

Burn Education Day

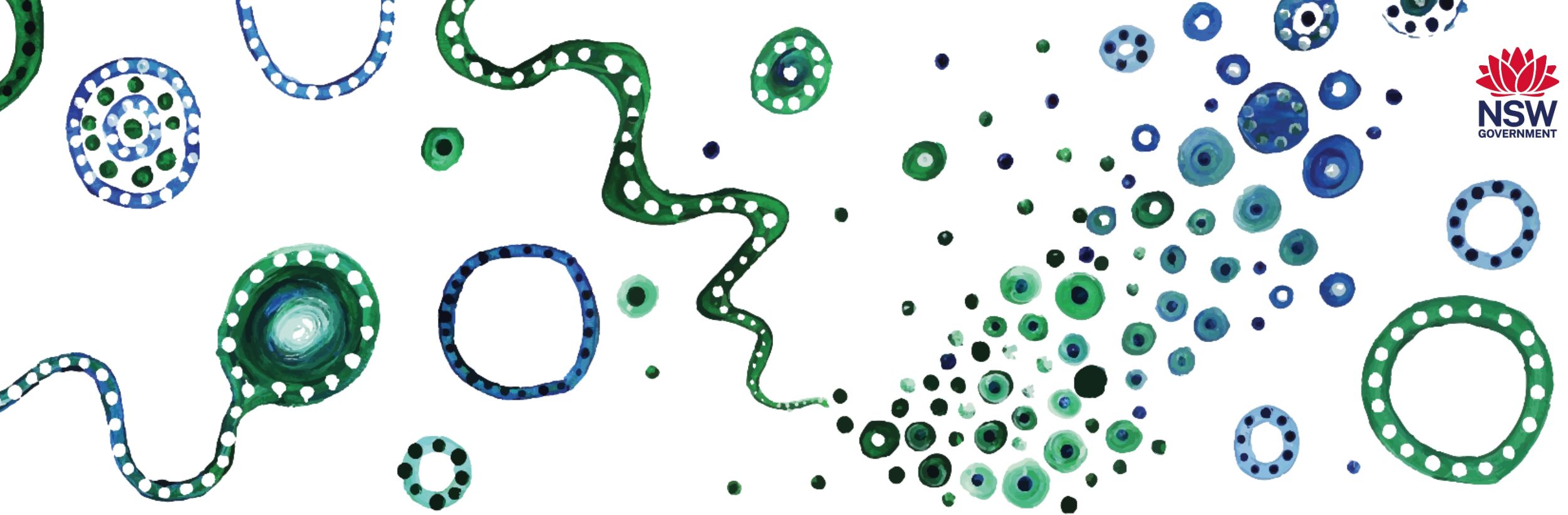
Burn Assessment

ACI Statewide Burn Injury Service

<http://www.aci.health.nsw.gov.au/networks/burn-injury>

Agency for Clinical Innovation

aci.health.nsw.gov.au



**We acknowledge the traditional custodians of the land that we work on.
We pay our respects to Elders past, present and emerging, and extend that
respect to other Aboriginal peoples present here today.**

I recognise and appreciate consumers, patients, carers, supporters and loved ones.

The voices of people with lived experience are powerful.

Their contribution is vital to enabling decision-making for health system change.

Content Acknowledgement

The information in these lectures has been obtained from the *Emergency Management of Severe Burns* (EMSB) course run by the **Australian and New Zealand Burn Association (ANZBA)** 2021, NSW Burn Guidelines and NSW Specialist Burn Clinicians.

WARNING

This presentation contains pictures of burn injuries.

Aims of Education Day

- To initiate appropriate early care of a burnt patient.
- To know when & how to transfer a burnt patient.
- To understand the principles of physical & emotional rehabilitation of a burnt patient.

Epidemiology



Burns Incidence

- 1% Australia and New Zealand per year
- 286,000 people per year
- 50% Restriction Daily Living Activities
 - 10% Hospital
 - 10% Severe Burns

Burns – The Cost

- Severe burn care is expensive
 - \$700k for a 70% TBSA burn
- Rehabilitation
- Time off work
- Loss of earning power
- Loss of life style



Adult Burns

ANZBA Statistics

■ Flame	44 %
■ Scald	28 %
■ Contact	13 %
■ Chemical	5 %
■ Friction	5 %
■ Electrical	2 %
■ Other	3 %

Places of Burn - Adults

ANZBA Statistics

• Home	56%
• Work	17%
• Roadway	11%
• Outdoors	11%
• Institutions	3%
• Other	2%



Children's Burns

ANZBA Statistics

• Scald	55%
• Contact	21%
• Flame	13%
• Friction	8%
• Electrical	1%
• Chemical	1%
• Other	1%

Place of Burns - Children

ANZBA Statistics

- Home 82%
- Outdoors 12%
- Roadway 3%
- Work 1%
- Institution/School 1%
- Other 1%

Where does it happen?



