
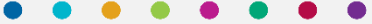


Guideline

Management of paediatric burn patient

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Version No.	4.0		
Risk Rating	Medium		
Primary Document			
Custodian	Nurse Practitioner Burns	Approval date	09/08/2024
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Applicable to	All nursing staff treating paediatric burns patients	Review date	09/08/2028

HUMAN RIGHTS

This governance document has been human rights compatibility assessed. Limitations identified were deemed justifiable indicating reasonable confidence that, if adhered to, there are no implications arising under the *Human Rights Act 2019*.

PURPOSE

The purpose of the document is to guide Medical, Nursing and Allied Health staff in the most appropriate way to treat a paediatric burn patient. This document includes;

- Introduction to the Paediatric Burns Centre
- Referring a paediatric burns patient
- First Aid
- Estimating Total Body Surface Area (TBSA)
- Burn Depth
- Fluid resuscitation
- Wound cleansing and Blister debridement
- Wound dressings
- Splinting requirements
- Nutrition
- Pain Management
- Complications



Queensland
Government

- Discharging a paediatric burns patient

SCOPE

This guideline applies to all medical and nursing staff within Children's Health Queensland (CHQ) who are treating a paediatric burns patient.

GUIDELINE

INTRODUCTION

The Paediatric Burns Centre (PBC) provides the only specialist dedicated paediatric burns centre in Queensland according to the Australian and New Zealand Burns Association (ANZBA) Guidelines. Other Burns Units in Queensland (including Townsville Hospital and The Gold Coast University Hospital) are only able to provide treatment for small to medium size burns in children.

The PBC provides inpatient care (acute and rehabilitation), together with ambulatory and outreach care, for any child referred with a burn injury irrespective of size or depth.

The PBC also has a burns theatre. Dressing changes, microneedling, laser therapy and ranging under general anaesthetic and laser under sedation are performed within the burns theatre.

Currently we treat over 1000 new burns per year. The most common mechanisms of burns reviewed within the unit are:

- Scalds- tea/coffee, kettles, baths, noodles.
- Contact – iron, hair straighteners, exhausts, campfires.
- Friction – treadmills, MVA.
- Flame –kerosene, petrol, house fires.
- Radiant heat- sunburn

Directed by Professor Roy Kimble, our multidisciplinary team consists of Surgical Consultants, Medical, Nursing, Allied Health, psychologists, administration and research staff.

We care for acute, post-acute and reconstruction burns from newborn through to adolescents, until they are then transitioned to the adult Burns Centre at the Royal Brisbane and Women's Hospital if required.

While burns are predominately our primary focus, we also consult and advise on other conditions including;

- Meningococcal septicemia.
- Scalded Skin Syndrome.
- Steven Johnson Syndrome.
- Intravenous Extravasations.
- Graft vs Host.
- Neonatal Burns.

Burns Outpatient provides Consultant led clinics Monday - Friday (except public holidays). All clinics are attended by Social Work, Occupational Therapy and Physiotherapy.

The PBC multidisciplinary team includes:

- | | |
|-------------------------------------|----------------------------------|
| ➤ 5 Paediatric Surgery Consultants. | ➤ Physiotherapists. |
| ➤ Burns Nurse Practitioner | ➤ Music Therapy. |
| ➤ Burns Clinical Nurse Consultant. | ➤ Dietician. |
| ➤ Burns Clinical Nurse. | ➤ School teacher. |
| ➤ Burns Registered Nurse. | ➤ Research. |
| ➤ Social Worker. | ➤ Child and Youth Mental Health. |
| ➤ Occupational Therapists. | |

1. REFERRING A BURN

The PBC offers a 24/7 referral service. For a referral coming from regional QLD, an email referral service is available. Criteria for referring to our service is based on the <https://anzba.org.au/resources/anzba-referral-criteria/> **For those burns located in the Mackay region and further north, please refer to Townsville Hospital first. For those burns located in the Gold Coast region and further south, please refer to Gold Coast University Hospital first. If they are unable to care for the patient, then please follow the information below to refer to QCH.**

To refer a patient to the PBC;

- Contact the Burns Registrar on call via switch (07) 3068 1111.
- Complete referral form via link <https://www.childrens.health.qld.gov.au/chq/health-professionals/referring-patients/specialist-online-advice/burns/>
- Further correspondence can be sent via our generic email address CHQ_QCHBurns@health.qld.gov.au
- Attach any photos to this email if possible.
- If advised that the patient can be treated locally, continue to contact the burns Registrar at each dressing change to update progress and send through photos to above email address.

