

Burn Patient Management

4th Edition



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Abbreviations

ACI	Agency for Clinical Innovation
Ag	Silver
C	Centigrade
CHW	The Children's Hospital at Westmead
CNC	Clinical Nurse Consultant
Coags	Coagulation test
CRGH	Concord Repatriation General Hospital
ECG	Electrocardiogram
ED	Emergency Department
EUC	Electrolytes Urea Creatinine
FBC	Full Blood Count
hr(s)	Hour(s)
IDC	In-Dwelling Catheter
IV	Intravenous
IM	Intramuscular
kg	Kilograms
Max	Maximum
Mg	Milligrams
mL	Millilitres
mm	Millimetres
NSW	New South Wales
RNSH	Royal North Shore Hospital
SBIS	Statewide Burn Injury Service
TBSA	Total Body Surface Area
yrs	years

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Introduction

The following guidelines were developed by specialist staff working within the ACI Statewide Burn Injury Service (SBIS) from the tertiary burn units at The Children's Hospital at Westmead (CHW), Royal North Shore Hospital (RNSH) and Concord Repatriation General Hospital (CRGH). The guidelines are designed for use by staff working in these burn units, and clinicians working in other areas and facilities, to guide practice, not to replace clinical judgement.

Burn units provide specialist, multidisciplinary care in the management of burn injuries, which is not readily available in outlying areas. They re-evaluate and adjust treatments according to current research and recommendations. Burn care involves high expense for wound management materials, staffing, equipment and long term scar management products. There are also commonly long-term issues arising from the initial trauma, resultant scars and the ongoing effects these have on the patient and their family.

It is acknowledged that primary care or follow up management of burn injuries may occur outside of specialist units, particularly for patients with a minor burn. These guidelines are designed as a practical guide to complement relevant clinical knowledge and the care and management techniques required for effective patient management. Clinicians working outside a specialist burn unit are encouraged to liaise closely with their colleagues within the specialist units for advice and support in burn patient management.

Due to the dynamic nature of burn wounds and the large and changing number of available wound management products, it is not possible to state emphatically which product is superior for each wound, however suggestions of possible dressings for different wound types are included in this document, along with application advice.

NB For the purpose of this guideline a child is defined as less than 16 years of age.

Aim

- Stop the burning process.
- Cool the burn wound.

Stop the burn process

- Remove patient from the source of injury.
- If on fire STOP, DROP, COVER face and ROLL.
- Remove hot, scalding or charred clothing.
- Avoid self-harm during above steps.

Cool the burn wound

- Cool the burn with cool running tap water for 20 minutes. If it is a chemical burn continue cooling for 1–2 hours.
- Ideal water temperature for cooling is 15°C, range 8°C to 25°C.
- Cooling is effective up to 3 hrs after injury.
- Keep the remaining areas dry and warm to avoid hypothermia. If patient's body temperature falls below 35°C – stop cooling.

Note

- Ice should not be used as it causes vasoconstriction and hypothermia. Ice can also cause burning when placed directly against the skin.
- Duration of running water should be 20 minutes unless other factors prevent this (e.g. large burn causing rapid heat loss, hypothermia, and multiple traumas).
- Wet towels, pads or hydrogel tea tree dressings (i.e. BurnAid®, Waterjel®, etc.) are not efficient at cooling the burn as they do not cool the wound adequately. They should not be used unless there is no water readily available, i.e. in transit to medical care. If required use two moistened towels or pads and alternate at 15 second intervals.
- Remove any jewellery or constrictive clothing as soon as possible.

Seek medical advice

- Dial '000' (Triple Zero) for any burn over 10% of the body for adults, 5% of the body for children, or when there are associated trauma or concerns.
- Visit a local doctor if the burn is larger than the size of a 20c piece with blisters, or if there are any concerns about the burn.

Plastic cling wrap is an appropriate simple dressing for transferring patients with burn injuries to a specialist burns unit. It protects against colonisation, excess fluid and heat loss.

On arrival at hospital

- Place the person on a clean dry sheet and keep them warm.
- Keep the burn covered with plastic cling wrap and a clean sheet when not being assessed.
- Elevate burnt limbs, and head of bed for burns to head and neck.
- Small burns may require continuous application of water to reduce pain.
- For chemical burns identify the chemical involved. If the chemical is a powder first brush off excess, then irrigate. Chemical burns require copious amounts of water for prolonged periods (at least 60 minutes). A shower is preferable as the chemicals are washed away from the body.
- Eye burns require an eye stream (saline) or an IV bag of saline attached to a giving set and placed over the open eye to flush it adequately – until pH is neutral.

Outcome

The burning process is stopped and the burn wound is cooled.

For further information see NSW Statewide Burn Injury Service Transfer Guidelines www.aci.health.nsw.gov.au/__data/assets/pdf_file/0004/162634/Burns-Transfer-Guidelines.pdf

Aim

Immediate life threatening conditions are identified and emergency management commenced.

Acute management

Primary survey

A. Airway maintenance with cervical spine control

- It is important to maintain a patent airway. Inspect the airway for foreign material or oedema. If the patient is unable to respond to verbal commands open the airway with a chin lift and jaw thrust.
- Insert a Guedel Airway if airway patency is compromised. Think about early intubation.
- Stabilise the neck for suspected cervical spine injury. Keep movement of the cervical spine to a minimum and never hyper-flex or hyperextend the head or neck.

B. Breathing and ventilation

- Administer 100% oxygen.
- Expose the chest and ensure that chest expansion is adequate and bilaterally equal.
- Palpate for crepitus and abnormalities such as rib fractures.
- Auscultate for breath sounds bilaterally.
- Ventilate via a bag and mask or intubate the patient if necessary.
- Monitor respiratory rate
 - beware if rate is <10 or >20 per minute.
- Apply pulse oximeter monitor.
- Beware circumferential deep dermal or full thickness chest burns – is escharotomy required?
- Consider carbon monoxide poisoning, non-burnt skin may be cherry pink in colour in a non-breathing patient (send blood for carboxyhaemoglobin).

C. Circulation with haemorrhage control

- Inspect for any obvious bleeding – stop with direct pressure.
- Monitor and record the peripheral pulse for rate, strength (strong, weak) and rhythm.
- Apply capillary blanching test (centrally and peripherally to burnt and non-burnt areas), normal return is two seconds. Longer indicates poor perfusion due to hypotension, hypovolaemia or need for escharotomy on that limb; check another limb.
- Monitor circulation of peripheries if there is a circumferential burn present. As a first measure elevate the limb to reduce oedema and aid blood flow. If this does not prove effective then it may be necessary to perform an escharotomy.

D. Disability: neurological status

- Establish level of consciousness:
 - **A** – Alert
 - **V** – Response to **V**ocal stimuli
 - **P** – Responds to **P**ainful stimuli
 - **U** – **U**nresponsive
- Examine pupil response to light for reaction and size.
- Be alert for restlessness and decreased levels of consciousness – hypoxaemia, carbon monoxide intoxication, shock, alcohol, drugs and analgesia influence levels of consciousness.

E. Exposure, environmental control and estimate burn size

- Remove all clothing and jewellery.
- Keep patient warm.
- Hypothermia can have detrimental effects on the patient. It is important to ensure that the patient is kept warm, especially during first aid cooling periods.
- Log roll patient, remove wet sheets and examine posterior surfaces for burns and other injuries.
- Estimate total body surface area (TBSA) burn size using Rule of Nines or Paediatric Rule of Nines (see Chapter 4). For smaller burns the palmar surface of the patient's hand (including fingers) represents 1% TBSA and can be used to calculate the %TBSA burnt.

F. Fluid resuscitation

- Fluid resuscitation will be required for a patient who has sustained a burn >10% for children, >20% for adults.
- Insert two large bore peripheral IV lines preferably through unburnt tissue.
- Collect bloods simultaneously for essential base line bloods: FBC/EUC/ LFT/Group and hold/Coags. Others to consider: Drug/alcohol screen, amylase, carboxyhaemoglobin.
- Obtain patients body weight in kg.
- Commence resuscitation fluids, IV Hartmann's solution at an initial rate of the Modified Parkland Formula and adjust according to urine output.
 - **The Modified Parkland Formula is used to calculate the fluid volumes needed for resuscitation and to generate the desired urine output.**

Modified Parkland Formula

[Calculated from the time of injury]

3ml Hartmann solution x kg body weight x % TBSA
½ given in the first 8 hrs
½ given in the following 16 hrs

- Children less than 16 yrs old require maintenance fluids e.g. 5% dextrose in 0.9% sodium chloride (or appropriate fluid), in addition to resuscitation fluids.
- Insert an IDC for all burns >10% for children, >20% for adults and attach hourly urine bag. IV fluids are adjusted each hour according to the previous hour's urine output.

Remember

The infusion rate is guided by the urine output, not by formula.

The urine output should be maintained at a rate
Adult 0.5ml / kg / hr
Children 1ml / kg / hr

- If urine output <0.5ml/kg/hr increase IV fluids by 1/3 of current IV fluid amount. E.g. Last hrs urine = 20ml, received 1200ml/hr, increase IV to 1600ml/hr.
- If urine output >1ml/hr for adults or >2ml/kg/hr for children decrease IV fluids by 1/3 of current IV fluid amount. E.g. Last hrs urine = 100ml, received 1600ml/hr, decrease IV to 1065ml.
- More IV fluids are required:
 - when haemochromogenuria (dark red/black urine) is evident. Haemochromogenuria occurs when the person has endured thermal damage to muscle e.g. electrical injury. For haemochromogenuria aim for a urine output of 2ml/kg/hr
 - for an inhalation injury
 - for an electrical injury
 - after delayed resuscitation
 - if there is fluid loss prior to burn e.g. fire fighter, diuretics, alcohol etc.
- Document ECG, pulse, blood pressure, respiratory rate, pulse oximetry or arterial blood gas analysis as appropriate.

Nutrition

- Insert nasogastric or nasojejunal tube for larger burns (>20% TBSA in adults; >10% TBSA in children) or if associated injuries. See [SBIS Nutrition Burn Patient Management Guideline](#).

Pain relief

- Give morphine (or other appropriate analgesia) slowly, intravenously and in small increments according to pain score and sedation scale (see Pain chapter).