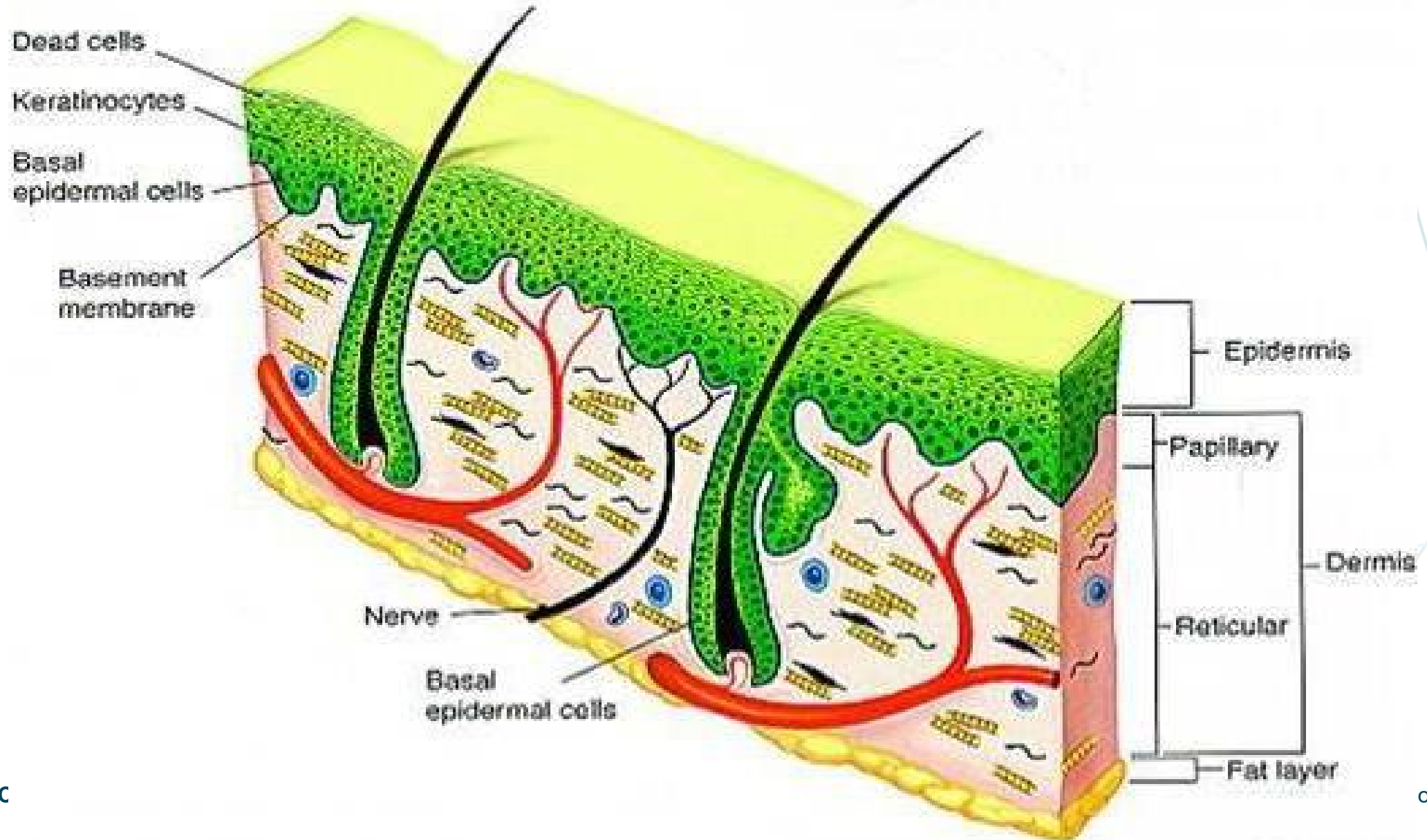
- 82% House/Home
- Mainly kitchen and bathroom



Response to Burn



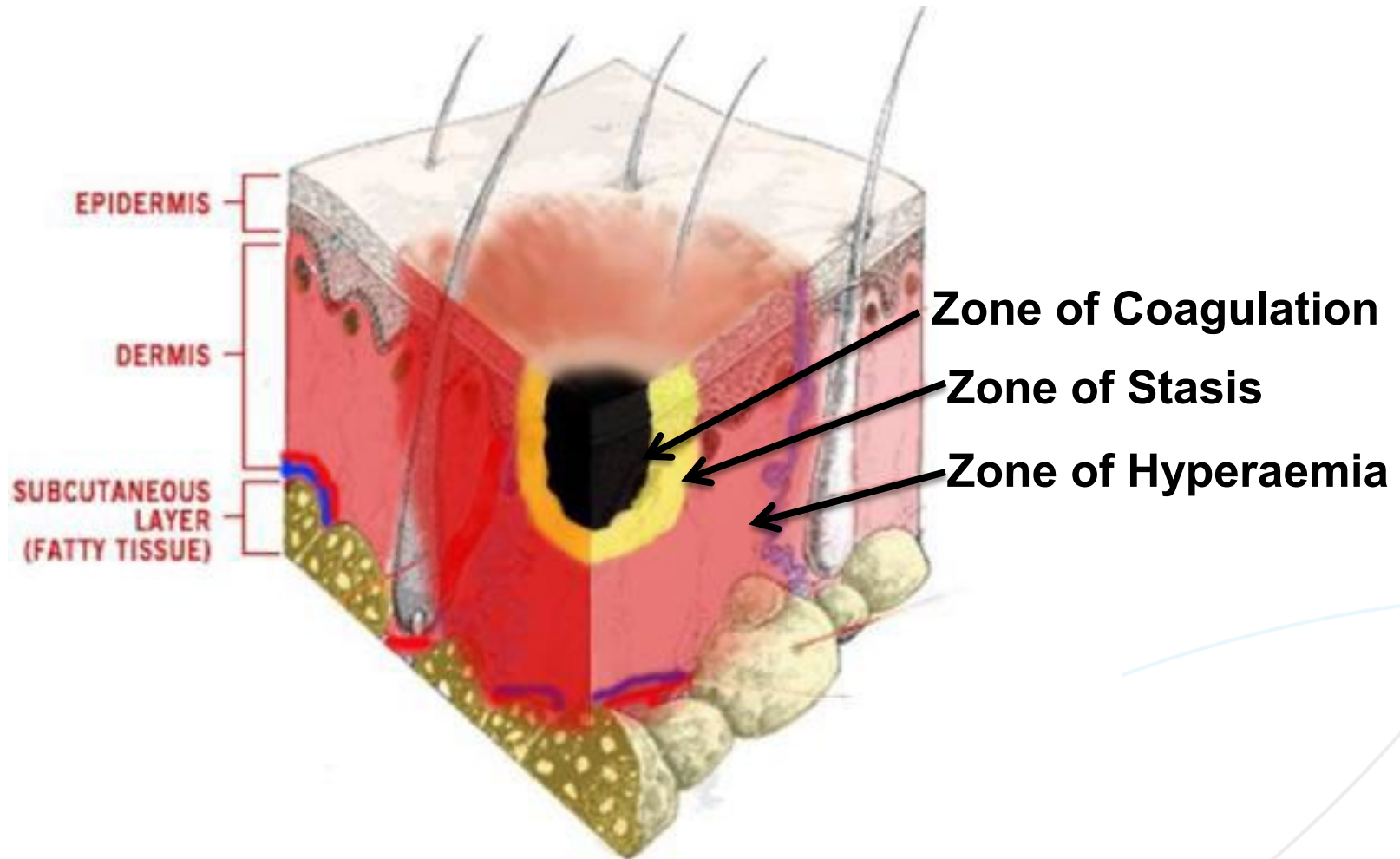
Structure of Skin



Functions of the Skin

- Temperature regulation
- Sensory interface
- Immune response/protection from bacterial invasion
- Control of fluid loss
- Metabolic function
- Psycho-social function