All paediatric patients should be referred to the PBC. However they may not physically be required to attend the QCH. If treatment can be managed in the local area then this is the preferred treatment.



ALERT

Patient referrals will not be accepted unless completed referral form is sent.

2. FIRST AID

Recent studies have enabled detailed recommendations for appropriate first aid in burns treatment. The application of cold water to the wound has multiple benefits including pain relief, decreased cell damage, improved wound healing and scar formation ^{1,2}.

Steps for providing adequate first aid:

- (1) Stop:
 - (a) Stop drop and roll.
 - (b) Remove all heat source including clothes, nappies, jewellery.
- (2) Cool:
 - (a) Running cold tap water for 20mins.
 - (b) Do NOT use ice.
- (3) Cover:
 - (a) Use cling film to cover wound.

Helpful links for further information on first aid in burns:

<http://anzba.org.au/care/first-aid/>

<http://www.coolburns.com.au/first-aid-for-burns>



ALERT

Ensure that patient is asked 'how long' has first aid been applied prior to admission to hospital. If less than 20mins, place under cool running water until a total of 20min has been completed.

Ensure unburnt areas are kept covered and warm to prevent hypothermia

First aid is effective for up to 3hrs post burns

3. ESTIMATING TBSA

Total Body Surface Area (TBSA) is to be undertaken on admission to Emergency department. While there are multiple techniques and apps that can assist with this calculation, the following are recommended:

- ITIM app, designed by NSW Institute of Trauma and Injury Management. This app includes many different calculators including estimating TBSA and Fluids Resuscitation.
- For small areas, e.g. the palm (including fingers), of the patient, equates to approximately 1% of the patient's body surface.
- Lund and Browder form ([Appendix 1](#)).



ALERT

Superficial burns (Erythema only) are not included in estimating burn TBSA.

4. BURNS DEPTH

Estimating burn depth allows us to further plan treatments for our patients and likelihood of scarring. Terminology has changed over the years with 1st, 2nd and 3rd degrees no longer used.

Superficial

- Previously called erythema.
- Involve only the epidermis.
- These burns are not included in estimating TBSA.
- Characterised by redness that slowly disappears, no blistering present.

Superficial Partial thickness

- Involve both the epidermis extending into the dermis.
- Characterised by blistering skin, blanches when touched.
- Often most painful burns.

Deep dermal Partial thickness

- Involves the epidermis and further into the dermis.
- Can often have areas of blistering with other pale areas.
- Some areas may blanch however deeper areas often will not.
- Can often get areas that look 'cherry red' in colour, while it may look nice and pink these areas generally will not blanch and are caused by red blood cells that have extravasated.

Full thickness

- Involves the epidermis, the dermis and often extends into subcutaneous fat.
- These appear white in colour and can be quite thick to touch or leathery.
- Generally has no sensation.



ALERT

Burns can often change appearance within the first 72 hrs, especially scald burns. It is hard to determine depth until after the first dressing change has occurred.

5. FLUID RESUSCITATION

SUPPO The systemic result following a burn injury causes increased capillary permeability resulting in fluid shifting into the interstitial space around the burn. This can occur up to around 24 hrs. Fluid Resuscitation is required to replace this large fluid loss over the first 24hrs. According to ANZBA guidelines, fluid resuscitation should be administered if TBSA.

- >10% in under 18mth old.
- >15% in over 18mth old.

The Parkland formula is recommended ([Appendix 2](#)), with half given over the first 8 hrs from the time of injury. The remaining half is given over the following 16hrs.

Maintenance fluid should also be commenced BUT must be on a separate line and NOT combined with fluid resuscitation.