Secondary survey

Perform a comprehensive secondary survey.

History

- A** – Allergies
- M** – Medications
- P** – Past illnesses
- L** – Last meal
- E** – Events or Environment related to injury

Mechanism of injury

Gather information from the patient or others about the following.

- Date and time of burn injury, date and time of first presentation
- Source of injury and length of contact time
- Clothing worn
- Activities at time of burn injury
- Adequacy of first aid.

Head to toe assessment

Reassess **A**, **B**, **C**, **D**, **E**, and **F**.

Other actions

Record and document

Circumferential burns

If the patient has a circumferential deep dermal to full thickness burn it may impede circulation and/or ventilation (if burn around chest).

- Contact the burn registrar at a specialist burn unit.
- Elevate the affected limb above the heart line.
- Start a circulation chart and monitor capillary refill in affected limb hourly.
- Escharotomy may be necessary to relieve pressure if circulation is compromised.

Psychosocial care

- Document next of kin and telephone number.
- Inform and provide support to family.
- Obtain relevant psychosocial information during assessment and document.
- Contact relevant social worker, psychologist or psychiatrist.

Re-evaluate

- Give tetanus prophylaxis if required.
- Note urine colour for haemochromogenuria.
- Laboratory investigations:
 - Haemoglobin/haematocrit
 - Urea/creatinine
 - Electrolytes
 - Urine microscopy
 - Arterial blood gases, carboxyhaemoglobin
 - Electrocardiogram.

Outcome

Life threatening injuries are identified and patient receives emergency management.

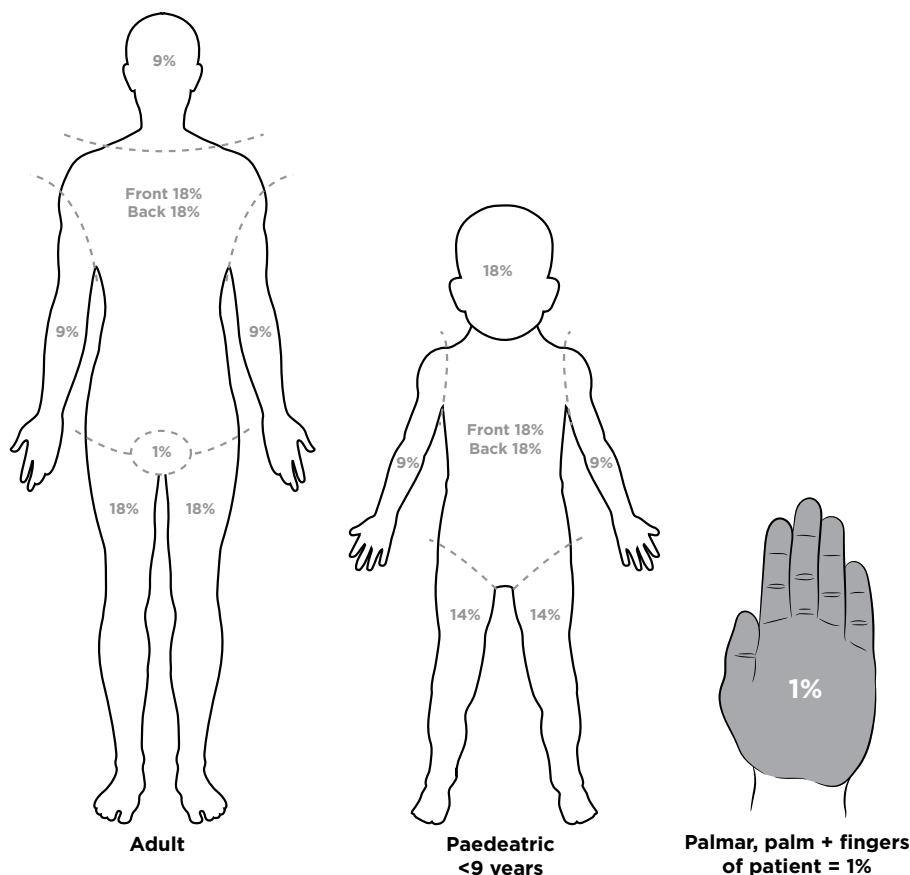
Assessment of burn injury: Total Body Surface Area

Rule of Nines

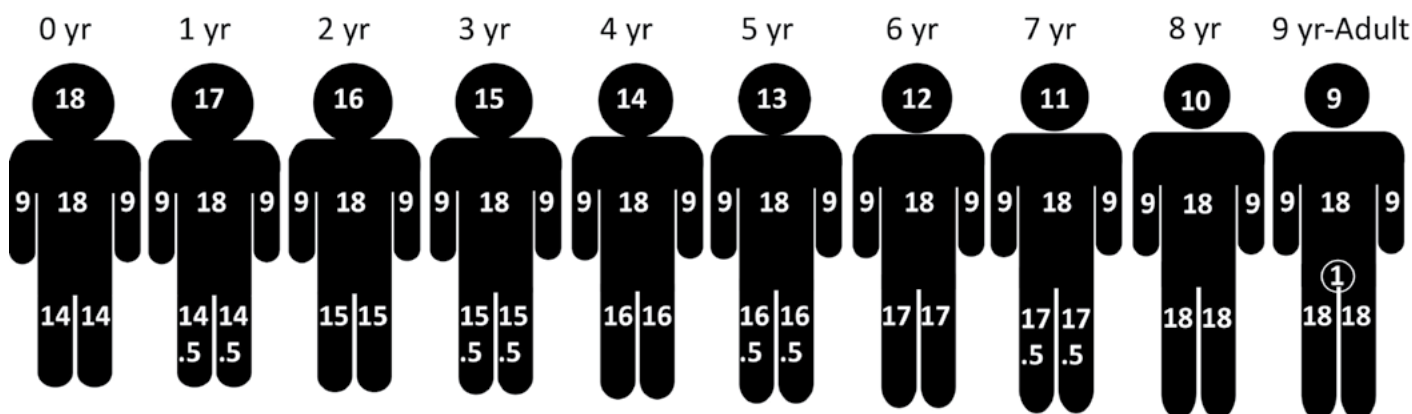
The '**Rule of Nines**' divides the body surface into areas of 9% or multiples of 9%, with the exception of the perineum which is estimated at 1%. This allows the extent of the burn to be estimated with reproducible accuracy.

Additionally small burns may be estimated by using the palmar surface (fingers and palm) of the **patient's** hand, which approximates to 1% body surface area.

When calculating the TBSA ignore simple erythema.



Children have different body surface area proportions: Use the **Paediatric Rule of Nines and adjust for age** by taking 1% TBSA from the head and adding ½% TBSA to each leg for each year of life until ≥8 years. At 9 years 1% is added to perineum. Proportions are then the same as an adult.



Images reproduced with permission from: Australian & New Zealand Burn Association, Emergency Management of Severe Burns Course Manual 18th Ed. 2016.

The NSW ITIM Trauma App has burn calculators to assist with the assessment and calculations.

Aims

- To reduce pain levels that are unacceptable to the patient.
- To minimise the risk of excessive or inadequate analgesia.

Assessment

- How much pain does the patient have? Use a scale such as the Visual Analogue Scale (VAS) at regular intervals every 3–5 minutes, document.
- How much analgesia has the patient been given prior to arrival?
- Ask the patient if they use illicit drugs and alcohol.
- Weigh patient so that analgesic amounts are adequate.

Acute management

- Give small increments of IV opioid. A standard stat dose of IV morphine is 2.5–10mg for adults and 0.1–0.2mg/kg of body weight for children.
- The dose should be titrated against the patient's response, including the respiratory rate.
- A opioid infusion can be commenced once the initial treatments have stabilised the patient.
- Burn procedures may require analgesia beforehand allowing time for it to take effect. The drug of choice is determined on an individual basis and may include an opiate, such as morphine, with paracetamol. Oral midazolam may also be used for its dissociative, anxiolytic and sedative qualities. Antihistamines can be useful in patients where there is excessive itch, but should not be used in conjunction with midazolam. Inhaled nitrous oxide mixture is often used during dressing removal and reapplication in some cases.
- Provision of diversion therapy can help decrease pain and anxiety for both adults and children. Games, movies and music are useful diversion techniques. For children a child life therapist can also assist with procedures.
- Anti-emetics may be necessary when opioids are given.
- When opioids are given aperients should be administered to avoid constipation.
- Oral analgesia may be administered to patients with minor burns.
- Follow local hospital or institutional pain management guidelines.

Special considerations

Opioid intra-muscular injections should not be administered for major burns as peripheral shut down occurs in burns >10% TBSA. Absorption of the drug will not take place so pain relief will not be achieved. As circulation improves an overdose of the opiate may occur.

Outcome

Pain is kept at an acceptable level.

Initial assessment of the burn wound depth

Aim

To determine the depth of the burn wound.

Determining burn wound depth

Epidermal, superficial dermal, mid-dermal, deep dermal, and full thickness are terms to describe the depth of burn injury.

To determine the depth of the injury several aspects should be assessed.

- Clinical examination of the burn, including capillary refill.
- Source and mechanism of the injury, including heat level, chemical concentration, and contact time with source.
- First aid. Prompt first aid will reduce further destruction of the zone of stasis.
- Age of the patient.
- Pre-existing disease or medical condition.

