

LRI Emergency Department

Clinical guideline for:

Burn injuries – management in adults

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1. Introduction

Burn injuries can range in severity from minor, moderate and severe to complex. The mechanism of injury varies from thermal (e.g. through scald, flame or contact), electrical, chemical and tar/bitumen to cold burn (frostbite). These can be isolated or associated with other trauma.

Within the [Midlands Burns Operational Delivery Network](#) (MBODN), a tiered approach is adopted for burns referrals as per size, depth, affected areas and other contributing factors. [1] Within UHL, the Plastic Surgery Department has been formally designated as burn facility, which can care for small, non-complex burn injuries in both adults and children.

This guideline provides the framework and tools for effective management of adults attending the LRI ED with burns in accordance with network guidance.

2. Scope

The guideline covers the management of adults presenting to the ED with burns caused by thermal, electrical or chemical injuries (excluding eye injuries) from arrival to discharge, admission or transfer to a higher burn service.

3. First aid

See [Appendix A](#) & [Appendix B](#) for the British Burn Association First Aid Clinical Practice Guideline poster. [2]

NB: **We do not support the use of hydrogel burn dressings** (least effective method of removing heat from wound). If patients arrive with such dressing (e.g. a 'Burnshield' Face Mask applied by an ambulance crew), remove immediately and employ cooling measures as described above.

4. Burn depth assessment

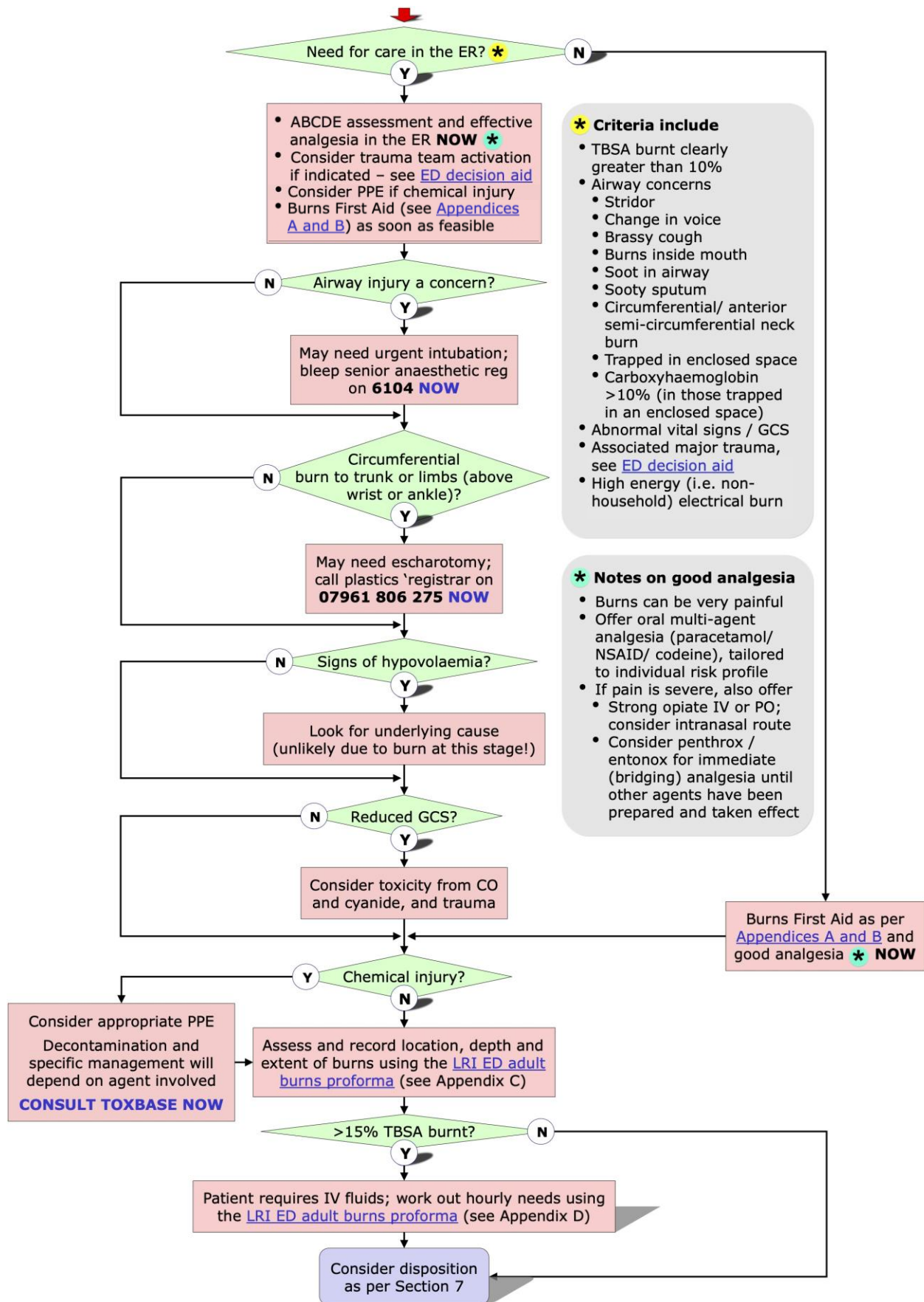
Burn depth assessment is essential for the estimation of burn size and for decisions about disposition from the ED.

