

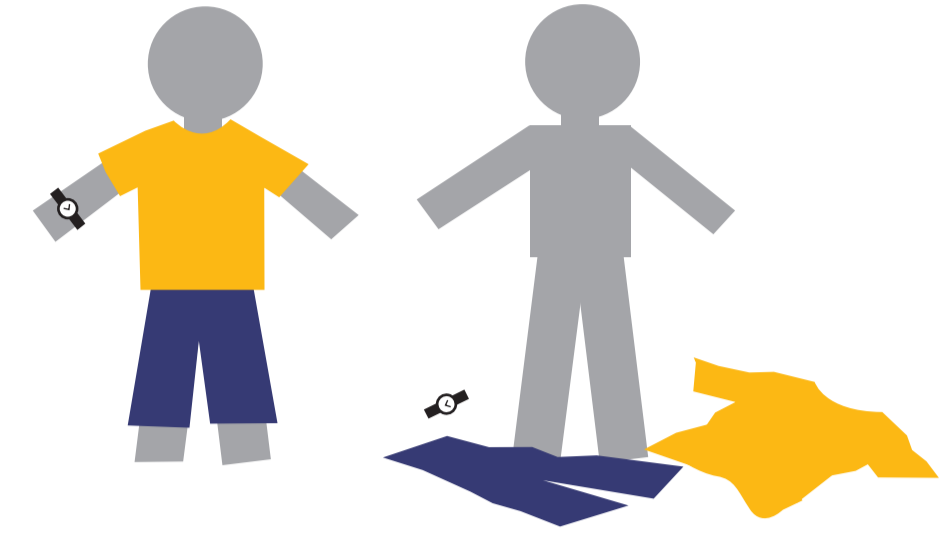
Burns Service of Western Australia Initial assessment and management of the adult and paediatric burn

First Aid

First aid can be effective for up to **three hours post burn**. First aid can reduce the size and ultimate depth of burn injury.



Stop the burning process



Remove clothing & jewellery



Apply cool running water to burn area for 20 minutes



Keep patient warm



Do not apply ice

Referral criteria to State Adult Burn Unit at FSH

- Burns greater than 10% total body surface area
- Circumferential partial thickness or full thickness burns
- Inhalational burns
- Chemical burns
- Electrical burns
- Special area burns i.e. face, neck, hands, feet, perineum, joint or inhalation burns
- Burns with concurrent injuries or co-morbidities

Referral criteria to paediatric Burns Unit at PMH

- Burns greater than 5 % total body surface area
- Circumferential partial thickness
- Full thickness burns
- Inhalational burns
- Chemical burns
- Electrical burns
- Special Area burns i.e. face, neck, hands, feet, perineum, joint or inhalation burns
- Burns with concurrent injuries or co-morbidities
- Suspicion on non-accidental injury
- Infected burns
- Pain control issues

Burn first aid - give immediately after burn injury or within the first 3 hours of burns. Conduct routine ABCs of first aid initially.

- **Stop** the burning process.
- **Cool** the burn with cool running water for a minimum of 20 minutes
- **Ice** is not to be used on the burn wound
- **Remove clothing**, cut around adhered clothing if required
- **Remove jewellery** if constricting circulation
- **Keep patient warm**

Primary survey

- **Airway** - check airway patency. There may be heat damage to the respiratory tract with burns to the face, neck or upper torso. Check if the burn took place in a confined space, or if there was an explosion.
- **Breathing** - if the patient is in respiratory distress, intubation is considered early. Check arterial blood gases when possible. Humidified oxygen should be commenced as soon as possible. Nurse the patient in the upright position if it is not contra-indicated e.g. suspected cervical or other spinal injury
- **Circulation** - check capillary refill time (should be < 3 seconds). Areas of circumferential burns may cause constriction to circulation and underlying structures that may progress to **compartment syndrome**.

If you suspect compartment syndrome, **escharotomies** may be required. Elevate affected area and perform 1/2 hourly neurovascular observations ie colour, warmth, movement and sensation of extremity/ies. Discuss with RPH/PMH consultant.

For adult burns contact on-call FSH Burn Consultant or Burn Fellow via switch on 6152 2222

For paediatric burns contact the on-call Burns Consultant via switch on 9340 8222

Burn history/circumstance

- Brief history of how, when and where the injury occurred
- **Significant information** - obtain from the patient or significant other, information on how, when and where the injury occurred and type of first aid given at the scene
- **Burning agent** - cause of the burn ie. flame, scald, contact with hot surface, chemical, electrical or friction
- **Duration of the burning process** - how long the person was in contact with the burning agent
- **Time of the burn** - the 36 hour burn resuscitation period is commenced from the time of the burn injury
- **How did the burn happen** - did the burn occur in a confined space? Was there an explosion? If so there is more risk of inhalation of heat, smoke or poisonous gases.