Burn skin depth

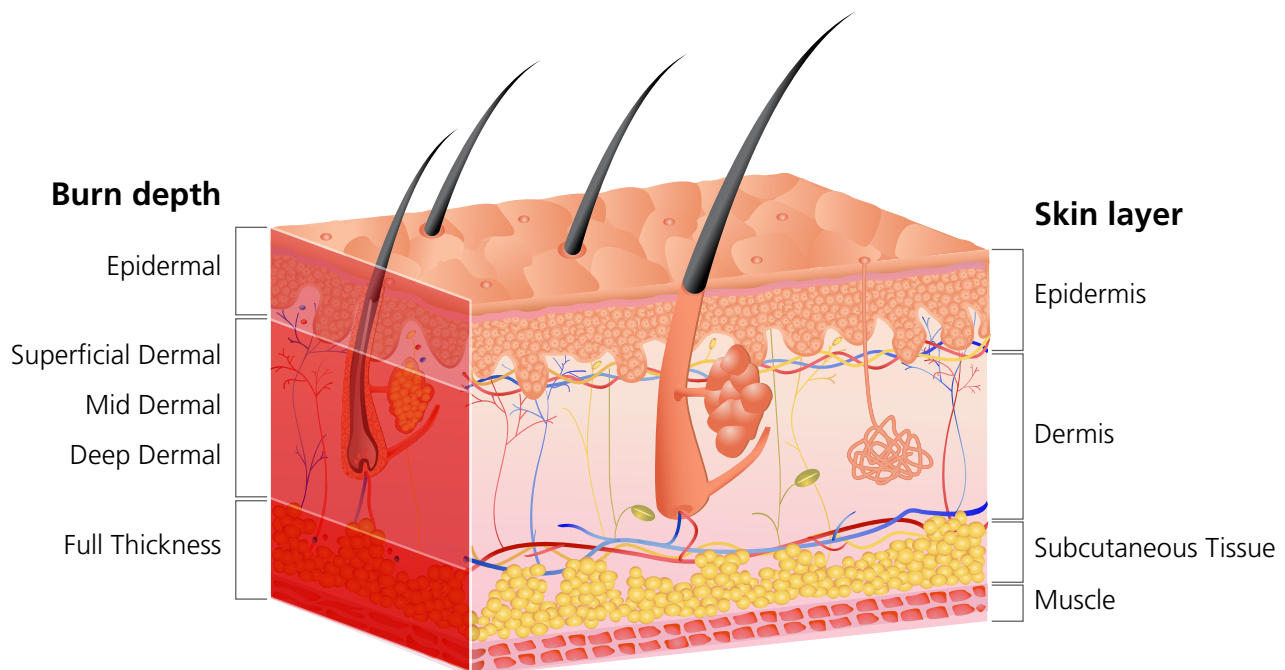


Image source: Shutterstock

Burn wound depth assessment table

Depth	Colour	Blisters	Capillary refill	Healing	Scarring
Epidermal	Red	No	Brisk 1–2 sec	Within 7 days	None
Superficial dermal	Red / Pale pink	Small	Brisk 1–2 sec	Within 14 days	None Slight colour mismatch
Mid-dermal	Dark pink	Present	Sluggish >2 sec	2–3 weeks Grafting may be required	Yes (if healing >3wks)
Deep dermal	Blotchy red / white	+/-	Sluggish >2 sec / absent	Grafting required	Yes
Full thickness	White / brown / black (charred) / deep red	No	Absent	Grafting required	Yes

Sources: Modified from Emergency Management of Severe Burns Course Manual, p461; Partial Thickness Burns – Current Concepts as to Pathogenesis and Treatment, p21. (Jan Darke CNC RNSH)

Wound appearance

The wound appearance can change over a period of time, especially during the first seven days following injury.

This patient suffered a scald burn. Notice changing appearance of the wound over just a few days.



Day 1



Day 2



Day 5

Outcome

Wound depths are defined.

On presentation of burn patient to emergency department flowchart

First aid for burns

- STOP, DROP, COVER face and ROLL if on fire
- Apply 20 minutes cool running water
- Keep rest of body warm to prevent hypothermia
- Remove clothing and jewellery

Perform Primary and Secondary Surveys

Obtain clear history of burn injury

- Mechanism of injury, how and when burnt
- Any first aid (what, how long?)
- Continue cooling if within 3 hours of burn
- Were clothes removed?

Give appropriate pain relief

Assess % total body surface area (TBSA) using Rule of Nines

Does it meet transfer criteria?

- Dermal thickness burns >10% TBSA, full thickness >5% TBSA in adults
- Dermal/full thickness burns in children >5% TBSA
- Burns with associated inhalation injury
- Any priority areas are involved, i.e. face, neck, hands, feet, perineum, genitalia and major joints

- Caused by chemical or electricity, including lightning
- Any circumferential burn
- Burns with concomitant trauma or pre-existing medical condition
- Suspected non-accidental injury
- Pregnancy with cutaneous burns

Yes

No

Refer to appropriate Burn Unit

Royal North Shore Hospital

Ph: (02) 9463 2111 (Burn Unit)

Ph: (02) 9463 2110 (Ambulatory Care)

Concord Repatriation General Hospital

Ph: (02) 9767 7776 (Burn Unit)

Ph: (02) 9767 7775 (Ambulatory Care)

The Children's Hospital at Westmead

(all paediatrics <16yrs)

Ph: (02) 9845 1114 (Burn Unit)

Ph: (02) 9845 1044 (Ambulatory Care)

Minor burn

Can be managed in outlying hospitals and clinics, (see Minor Burn Management document)

- Assess burn wound
- Apply appropriate dressing
- Arrange follow-up dressing and review
- Prescribe pain relief as required
- Contact Burn Unit for any questions or for further review via emailed digital photograph or phone consult

Aims

- Define the difference between severe and minor burns.
- Define SBIS burn transfer criteria.

Severe burns

These are burns which require retrieval or referral to a specialised tertiary burn unit (as per Burn transfer table below). The NSW burn units include adult units at Royal North Shore Hospital and Concord Repatriation General Hospital, and the paediatric unit at the Children's Hospital at Westmead.

Acute period – first 24–48 hours – may be longer in severe burns

NSW burn units will admit patients who meet the criteria for a severe burn. They will also admit patients who have major skin loss due to trauma or disease, or require post burn reconstructive surgery. Additionally burn units will admit patients requiring pain management, physical or psychosocial support.

Special considerations

- Burn unit staff are available for consultation on any burn patient as required. See Page 23 for digital photograph information.
- If the patient requires admission, referring staff must liaise with burn unit staff prior to sending the patient to the unit.

Burn transfer table

Retrieval	Referral	Minor burns
<ul style="list-style-type: none"> • intubated patient • inhalation injuries • head/neck burns • >10% in children • >20% in adults • burns with significant comorbidities • associated trauma • significant pre-existing medical disorder • circumferential burn to limbs or chest that compromises circulation or respiration • significant electrical including lightning injuries • significant chemical, e.g. hydrofluoric acid 	<ul style="list-style-type: none"> • >5% children, >10% adults • burns to the hands, feet, genitalia, perineum, or major joints • chemical burns • electrical burns • burns in patients with pre-existing medical conditions • suspected non-accidental injury including children, assault or self-inflicted • pregnancy with cutaneous burns (RNSH 2nd and 3rd trimester) • extremes of ages 	<p>Burns that do not fit the criteria for retrieval or referral and can be managed in a non-burn unit hospital or clinic, including appropriate management for wounds and pain.</p> <p>Minor burns can be treated, in consultation with the referring clinician, on an outpatient basis; either locally (at original place of care), or on referral to an ambulatory care burn clinic for assessment.</p>

Outcome

Severe and minor burns are defined and transfer criteria is outlined.

- Patients with respiratory involvement and/or large %TBSA are generally managed in the intensive care unit (ICU) until they can be cared for in the ward setting.
- Child protection unit (CPU) involvement is required for all suspected non-accidental injuries in children. Psychiatry involvement is required for adult suspected non-accidental injuries.

Minor burns

A minor burn is defined as a burn which does not meet any of the above criteria for referral to specialist burn unit and there are no adverse physical or social circumstances to outpatient management.

These are patients which can be managed in outlying hospitals or medical centres, via the ambulatory care units within the referral hospitals named above, or co-managed with the burn unit. It is recommended that there is at least some discussion with burn unit staff to aid planning for appropriate management.

Statewide Burn Injury Service transfer criteria

Burns can be classified into three sections (see table below)

- Retrieval
- Referral
- Minor burns – For further information see [NSW Statewide Burn Injury Service Transfer Guidelines](#)

Burn wound healing principles and concepts

Aim

Define the principles and concepts of burn wound healing.

Principles

To promote wound healing and ease patient discomfort, observe the following principles.

- Ensure adequate perfusion.
- Minimise bacterial contamination.
- Minimise negative effects of inflammation.
- Provide optimal wound environment.
- Promote adequate nutrition and fluid management.
- Provide adequate pain management.
- Promote re-epithelialisation.
- Provide pressure management.

Concepts

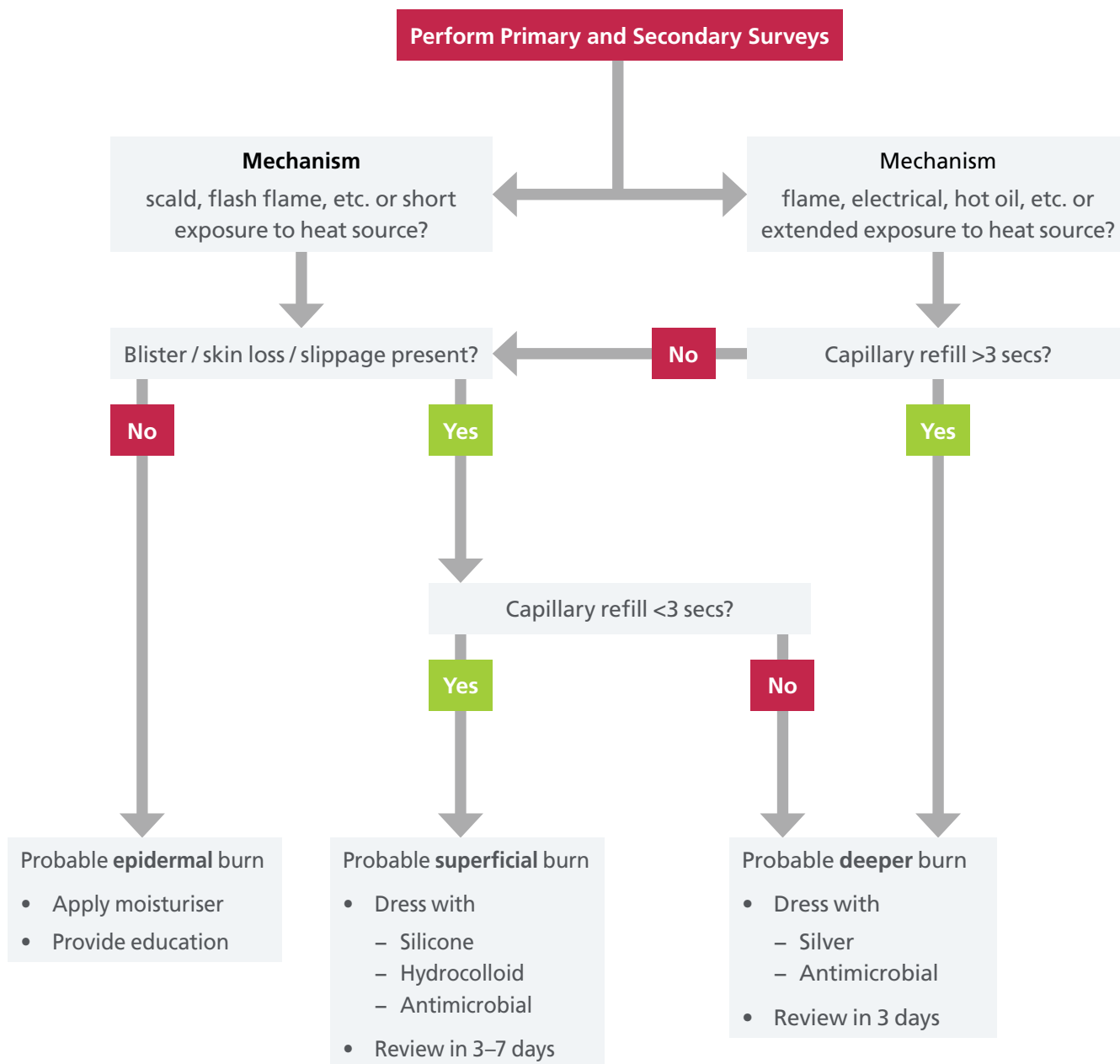
To ensure the above principles are observed, use the following concepts for burn wound management.