Jackson's Burn Wound Model



Severity of Burn



- Depth = time & temperature
- Severity of **local** injury determined by depth
- However, depth is not the most important predictor of severity

Systemic injury



- For all burns, tissue damage initiates an inflammatory response
- Cytokine release, pathological cascade
- If large enough causes a systemic inflammatory response

Body Response to Burn Injury

- Proportional to area burnt
- Clinically significant >20%TBSA adult / >10%TBSA paed
- Affects all major organ systems:
 - Heart and blood vessels
 - Lungs (Pulmonary oedema and ARDS)
 - Gut (Paralytic ileus /bacterial translocation)
 - Immune system (immunosuppression)
 - Neuro-humeral regulation
 - Kidney (Oliguria and renal failure)
 - Bone mineralisation & growth

Abnormal Capillary Exchange

- Caused by inflammatory mediators
- These produce –
 - Vasodilatation
 - Increase in capillary permeability
 - Lowering of intercellular pressure

Circulatory Effects

- Increase in capillary permeability
 - Loss of fluid from circulation
 - Loss of albumin from circulation
 - Oedema formation

HYPOVOLAEMIA IS AN EARLY THREAT TO LIFE

Metabolic Effects of Burn

- Secretion of stress hormones
 - Tachycardia
- Neural response via sympathetic nervous system and hypothalamus
 - Hyperthermia
- Suppression of anabolic hormones and development of massive catabolic response
 - Protein wasting
- Depression of immune response
 - Susceptibility to infection

First Aid



First Aid



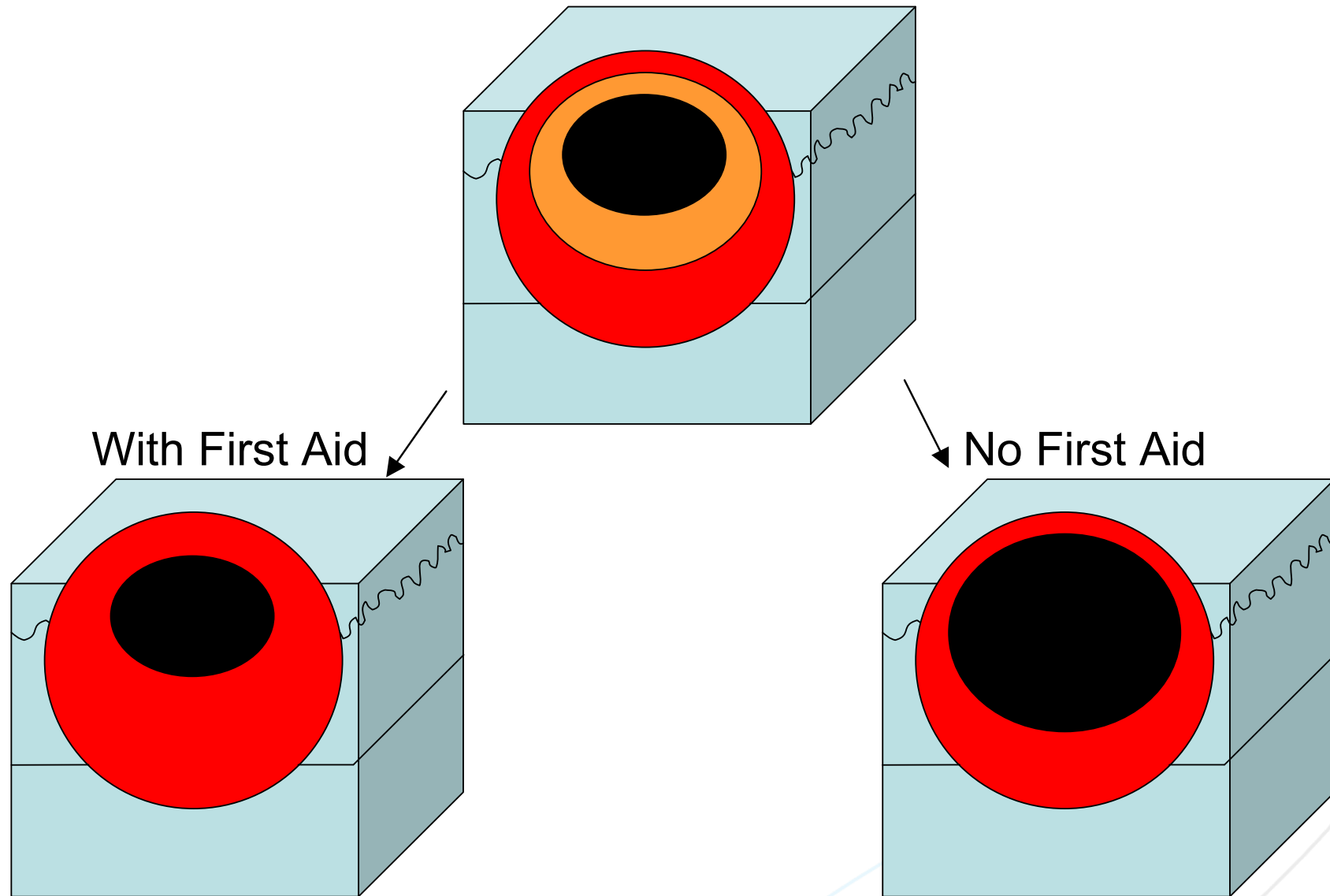
- Stop the burning
 - Stop! Drop! Cover (face) & Roll!
 - Remove all clothing
 - If dry chemical – brush off before irrigating

