

## **BURNS TRAUMA**

# Thermal burns Case discussion

Facilitator resource kit





#### **Queensland Trauma Education**

The resources developed for Queensland Trauma Education are designed for use in any Queensland Health facility that cares for patients who have been injured as a result of trauma. Each resource can be modified by the facilitator and scaled to the learners needs as well as the environment in which the education is being delivered, from tertiary to rural and remote facilities.

#### **Developed by**

Dr Frances Williamson, Staff Specialist Emergency Physician – Metro North Health Kimberly Ballinger, Simulation Educator – Clinical Skills Development Service

#### Reviewed by

Education Working Group, Statewide Trauma Clinical Network - Clinical Excellence Queensland

#### **Queensland Trauma Education**

Burns Trauma – Thermal burns: Case discussion – Facilitator resource kit Version 1.0

Published by the State of Queensland (Clinical Skills Development Service), 2021



This document is licensed under a Creative Commons Attribution 3.0 Australia licence. To view a copy of this licence, visit <a href="https://creativecommons.org/licenses/by/3.0/au">https://creativecommons.org/licenses/by/3.0/au</a>.

© State of Queensland (Metro North Hospital and Health Service through the Clinical Skills Development Service) 2021

You are free to copy, communicate, and adapt the work, as long as you attribute the Metro North Hospital and Health Service through the Clinical Skills Development Service. For more information, please contact Clinical Skills Development Service, Royal Brisbane and Women's Hospital, Herston, Queensland +61 3646 6500, CSDS-Admin@csds.gld.edu.au.

An electronic version of this document is available via csds.qld.edu.au/qte

Cover image source: <a href="www.vicburns.org.au">www.vicburns.org.au</a> The Victorian Adult Burns Service, Alfred Health, Melbourne, Australia

**Disclaimer**: The content presented in this publication is distributed by the Queensland Government as an information source only. The State of Queensland makes no statements, representations or warranties about the accuracy, completeness or reliability of any information contained in this publication. The State of Queensland disclaims all responsibility and all liability (including without limitation for liability in negligence) for all expenses, losses, damages and costs you might incur as a result of the information being inaccurate or incomplete in any way, and for any reason reliance was placed on such information.

#### About this training resource kit

This resource kit provides healthcare workers with knowledge on how to recognise and effectively manage a patient with thermal burns to special areas.

#### National Safety and Quality Health Service (NSQHS) Standards













#### **Target audience**

Emergency department medical and nursing clinicians, allied health clinicians.

#### **Duration**

30 - 45 minutes.

#### **Group size**

Small group participation.

#### **Learning objectives**

By the end of this session the participant will be able to:

- demonstrate an understanding of burns size estimation
- discuss the clinical features to suggest burn depth estimation
- recognise 'special areas' in burns management and burns referral criteria
- recognise differences between hot liquids for burn management.

#### Facilitation guide

- 1. Facilitator to provide participant resource kit to participants.
- 2. Facilitator to provide cases and photographs to participants and use the questionand-answer guide to facilitate case discussion.
- 3. Utilise supporting documents and resources to support discussion.

#### Overview of burns trauma

Injury following a burn can be complex, with significant variation in both the aetiology and severity requiring prompt clinical assessment and management. As with all trauma presentations, patients who have sustained a burn injury are best managed in a systematic manner with a thorough primary and secondary survey.

Additionally, a focus on the burn injury pattern, characteristics and identification of high-risk features will help ensure optimal patient management.

Knowledge of the initial management strategies for burn injury, the use of a consistent, standardised approach in determining burns severity and depth, and recognising potential complications is critical for patient survival.

#### **Further reading**

RBWH Burns Information for Practitioners				
Organisation	Metro North Health			
Link	https://metronorth.health.qld.gov.au/rbwh/healthcare- services/burns/information-for-practitioners			

ACI State-wide Burns Service Clinical Guidelines				
Organisation	NSW Health			
Link	https://www.aci.health.nsw.gov.au/ data/assets/pdf file/0009/250020/ Burn-patient-management-guidelines.pdf			

	The Burns Registry of Australia and New Zealand: Progressing the evidence base for burn care		
Publication	The Medical Journal of Australia		
Link	https://doi.org/10.5694/mja16.00511		

Thermal Burns Management				
Organisation	Organisation RACGP Australian Family Physician			
Link	https://www.racgp.org.au/download/documents/AFP/2012/June/ 201206cleland.pdf			