Medical history

- Pre existing diseases or co-morbidities
- Past medical history
- Check the patient for drug or other allergies, tetanus status, medications, alcohol and any use of recreational drugs.

Medications

- Tetanus Immunisation Status -Tetanus toxoid should be given if the patient is not currently covered, or status unknown
- Check with the patient and family for any allergies to medications
- Check if the patient is taking any regular medications or if the patient/ family/ GP/ transferring hospital has administered any medications following the burn injury
- Analgesics should be given as boluses via infusion. Opioids or opioid-like analgesics should be commenced as soon as possible. Patient should be monitored closely for possible side effects of medications
- No medications should be given orally, subcutaneously, or intra muscularly at this stage.

Oedema

- Elevate the burn area. If the face, neck or airway are burnt, sit the patient upright (if no contra-indications) and elevate burnt limbs above the level of the heart where possible. Discuss resuscitation parameters if a long transfer time is anticipated.

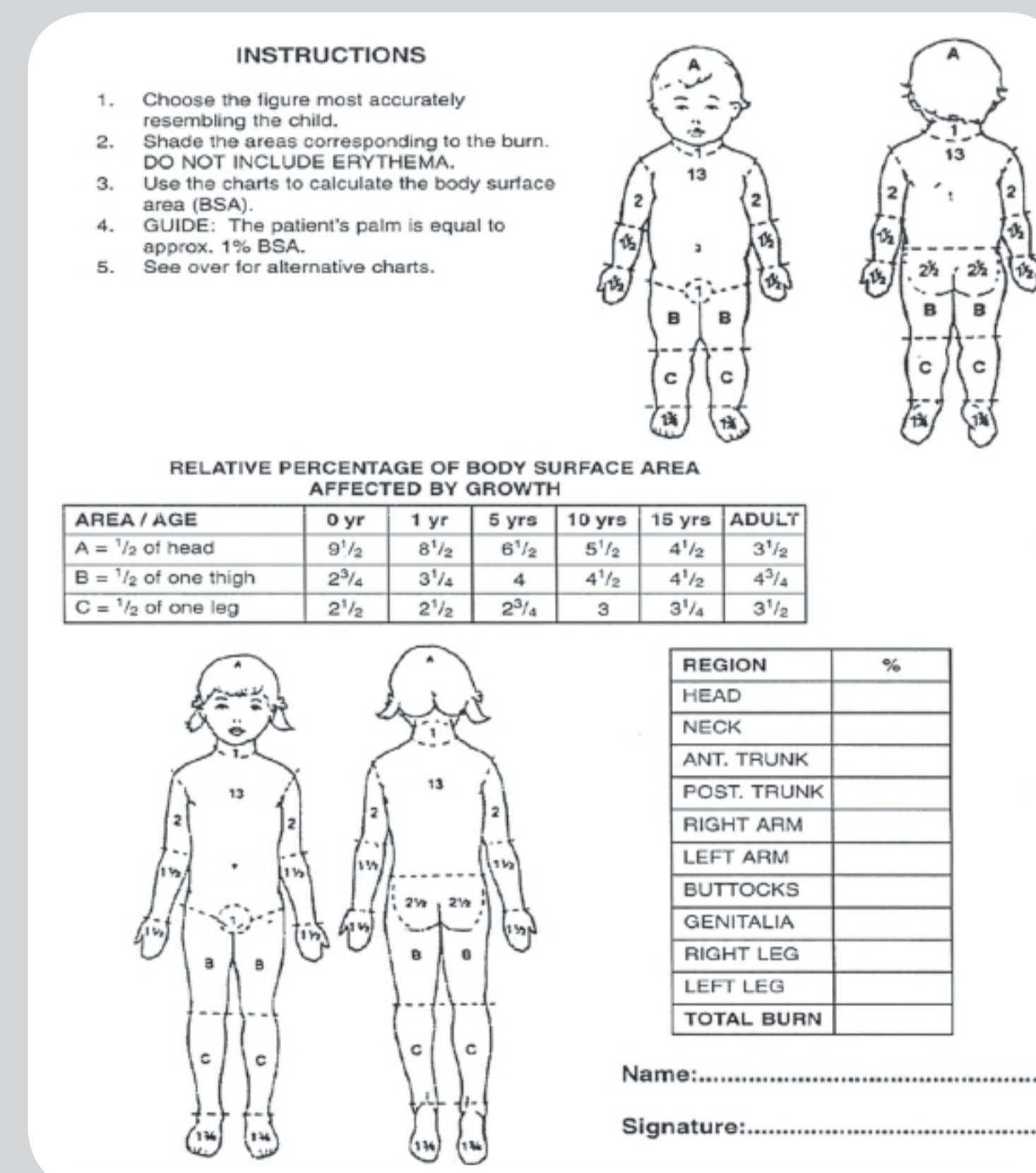
Burn size - percentage burn

Paediatrics

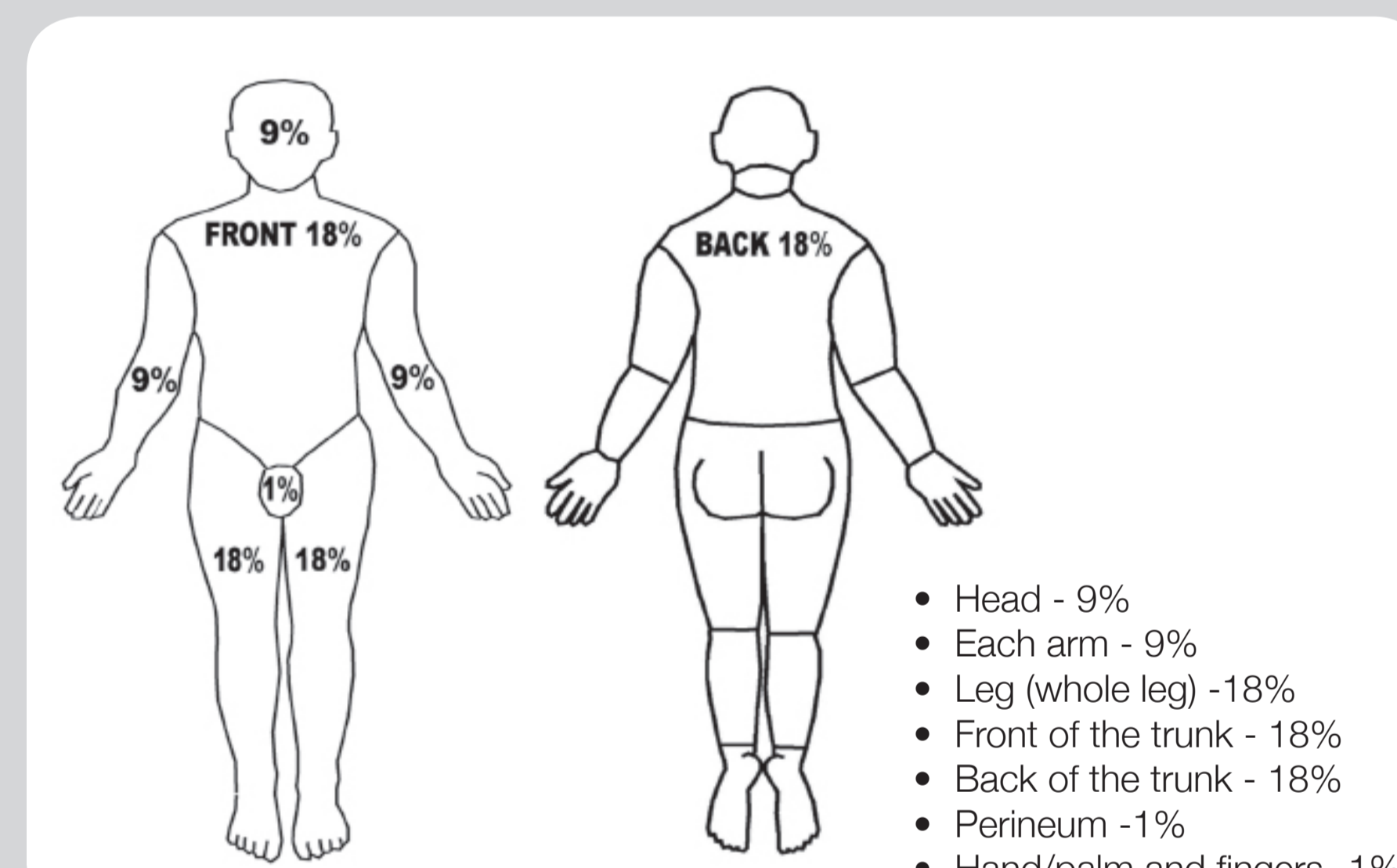
- The Modified Lund and Browder Chart should be used to estimate the burn size (% total body surface area burn is often referred to as %TBSA)
- Do not include areas of erythema.