First Aid



- Cool the burn
 - ASAP
 - Any fluid 8° - 25°C
 - Continue ~20 minutes
 - If chemical - irrigate copiously with water
 - Avoid hypothermia

First Aid





First aid: What NOT to use



Hydrogels do not cool a burn wound adequately



Never use ice as this can make the burn worse by decreasing blood flow



Toothpaste does not cool a burn and can increase pain



Creams do not cool a burn



Honey does not cool a burn



Butter or margarine do not provide adequate cooling

Reverse Thermal/Cold

PLEASE NOTE: the usual recommendations for burns first aid (20 mins cool running water) is contraindicated in contact LPG gas cold burns

- Rapid re-warming in bath of water between 37 - 40°C for 15 - 30 minutes – aims to minimise tissue loss and reduce chemical irritation
- Active motion whilst rewarming is recommended
- Avoid massaging affected area during rewarming

Early Management



Emergency Department



Primary Survey

Airway & C-spine

Breathing & O₂

Circulation & haemorrhage control

Disability

Exposure & environment

Airway & C-spine

- Upper (supraglottic) airway is subject to thermal injury
 - Burns in a confined space (room, car)
 - Burns above the clavicle
- Onset hours after injury
- Stabilise C-spine

When to Consider Intubation

- Head and neck burns
- Soot in mouth, stridor, wheezing, breathing difficult, laryngeal tug, hoarse voice
- Facial or neck swelling
- Large surface area burn >40%
- Burn in an enclosed space e.g. house, car
- Inhalation of gases

Intubation

If in doubt - intubate



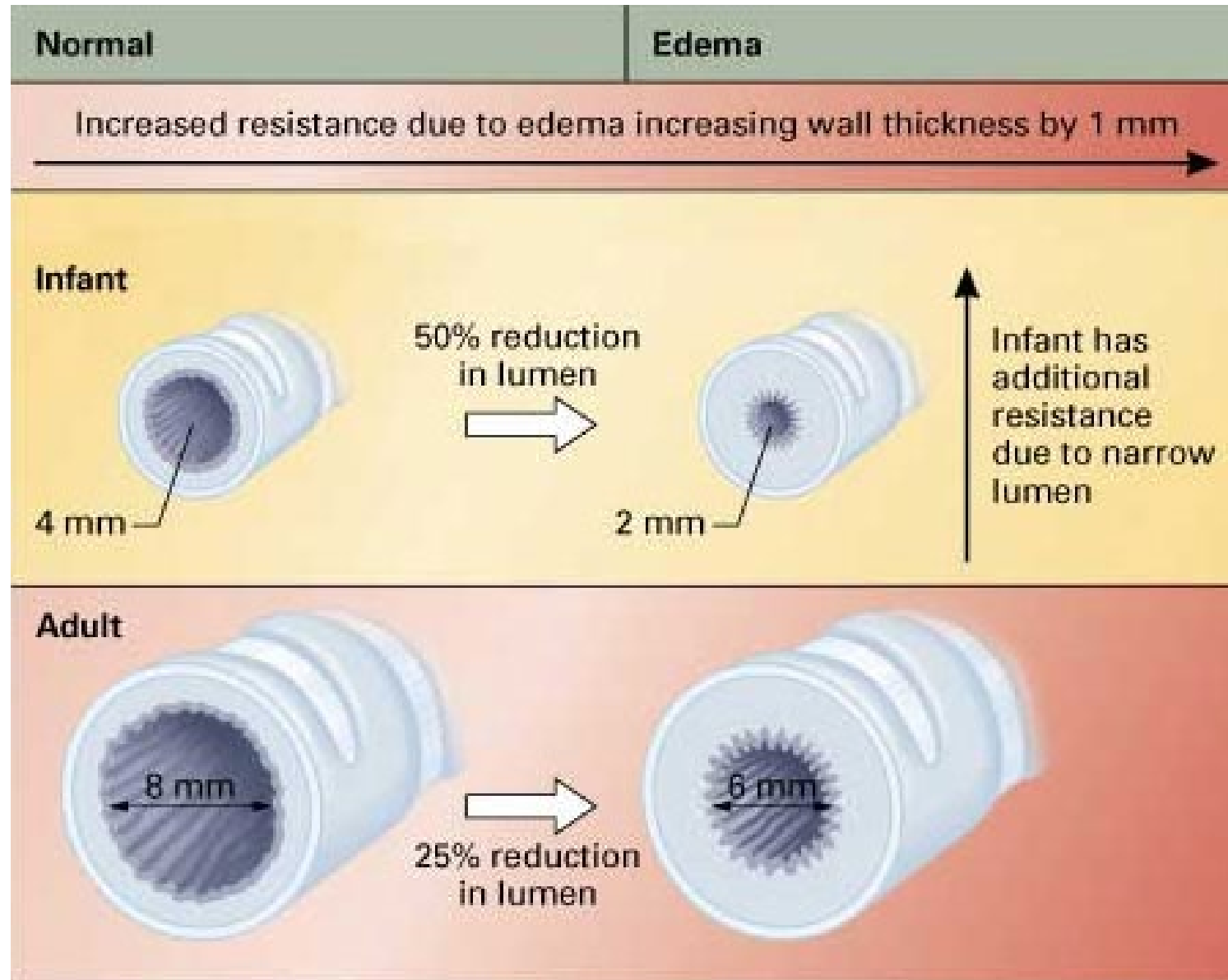
- <1 hour post burn injury



- 6 hours post burn
- Swelling, oedema

Would you intubate this child?