QAS Clinical Practice Guideline: Trauma/Burns				
Organisation	ganisation Queensland Ambulance Service			
Link	https://www.ambulance.qld.gov.au/docs/clinical/cpg/CPG_Burns.pdf			

Patient Fact Sheet – Burns Patient information				
Organisation	anisation Metro North Health			
Link	https://metronorth.health.qld.gov.au/rbwh/wp- content/uploads/sites/2/2017/06/burns-patient-factsheet.pdf			

#### **Case discussion**

#### Case study 1

28yo female making a cup of tea at home. Accidently knocked the kettle of boiling water over and spilt it, splashing her L leg. Immediate pain, patient rang '000' who advised cool water in the shower for 20 minutes which she has done.



#### Case study 2

56yo male working in a fish and chip shop. Accidently dropped the chip basket into the hot oil with a resultant splash up his R upper limb. Burn to R hand over radial aspect and along radial border of forearm. Blistering and patchy burn, not circumferential.



#### Case study 3

A 32yo male construction worker presents with bitumen stuck to his hair and posterior neck after accidently getting it under his protective gear whilst at work. He has presented directly to the Emergency Department.



Image source: www.vicburns.org.au The Victorian Adult Burns Service, Alfred Health, Melbourne, Australia

#### Question and answer guide

#### 1. What first aid should thermal burns receive?

- a) Cool running water for 20 minutes, unless risk to patient (immediate life threats necessitating further management).
- b) Avoid ice as may deepen the burn by constricting blood vessels and reducing blood supply to injured tissue.<sup>7</sup>

#### 2. How long is cool water effective for?

- a) Up to three hours post burn.1
- b) One study suggested until burning pain stops.
- c) Should be considered in the Emergency Department (if suitable) if not performed pre-hospital.
- d) Consider use of spray bottle to apply water or cooling with 0.9% Normal saline fluid bags delivered slowly via a giving set to the area.

#### 3. What dressing should be applied in the first aid phase of assessment?

- a) Clear cling-film applied without creating a compressive or circumferential dressing will aid analgesia due to reducing air flow over the skin.
- b) It protects against colonisation, excess fluid and heat losses.<sup>7</sup>

#### 4. What is the role of hydrogel dressings, 'Burn AID' and other products?

- a) Not useful in larger/deeper burns.
- b) Can be used to provide analgesia as a temporary dressing.
- c) Only useful to cool the wound if NO water is available. 1,7
- d) Must be left exposed to air to aid evaporative heat loss.

#### 5. How do you assess the size of a burn in adults?

- a) Total Body Surface Area %.
- b) Rule of Nines (see supporting documents).
- c) Lund and Browder Chart (see supporting documents).
- d) Partial/dermal and full thickness only: does not include erythema/superficial burn area.

#### 6. How do you assess the depth of a burn and what is Nikolsky's sign?

- a) Burn Depth Characteristics (see supporting documents).
- b) Early burns can be difficult to determine depth due to the misleading appearance of intact epithelium. Nikolsky's sign is where the superficial epithelial layers separate from the basal layers: assess this by applying digital pressure and sliding a gloved finger over the affected area of skin.

#### 7. Are there any 'special' burns?

- a) Special areas include: face, hands, feet, genitalia, perineum and circumferential limb/chest burn.
- b) Special types: chemical, electrical, inhalational injury.
- c) Associations: pre-existing illness, major trauma, extremes of age (elderly/children), pregnant women/people, non-accidental injury.

#### 8. What burn estimation size requires referral to a specialist burns centre?

- a) Any burn (Dermal/Partial Thickness) >10%TBSA in adult (>5% in children).
- b) Any burn (Full thickness) >5% TBSA.
- c) See ANZBA referral criteria (Appendix C).

#### 9. What is the burn depth for each case based on the images provided?

Utilise Burn Depth Characteristics (see supporting documents) to determine likely burn depth and discuss the differences with the group.

**Case 1**: mid dermal thickness (partial thickness).

**Case 2**: areas of mid to deep dermal (partial thickness) but need to consider full thickness due to white appearance to some areas.