	Epidermal (superficial)	Partial thickness		Full thickness
		Superficial	Deep	
Appearance	Red, shiny	Pale pink, mottled	Cherry red	Dry, leathery, white / black / charred
Blistering	No	Yes	Yes	No
Blanching	Yes – brisk	Yes – brisk	No, or sluggish	No
Sensation	Painful	Painful	Dull	Absent

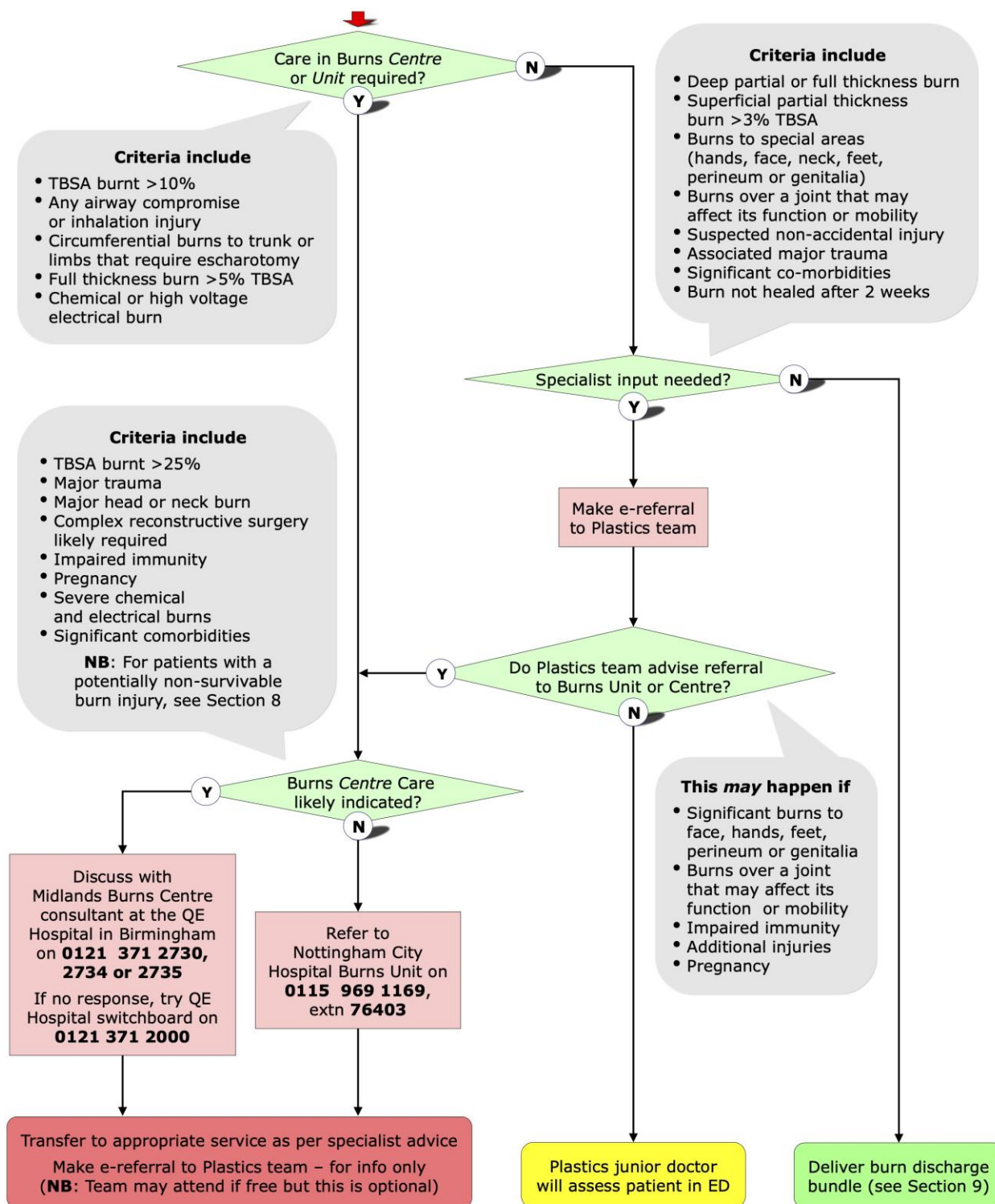
5. Calculating burn size and IV fluid requirements over the first 24h

Use the LRI ED adult burns proforma (see [Appendix C](#) & [Appendix D](#)).