- **Cleansing** – wound surface should be free of slough, exudate, haematoma and creams.
- **Debridement** – removal of loose, devitalised tissue (i.e. blister skin) and non-surgical removal of eschar.
- **Dressing**
 - Choose appropriate primary dressing to maintain optimal moisture level and promote wound healing.
 - Exudate management – appropriate absorbency level of dressing must be considered on application.
 - Consider pain and trauma on dressing removal. Consider long-term dressing wherever possible. Aim for prevention of trauma on dressing removal.
 - Application – protect against alteration to distal perfusion due to constrictive dressings, protect against wound bed colonisation.
- **Pressure** – to manage oedema and minimise the effects of scarring.

Outcome

Burn wound healing principles and concepts are defined.

Burn patient dressing decision-making tree



Cleansing and debriding the burn wound

Aims

- Remove exudate and creams.
- Debride devitalised and loose tissue.
- Prevent damaging the healing burn wound.
- Minimise bacterial contamination.
- Minimise psychological trauma to patient, carers and staff.
- Reassess the wound.

Pain management

- Adequate analgesia (refer to pain management section 5)
- For specific pharmacological and non-pharmacological pain management strategies see Clinical Practice Guidelines: Summary of Evidence.

Preparation

- The patient should be given adequate explanation of the procedure. Older children and adult patients are involved, wherever possible, in the procedure as this gives them a sense of control.
- Prepare environment and equipment e.g. warm environment. The patient with an acute burn wound should be washed and dried within 30 minutes or less, if possible. Longer sessions may cause heat loss, pain, stress and sodium loss (water is hypotonic). Keep the bathroom well heated.

Cleansing

- The wound is cleansed gently to remove loose devitalised tissue, exudate and old dressings or creams.
- Wash with soft cloth such as sterile handtowels (i.e. Chux® or Daylees®) in diluted approved solution (ie saline, Prontosan®, Microdacyn®, chlorhexidine gluconate [diluted in water 1:2000], dilute betadine). Use cloth for unburnt parts of the body to maintain hygiene.
- Dry the patient well, as moisture left behind may macerate the burn and provide an ideal environment for bacterial contamination.

Debridement

- Complete a holistic patient and wound assessment, not all wounds require debridement. Clinically examine the patient.
 - Does the wound require debridement?
 - Can the patient tolerate debridement?
 - What is the patient's clinical pathway (e.g. surgical, non-surgical, conservative treatment, comfort care)?
- Select the most appropriate method of debridement (see Summary of Evidence for different methods)

Exudate management

- There will be high exudate from the wound in the first 72hrs post injury.
- Appropriate dressing will be required to manage exudate level.
- Maintain optimal moisture balance.

Special considerations

- Assess and monitor for possible hypersensitivity or allergic responses to products.
- Burns to scalp and excessively hairy areas should be shaved to allow initial assessment and ongoing wound management, thus to prevent folliculitis. Ideally this should extend 2–5cm past the boundary of the burn to ensure full visualisation and prevent hair impeding skin regeneration. The necessity for this procedure should be discussed with the patient, as sometimes religious beliefs preclude cutting of the hair under normal circumstances, and may cause great distress if they do not understand the rationale.
- Prophylactic antibiotics are not routinely given to burn patients as they do not reduce the risk of infection. Antibiotics are only given to patients with known infections and are prescribed to sensitivities, consultation with infectious disease staff is strongly recommended.

Outcome

The burn wound is visibly clean.

Digital photography of the burn wound

Aims

- Allow ease of communication between burn units and external hospitals or healthcare facilities.
- Assist with monitoring of wound progress.
- Minimise prolonged or multiple exposure of patients.
- Reduce issue of infection control by reducing attending staff numbers.

Preparation

- The patient should be given adequate explanation of the procedure and sign a consent form prior to any photographs being taken.
- Taking of photos should not delay the dressing procedure for extended periods due to the risk of hypothermia and distress to the patient.
- Turn off overhead heat light whilst taking photographs as they can lead to discolouration.
- Consider colouring. Dark skin on stark white background can give illusion of greater severity of burn. Very pale skin on white background will not give enough contrast.
- Aim for neutral colour background such as green sterile sheet.

Procedure

- Patient should be made comfortable on clean dry sheet.
- Take a photo of the patient's hospital sticker for identification.
- If patient has extensive burns take global photograph to show where burn occurs on body.
- For small burns lay a measure rule next to the wound to display wound size.
- Consider patient's dignity especially if burns around perineum or genitalia. Use small cloth to cover non-involved areas.

Storage

- To preserve confidentiality all images must be stored in a limited access area, such as with password protection.
- For ease of access to appropriate images, each should be stored in an easily recognisable pattern, such as under medical record number and date taken.

Emailing pictures

It is possible to email digital photographs of burn wound to burn units. Contact must be made between referring and accepting medical or nursing staff. Photographs must be taken in accordance with above guidelines and must be accompanied by injury history and consent.

Email consultation addresses

CHW: kidsburns@health.nsw.gov.au

RNSH: BurnsRNS@health.nsw.gov.au

CRGH: SIhd-concordburnsunit@health.nsw.gov.au







Outcome

The burn wound is photographed.

Tips

- Take numerous pictures, with and without flash if necessary, extras can be deleted when downloading.
- Label photos, stating date photo taken, days post burn injury, patient identification, anatomical position and orientation.

Selecting an appropriate dressing – quick reference guide

	Dressing options	Dressing product	Dressing application
	<ul style="list-style-type: none"> • Silicone foam • Impregnated gauze • Silver • Hydrocolloid 	Silicone e.g. <ul style="list-style-type: none"> • Mepilex® • Mepilex Lite® • Allevyn® Also available with silver <ul style="list-style-type: none"> • MepilexAg® 	<ul style="list-style-type: none"> • Apply to clean wound bed • Cover with fixation or retention dressing • Change 3–7 days depending on level of exudate
	<ul style="list-style-type: none"> • Hydrocolloid • Silicone • Impregnated gauze • Silver 	Hydrocolloid e.g. <ul style="list-style-type: none"> • Comfeel® • Duoderm® 	<ul style="list-style-type: none"> • Apply to clean wound bed • Change 3–4 days depending on level of exudate
	<ul style="list-style-type: none"> • Impregnated gauze • Silicone • Silver • Hydrocolloid 	Impregnated gauze e.g. <ul style="list-style-type: none"> • Bactigras® • Jelonet® • Curity® • Adaptic® 	<ul style="list-style-type: none"> • Apply directly to wound • 2 layers for acute wounds 1 layer for almost healed wounds • Cover with appropriate secondary dressing • Change every 1–3 days
	<ul style="list-style-type: none"> • Silver • Silicone • Impregnated gauze • Hydrocolloid 	Silver e.g. <ul style="list-style-type: none"> • AquacelAg® 	<ul style="list-style-type: none"> • Apply to moist wound bed • Allow 2–5 cm overlap • Cover with secondary dressing • Review in 7–10 days, remove secondary dressing • Leave intact until healed, trimming edges as required. • Do not use if frequent dressing change required
	<ul style="list-style-type: none"> • Silver • Impregnated gauze • Hydrocolloid 	Silver e.g. <ul style="list-style-type: none"> • Acticoat® 	<ul style="list-style-type: none"> • Wet Acticoat with H2O; drain and apply blue side down • Insert irrigation system for Acticoat 7 • Moistened secondary dressing to optimise desired moisture level • Replace 3–4 days (Acticoat) or 7 days (Acticoat 7)
	<ul style="list-style-type: none"> • Silver • Impregnated gauze • Hydrocolloid 	Silver e.g. <ul style="list-style-type: none"> • Flammazine® 	<ul style="list-style-type: none"> • Apply generous amount to sterile handtowel to ease application • Cover with secondary dressing • Not recommended for most burns due to changes to wound appearance and frequency of required dressing changes – daily

Dressing procedure

Aim

- To apply most appropriate dressing using correct technique.
- To apply dressing in timely manner to avoid hypothermia, excess pain or trauma.
- To maintain an aseptic technique at all times.

Dressing notes

- Appropriate pre procedural pain relief must be administered and given time to take effect.
- Open areas must not come in contact with each other as they heal i.e. fingers, toes, etc.
- Healed areas of skin should be moisturised with appropriate moisturiser. A small amount is rubbed in until absorbed.
- Secondary dressings must not come in contact with the wound as they may adhere and cause trauma on removal.
- Care must be taken not to tightly wrap primary dressings circumferentially around the burns.
- Post procedure pain relief may be required for some patients.
- Occlusive dressings should not be applied to infected wounds

Dressing specialised areas

Specialised areas include face, head, neck, ears, hands, perineum and genitals. These areas require the application of complex dressings which should only be carried out by experienced clinicians. If attending these types of dressings in areas other than a burn unit please seek advice from burn unit staff and access resources available on the SBIS website.

