

# The forgotten public health challenge

Treating burns in the first response with better first aid

*Much of the world is still suffering from a crisis of burn injuries. Over three hundred thousand people die per year worldwide, with Africa having the highest proportion of deaths from burns in the world. Evidence from African countries like Tanzania highlights how first responders are failing to provide the right prehospital care for burn victims. Dr Anne Outwater and her colleagues at the Muhimbili University of Health and Allied Sciences explore the problem, looking for potential solutions to the “forgotten public health challenge”.*

If you live in a high-income country (HIC), the sight of a burn is a rare one. As tedious as it may feel to do the mandated health and safety quiz at work, these protocols and protective legislation have helped to curtail burn injuries. Thanks to smoke alarms, flame-retardant clothes, and lowering the temperature of boilers, you're unlikely to burn yourself.

Despite this, over 300,000 people still die from burn injuries every year. That's because what has become a relatively scarce occurrence in HICs is still commonplace in low (LICs) and middle-income countries (MICs), which share at least 90% of burn mortality worldwide.

The area with the highest numbers in the world is Africa – specifically, the 'WHO Africa Region' which is defined as most African countries, excluding Algeria, Egypt, Libya, Morocco, Tunisia, Sudan, and Western Sahara. People in the 'WHO Africa region' are estimated to be three times more likely to succumb to fatal burn injuries, compared to the rest of the world.

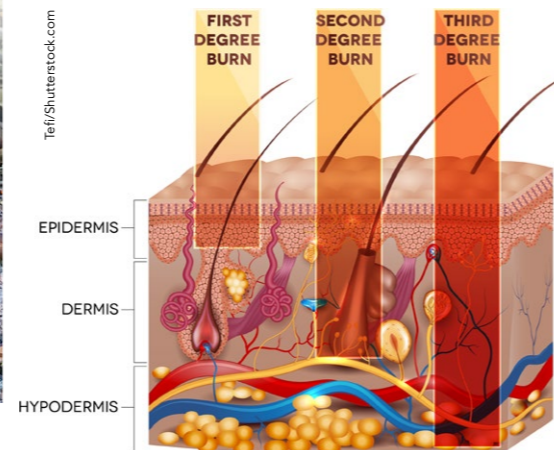
Long-term consequences for survivors differ. Patients can be maimed from burns and require amputation,

experience wound contractures, contract infections, or develop hypertrophic scars. And the stigma from such injuries can have psychological and social consequences. It isn't surprising that one research paper described burn injuries as “a forgotten public health challenge” (A.A. Hyder, 2004).

Appropriate first aid will help to prevent these issues from developing. Unfortunately, the treatment process is plagued with problems. The research of Dr Anne Outwater at the Muhimbili University of Health and Allied Science and her collaborators shows what goes wrong for burn patients seeking treatments.

## PROBLEMS WITH PREHOSPITAL TREATMENT

A significant problem is victims travelling to the hospital for treatment, particularly in rural areas. In the Kilimanjaro region of Tanzania, the percentage of burn victims that were transported to a hospital within 24 hours was only 41.5%. Problems also arise from local hospitals making referrals to another hospital with burn units that can administer appropriate treatment, which took an average of six days in South Africa.



This has repercussions for recovery. One study reported that children who received treatment for burn wounds at a hospital within 24 hours of the incident were hospitalised for an average of 12.8 days, a number which almost doubled (25.2 days) if the children arrived after 24 hours. A delayed visit to the hospital means an increased chance of septicaemia and hypertrophic scarring.

Another problem is pain management. Pain management isn't just important for the patient's current wellbeing (and fulfilling the Hippocratic oath); it's necessary to prevent mental health problems from developing, and can help accelerate the healing process. But pain management is rarely managed effectively, as most victims aren't prescribed painkillers in their treatment.

The biggest risk factors are being very young (no older than three) and being in a home environment, where burns can be a consequence of kitchen fires. Accordingly, the first response is rarely administered by a paramedic or even someone with first aid training. It's family, carers, or friends (with help from neighbours) that are the first responders.

It is universally agreed that continuously applying cool water – and nothing else – to the burn for at least 10 minutes is the most effective first aid treatment for burns. Studies have shown that it reduces pain and cell damage by preventing necrosis, improves scar formation, and stabilises the vasculature at the wound to continue blood flow. Unfortunately, it's not common that water is applied to the

wound. Once the burn has been cooled, the injury should be lightly covered to prevent dust getting into the wound. If the burn covers more than 10% of the body, or is on sensitive parts of the body such as hands, face, or private parts, the individual needs to seek medical care.

A review of first aid injury papers in nations throughout Africa by Dr Outwater found that water was used in less than 20% of burns, sometimes together with

Other cases looked outside of the kitchen and used antibiotics, mud, kerosene, and even engine oil to cover burns! You might be wondering where the instinct to cover a burn wound with kerosene would come from, but it's actually a relic of former first aid practice.