Adults

- Use the Rule of Nine to estimate the burn size (% total body surface area burn)
- Do not include areas of erythema.



¹Modified Lund and Browder chart



²Wallace rule of nines chart

Depth of the burn

Burns are classified as:

- **Superficial** - involves the epidermum - pink, red, painful
- **Partial thickness** - involves the epidermum and portions of the dermis - blistered, mottled pink, painful, cool, hairs intact
- **Full thickness burn** - may extend through the skin to underlying structures - may be cold to touch, typically white, brown or black, leathery, insensate, may have thrombosed blood vessels, no hairs present or hairs fall out when rubbed.

Fluid resuscitation

Fluid Resuscitation- For adults with burns to >15%TBSA and children >10%TBSA

- Insert two large bore cannulae and commence fluid resuscitation
- Insert urethral catheter and monitor urine output hourly
- Insert a nasogastric tube and commence gradual enteral feeding over 24 hours
- Document all fluid administration and urinary output and ensure all relevant documentation accompanies the patient for transfer to the Burn Unit.

FSH Fluid Resuscitation Formula - this is the fluid that will be lost from the circulatory system in the first 24 hours post burn injury. To prevent the onset of circulatory shock, FSH Burns Service recommends resuscitation starts immediately with Hartmanns Solution (Normal Saline if no Hartmanns solution is available).

Example for a 60kg adult patient with 60% TBSA

- 2 x % TBSA x pre-burn body weight (in kg) = Volume in mLs 2 x 60% x 60kg = 7200mLs
- Give 50 per cent of quantity in the first **8 hours**. ie. 3600mLs
- Give 25 per cent of quantity in the second **8 hours**. ie. 1800mLs
- Give 25 per cent of quantity in the third **8 hours**. ie. 1800mLs
- The normal daily fluid intake of the patient i.e. 2000 mLs must be given with the above volume in the same time period eg 2000mLs over 24 hours =83 mL/hr.

Contact the Burns Unit at FSH for advice on fluid resuscitation

PMH Burns Fluid Resuscitation Formula - this is the fluid that will be lost from the circulatory system in the first 24 hours post burn injury. To prevent the onset of circulatory shock, PMH Burns Service recommends resuscitation starts immediately with Hartmanns Solution (if none available Normal Saline).

2 x % TBSA x pre-burn body weight (in kg) = Volume in mls

- Give 50 per cent of quantity in the first **8 hours from the time of burn injury**
- Give 25 per cent of quantity in the second **8 hours**
- Give 25 per cent of quantity in the third **8 hours**.

- The child's normal maintenance fluid based on age and weight should be added to this as an hourly amount.

Contact the Burns Unit at PMH for advice on fluid resuscitation

Contact the PMH or FSH units for a copy of the burns transfer checklist to be faxed to your hospital if you do not already have a copy

For advice or to organise transfer to the Burn Units at FSH or PMH please contact:

- For patients up to 16 years old contact switch on 9340 8222 and ask for on call Burn/Plastic Registrar or Burns Consultant at PMH
- For patients 16 years old and over contact switch on 6152 2222 and ask for on call Burn/Plastic Registrar or Burns Consultant at FSH

To refer a patient to the Burn Clinics please contact:

FSH: 6152 0342 or fax a referral to 6152 4407

PMH: 8340 8257

Email: fsh.burnstelehealth@health.wa.gov.au

pmhburnstelehealth@health.wa.gov.au

Burn Wounds

Assessment

Burn wounds are assessed and described according to their size (%TBSA burned), depth, mechanism and area.

Special areas: burns to the face, neck, joints, hands, feet, perineum, buttocks require specialist management.