**Case 3**: unable to accurately assess until bitumen is cooled and removed with appropriate solution.

#### 10. Discuss the potential risks associated with each case and burn type?

#### Case 1:

- Lower limb potentially circumferential assess for perfusion to distal limb (cap refill, pulses, colour, temperature). If circumferential – for burns centre referral and management.
- Foot special area for burns centre referral and management.

#### Case 2:

- Upper limb potentially circumferential assess for perfusion to distal limb (cap refill, pulses, colour, temperature). If circumferential – for burns centre referral and management.
- Hand special area for burns centre referral and management.

#### Case 3:

- Face/head/neck clinical priorities are primary survey airway, breathing, circulation, disability, exposure.
- Exposure to manage life threats.
- Face, head, neck special area for burns centre referral and management.
- Bitumen management as per question 11.

#### 11. For Case 3, should bitumen be removed initially on scene?

- a) No. Trying to pry the bitumen off will injure the underlying skin. The bitumen needs to be thoroughly cooled and allowed to harden. A lubricating paraffin-based cream can then be applied to help loosen and soften the bitumen enabling it to be removed a few days later.
  - De-solvit or orange oil (frequently used by RBWH Burns Unit) may be used to soak the affected areas for 4 hours with gauze, this should then be changed every 4 hours for 24 hours until the bitumen can be fully removed.
  - Flamazine, paraffin-based cream/ointment, or Vaseline.
  - Olive oil (new bottle) as above.
- b) If bitumen is creating a circumferential injury, the cooled and hardened bitumen may create a tourniquet effect. If this occurs, the bitumen must be softened as soon as able and split to prevent an ischaemic injury to the limb.

#### 12. What dressings should be used for the case images provided?

- a) Small/superficial burn non-stick, protective dressing, parrafin.
- b) Dermal burn flamazine/mepelex Ag or equivalent.
- c) If deemed full thickness antimicrobial dressing and burns referral. If partial thickness as above.

#### 13. When should small burns be reviewed?

Within 48 hours to reassess burn depth and dressing regime.

#### 14. What other medications should be administered?

- a) Analgesia IV/oral analgesia titrated to desired effect.
- b) Tetanus prophylaxis tetanus prone wound.
- c) No indication for routine administration of antibiotics unless trauma complications.

#### Supporting documents

The following supporting documents are provided for this case discussion:

1. ANZBA Burn First Aid

Source: https://anzba.org.au/assets/ANZBA-Factsheet-First-aid-1.pdf

2. ANZBA Initial Management of Small Burns

Source: http://anzba.org.au/assets/ANZBA-Initial-Management-of-Small-Burns.pdf

3. VIC Burns - Rule of Nines

Source: <a href="https://www.vicburns.org.au/wp-content/uploads/2016/06/poster3-wallace-rule-of-nine-adults-only.pdf">https://www.vicburns.org.au/wp-content/uploads/2016/06/poster3-wallace-rule-of-nine-adults-only.pdf</a>

4. Lund and Browder chart for calculating the percentage of total body surface area burnt Source: <a href="https://www.lagaay.com/Catalogus/Product%20information/201350/lund%20and%20browder%20chart.pdf">https://www.lagaay.com/Catalogus/Product%20information/201350/lund%20and%20browder%20chart.pdf</a>

5. VIC Burns – Burn Depth Characteristics

 $Source: \underline{https://www.vicburns.org.au/wp-content/uploads/2016/06/poster12-different-burn-depth-\underline{characteristic.pdf}}$ 

6. AAPA Bitumen Burn First Aid card

Source: https://www.aapa.asn.au/technology-publications/bitumen-burns-cards/

7. ANZBA Referral Criteria

Source: https://anzba.org.au/resources/anzba-referral-criteria/

#### **Burn First Aid**

#### **Factsheet**



- Cooling is critical immediately after a burn injury however only approximately 70% of children and 60% of adults receive good burn first aid\*
- Applying cool running water for 20 minutes to the burn up to three hours following burn injury reduces burn size, and depth, and is good for pain management

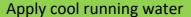
\*Data obtained from Burns Registry of Australia and New Zealand (BRANZ) 2020



- ✓ Stop, drop to ground, cover face & roll so fire is smothered.
- ✓ Smother flames with a fire blanket
- ✓ Move away from heat source

Remove clothing and jewellery (including nappies)

- ✓ Clothing can hold heat on burnt area.
- ✓ If swelling occurs jewellery can stop blood flow to burnt area.