Airway compromise



12 hrs post burn



36 hrs post burn
obstructed → intubated



Breathing & O₂

- Check air entry – look, feel, listen
- Give O₂: monitor with oximetry
- Lung injury due to smoke inhalation
- Lung effects of burns start days after injury
- Early lung problems are likely to be due to associated injuries

Circulation

- Monitor vital signs
- Apply capillary blanching test centrally and in limbs
>2 secs indicate hypovolaemia or need for escharotomy on that limb
check another limb
- Inspect for any obvious bleeding – stop with direct pressure or appropriate management

Circulation

Insertion of IV access

- 2 IV cannulas inserted
- Preferably through unburned skin
- Sometimes an IO cannula is required

Bloods

Disability: Neurological Status

- Establish level of consciousness:
 - A - Alert
 - V - Response to Vocal stimuli
 - P - Responds to Painful stimuli
 - U - Unresponsive
- Pupillary response
- Restlessness, confusion, aggression and altered states of consciousness may be due to hypovolaemia, hypoxia or CO poisoning as well as drugs, alcohol, etc

Exposure with Environmental Control

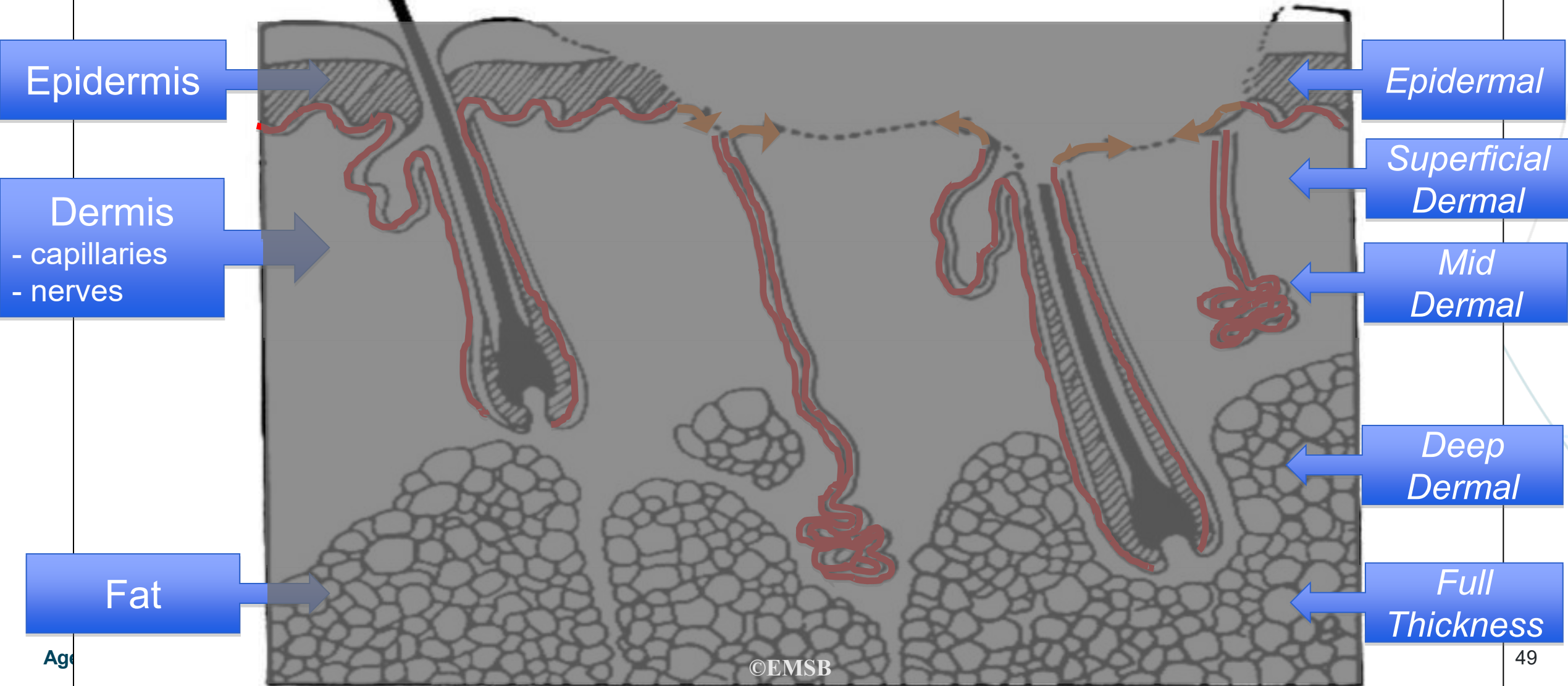
- Remove all clothing and jewellery
- Keep patient warm
- Log roll and examine posterior surfaces for burns and other injuries
- Remove wet sheets

Burn Assessment - Depths



Burn Depth Classification

Burn Wound Healing = re-epithelisation



Burn Depth Assessment

<i>Depth</i>	<i>Colour</i>	<i>Blisters</i>	<i>Cap Refill</i>	<i>Sensation</i>	<i>Healing</i>
<i>Epidermal</i>	Red	No	Present	Present	Yes
<i>Superficial Dermal</i>	Pale Pink	Small	Present	Painful	Yes
<i>Mid-dermal</i>	Dark Pink	Present	Sluggish	+/-	Usually
<i>Deep Dermal</i>	Blotchy Red	+/-	Absent	Absent	No
<i>Full thickness</i>	White	No	Absent	Absent	No

Epidermal Burn



- Skin intact, red, brisk capillary refill
- Erythema not included in % TBSA assessment
- Heal spontaneously within 3 - 7 days with moisturiser or protective dressing



Superficial Dermal Burn



- Blisters present or denuded
- Pink, brisk capillary refill
- Should heal within 7-14 days with minimal dressing requirements

Mid Dermal Burn



- Heterogeneous, variable depths
- Dark pink, sluggish capillary refill
- Should heal within 14 -21 days
- Deeper areas or over a joint may need surgical intervention and referral

Deep Dermal Burn



- Heterogeneous, variable depths
- Blotchy red/white Sluggish to absent capillary refill
- Surgical intervention
- Refer to specialist unit

Full Thickness Burn



- Outer skin, and some underlying tissue dead
- White, brown, red, black
- No capillary refill
- Surgical intervention and long-term scar management required

Burns are Dynamic

- The first impression may not be the most accurate



Day 1



Day 2



Day 5

Your turn - What Depth?