Face, head, neck

- In most instances faces do not need dressings. Soft white paraffin ointment should be applied to allow moist wound healing. Apply approximately 3 times/day.
- Bandages can be used to maintain neck angle.
- Tracheostomy tape may be used to secure a nasogastric tube when adhesive tape is unsuitable due to burns around the nose.

Ears

- The area behind the ear should be padded to avoid burnt surfaces coming into contact with each other and the area incorporated into the head dressing if appropriate.
- Impregnated gauze is often the dressing of choice on ears.
- Doughnuts made of a soft foam can be made to fit around the ear to help prevent pressure on the ear.
- To protect the helix (cartilage) of the ear, the ear must lie in a natural position and the padding must be high enough so that any pressure from the bandaging is borne by the padding.

Hands and fingers

- In the first 24–48 hours if the fingers are swollen, it is sometimes recommended to dress each finger separately by applying an appropriate primary dressing. The whole hand is then bandaged as shown in Figure.1. This method inhibits normal functioning and mobility and should only be used when necessitated.
- At all other times, and once oedema has subsided, the fingers should be individually bandaged as shown in Figure.2. These bandages allow better mobility and enhance functional ability.

Figure 1

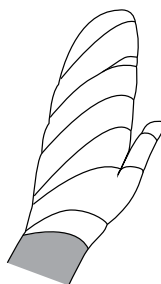
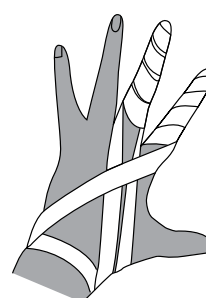


Figure 2



Feet

- The web spaces between the toes should be separated but it is often difficult to bandage toes separately due to their size.
- A large supportive dressing allows for mobilisation and helps keep the toes in a natural position. Foam padding can be used to protect burnt soles.

Perineum

- Patients with perineal burns are generally catheterised to decrease pain and allow for the area to be kept as clean as possible. Bowel management systems may also be required to prevent soiling of dressings.
- Impregnated gauze, 2–3 layers, can be cut to size and placed in nappy for young children or on a pad in underwear for older children and adults. Change as required.
- **Males**
If the penis and/or scrotum are burnt, apply appropriate primary dressing with outer supportive dressings. A scrotal support may be necessary.

Outcome

The most appropriate cleansing and dressing is applied using aseptic technique.

Tips

- It is important to separate burnt surfaces.
- Occlusive dressings should not be applied to infected wounds.
- Care must be taken not to tightly wrap primary dressings circumferentially around the burns.
- Secondary dressings must not come in contact with the wound as they may adhere and cause trauma on removal.
- When bandaging start distally and work proximally, from feet or hands. It may be necessary to incorporate feet or hands, even if they are not burnt to avoid oedema formation.
- Elevate the arms and legs, especially in the acute period to reduce oedema.
- Legs should be bandaged straight and splints may be necessary.
- Healed areas of skin need moisturising with appropriate moisturiser. A small amount is rubbed in until absorbed.
- Even if analgesia has been administered before or during procedure, post-procedure pain relief may be required for some patients.

Specific dressing application

Silicone foam application



Clean wound bed



Apply directly to wound

Silver silicone foam application



Clean wound bed



Apply directly to wound surface



Apply stabilisation dressing if required

Acticoat® application



Clean wound bed



Moisten with water **NOT** saline



Apply to wound, either side down and stabilise with tape e.g. Hypafix®



Apply moistened secondary dressing

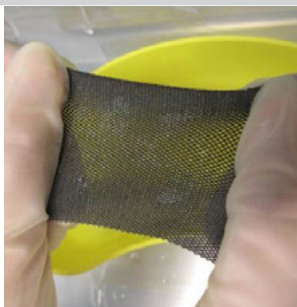


Cover with film

Acticoat Flex® application



Clean wound bed



Moisten with water **NOT** saline

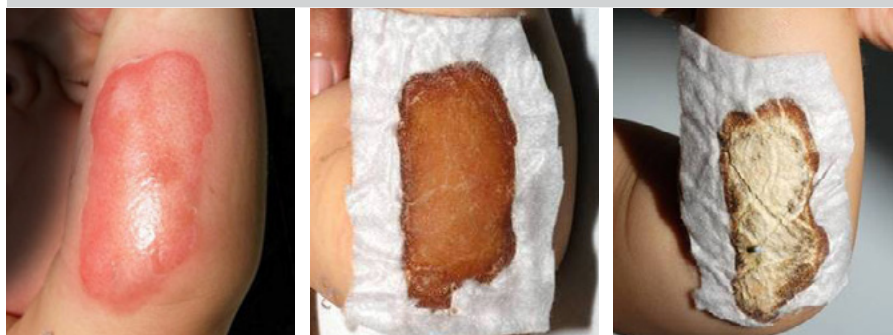


Apply to wound



Secure with tape e.g. Hypafix® and cover with film

AquacelAg® application



Clean wound bed

Apply to wound

Leave intact

Impregnated gauze application



Clean wound bed

Apply 2 layers for moist wounds

Appropriate external dressings

Problem dressings



Issue

Primary dressing slipped off wound.

Solution

Use appropriate fixation dressing over primary and secondary dressings.



Issue

Secondary dressing stuck causing trauma.

Solution

Use appropriate fixation dressing over primary and secondary dressings.



Issue

Maceration of surrounding unburnt skin.

Solution

Use appropriate dressing on burn wound only.
Do not leave wet or moist dressing on large areas of unburnt skin.

Dressing fixation application

Cohesive bandage application – adult patients only

Only to be used by accredited staff after completing competencies.



Start at base of hand working with a slight stretch



Then work from tips of fingers in a spiral covering half of the previous tape



Anchor to tape on hand



Place pieces through web spaces of each finger to separate

NB: Care must be taken not to wrap tightly. Check distal vascularity post application.

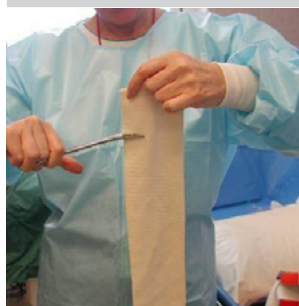
Adhesive tape application



Can be used on many areas of the body to fix dressing in place.

NB: This is not suitable as a primary dressing and must not be used on areas of skin loss.

Tubular bandage application



Cut to length, then cut slit for thumb



Apply with applicator, or alternative*



Remove wrinkles

* Alternative to applicator can be large tin with both ends removed, cleaned and ends sealed with tape or similar

Problem fixation dressings



Issue

Swelling, pressure injuries and reduced blood flow in peripheries.

Solution

Remove wrinkles in tubular bandage and incorporate feet and hands even if not burnt to prevent pressure injuries and swelling.



Issue

Patient unable to move hand adequately.

Solution

Wrap fingers individually.



Issue

Dressing falls off quickly.

Solution

Use appropriate fixation dressing.



Issue

Tape applied over pressure dressing can lead to pressure injuries.

Solution

Use appropriate fixation dressing.

The multidisciplinary team

Burn management is conducted by members of a multidisciplinary burn team which include medical, surgical, intensive care, nursing, physiotherapy, occupational therapy, dietetics, social work, psychiatry, psychology, speech therapy, pharmacy and technicians. A multidisciplinary approach to burn management is essential for optimal functional and cosmetic outcome. Serious long term physical and psychosocial morbidity may be associated with a burn injury. All members of the burn team interact throughout the patient's management, from admission to discharge and beyond to support the patient and family in reintegration. All team members contribute to patient care throughout the early management, ongoing clinical intervention periods during all phases of care, and continuous education and support to the patient, family and staff.

For further information regarding multidisciplinary care please refer to the following documents:

- Clinical Guideline: Burn Physiotherapy and Occupational Therapy Guidelines
www.aci.health.nsw.gov.au/data/assets/pdf_file/0018/236151/Burns-PT-OT-Guidelines.pdf
- Clinical Practice Guidelines: Nutrition Burn Patient Management
www.aci.health.nsw.gov.au/data/assets/pdf_file/0009/162639/SBIS_Nutrition_CPG_new_format.pdf
- Clinical Practice Guidelines Speech Pathology Burn Patient Management
www.aci.health.nsw.gov.au/data/assets/pdf_file/0020/162641/SBIS_Speech_Path_CPG_2011.pdf
- Practice Guidelines: Child Life Therapy Burn Patient Management
www.aci.health.nsw.gov.au/data/assets/pdf_file/0008/162638/SBIS_Child_life_therapy_CPG_2011.pdf
- Clinical Practice Guidelines: Social Work (adults) Burn Patient Management
www.aci.health.nsw.gov.au/data/assets/pdf_file/0007/162637/SBIS_Adult_Social_Work_CPG_new_format.pdf
- Clinical Practice Guidelines: Social Work; Paediatric Burn Patient Management
www.aci.health.nsw.gov.au/data/assets/pdf_file/0019/162640/SBIS_Paed_Social_Work_CPG_new_format.pdf

All of these documents are available via the ACI Statewide Burn Injury Service Website:

www.aci.health.nsw.gov.au/resources/burn-injury

Also available on this website are:

- Clinical Practice Guidelines: Burn Patient Management, Summary of Evidence
- Minor Burn Management
- Clinical Practice Guidelines: Escharotomy for Burn Patients
- NSW Statewide Burn Injury Service Burn Transfer Guidelines
- NSW Statewide Burn Injury Service Model of Care

Websites

There are many useful websites. For a few examples please see the list below.