For large burns (>25%), Albumin has been shown to decrease total amount of fluids required. Albumin should not be used within the first 6hrs of sustaining a burn injury. After this time, Albumin should be given as a 50:50 ratio to the resuscitation crystalloid.

ALERT



All patients commenced on fluid resuscitation should have an IDC inserted. Aim for output of 1ml/kg/hr.

All patients commenced on fluid resuscitation should have an NGT inserted. Feeds should be commenced at 10ml/hr and slowly increased to full feeds within 24hrs of sustaining a burn injury. Dietician review is required.

6. WOUND CLEANSING AND BLISTER DEBRIDEMENT

Once first aid has been completed, the wound can be cleaned and blisters debrided in preparation for dressing application. Prior to commencing procedure, please ensure that adequate pain relief has been administered and appropriate time has elapsed for medication to become effective.

To cleanse the burn wound, apply QV wash to a damp cloth. Wash wound then rinse with a clean cloth to remove soap residue. Rinse burn area using a dilute Chlorhexidine Gluconate solution. Dilute 10ml Chlorhexidine Gluconate 5 % with 500ml water. An alternative if Chlorhexidine Gluconate 5% is not available is Aqueous Chlorhexidine 0.1%.

Blisters should be debrided prior to application of dressing. To do this, use a cloth to wipe over wound and remove surrounding tissue. If blisters are quite thick and unable to be wiped away, use a pair of sterile scissors to remove top of blister. Avoid using forceps or scissors as much as possible as this can induce anxiety and stress for a paediatric patient.

Any remaining skin can be removed at next dressing change.

Cover wound with cling wrap after debridement.

ALERT



DO NOT use needles to express blisters. There is a high risk of sustaining a needle stick injury.

7. WOUND DRESSINGS

While there are many different dressings on the market that may be suitable for treating burns, the dressings used within our department are evidence based and most suitable for the paediatric population.

Once the wound has been cleaned, follow the flow chart (Appendix 4) to determine the most appropriate dressings choice.

Once dressing has been chosen, please refer to the following standards and videos for correct application.

Standards

[Acticoat Standard](#)

[Mepilex Ag](#)

[Burns- Hand Dressings](#)

Videos

How to apply a burns dressings video- <https://vimeo.com/153986604>. Password: burns-opd

How to attend a burns dressing fingers, toes and ears video-
<https://vimeo.com/user40367044/review/189879919/b1a0e64213>

Some patients will require dressing changes under general anaesthetic. Please discuss with the Burns NP and CNC if you are unsure if the patient may require this.



ALERT

Flamazine is not to be used in paediatric patients. If Mepilex Ag or Mepitel and Acticoat are not available, then patient must be transferred to QCH for further treatment.

8. SPLINTING REQUIREMENTS

Some burns may require review by the Occupational Therapist on call. These may include:

- Deep partial or full thickness burn injury crossing the flexor surface of a joint, placing joint at risk of contracture.
- Immobilisation by use of a splint is required to ensure safe position or integrity of underlying body structures and function, and suitable short-term alternatives (e.g. positioning devices and bandaging techniques) are not available or considered suitable.
- Significant oedema present limiting function or contributing to vascular insufficiency as indicated by poor capillary return and cool to touch distal limb.
- Continuation of occupational therapy intervention commenced during business hours is required to maintain current level of patient function or to minimise risk of irreversible harm, as determined by Occupational Therapist in conjunction with a medical Consultant.

Occupational Therapy provides a Burns On-Call Service at QCH between 8am-5pm on weekends and public holidays. Children identified as requiring Occupational Therapy input are to be determined by a Burns/Surgical Consultant or Registrar and meeting criteria outlined in the [Occupational Therapy Burns On-Call procedure](#).



ALERT

If splint is required and Occupational Therapists are unavailable, armboards are NOT appropriate and patient should be admitted until review by Occupational Therapist is available.

9. NUTRITION

Nutrition is an important facet of burns care especially within the paediatric burns population. Children are more vulnerable to the metabolic demands and consequences of a burn injury compared to adults³. They have limited fat and lean body reserves, increased body surface area in relation to weight, and extra need for nutrients for growth and development⁴.

All children requiring Burns Fluid Resuscitation should have a NGT inserted and commenced on enteral feeds. A dietician review is required to ensure appropriate formula is used.