- ✓ For at least 20 minutes
- ✓ If running water not available, spray water or wet 2 cloths and alternate them onto burn every 30 seconds (re-wet if needed to keep cool)
- ✓ If no water is available a hydrogel burn first aid dressing can be used until water is available (if within 3 hours). Caution when using on large % TBSA due to high risk of hypothermia

After first aid cover burn with clean cloth and keep patient warm

Give pain relief if required



#### For first aid do not use alternatives like

- x Ice
- \* Butter
- x Toothpaste
- Creams
- Bandage

These do not cool the burn





#### Seek medical attention

- ✓ For any burn bigger than 3cm, or with blisters
- ✓ If any concerns

For more information go to www.anzba.org.au

## Initial Management of Small Burns



FIRST AID

Cool with running water for up to 20 minutes Consider immersion or wet towels if running water unavailable If water is unavailable consider water gel products (in adults only)

PREPARE

Provide analgesia
Clean wound with 0.1% Aqueous Chlorhexidine or Normal saline,
Remove all foreign, loose and non viable skin/tissue
Debride blisters if >5cm or over joints
Shave hair in and around wound to 2cm radius

BURN	EPIDERMAL	SUPERFICIAL DERMAL	MID DERMAL	DEEP DERMAL	FULL THICKNESS
ASSESS DEPTH	Painful Epidermis damaged but intact Red	Blistered, painful raw Pale pink/red Brisk capillary return within burn wound	Sluggish capillary return Less painful Dark pink to red	Deep red or white Dull sensation Severely delayed or absent capillary return	No sensation No capillary return Leathery white/ black or yellow
INITIAL PRIMARY DRESSING	<ul><li>Gels to soothe</li><li>Soothing moisturisers</li><li>Vaseline</li></ul>	Absorbent dressings	Silver products  Acticoat  Acticoat  Absorbent  Mepilex Ag  Aquacel Ag  Flamazine  Biatain Ag  Allevyn Ag  Antimicrobial  Flaminal  Silicone dressings  Mepilex	Silver products  Acticoat  Acticoat  Absorbent  Mepilex Ag  Aquacel Ag  Flamazine	Silver products  Acticoat  Acticoat  Absorbent  Aquacel Ag  Flamazine
	Fpidermal burns	do not need secondary	dressings		

INITIAL SECONDARY LAYER DRESSING Epidermal burns do not need secondary dressings

Dermal burns produced a significant amount of exudate in the first 72 hours.

Absorbent secondary dressings such as gauze or foam should be considered to manage excess exudate Secure with adhesive tape dressing, crepe bandage, tubinet or tubigrip. Ensure it is non constrictive Elevate affected area as appropriate.

FOLLOW UP

In 24 – 48 hours by GP or appropriate service

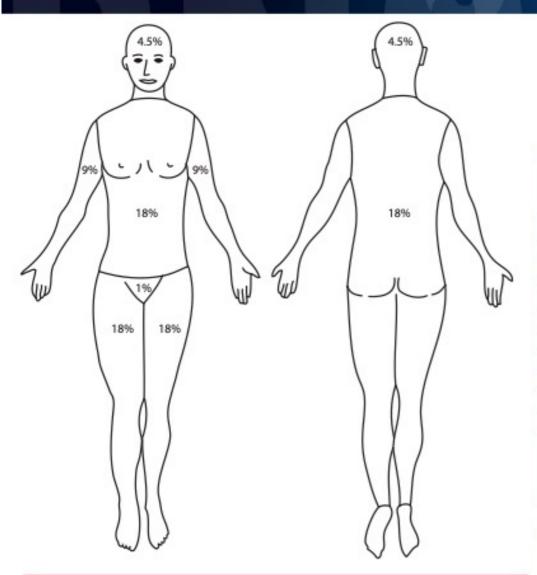
Refer early to a surgeon if excision and skin grafting should be considered for mid dermal, deep dermal and full thickness burns.

Refer on appropriately if wound becomes infected or is slow to heal (Unhealed >14 days).