- ACI Statewide Burn Injury Service www.aci.health.nsw.gov.au/resources/burn-injury
- Australian New Zealand Burn Association www.anzba.org.au
- Journal of Burn Care & Research www.burncareresearch.com
- International Society for Burn Injuries www.worldburn.org
- Annals of Burns and Fire Disasters www.medbc.com/annals/
- Total Burn Care: Resident Orientation Manual – Acute Burn Management (Galveston Shriners Burn Hospital and The University of Texas Medical Branch Blocker Burn Unit) www.totalburncare.com/orientation_acute_burn_mgmt.htm

Appendices

Appendix 1: Burn wound management: wound care product selection

Appendix 2: Recognising burn depths chart

Appendix 3: Minor burn blister management

Appendix 4: NSW Trauma App

Appendix 1: Burn wound management: wound care product selection

Silver

Wound care product What?	Function Why?	Indications When?	Application How?	Notes and precautions
Acticoat®, Acticoat7® 2 layered/3 layered nanocrystalline Ag coated mesh with inner rayon layer. Acticoat®Flex Nanocrystalline Ag coated mesh	<ul style="list-style-type: none"> Broad spectrum antimicrobial protection Decreases exudate formation Decreases eschar autolysis 	<ul style="list-style-type: none"> Dermal to full thickness Grafts and donor sites Infected wounds Over Biobrane and Integra 	<ul style="list-style-type: none"> Moisten Acticoat® with H2O; remove excess water, apply either side down Moistened secondary dressing to optimise desired moisture level Replace 3–4 days (Acticoat®/Acticoat® Flex) or 7 days (Acticoat7®) 	<ul style="list-style-type: none"> Initial stinging on application <ul style="list-style-type: none"> provide prophylactic pain relief Temporary skin staining Maintain normothermia <ul style="list-style-type: none"> use warm blankets
MepilexAg®, MepilexAg® Transfer Hydrophilic polyurethane foam with soft silicone layer and waterproof outer layer	<ul style="list-style-type: none"> Absorb exudate from wound bed 	<ul style="list-style-type: none"> Superficial to mid dermal burns. Low to moderately exuding wound 	<ul style="list-style-type: none"> Apply to clean wound bed Cover with fixation or retention dressing 	
AquacelAg® Sodium carboxymethylcellulose and 1.2% ionic Ag in fibrous material	<ul style="list-style-type: none"> Broad spectrum antimicrobial protection Facilitates debridement Decreases exudate formation Absorbs exudate 	<ul style="list-style-type: none"> Dermal thickness burn Moderately exuding wound Moderate bacterial load 	<ul style="list-style-type: none"> Apply to clean wound bed Cover with fixation or retention dressing 	<ul style="list-style-type: none"> Exudate level indicates frequency of dressing change
Allevyn®Ag, Allevyn®Ag Gentle Non-adherent hydrocellular foam with silver	<ul style="list-style-type: none"> Absorb exudate from wound bed 	<ul style="list-style-type: none"> Exuding wounds Granulation 	<ul style="list-style-type: none"> Use as primary or secondary dressing, white side down Retention dressing to secure Change when exudate approaches 2cm from edge 	<ul style="list-style-type: none"> Avoid use with oxidising agents
Biatain®Ag Foam dressing with silver	<ul style="list-style-type: none"> Highly absorbent foam that absorbs exudate 	<ul style="list-style-type: none"> Highly exuding wounds 	<ul style="list-style-type: none"> Retention dressing to secure Change when exudate approaches 2cm from the edge of the dressing 	<ul style="list-style-type: none"> Remove if radiation, ultrasonic, diathermy or microwaves treatment
Durafiber®AG Cellulose ethyl sulphonate fibre dressing with ionic silver	<ul style="list-style-type: none"> Broad spectrum antimicrobial protection Facilitates debridement Decreases exudate formation Absorbs exudate 	<ul style="list-style-type: none"> Dermal thickness burn Moderately exuding wound Moderate bacterial load 	<ul style="list-style-type: none"> Apply to clean wound bed Cover with fixation or retention dressing 	<ul style="list-style-type: none"> Exudate level indicates frequency of dressing change
Flamazine® Silver sulphadiazine 1%	<ul style="list-style-type: none"> Reduces infection 	<ul style="list-style-type: none"> Dermal to full thickness Infected wounds 	<ul style="list-style-type: none"> Apply generous amount to sterile handtowel to ease application Apply to wound Cover with secondary dressing 	<ul style="list-style-type: none"> Change daily, remove old cream Contraindicated during first trimester of pregnancy Not recommended for most burns due to changes to wound appearance and frequency of required dressing changes
Flammacerium® Silver sulfadiazine 1% + cerium nitrate 2.2%	<ul style="list-style-type: none"> Creates dry inactive wound Decreases bacterial load 	<ul style="list-style-type: none"> Burn specialist to decide application. Consult with specialist for repeat application at 48 hrs 	<ul style="list-style-type: none"> Apply to body pad or combine dressing then onto wound 	<ul style="list-style-type: none"> Only to be used by burn units under order by a treating burn specialist

Impregnated gauze

Wound care product What?	Function Why?	Indications When?	Application How?	Notes and precautions
Bactigras® Chlorhexidine impregnated paraffin gauze	<ul style="list-style-type: none"> Non adherent antiseptic dressing 	<ul style="list-style-type: none"> Dermal thickness wounds 	<ul style="list-style-type: none"> Apply directly to wound 2 layers for acute wounds, 1 layer for almost healed wounds Cover with appropriate secondary dressing Change every 1–3 days 	
Jelonet®, Adaptic®, Curity® Paraffin impregnated gauze	<ul style="list-style-type: none"> Non adherent conservative dressing 	<ul style="list-style-type: none"> Clean dermal thickness wounds. 	<ul style="list-style-type: none"> As above 	
Xeroform® Mesh gauze impregnated with 3% Xeroform® (Bismuth tribomophophenate)	<ul style="list-style-type: none"> Non adherent 	<ul style="list-style-type: none"> Dermal thickness wounds Light exudating wounds 	<ul style="list-style-type: none"> Secondary dressing to optimise desired moisture level 	

Film

Wound care product What?	Function Why?	Indications When?	Application How?	Notes and precautions
Tegaderm®, Opsite®, AsGuard®, Curapor®, Hydrofilm®, Mepitel Film®, Curimed®, Medstock® Adhesive, conformable film dressing	<ul style="list-style-type: none"> Barrier to contaminants 	<ul style="list-style-type: none"> Small isolated wounds Some blisters 	<ul style="list-style-type: none"> Apply directly to wound No secondary dressing required 	<ul style="list-style-type: none"> Only use when surrounding tissue not compromised

Hydrocolloid

Wound care product What?	Function Why?	Indications When?	Application How?	Notes and precautions
Comfeel® Hydrocolloid containing carboxymethylcellulose (CMC) Hydrocolloid wafer Hydrocolloid paste	<ul style="list-style-type: none"> CMC combines with exudate to aid autolysis of devitalised tissue Provides moist wound environment Absorbs exudate 	<ul style="list-style-type: none"> Devitalised tissue, sloughy wounds Low to moderately exudating wounds 	<ul style="list-style-type: none"> Allow 2cm margin around wound Can remain intact 2–3 days Wafers up to 5 days if no signs infection 	
Duoderm®, Suprasorb® H, Hydrocoll®, Osmocol® Hydrocolloid wafer	<ul style="list-style-type: none"> Provides moist wound environment Absorbs exudate Assists scar management in healed wounds 	<ul style="list-style-type: none"> Exudating wounds Scars 	<ul style="list-style-type: none"> Apply directly to area No secondary dressing required 	<ul style="list-style-type: none"> Only use when surrounding tissue not compromised

Foam

Wound care product What?	Function Why?	Indications When?	Application How?	Notes and precautions
Mepilex® Transfer Hydrophilic polyurethane foam with soft silicone layer	<ul style="list-style-type: none"> Absorb exudate from wound bed and transfers to outer dressing 	<ul style="list-style-type: none"> Superficial to mid dermal burns 	<ul style="list-style-type: none"> Apply to clean wound bed Cover with absorbent secondary dressing 	<ul style="list-style-type: none"> Avoid use on infected wounds
Mepilex® Lite, Askina® Foam Hydrophilic polyurethane foam with soft silicone layer and waterproof outer layer	<ul style="list-style-type: none"> Absorb exudate from wound bed 	<ul style="list-style-type: none"> Superficial to mid dermal burns 	<ul style="list-style-type: none"> Apply to clean wound bed Cover with fixation or retention dressing 	<ul style="list-style-type: none"> Avoid use on infected wounds
Mepilex® Border, Askina® DresSil Hydrophilic polyurethane foam with soft silicone layer, adhesive external layer	<ul style="list-style-type: none"> Absorb exudate from wound bed 	<ul style="list-style-type: none"> Superficial to mid dermal burns 	<ul style="list-style-type: none"> Apply to clean wound bed No need for secondary dressing 	<ul style="list-style-type: none"> Avoid use on infected wounds
Biatain®, Biatain®Silicone, Suprasorb®, Aquacel® Foam Foam dressing	<ul style="list-style-type: none"> Highly absorbent foam that absorbs exudate 	<ul style="list-style-type: none"> Highly exuding wounds 	<ul style="list-style-type: none"> Retention dressing to secure Change when exudate approaches 2cm from the edge of the dressing 	<ul style="list-style-type: none"> Remove if radiation, ultrasonic, diathermy or microwaves treatment
Allevyn®, Allevyn® Gentle Non-adherent hydrocellular foam	<ul style="list-style-type: none"> Absorb exudate from wound bed 	<ul style="list-style-type: none"> Exuding wounds Granulation 	<ul style="list-style-type: none"> Use as primary or secondary dressing, white side down Retention dressing to secure Change when exudate approaches 2cm from edge 	<ul style="list-style-type: none"> Avoid use with oxidising agents

