@ambulance.qld.gov.au
Most **burn injuries** are a result of flame burns or scalds, while electrical and chemical burns are less common.[4] Concurrent blast injuries can accompany explosions and need to be considered when assessing a patient with major burns.

Burns can cause a wide range of injuries. In the acute setting, airway burns and inhalation injury can lead to respiratory compromise. With major burns, fluid and electrolyte abnormalities develop over several hours, that can lead to shock.[3]

Fires in enclosed spaces pose further danger from the production of potentially lethal toxic gases (e.g. carbon monoxide and cyanide).[3]

### Clinical features

#### Depth of burn

Accurate burn-depth assessment can be difficult, as most burns usually have a mixture of different depths.[4] Burn depth assessment has implications in guiding treatment, but lengthy assessment in the pre-hospital setting is not required.

<table>
<thead>
<tr>
<th>Depth</th>
<th>Appearance</th>
<th>Sensation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Superficial</strong></td>
<td>Erythema, brisk cap refill</td>
<td>Painful</td>
</tr>
<tr>
<td><strong>Superficial dermal</strong></td>
<td>Moist, reddened with blisters, brisk cap refill</td>
<td>Painful</td>
</tr>
<tr>
<td><strong>Deep dermal</strong></td>
<td>White slough, reddened and mottled, sluggish or absent cap refill</td>
<td>Painful</td>
</tr>
<tr>
<td><strong>Full thickness</strong></td>
<td>Dry, charred, whitish, absent cap refill</td>
<td>Painless</td>
</tr>
</tbody>
</table>
Risk assessment

Ensure safety for self and bystanders.

Life threats

Respiratory compromise can manifest quickly in airway and inhalation burns. Early endotracheal intubation is required to ensure airway patency.[5]

Consider the possibility of an airway or inhalation burn in the presence of:

- Facial/oral burns
- Singed nasal hair
- Carbonaceous sputum
- Tachypnoea, stridor, hoarseness

Hypovolaemia does not manifest from burns acutely but develops over many hours. The presence of circulatory shock in the early stages of a burn implies an associated injury (e.g. blast injury).

However, major burn patients are at risk for multi-organ failure due to fluid losses and inflammatory processes. Fluid resuscitation should commence as soon as it is safe to do so. For airway and facial burns, fluid resuscitation should commence as soon as the airway is secure.

Features of carbon monoxide and cyanide toxicity should be sought if the patient was trapped in an enclosed space with the potential for significant smoke inhalation.[1]

Circumferential burns to the torso may restrict ventilation, requiring urgent surgical intervention.

Major burns without airway involvement are also a life-threatening injury.

Limb threats

Deep dermal and full thickness burns cause inelastic dead tissue, referred to as eschar. Circumferential burns may compromise limb vascular supply leading to ischaemia if untreated. Limbs with circumferential burns are at risk of vascular compromise.[4]

Additional information

- Burns requiring management in a dedicated burns unit:[6,7]
  - Partial thickness burns > 20% all ages; or > 10% in patients younger than 10 or older than 50.
  - Full thickness burns > 5%
  - Burns involving face, eyes, ears, hands, feet, genitalia, perineum or overlying a major joint
  - All inhalation burns
  - All significant electrical burns
  - Burns in people with significant co-morbidities (e.g. heart failure)
- Large volumes of fluid increase the risk of interstitial oedema and tissue swelling, potentially increasing the difficulty of endotracheal intubation.[8]
- Fluid resuscitation should be commenced as soon as possible.
- The ‘PHIFTEEN-B’ formula is to be used for calculating fluid resuscitation volume (refer to DTP: Sodium chloride 0.9%).
- In the paediatric population, consider non-accidental causes as a mechanism for burn injuries.[8]
- Escharotomies are surgical incisions through burnt eschar to release tissue pressure in circumferential limb or thoracic burns. They are best performed in hospital by electrocautery as the wounds tend to bleed. They may be necessary in the pre-hospital environment in situations where there is imminent limb or ventilatory compromise.[4]
Estimation of surface area affected

The total area burnt can be estimated with the rule of nines, or the more complicated, but more accurate, Lund Browder burn chart. Do not include skin with just isolated erythema in the calculation. The area over the patient’s palm can also be used to approximate 1% total body surface area (TBSA).[6]

### Rule of nines

<table>
<thead>
<tr>
<th>AREA</th>
<th>Age 0</th>
<th>Age 1</th>
<th>Age 5</th>
<th>Age 10</th>
<th>Age 15</th>
<th>ADULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: half of head</td>
<td>9.5</td>
<td>8.5</td>
<td>6.5</td>
<td>5.5</td>
<td>4.5</td>
<td>3.5</td>
</tr>
<tr>
<td>B: half of one thigh</td>
<td>2.75</td>
<td>3.25</td>
<td>4</td>
<td>4.5</td>
<td>4.5</td>
<td>4.75</td>
</tr>
<tr>
<td>C: half of one leg</td>
<td>2.5</td>
<td>2.5</td>
<td>2.75</td>
<td>3</td>
<td>3.23</td>
<td>3.5</td>
</tr>
</tbody>
</table>
Consider:

- Oxygen
- IPPV
- Analgesia
- IV fluid (use PHIFTEEN-B formula)
- Frequent airway assessments
- Midazolam

Consider:

- Covering burns with cling wrap
- Burn Aid dressing only if:
  - Less than 5% TBSA in paediatric patients or less than 10% TBSA in adult patients
  - No circumferential burns or burns requiring management in a dedicated burns unit (refer to Additional Information section)

Note: Clinicians are only to perform procedures for which they have received specific training and authorisation by the QAS.

Transport to hospital
Pre-notify as appropriate