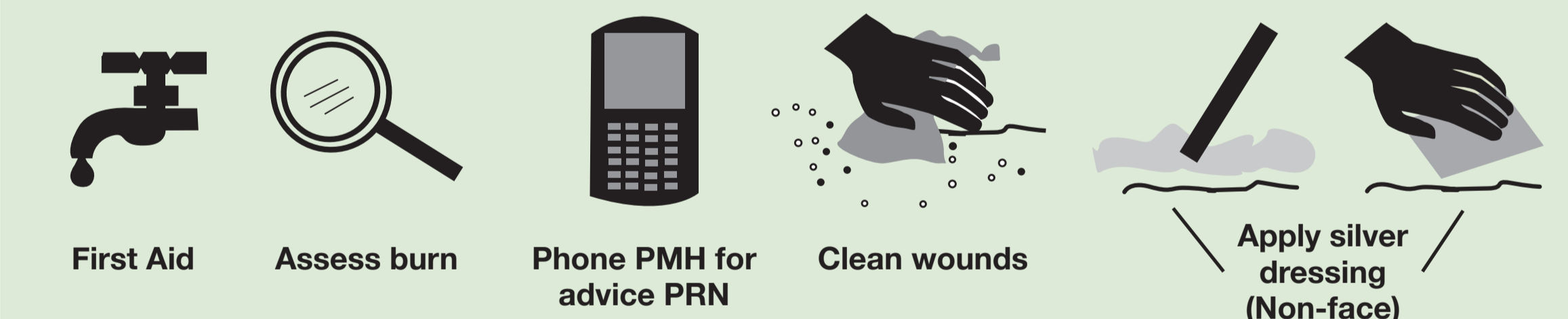
Circumferential burns to the neck, chest, hand, finger, arm, toe, foot, leg or penis require specialist management, elevation, loose dressings, close monitoring and may potentially require escharotomy following consultation with the on-call Burns Consultant.

| Burn Depth | Superficial | Superficial partial | Deep partial | Full thickness |
|------------------|--|--|--|---|
| Wound appearance | • Involves the epidermum • Pink, red • Painful | • Epidermis and superficial (papillary) dermis destroyed • Very painful • Often blistered (as fluid collects at epidermis-dermis interface) • Pink, moist • Blanches | • Involve epidermis and reticular dermis • May blister • Mottled pink or white • Fairly dry after day two • "Discomfort" rather than pain • Slow or no capillary refill | • Involves epidermis, dermis, and may include fat • Do not blanch • May be mottled, dry, translucent, black or pale appearance • Full thickness scalds may have red non blanching appearance |
| Healing scarring | • Complete, scarless healing within seven days | • Heals by epithelial migration within two weeks • Can convert to deeper injury | • Will take more than three weeks to heal | • Will not heal, unless very small wound (scarring ++) • Early excision and grafting reduce scarring and contracture |

Management

Burn wound management aims to prevent infection, promote healing, absorb exudate, maintain function and ultimately an optimal scar outcome for each patient.

Please note burns to the face should be treated with four hourly wash and application of emollient ointment, plus investigate for signs of possible inhalation and/or eye injury.



Burn wounds

Reassess

Observe for signs of infection:
• pain, redness, purulent exudate, odour, swelling, heat, conversion to deeper wound or patient febrile.

Observe for signs of Toxic Shock Syndrome:

- Young burns patients at high risk due to low levels anti-TSS-1 antibodies
- Pyrexia, rash, diarrhoea, vomiting, general malaise
- Shock can develop rapidly if untreated
- High mortality rate

Refer to PMH or FSH if any of the above signs or if "minor" burn is not healed after seven days.

Urine Output

- Fluid therapy regime is titrated to the amount of urine measured hourly in order to maintain the urine output at 0.5 - 1 mL per kg body weight per hour with a specific gravity 1020. (NB 1-2 mL per kg body weight per hour for electrical burns to flush out myoglobin. People who have an inhalation burn are dehydrated or intoxicated may also have greater intravenous fluid requirement).
- **Patients receiving fluid resuscitation require very close monitoring and observation. The above formula is a guide only and must be adjusted according to patient condition and urine output.**

Secondary survey

Perform a **head-to-toe assessment - check for concurrent injuries** eg. cervical, spinal injuries, fractures, loss of consciousness, internal injuries or shrapnel injuries

- Obtain patient history eg. allergies, medications, past medical history, last meal.

Patient demographics

- Age, name, address and best phone contact(patient and carer)
- Occupation

Wound management

- Keep the patient warm at all times, heat the resuscitation room if necessary-keep the patient's core temperature above 36.5°C
- Wash the burns and remove any blisters or devitalised skin- use Chlorhexidine 4% liquid soap and tap water
- If anticipated transportation time is **2 hours** or less (from time of injury to arrival to the Burn unit), wrap the burnt area with saline soaked dressings or towels and cover the patient with a warm blanket (i.e. cool the burn and warm the patient)
- If anticipated transportation time is **2 hours or more** (from time of injury to arrival to the Burn unit), cover the wound surface with **antimicrobial dressings (Acticoat™ is the preferred dressing, apply Acticoat dressings moistened with sterile water followed with sterile water compresses, jelonet and dry gauze)**. If Acticoat is not available apply Flamazine™ and gauze dressings. Cover the patient with a warm blanket
- Do not use plastic or 'Gladwrap' alone. This retains heat and may increase the risk of infection.