#### CONTACT DETAILS



## Rule of Nine For Adults Only.



TBSA %				
	%			
Head				
Right arm				
Left arm				
Chest				
Back				
Right Leg				
Left Leg				
Genitalia				
TOTAL TBSA				

#### Estimated fluid (Parkland)

4mls x TBSA% x Kg = mls/24hrs 1/2 total in 8 hours post injury 1/2 total in 16 hours post injury

Time of injury: \_\_\_\_\_\_ Time elapsed since burn: \_\_\_\_\_

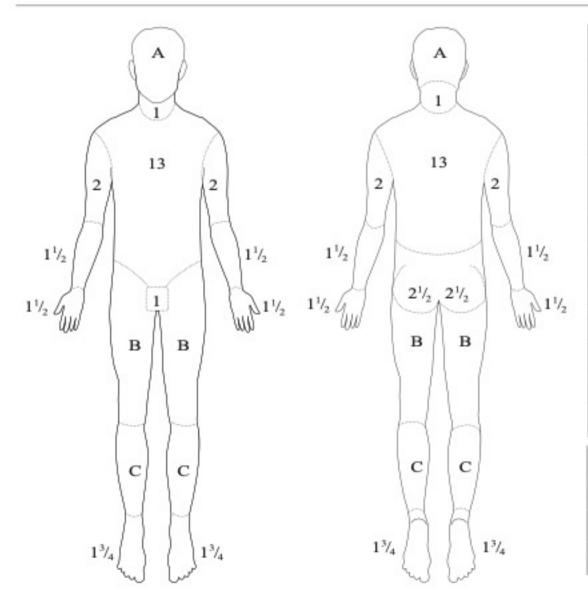
Estimated fluid required: \_\_\_\_\_mls Total fluid since burn: \_\_\_\_\_mls

Use as a guide to estimate fluid requirements. Titrate fluid administration to achieve desired urine output

DEPTH LEGEN	D:
Full Thickness	
Deep Dermal	
Mid Dermal	
Superficial Dermal	
X Circumferential	



## Lund and Browder chart for calculating the percentage of total body surface area burnt (Fig 14.19)



Region	Partial thickness (%) [NB1]	Full thickness (%)
head		
neck		
anterior trunk		
posterior trunk		
right arm		
left arm		
buttocks		
genitalia		
right leg		
left leg		
Total burn		

Area	Age 0	1	5	10	15	Adult
A = half of head	91/2	81/2	61/2	51/2	41/2	31/2
B = half of one thigh	2%	314	4	41/2	4½	4%
C = half of one lower leg	21/2	21/2	234	3	31/4	31/2

## **Burn Depth** Characteristics

#### CONTACT DETAILS





The Royal Children's Hospital Melbourne

(03) 9345 5522

Contact: Burn Registrar

	Superficial Epidermal eg sunburn '1" degree'	Superficial Dermal Thickness (partial) '2 <sup>nd</sup> degree'	Mid Dermal Thickness (partial) '2 <sup>nd</sup> degree'	Deep Dermal Thickness (partial) '2 <sup>nd</sup> degree'	Full Thickness '3rd degree'
			經過		9 9
PATHOLOGY	Involves epidermis only	Involves epidermis and upper dermis, most adnexal structures intact	<>	Involves epidermis and significant part of dermis, only deeper adnexal structures intact	Epidermis, dermis and cell adnexal structures destroyed
APPEARANCE	Dry and red, blanches to pressure. No blisters.	Pale pink. Smaller blisters. Wound base blanches with pressure.	<	Blotchy red or pale deeper dermis where blisters have ruptured	White waxy charred. No blisters. No capillary refill
SENSATION	Maybe painful	Increased sensation Very painful and tender	<b>←→</b>	Decreased sensation	No sensation
CIRCULATION	Normal, increased	Hyperaemic Rapid capillary refill.	<b>←</b> →	Sluggish capillary refill	Nil
COLOUR	Red, warm	Pink	<del>&lt;&gt;</del>	White/Pale pink/ Blotchy red	White/Charred Black
BLISTERS	None or (days) later or desquamation	Yes (within hours of injury)	<>	Early—usually large blisters which rupture rapidly and slough	Epidermis & dermis destroyed, no blistering
HEALING TIME	Within seven days	7-14 days	*	Over 21 days	Does not heal spontaneously
SCARRING	No scar	Colour match defect. Low risk of hypertrophic scarring	<>	High risk (up to 80%) hypertrophic scarring	Wound contraction Heals by secondary intention

#### AAPA Bitumen Burn first aid card

#### Bitumen Burns First Aid

NOTE: A work colleague should accompany the casualty to Hospital to provide support.

A full size Bitumen Burns Card with information to medical practitioners should be attached to the casualty.