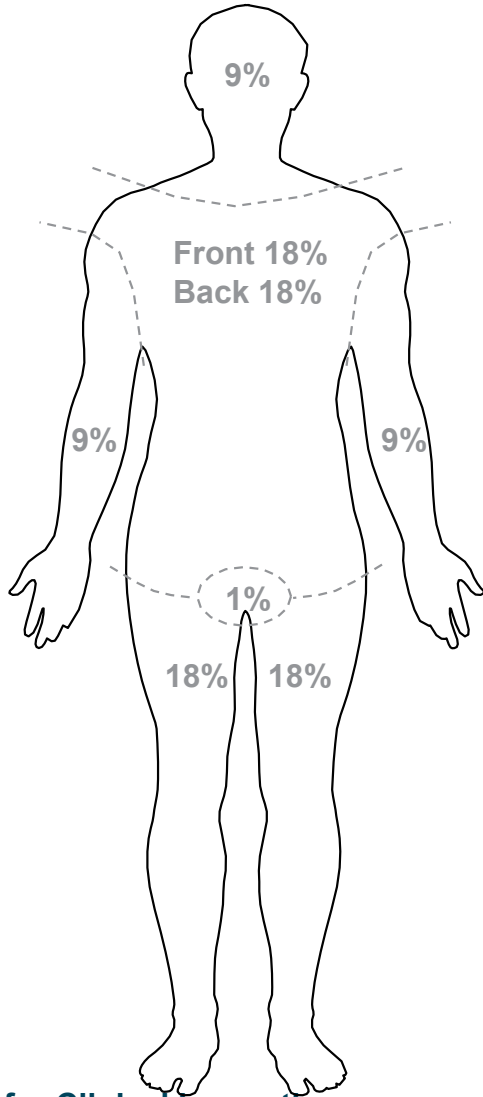




Burn Assessment - TBSA



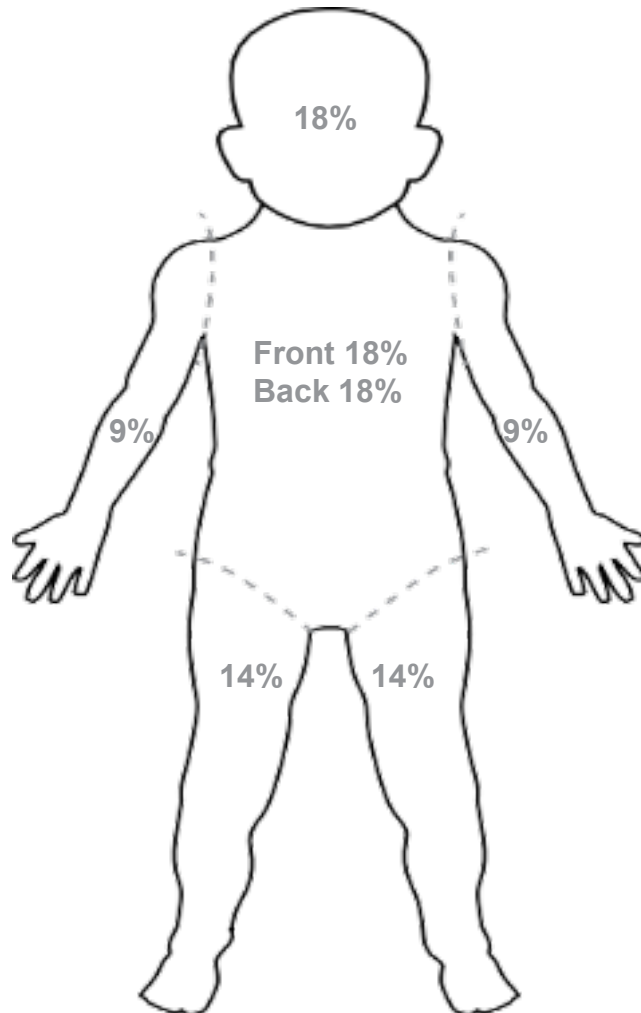
Surface Area Assessment



Rule Of Nine's

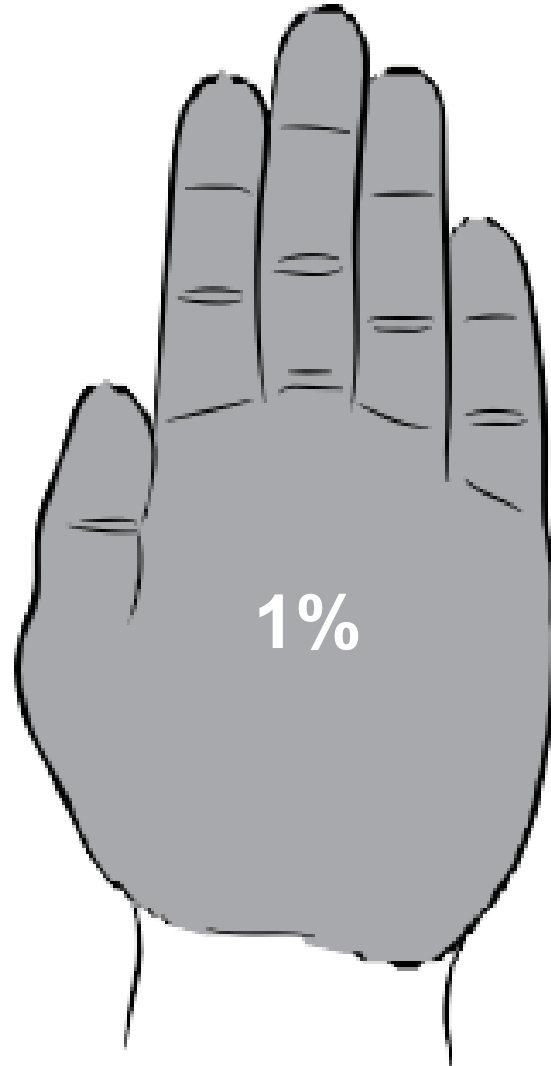
- Head & Neck = 9%
 - Arms (2 x 9) = 18%
 - Trunk (front) = 18%
 - Trunk (back) = 18%
 - Legs (2 x 18) = 36%
 - Perineum = 1%
- 100%