6. ED management



7. Appropriate disposition following ED management



8. Potentially non-survivable burns

Some patients may present with such catastrophic burn injuries that end-of-life care is the only realistic management option. Survivability is determined by multiple factors, including:

- % TBSA burnt
- Burn depth (partial or full thickness)
- Presence or absence of inhalation injury
- Presence or absence of co-morbidities
- Patient age
- The wishes of the patient and/or family/carers

Any decision to withdraw active treatment must be taken as a team and, wherever possible, involve the patient, their family and carers. The following process should be followed:

- The patient must be assessed in person by an ED consultant **AND** a senior doctor from Plastic Surgery. This should generally be the on-call consultant, but is delegated to the on-call 'registrar' where the on-call consultant is unable to attend within 1h (i.e. if the consultant is stuck in theatre or an off-site clinic). **NB:** Plastic surgical registrars must always discuss the case with their on-call consultant.
- The patient should then be discussed with the on-call Midlands Burns Centre consultant at the Queen Elizabeth Hospital in Birmingham on **0121 371 2730, 2734 or 2735** (or go through QE Hospital switchboard **0121 371 2000** if unsuccessful)
- The senior doctors from both specialties and the Midlands Burns Centre Consultant must all agree that the patient's injuries are non-survivable
- The outcome of the discussion should be communicated to the patient (if appropriate) and the family/carers in a sensitive but honest manner

If the decision to provide End-of-Life Care at the LRI has been agreed, admit the patient under the plastic surgical team (**NB:** Patient should not be moved if death is believed to be likely within the next hour). The plastic surgical team will involve the ITU team if required.

During the hours of 08:00 – 16:00 Mon-Fri and 11:00 – 19:00 on Sun, the Burns & Plastics Specialist Nurses may be contacted on **07956 266 983** to assist ED staff with any questions around optimal wound care, family/carers physical contact with the patient etc.

9. Discharge bundle for patients not seen by plastics

- Thoroughly clean wound with tap water (or 0.9% NaCl)
NB: Perfect sterility is not required and tap water has been shown to be safe [3]
- Remove all loose / dead skin
- De-roof all blisters (excluding those that are too small to do this easily using scissors)
- Apply non-adherent dressing to all burnt areas
 - Mepitel
 - Secondary dressing (gauze)
 - Bandage
- Patient to contact SPA on **0300 300 7777** to arrange review after 48h
- Patient to contact GP if burn not healed after 10 days
(will need review in Burns and Plastics Dressing Clinic - BPDC)

10. References

1. [MBODN patient referral guidance](#); accessed on 2nd May 2022
2. British Burn Association. First Aid Clinical Practice Guidelines. [Jun;2021]; <https://www.britishburnassociation.org/wp-content/uploads/2017/06/BBA-First-Aid-Guideline-24.9.18.pdf> 2018.
3. HayekS, El KhatibA and AtiyehB. Burn Wound Cleansing - A Myth or a Scientific Practice. Ann Burns Fire Disasters 2010;23:19–24.

British Burn Association First Aid Clinical Practice Guidelines



Compiled by: Kristina Stiles and Nicholas Goodwin, April 2018
On behalf of the BBA Pre-Hospital Special Interest Group

www.britishburnassociation.org

The prompt and effective application of burns first aid has been shown to positively impact on the burn outcome, preventing further tissue damage and reducing subsequent morbidity.^{1,2} However, there is widespread variation in the first aid advice currently available for management of burns and scalds.^{3,4,5,6} The following recommendations are based on evidence from a systematic literature review and form a minimum standard of care for first aid management of burns and scalds that is practical and effective to perform in any setting or environment.

Thermal burns

STOP the burning process

- Remove person/s from the source of the burn, once safe to do so⁷
- Extinguish burning clothing using water or the 'Stop, Drop and Roll' method⁸
 - STOP where you are
 - DROP to the ground and cover your eyes and mouth with your hands
 - ROLL over and back and forth until the flames are out
- Isolate electrical power sources, if safe to do so before attempting rescue
- Avoid chemical cross-contamination

REMOVE clothing and jewellery

- Remove any burned/contaminated/damp/constricting clothing, if able to do so⁹
- Remove any nappies, jewellery and contact lenses near burned area, if able to do so
- Leave any molten/adherent clothing.