Some children not requiring fluid resuscitation may require admission to ward to monitor oral intake. It is common for children who have sustained burns involving the face to have decreased oral intake over the following days. They may also require insertion of a NGT if oral intake is poor.

For more information regarding nutritional requirements of Burns patient please refer to [Nutritional Management of Paediatric Burns Patients](#).

10. PAIN MANAGEMENT

Pain management is an integral part of Burns care. No procedures should be undertaken without adequate pain relief and constant reassessing of the patient. It has been proven that there is a correlation between pain, stress, anxiety and their effect on burn wound re-epithelialisation.

Pain relief does not have to be just pharmaceutical. It is important to have non pharmaceutical, age-appropriate devices available for the children prior to commencing the procedure. Such items include:

- Bubbles.
- Toys.
- TV, DVD.
- Music Therapist.
- Breast Feeding.

We have distinguished certain burns that tend to require greater amounts of pain relief during dressing procedures. These include:

- Circumferential burns.
- Contact burns from hot coals.
- Burns > 5%.
- Patients suffering anxiety.
- Previous distressing dressing changes.

For these patients we will progress them onto our [Burns Procedural Pain](#). Please ensure you have adequate Medical Staff available when undertaking these procedures and consult with your hospital guidelines to determine the most appropriate medication and administration route.

11.COMPLICATIONS

Escharotomy

Circulation may become impaired in circumferential burns of the limbs and torso due to increased oedema. In the first instance the limbs should be elevated to reduce swelling and closely monitored for changes in:

- Colour.
- Capillary return.
- Skin temperature

If this occurs, an escharotomy may be required. This is an emergency procedure and consultation with the Burns Surgeon on call is required⁵.



ALERT

An escharotomy should be anticipated prior to the loss of pulses and numbness.

Toxic Shock

Toxic Shock Syndrome (TSS) is a severe systemic illness which can cause death. While it is very rare, TSS is more common in children under the age of 4yr with skin loss due to the fact they have not developed the antibodies to the toxins⁶.

TSS is characterised by:

- Shock.
- Pyrexia.
- erythematous rash.
- diarrhoea and vomiting.
- lethargy and irritability.

Treatment for TSS can include:

- Intravenous fluids.
- Intravenous antibiotics.
- Intravenous immunoglobulin (IVIG).

While TSS is not common, if you have a patient exhibiting similar signs, TSS must be considered. If you have not already referred the patient to a Burns Specialist, this should occur urgently.

12.DISCHARGING A BURN

For small burns, they can often be treated as outpatients and only return to the hospital once or twice a week for dressing changes and review by the Consultants. If the patient has adequate pain relief and there is no concern regarding the burn, mechanism or attendance, they may be suitable for discharge home.

Discharge information should be provided to the family. This can include the following fact sheets:

Acticoat care- <http://qheps.health.qld.gov.au/childrenshealth/docs/chifs/chifs-burn-acticoat-care.pdf>

Mepilex Ag care- <http://qheps.health.qld.gov.au/childrenshealth/docs/chifs/chifs-burn-mepilex.pdf>

[Burns care at home- Burns care at home - Helpful hints for parents and carers \(health.qld.gov.au\)](http://health.qld.gov.au)

Patient and parent videos have been developed to support families attending the burns unit. New patients to the clinic will receive a link to these videos in their appointment text. All videos can be accessed through the below link.

[Burns - YouTube](#)

Other Fact sheets available

[Burns - Betadine/Kenacomb and Mepilex Daily Dressings \(health.qld.gov.au\)](http://health.qld.gov.au)

[Negative pressure wound therapy - Discharge advice \(health.qld.gov.au\)](http://health.qld.gov.au)

[PICO 7 Single-Use Negative Pressure Wound Therapy System \(health.qld.gov.au\)](http://health.qld.gov.au)

[Skin grafting and debridement | Children's Health Queensland](#)

Ensure appointment has been organised for review at the PBC within the next 3 days.

For those patients from rural areas, local follow up may be appropriate. This will be discussed with the Consultant and families.