Absorbent

Wound care product What?	Function Why?	Indications When?	Application How?	Notes and precautions
Exudry® Non-adherent, highly absorbent, permeable dressing	<ul style="list-style-type: none"> Absorbs high exudate Protects against shearing 	<ul style="list-style-type: none"> Over primary dressing 	<ul style="list-style-type: none"> Apply appropriate primary dressing Then apply outer absorbent dressing 	
Mesorb®, Zetuvit® Sterile absorbent pad	<ul style="list-style-type: none"> Absorbs exudate 	<ul style="list-style-type: none"> As above 	<ul style="list-style-type: none"> As above 	
Webril® Cotton bandage	<ul style="list-style-type: none"> Protective 	<ul style="list-style-type: none"> As above 	<ul style="list-style-type: none"> As above 	<ul style="list-style-type: none"> May adhere if inappropriate primary dressing
Telfa®, Melolite® Non-adherent, absorbent wound dressing pad	<ul style="list-style-type: none"> Non-adherent 	<ul style="list-style-type: none"> As above 	<ul style="list-style-type: none"> As above 	
Combine® Absorbent pad	<ul style="list-style-type: none"> Absorbs exudate 	<ul style="list-style-type: none"> As above 	<ul style="list-style-type: none"> As above 	<ul style="list-style-type: none"> May adhere if inappropriate primary dressing
Kaltostat®, Algisite®, Algoderm® Calcium sodium alginate wound dressing	<ul style="list-style-type: none"> Absorbent dressing Moist wound environment Haemostatic 	<ul style="list-style-type: none"> Donor sites Granulating wounds Excessively bleeding wounds 	<ul style="list-style-type: none"> Apply directly to wound 	<ul style="list-style-type: none"> Replace when exudate no longer absorbed or infection evident Donor site leave intact at least 10 days

Skin or dermal substitutes

Wound care product What?	Function Why?	Indications When?	Application How?	Notes and precautions
Cultured epithelial autograft (CEA) / keratinocyte spray Only used in specialist burn unit	<ul style="list-style-type: none"> Assists with skin closure Reduces need for extensive donor skin harvesting 	<ul style="list-style-type: none"> Burns medical specialist will indicate application Excised full thickness and deep dermal thickness burns 	<ul style="list-style-type: none"> Used in conjunction with autograft 	<ul style="list-style-type: none"> Only used in specialist burn unit
Biobrane® Biosynthetic dressing made up of collagen coated nylon bonded to silicone	<ul style="list-style-type: none"> Temporary skin cover Decreases risk of infection Reduces evaporative water loss 	<ul style="list-style-type: none"> If limited donor skin available or loss Applied over debrided wound bed 	<ul style="list-style-type: none"> Appropriate secondary dressing 	<ul style="list-style-type: none"> Granulation may incorporate Biobrane into regenerating skin layer
Integra® Bovine tendon collagen and glycosaminoglycan cross linked fibres with a silastic top layer	<ul style="list-style-type: none"> Dermal replacement. The matrix layer allows the infiltration of fibroblasts, macrophages, lymphocytes and capillaries to generate the new dermis 	<ul style="list-style-type: none"> Surgical indication and application by burns medical specialist Full thickness burns over a flexor joints 	<ul style="list-style-type: none"> Burn debrided, Integra applied, 3 weeks silastic layer peeled off and skin graft applied Area immobilised and splint applied If Integra lifting consult with medical officer, remove affected Integra, clean gently (saline) and apply Acticoat 	<ul style="list-style-type: none"> No paraffin, moisturisers, Silvazine dressings or water as this will lift Integra Not to be applied to people with known sensitivities to collagen or silastic

Silicone

Wound care product What?	Function Why?	Indications When?	Application How?	Notes and precautions
Mepitel® Transparent, open mesh, polyamide net, coated with soft silicone layer	<ul style="list-style-type: none"> Non-stick dressing 	<ul style="list-style-type: none"> Painful open granulating wounds Dermal thickness burns Skin tears 	<ul style="list-style-type: none"> Can be left intact 2–3 days if exudates minimal Secondary dressing to optimise desired moisture level 	<ul style="list-style-type: none"> Do not apply if sensitive to silicone
Askina® Skilnet Conformable non-woven material, coated on both sides with soft silicone	<ul style="list-style-type: none"> Non-stick dressing 	<ul style="list-style-type: none"> Painful open granulating wounds Dermal thickness burns Skin tears 	<ul style="list-style-type: none"> Can be left intact 2–3 days if exudates minimal Secondary dressing to optimise desired moisture level 	<ul style="list-style-type: none"> Do not apply if sensitive to silicone

Scar management (use in consultation by specialist therapists)

Wound care product What?	Function Why?	Indications When?	Application How?	Notes and precautions
CicaCare® Silicone sheet	<ul style="list-style-type: none"> Scar softening 	<ul style="list-style-type: none"> Reduces effects of scar 	<ul style="list-style-type: none"> Apply to affected area as instructed by therapist 	<ul style="list-style-type: none"> Strict initial usage regime to assess sensitivity Do not apply if sensitive to silicone
Mepiform® Silicone sheet	<ul style="list-style-type: none"> Scar softening 	<ul style="list-style-type: none"> Reduces effects of scar 	<ul style="list-style-type: none"> Apply to affected area as instructed by therapist 	<ul style="list-style-type: none"> Do not apply if sensitive to silicone

Other

Wound care product What?	Function Why?	Indications When?	Application How?	Notes and precautions
Solosite®, Intrasite®, Purilon®, Microdacyn® gel, Askina®, Hydrosorb® gel, Prontosan® Hydrogels	<ul style="list-style-type: none"> Re-hydrate wounds and absorbs some exudate into the gel 	<ul style="list-style-type: none"> Dry, necrotic Low exudating Cavity wounds 	<ul style="list-style-type: none"> Apply directly onto wound, cover with film OR <ul style="list-style-type: none"> Apply to secondary dressing and apply onto wound 	
Bepanthen® Antiseptic cream	<ul style="list-style-type: none"> Antiseptic with moisturising capabilities 	<ul style="list-style-type: none"> Superficial burns Newly healed dermal thickness burns 	<ul style="list-style-type: none"> Apply thin film to wound For hand burns cover with cotton glove 	<ul style="list-style-type: none"> Do not apply too thick Do not use longer than 7 days
Hydrocortisone cream e.g. Betnovate®, Diprosone®	<ul style="list-style-type: none"> Reduces blood flow to hypergranulated wound 	<ul style="list-style-type: none"> Hypergranulating wounds 	<ul style="list-style-type: none"> Apply direct to wound or to dressing 	<ul style="list-style-type: none"> Change daily Short term usage only
Silver nitrate cauterizing agent	<ul style="list-style-type: none"> Cauterises hypergranulated wound 	<ul style="list-style-type: none"> Hypergranulating wounds 	<ul style="list-style-type: none"> Apply direct to affected area 	<ul style="list-style-type: none"> Single application, can be repeated if necessary
Inadine®PVP-I NA Low adherent knitted viscose fabric impregnated with polyethylene glycol containing 10% Povidone Iodine.	<ul style="list-style-type: none"> Manages bacterial contamination and prevents infection. 	<ul style="list-style-type: none"> Wound infected with bacteria, microbacteria, fungi, protozoa & viruses. 	<ul style="list-style-type: none"> Apply as primary dressing or in combination with other dressings. Change dressing when colour goes from orange to white. 	
Iodosorb® Cadexomer Iodine	<ul style="list-style-type: none"> Assists healing Reduces bacteria Facilitates de-sloughing Absorbs exudate 	<ul style="list-style-type: none"> Chronic and infected wounds 	<ul style="list-style-type: none"> Cut to size and apply to wound 	<ul style="list-style-type: none"> Avoid use if sensitive to iodine, or thyroid condition Iodine toxicity may occur
Iodine® Betadine®	<ul style="list-style-type: none"> Anti-microbial agent 	<ul style="list-style-type: none"> Wounds infected with gram +ve and –ve bacteria, spores, fungi, viruses proteus. 	<ul style="list-style-type: none"> Dab onto wound 	<ul style="list-style-type: none"> Avoid use if sensitive to iodine, or thyroid condition Iodine toxicity may occur
Prontosan® Wound irrigation solution containing polyhexanide and betaine	<ul style="list-style-type: none"> Removes debris, slough, bioburden and biofilm 	<ul style="list-style-type: none"> Colonised wounds 	<ul style="list-style-type: none"> Use solution to cleanse wound 	
Microdacyn® Hypochlorous acid and sodium hypochlorite pH neutral super oxidized solution	<ul style="list-style-type: none"> Removes debris, slough, bioburden and biofilm 	<ul style="list-style-type: none"> Colonised wounds 	<ul style="list-style-type: none"> Use solution to cleanse wound 	
Mesalt® Absorbent non-woven dressing impregnated with sodium chloride	<ul style="list-style-type: none"> Stimulates the cleansing of heavily discharging and discharging infected wounds 	<ul style="list-style-type: none"> Medium to high levels of exudate 	<ul style="list-style-type: none"> Apply to wound. Change daily as indicated 	
Surfasoft® Woven polyamide transparent dressing.	<ul style="list-style-type: none"> Reduces friction rub over graft Exudate able to pass through dressing Easy to view 	<ul style="list-style-type: none"> Applied in the operating theatre over meshed grafts 	<ul style="list-style-type: none"> Surfasoft applied wet (sterile normal saline) Leave intact 5 days unless infection evident 	<ul style="list-style-type: none"> Apply olive oil prior to day of removal (day 4 usually) Peel off gently. If adhered reapply oil

Moisturising products

Wound care product What?	Function Why?	Indications When?	Application How?	Notes and precautions
Dermaveen® bath and shower oil Oatmeal based oil	<ul style="list-style-type: none"> Helps remove and clean devitalised tissue and exudate when massaged onto wound Can relieve pruritus 	<ul style="list-style-type: none"> Epithelialised, dry skin Folliculitis 	<ul style="list-style-type: none"> Massage onto wounds and healed areas Wash with warm water and pat dry 	<ul style="list-style-type: none"> Do not apply if known sensitivities to oatmeal
Paraffin	<ul style="list-style-type: none"> Prevents wound from drying out 	<ul style="list-style-type: none"> Face / lips Superficial and dermal thickness burns 	<ul style="list-style-type: none"> Apply layer to affected area, do not rub in 	
Lacrilube®	<ul style="list-style-type: none"> Prevents wound from drying out 	<ul style="list-style-type: none"> Burns around the eye 	<ul style="list-style-type: none"> As above 	
Lanolin	<ul style="list-style-type: none"> Moisturiser 	<ul style="list-style-type: none"> Burnt lips Dry, healing wounds 	<ul style="list-style-type: none"> As above 	
Sorbolene Sorbolene + 10% Glycerin	<ul style="list-style-type: none"> Can be used as a moisturiser or 'soap' 	<ul style="list-style-type: none"> Dry, healing exuding and devitalised tissue 	<ul style="list-style-type: none"> Massage small amount into required areas of healing wound 	
Dermaveen® Oatmeal based moisturiser	<ul style="list-style-type: none"> Rehydrates new epithelium, may relieve pruritus 	<ul style="list-style-type: none"> Epithelialised wounds Grafts and donor sites 	<ul style="list-style-type: none"> Massage onto healing wound 	<ul style="list-style-type: none"> Do not apply if known sensitivities to oatmeal