Surface Area Assessment



Paediatric Rule of Nines

- For every year of life take 1% from the head and add $\frac{1}{2}\%$ to each leg
- At 9 yrs old body proportions same as adult



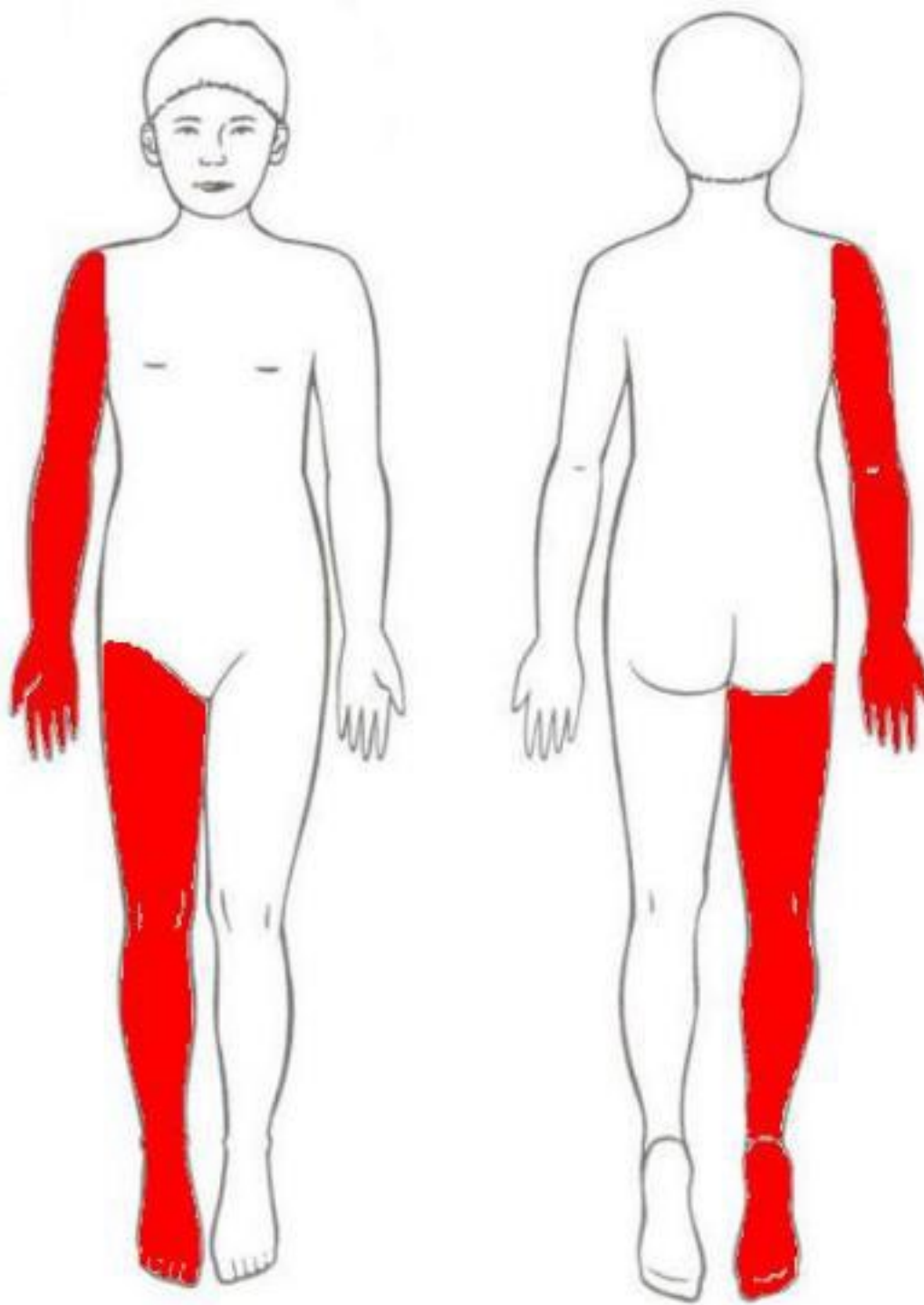
Palmar Method

- Palm and fingers of the patient = 1% TBSA
- Useful for small and scattered burns

Your turn - What TBSA?