Back in the 1880s, first aid advice recommended that the wound be covered as quickly as possible, to prevent further damage from its

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other substances – and wasn't ever applied for the golden minimum of 10 minutes. In 27% of cases analysed, first responders didn't apply any substance to the wound.

First responders drew from a variety of substances. Over 20% of people had food items, typically eggs, honey, salt, or cooking oil applied to their burn wounds.



A majority of burns occur in kitchens.





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### SEARCHING FOR A CONSENSUS

This hints at a larger problem, as there are many debates around best first aid practice for burns. A hotly contested area is, surprisingly, around using cool water. While first aid organisations agree on using it as a first response, they disagree most notably on how long to apply cool water to the burn.

Hydrogels are another contested issue in the scientific literature. Hydrogels are a polymer chain that can absorb lots of water used in burn dressings to reduce the temperature of the wound and stop its development. However, there is no evidence showing they're effective when compared to cool water.

There's also very little agreement on how to cover burn wounds. Medical science recognises the need to lightly coat the burns to stop infections, but there isn't a consensus on what materials to use. The recommended materials have ranged from clean cloth or gauze to hydrogels

and makeshift materials like cling film and banana leaves.

The problem is exacerbated by professional healthcare workers who do not know, or fail to follow best practice. A study in Tanzania found that some



First responses to burn injuries are easy to implement.

health workers gave incorrect advice, recommending egg yolks or saltwater baths. This problem extends to HICs, as a study in the Royal Perth Hospital in Australia found that only 39% of people received appropriate first aid for their burns. The good news is that it doesn't have to be this way.

### A SIMPLE SOLUTION

In fact, many of the solutions are easy to implement. Most of the households in areas analysed in Dr Outwater's research have easy access to cool water, particularly as a majority of burns occur in kitchens. Additionally, there are nearly 20% of people that already use cool water, and simply need to learn that water should be applied for a longer period of time, and without applying anything else. The problem with first responses to burn injuries isn't accessibility to suitable treatments, it's a lack of awareness for such treatments.

Dr Outwater recommends a two-part communications campaign to help people remember this forgotten public health challenge. A nationwide mass media campaign is essential to reach regular citizens about preventing burns, and the best response treatment. It's essential that these are designed with their national audience in mind. If most houses in the country don't have a boiler, it's pointless to create a campaign on protecting children from boilers.

This should be complemented with an evaluation of school curriculums that train healthcare workers. It is important to ensure medical advice is updated to train healthcare workers with the latest good practice for a first response to burn injuries, rather than medical advice from the 1880s. Both solutions also have the advantage of being relatively cheap and simple to implement.

While this is primarily a response to problems in Tanzania – and Africa generally – this advice should be heeded around the world. Bad first response treatment for burns is a worldwide phenomenon, as research from Australia shows. It's possible to save lives and provide people with better care for burns with the simplest of reforms.



# Behind the Research

## Anne Outwater PhD, RN

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### Research Objectives

Dr Outwater's research shows that first responders to a burn injury in Tanzania often lack knowledge of appropriate first aid, even though appropriate equipment is usually at hand. She hopes to update healthcare curricular and set up worldwide mass communication campaigns.

### Detail

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#### Bio

Anne H. Outwater PhD, RN FAAN cared for burn patients at Kapiolani Children's Hospital in Honolulu, Hawaii

and Aghia Sophia in Athens, Greece. She received her PhD from Johns Hopkins University in 2008 and since then has been teaching at Muhimbili University of Health and Allied Sciences, in Dar es Salaam, Tanzania, School of Nursing.

#### Funding

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- Mary Justin-Temu, Minou Fuglesang

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### Personal Response

**Would having short, accessible first aid courses which awarded certificates like in high-income countries also be useful?**

“ I think short accessible first aid courses are a great idea, and if people pass a competency-based exam a certificate is warranted. Initial care for burns should be part of any first aid course. However, initial care or first aid for burn injuries is relatively simple. The message is: **1)** Burn injuries should as soon as possible be placed in cool water for 10-30 minutes. **2)** Nothing else should be applied. **3)** Afterwards, the burn injury should be lightly covered to keep dust off the wound. **4)** If it is more than 10% of the body, or on the hands, face or private parts, medical care should be accessed.

People need to catch the message and they will understand it. This simple message can go out with posters at small clinics, radio ads, social media, etc.

**While many people in low-income areas may have access to water, is it clean? And could dirty water cause issues, for example with infections?**

Everybody has access to water because it is a daily need. Water is usually stored near the kitchen where it is frequently used, and where most burns take place. The amount of water stored is more than is needed to cool almost any burn. It is possible that the water is not clean, but the first issue with a burn injury is to cool it. So even somewhat dirty water is better than no water. ”