Retention / fixation

Wound care product What?	Function Why?	Indications When?	Application How?	Notes and precautions
Hypafix®, Fixamul®, Mefix®, Primafix® Adhesive non-woven fabric	<ul style="list-style-type: none"> Stabilises primary and secondary dressings Protects epidermis while healing and initially after epithelialisation 	<ul style="list-style-type: none"> Superficial dermal thickness (skin intact) Stabilising external dressing layer 	<ul style="list-style-type: none"> Remove 7–10 days when epithelialised Removed easily with De-Solve-It (immediate) or olive oil (takes 30–60mins) 	<ul style="list-style-type: none"> DO NOT use on open areas as primary dressing Do not apply to people who may have delayed healing or fragile skin (e.g. the elderly)
Tubigrip®, Tubular Form® Tubular pressure bandage 67% cotton and 30% rayon	<ul style="list-style-type: none"> Tissue support Pressure to healing and epithelialised wounds 	<ul style="list-style-type: none"> Healing or epithelialised wounds 	<ul style="list-style-type: none"> Measuring tapes to be used to decide appropriate size and pressure Use rings for application 	<ul style="list-style-type: none"> Closely monitor use on upper arms and upper thighs, as soft tissue damage may occur. Remove if painful /tingling
Tubifast® Tubular pressure bandage	<ul style="list-style-type: none"> Tissue support Assist keeping dressing in place 	<ul style="list-style-type: none"> Healing or epithelialised wounds 	<ul style="list-style-type: none"> Use appropriate size Use rings for application 	<ul style="list-style-type: none"> Remove if painful /tingling
Coban® Self-adherent wrap bandage	<ul style="list-style-type: none"> Stabilises primary and secondary dressings Pressure to wounds 	<ul style="list-style-type: none"> Healing or epithelialised wounds 	<ul style="list-style-type: none"> Adheres to itself but not the skin Apply with gentle stretch only 	<ul style="list-style-type: none"> Do not apply with full stretch as this may impair blood flow to peripheries

Suppliers

Company	Products	Website
3M	Tegaderm®, Coban®, Cavilon®	www.3m.com/intl/au
B.Braun	Askina® Foam, Askina® DresSil, Prontosan®, Carbosorb®	www.bbraun.com.au/
BSN Medical	Fixomull®, Hypafix®	www.bsnmedical.com/products/
Coloplast	Comfeel® Wafer, Comfeel® Paste, Biatain®, Biatain®Ag	www.coloplast.com.au
Convatec	AquacelAg®, Duoderm®, Kaltostat®	www.convatec.com
Hartmann	Zetuvit®	https://hartmann.info/en-au
KCI Medical	Inadine®, Adaptic®,	https://www.bbraun.com.au/en.html
Lohmann & Rauscher Pty Ltd	Suprasorb H	https://www.lohmann-rauscher.com/au-en/
Medtronic Australia / Covidien	Curity®, Telfa®, AMD®, Webri®, Vaseline®, Kerlix®	www.medtronic.com/au-en/index.html
Molnlycke	MepilexAg®, Mepilex® Transfer, Mepilex® Lite, Mepitel®, Mepiform®, Mefix®, Mepore®, Tubigrip®, Tubifast®	www.molnlycke.com/item .
Smith & Nephew	Acticoat®, Silvazine®, Bactigras®, Jelonet®, Allevyn®, Exudry®, Melolite®, Algisite®, CicaCare®, Solosite®, Intrasite®, Primafix®, Iodosorb®, Biobrane®	http://wound.smith-nephew.com/australia/

Appendix 2: recognising burn depths chart

Epidermal burn (erythema)

- Damage to epidermis only. Skin intact, no blisters present
- Erythema. Red
- Brisk capillary refill
- Heal spontaneously within 3–7 days with moisturiser or protective dressing



Superficial dermal burn

- Damage to upper layer of dermis
- Pink. Blisters present or absent
- Brisk capillary refill (under blister)
- Should heal within 7–10 days with minimal dressing requirements



Mid dermal burn

- Damage into mid dermis
- Dark pink
- Sluggish capillary refill
- Should heal within 14 days.
- Deeper areas may need surgical intervention and referral



Deep dermal burn

- Burn extends into the deeper layers of the dermis, but not through the entire dermis
- Blotchy red/white
- Sluggish to absent capillary refill
- Generally need surgical intervention.
- Refer to specialist unit



Full thickness burn

- Entire destruction of dermis, sometimes underlying tissue involved
- White, waxy, brown, black.
- No capillary refill
- Surgical intervention and long-term scar management required
- Refer to specialist unit



MINOR BURN BLISTER MANAGEMENT

Blisters are formed when there is separation of the epidermal and dermal layers, often with fluid present. The management of these blisters is generally guided by specialist clinician or institutional preference. The ACI Statewide Burn Injury Service recommended management for burn blisters is 'de-roofing' (removal of skin and fluid), after adequate analgesia.

NB If your facility does not have capacity or resources (access to adequate analgesia and dressings) to follow this guideline, incise and drain the blister and contact the appropriate Burn Unit.

De-roofing is done to:

- remove non-viable tissue
- prevent uncontrolled rupture of blister
- avoid risk of blister infection
- relieve pain from tense blisters
- reduce restriction of movement of joints
- assess the burn wound bed

Prior to de-roofing

- Assess blister size. Burn blisters $\leq 5\text{mm}$ can be left intact.
- If patient is being transferred to a burn unit contact the receiving unit before de-roofing.
- Obtain consent from the patient or family.
- Administer appropriate analgesia and allow time to take effect prior to procedure.
- Take digital image before and after de-roofing procedure if possible.

Procedure for de-roofing blisters $>5\text{mm}$

- de-roof blister either with moist gauze or forceps and scissors
- dress wound appropriately with a moist, non or low-adherent dressing¹
- refer patient to local emergency department or burn service if your facility does not have the capacity or resources to de-roof blisters.

Important clinical considerations

- There is risk of infection or desiccation if removing blister skin when adequate facilities or resources are not available (i.e. in remote area). Consider leaving blister intact until patient transferred to appropriate facility.
- Skin on the palm of the hand and the sole of the foot is thicker. Consider leaving blisters intact in these areas if appropriate.
- Consider leaving small, non-tense blisters intact when there is a risk of poor patient compliance with the procedure and on-going care i.e. patients with dementia, learning difficulties, etc.

Blister management example



Blister in situ



Carefully trim blister skin



Clean wound bed. Dress

Contacts

Royal North Shore Hospital – BurnsRNS@health.nsw.gov.au
Burn Unit (02) 9463 2111 Ambulatory Care (02) 9463 2110

Concord Repatriation Hospital – slhd-concordburnsunit@health.nsw.gov.au
Burn Unit (02) 9767 7776 Ambulatory Care (02) 9767 7775

The Children's Hospital at Westmead (all paediatrics $<16\text{yrs}$) – kidsburns@health.nsw.gov.au
Burn Unit (02) 9845 1114 Ambulatory Care (02) 9845 1850

ACI Statewide Burn Injury Service resources
aci.health.nsw.gov.au/resources/burn-injury

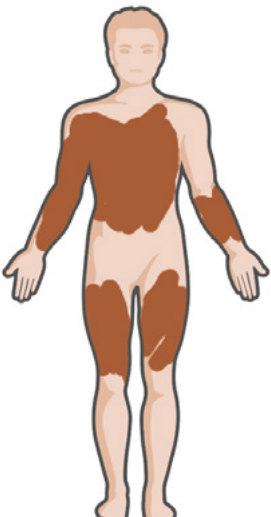
Appendix 4: NSW Trauma App

The NSW Trauma App was created by the Institute of Trauma and Injury Management (ITIM). It includes information on traumatic injured patients, including a section on burn management. The app can be downloaded from iTunes and Google Play.

Useful tools included in the Burn section include algorithms on recognition and management of specific issues such as circumferential burns. Also included are the calculators which are useful for calculating burn size and fluid requirements. Below are examples of views of the calculators.

← BURNS TBSA AND PARKL... ↻ ☆


Weight TBSA % Results



Next

← BURNS TBSA AND PARKL... ↻ ☆

Weight TBSA % Results



Next

← BURNS TBSA AND PARKL... ↻ ☆

Weight TBSA % Results

33%
Estimated TBSA %

316 mls/hr
Adjusted Parkland Fluid Rate (first 8 hours)
Calculated from time of burn minus fluid already given

201 mls/hr
Next 16 Hours Parkland Fluid Rate

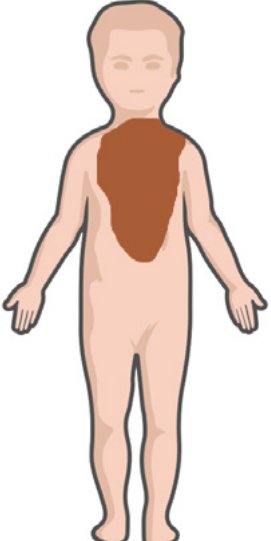
32 mls/hr
Targeted Urine Output mls/hr
(0.5mls/kg/hr)

Answers

Weight (kg)	65
Prehospital IV Fluids (mls)	1000

← BURNS TBSA AND PARKL... ↻ ☆

Weight TBSA % Results



Next

← BURNS TBSA AND PARKL... ↻ ☆

Age/Weight TBSA % Results

8%
Estimated TBSA %

0 mls/hr
Fluid resuscitation not required with < 10%
estimated TBSA burns

0 mls/hr
Next 16 Hours Parkland Fluid Rate

18 mls/hr **56 mls/hr**
Urine Output mls/hr Maintenance Fluid mls/hr
(1 mls/kg/hr) (1 mls/kg/hr)

Answers

Age (years)	2
Weight (kg)	18