Please ensure all families are discharged with further supplies to reinforce dressings



ALERT

Circumferential burns should not be discharged within first 24hrs.

13. FURTHER EDUCATION

A paediatric burns education resource has been developed through ilearn.

To access,

- log into ilearn
- under course catalogue, search 'burns'
- click on Management of Paediatric Burns

SUPPORTING DOCUMENTS

- [Burns Procedural Pain](#)
- [Occupational Therapy Burns On-Call procedure.](#)
- [Nutritional Management of Paediatric Burns Patients \(health.qld.gov.au\)](http://health.qld.gov.au)
- <http://qheps.health.qld.gov.au/childrenshealth/docs/chifs/chifs-burn-acticoat-care.pdf>
- [Burns care at home- Burns care at home - Helpful hints for parents and carers \(health.qld.gov.au\)](http://health.qld.gov.au)
- <http://qheps.health.qld.gov.au/childrenshealth/docs/chifs/chifs-burn-mepilex.pdf>
- [Burns - YouTube](#)
- [Burns - Betadine/Kenacomb and Mepilex Daily Dressings \(health.qld.gov.au\)](http://health.qld.gov.au)
- [Negative pressure wound therapy - Discharge advice \(health.qld.gov.au\)](http://health.qld.gov.au)
- [PICO 7 Single-Use Negative Pressure Wound Therapy System \(health.qld.gov.au\)](http://health.qld.gov.au)
- [Skin grafting and debridement | Children's Health Queensland](#)

CONSULTATION

<ul style="list-style-type: none"> • Director Paediatric Surgery, Urology, Burns 	<ul style="list-style-type: none"> • Clinical Nurse Consultant Burns
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REFERENCES

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GUIDELINE REVISION AND APPROVAL HISTORY

Version No.	Modified by	Amendments authorised by	Approved by	Comments
1.0	CNC Burns	Executive Director Medical Services	Executive Director Hospital Services	New document
2.0	CNC Burns	Nursing Director, Division of Surgery	Executive Director Nursing Services	
3.0	CNC Burns	Chief of Surgery	Executive Director Medical Services	
4.0 09/08/2024	NP Burns	Divisional Director Surgery & Perioperative Services	Executive Director Clinical Services	Scheduled review and new template

Key words	Burns, paediatric, wounds, dressings, first aid, 06003, management
Accreditation references	<p>The National Safety and Quality Health Service (NSQHS) Standards (1-8):</p> <ul style="list-style-type: none">• Standard 1 Clinical Governance;• Standard 2 Partnering with Consumers; &• Standard 3 Preventing and Controlling Healthcare• Standard 5 Comprehensive Care

APPENDIX 1: PARKLAND FORMULA

Fluid Resuscitation Parkland Formula

3mL Hartmanns' Solution x Body Weight (kg) x Area of Burns (TBSA)

Plus

Maintenance Fluid of Saline and 5% Dextrose

Fluid Resuscitation Formula (24hr)

- First half of total volume given over the first 8hrs from time of injury
- Second half given over remaining 16hr

Maintenance Fluid

- 100ml/kg up to 10kg
- 50ml/kg for each kg between 10-20kg
- 20ml/kg for each kg over 20kg

IDC must be inserted for all children receiving fluid resuscitation.

Aim for 1ml/kg/hr of urine output

NGT to be inserted for all children receiving fluid resuscitation.

Commence at 10ml/hr and titrate with maintenance fluid. Dietician to be notified

For large burns $\geq 25\%$, Albumin has been shown to decrease total amount of fluids required. Albumin should not be used within the first 6hrs of sustaining a burn injury. After this time, Albumin can be given as a 50:50 ratio to the resuscitation crystalloid

APPENDIX 2:



Children's Health Queensland
Hospital and Health Service



Centre For Children's
Burns & Trauma Research

1. Contact the QCH Burns Registrar (07) 3068 1111
2. Complete online referral.
<http://qheps.health.qld.gov.au/childrenshealth/resources/clinforms/docs/500026.pdf>
3. Email referral with photos. We will advise regarding dressings.
4. We do **not** recommend the use of Flamazine, or other dressings, in the majority of our patients.
5. See flow chart for our usual advice.