Burns Cards should be in each vehicle or first aid kit associated with bituminous paving and information on the card MUST be brought to the attention of medical staff.



PROTECT yourself and others from harm.
DO NOT ATTEMPT TO REMOVE ANY BITUMEN.
COOL the burnt area with cold water for a
minimum of 20 minutes. DO NOT USE ICE.



EYE burns – flush with water, same as above.

REMOVE belts, rings and any other constrictions if you can do so without further damage.

DO NOT attempt to remove clothing or material that is stuck to the bitumen.

This may cause further injury.



COVER any exposed burns (those not covered with bitumen) with clean non-stick burn dressings.

DO NOT wrap dressings too tightly.

MAINTAIN body heat and treat for Shock Process.

DO NOT attempt to clean the affected area.

DO NOT apply lotions or ointments.

DO NOT dress areas covered with bitumen.

DO NOT let blankets touch burns or bitumen.

**DO NOT** give ANYTHING by mouth until cleared to do so by medical personnel.



CALL for an Ambulance by dialling 000 immediately for any serious burn or medical complaint.

ATTACH the Bitumen Burns Card to the casualty.

Remember to attach the Bitumen Burns Card to the casualty. A Bitumen Burns Card should be carried in each vehicle associated with bituminous paving.





#### **ANZBA Referral Criteria**

- Burns greater than 10% Total Body Surface Area (TBSA)
- Burns greater than 5% TBSA in children
- Full Thickness burns greater than 5% TBSA
- Burns of Special Areas Face, Hands, Feet, Genitalia, Perineum, Major Joints and circumferential limb or chest burns
- Burns with inhalation injury
- Electrical burns
- Chemical burns
- Burns with pre-existing illness
- Burns associated with major trauma
- Burns at the extremes of age young children and the elderly.
- Burn injury in pregnant women
- Non-accidental burns

### **Acronyms and abbreviations**

Term	Definition
ANZBA	Australian and New Zealand Burn Association
TBSA	total burn surface area

#### References

- 1. Australian and New Zealand Burn Association. (2020). *Initial Management of Small Burns*. https://anzba.org.au/assets/ANZBA-Initial-Management-of-Small-Burns.pdf
- 2. Australian and New Zealand Burn Association. (2020). *Burn First Aid Factsheet*. https://anzba.org.au/assets/ANZBA-Factsheet-First-aid-1.pdf
- 3. Victoria Adult Burns Service at the Alfred. (2019). *Rule of Nine for adults only*. <a href="https://www.vicburns.org.au/wp-content/uploads/2016/06/poster3-wallace-rule-of-nine-adults-only.pdf">https://www.vicburns.org.au/wp-content/uploads/2016/06/poster3-wallace-rule-of-nine-adults-only.pdf</a>
- 4. Victoria Adult Burns Service at the Alfred. (2020). *Burn depth characteristics*. <a href="https://www.vicburns.org.au/wp-content/uploads/2016/06/poster12-different-burn-depth-characteristic.pdf">https://www.vicburns.org.au/wp-content/uploads/2016/06/poster12-different-burn-depth-characteristic.pdf</a>
- 5. Australian Flexible Pavement Association. (2018). *Bitumen burns first aid*. <a href="https://www.afpa.asn.au/technology-publications/bitumen-burns-cards/">https://www.afpa.asn.au/technology-publications/bitumen-burns-cards/</a>
- 6. Australian and New Zealand Burn Association. (2019). *ANZBA referral criteria*. https://anzba.org.au/resources/anzba-referral-criteria/
- 7. Metro North Health. (2020). *RBWH Prof Stuart Pegg Burns Centre*. <a href="https://metronorth.health.qld.gov.au/rbwh/healthcare-services/burns">https://metronorth.health.qld.gov.au/rbwh/healthcare-services/burns</a>

#### **Share your feedback**

### Please complete our survey to help make Queensland Trauma Education better

The survey should take no more than 5 minutes to complete.

Scan the QR code or visit: https://www.surveymonkey.com/r/3FWL3ZD





Queensland Trauma Education

Burns Trauma – Thermal burns: Case discussion – Facilitator resource kit

Published by the State of Queensland (Clinical Skills Development Service), 2021

Visit csds.qld.edu.au/qte
Email CSDS-Admin@health.qld.gov.au
Phone +61 7 3646 6500