COOL the burn

If water is available

- Do not delay cooling.
- Cool the burn **immediately** with cool running tap water for 20 minutes and within 3 hours of injury^{10,11,12}
- Aim to complete 20 minutes of cooling. Further cooling attempts may induce hypothermia, especially in children and the elderly, or where large burns are present.¹³

If water supply is limited

- Apply a cool water compress using any clean wetted lint free cloth
- Change compress frequently over 20-minute period
- If no water is immediately available in any form, burns should be covered with cling film and cooled at the first available opportunity within 3 hours of injury.^{7,11,14}
- Hydrogels are marketed but evidence as to their efficacy is limited³¹

Do not

- Use ice or iced water to cool burns^{16,17}

WARM the patient

- "Cool the burn but warm the patient"⁷
- Keep patient warm to prevent hypothermia (children and elderly are most susceptible)¹⁵
- Cover non-burned areas during cooling and continue to warm throughout care interventions

COVER the burn

- Cover the cooled burn with loose longitudinal strips of cling film or any clean lint free cloth or non-adherent dressing¹⁸
- Do not wrap cling film circumferentially around limbs or other burned areas
- Do not apply cling film to facial burns
- Cover irrigated and fully decontaminated chemical injuries with a wet compress

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Chemical burns

Immediacy of decontamination and dilution through irrigation of chemical injury is paramount as the duration of the chemical's contact with the skin is a major determinant of burn severity^{19,20}

Remove chemical agent

- Wear appropriate personal protective equipment to minimize the risk of cross-contamination
- Brush off dry powders, remove fragments of solid chemical substances and discard contaminated clothing prior to wet decontamination¹⁹

Irrigate

- Do not delay **immediate** irrigation for detailed assessment of patient or acquiring a particular irrigation fluid, regardless of delay in presentation.
- Commence urgent irrigation of skin/eyes with a sterile isotonic solution (e.g. Hartmann's or Normal Saline), an amphoteric solution, or room-temperature running water for at least 20 minutes.^{19,21,22,23,24}
- Continue irrigation until the patient experiences a decrease in pain or burning in the wound or until the patient has been assessed by a burn specialist.²⁵
- Do not irrigate dry lime, phenols, muriatic acid, concentrated sulphuric acid and elemental metals with water.¹⁹
- Do not attempt to neutralize the chemical due to the potential exothermic reaction, which could contribute to further tissue destruction.²⁵

Treat

- Access National Poisons Information Service/TOXBASE for agent-specific decontamination and treatment information
- Administer antidote treatment for specific agents if appropriate¹⁹
- Manage any systemic toxicity or expected side-effects of a chemical agent¹⁹

Electrical burns

- Prioritise and manage life threatening conditions as per standard ATLS protocol²⁵
- Cool the injury site(s) immediately with cool running tap water for 20 minutes within 3 hours of injury (after the electrical source has been controlled)²⁵
- If there is no history of unconsciousness, cardiac arrest, or abnormal rate or rhythm (normal ECG), prolonged monitoring is not required.^{25,26}

Tar and Bitumen Burns

- Cool the molten agent and the injury site(s) with cool running tap water for 20 minutes within 3 hours of injury or until it is completely cooled²⁵
- Once cooled, use solvents containing liquid paraffin or any oily substance to emulsify the tar. Tar removal is not an emergency and may be delayed until arrival at the burn service.

Cold burns (frostbite)

- Prioritise and manage life threatening conditions, such as hypothermia or severe trauma over the presence of regional cold injury.^{25,27}
- In the pre-hospital care of cold injury, begin local rewarming only if refreezing will not occur in transit. Avoid refreezing if field thawing occurs.²⁸
- Rewarm rapidly and continually in circulating water at 37°C to 39°C with a mild antibacterial agent (povidone-iodine or chlorhexidine) for at least 30 minutes within 12 hours of injury.^{27,28,29,30}
- Rewarming is complete when all injured tissues have regained sensation, feel soft and pliable to the touch, with a red-purple appearance.^{25,27}
- Do not use dry heat as it may compound the injury.²⁵
- To avoid further tissue damage, do not apply pressure, massage or rub the affected area²⁵
- Elevate the injured area to reduce any developing swelling.²⁵

Appendix C. LRI ED adult burns proforma – page 1 ('Lund and Browder' chart)

NB: Print the proforma directly from the ED '[Injuries -](#) and [ER – other](#)' on-demand print menus

University Hospitals of Leicester

ED Adult Burns Proforma

'Lund and Browder' Chart

An aid for documenting burn extent and calculating the percentage of burnt total body surface area (TBSA)

Patient details

Full name

DoB

Unit number

(use sticker if available)

Do not record epidermal (superficial) burns

The surface area of the patient's palm plus fingers equates to around 1% of their TBSA. Making a paper cutout of similar dimensions can help to estimate the size of larger burns.

	% superficial or deep partial thickness	% full thickness
Head		
Neck		
Front		
Back		
R arm		
L arm		
Buttocks		
Genitalia		
R leg		
L leg		
TBSA burnt		

Chart completed by

Print name
Signature
Role
Date
Time

Martin Wiese . Aug16 . Version 5