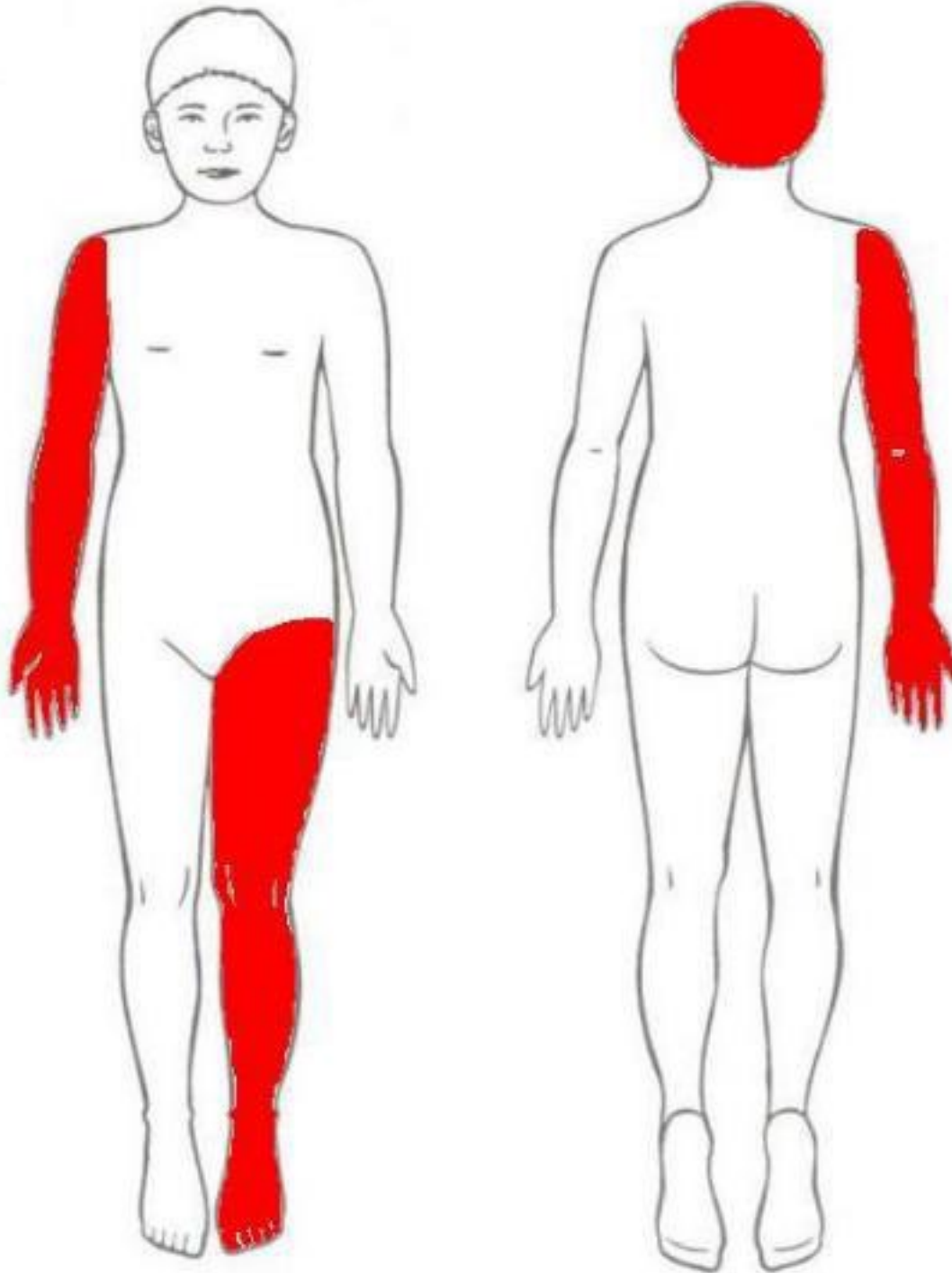


Adult



27% TBSA

Adult

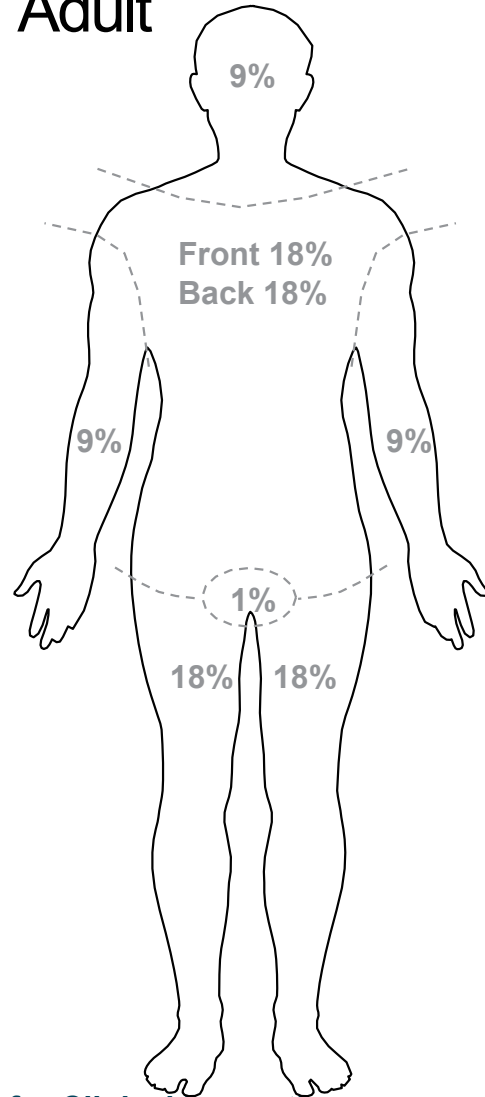


22.5% TBSA

What is the TBSA %?

8yr old

- Adult

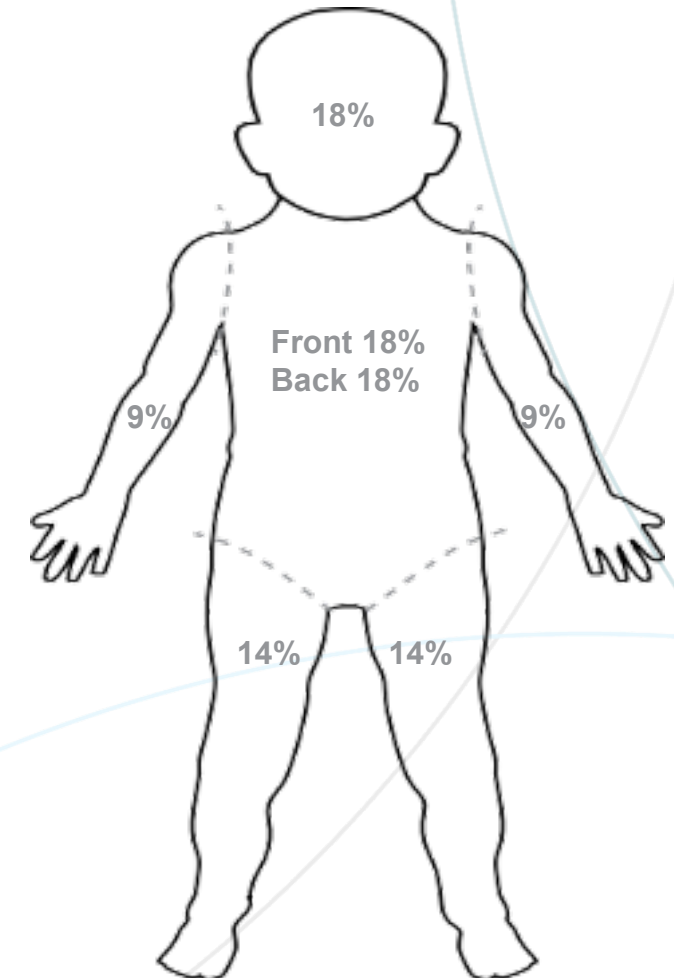


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13% TBSA

- Child



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