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First aid for children's burns in the US and UK: An urgent call to establish and promote international standards

C. Verity Bennett [a,*], Sabine Maguire [a], Diane Nuttall [a], Daniel M. Lindberg [b], Steven Moulton [c,d], Lalit Bajaj [b], Alison M. Kemp [a], Stephen Mullen [a,e]

[a] Division of Population Medicine, School of Medicine, Cardiff University, Cardiff, CF14 4YS, United Kingdom
[b] Department of Emergency Medicine, Children's Hospital Colorado, United States
[c] Division of Paediatric Surgery, Children's Hospital Colorado, United States
[d] Department of Surgery, University of Colorado School of Medicine, United States
[e] Paediatric Emergency Department, Royal Belfast Hospital for Sick Children, Falls Road, Belfast, BT12 6BA, United Kingdom

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ABSTRACT

Introduction: Appropriate first aid can reduce the morbidity of burns, however, there are considerable variations between international first aid recommendations. We aim to identify, and compare first aid practices in children who present to Emergency Departments (ED) with a burn.

Methods: A prospective cross-sectional study of 500 children (0–16 completed years) presenting with a burn to a paediatric ED in the UK (Cardiff) and the USA (Denver, Colorado), during 2015–2017. The proportion of children who had received some form of first aid and the quality of first aid were compared between cities.

Results: Children attending hospital with a burn in Cardiff were 1.47 times more likely (RR 1.47; CI 1.36, 1.58), to have had some form of first aid than those in Denver. Denver patients were 4.7 time more likely to use a dressing and twice as likely to apply ointment/gel/aloe vera than the Cardiff cohort. First aid consistent with local recommendations was only administered to 26% (128/500) of children in Cardiff and 6% (31/500) in Denver. Potentially harmful first aid e.g. application of food, oil, toothpaste, shampoo or ice was applied to 5% of children in Cardiff and 10% in Denver.

Conclusion: A low number of children received optimal burns first aid, with potentially harmful methods applied in a considerable proportion of cases. There is an urgent need for internationally agreed, evidence-based burn first aid recommendations.

* *Corresponding author at*: Division of Population Medicine, School of Medicine, Cardiff University, Heath Park, 3rd Floor, Neuadd Meirionnydd, Cardiff, CF14 4YS, United Kingdom.
E-mail address: bennettcv@cardiff.ac.uk (C. V. Bennett).

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1. Introduction

The prevalence of paediatric burns is decreasing in developed countries, yet the sequelae associated with these injuries can be life altering. Physical disability as a consequence of scarring from serious burns impacts appearance, functional status, long-term morbidity, quality of life and employment [1,2]. Psychological sequelae, often unrelated to the severity of the burn, include anxiety, behavioural disorders and post-traumatic stress disorder [3]. Economically, burns carry a significant burden to society. Data from the United States of America (USA) in 2000 estimated the cost of caring for childhood burns was in excess of $211 million dollars [4]. In the United Kingdom (UK) in 2005 one study estimated the cost for managing burns of 2–4% TBSA in children was £1850 per case ($2543) [5], equivalent to at least £2700 ($3580) in 2018.

Appropriate first aid is an essential part of the immediate medical management of burns, aiming to reduce the severity of the injury. There is strong evidence that cooling the burn and then covering it with a non-adhesive dressing is effective. The cooling process has multiple potential benefits. It is associated with a reduction in mortality, pain relief and a reduction in cellular damage with improved wound healing [6–9]. The mechanism is attributed to the prevention of tissue necrosis in the zone of stasis [10,11]. Cooling is most effective when running water is applied promptly, to reduce the cellular damage, but can be effective if applied up to three hours after injury [12,13]. In covering the burn with a non-adhesive dressing, air is prevented from stimulating the exposed nerve fibres and minimising pain [14]. The dressing prevents colonisation of the wound and reduces the incidence of infection. Some advocate for a translucent dressing, which allows the burn wound to be inspected without the need to remove and replace the dressing [14,15]. Dressings that are classified as adhesive may cause further tissue damage when removed.

Bystander first aid is a crucial aspect in the emergency management of burns. The cellular damage and inflammatory cascade that ensues may occur within minutes of the injury. In these instances, it is imperative that either the injured party or a bystander administer the correct first aid, and hence improve outcomes for the child. When a child is injured it is assumed that the caregiver(s) will administer first aid.

There are discrepancies between recommendations for burns first aid as shown in Table 1, which describes cooling, covering and 'other' guidance. In the UK, the recommended cooling time ranges from 10 to 20 min before covering the burn with a non-adhesive dressing. In the US, recommended cooling times range from 5 to15 min before covering the burn with a non-adhesive dressing. Some US guidelines suggest antibiotic ointments, moisturisers or aloe vera lotion.

Variations in guidance coupled with circulating myths about the best remedies for burns cause confusion and may delay immediate burns first aid. Therefore, increasing public awareness and knowledge of correct burns first aid is a critical step in managing burns in children. Current literature highlights a deficiency in parental knowledge regarding first aid practice [28,29]. A 2013 UK study identified that only 32% of parents had adequate knowledge of burns first aid, while 43% had poor or no knowledge [30]. A 2016 study in Saudi Arabia stated that only 41% of parents treated burns with cool or cold water, with 97% having inappropriate or no knowledge of the duration recommended. Moreover, 32% of parents treated their children's burns with non-scientific remedies alone or in combination, including honey, egg white, toothpaste, white flour, tomato paste, yogurt, tea, sliced potato, butter, or ice [30]; however, many of these methods can be harmful [31].

Given the importance of appropriate and timely first aid, in the context of widely varying advice available to parents, we aim to identify and compare burn first aid practices in children who present to two different Emergency Departments (ED) with a burn injury, one in the UK and one in the USA.

2. Methods

This prospective cross-sectional study was conducted in two paediatric emergency departments: one in the UK (Cardiff) and the other in the USA (Denver, Colorado). Each hospital serves a mixed urban population, with moderate levels of deprivation. Data collection was carried out over a 30 month period, from May 2015 to October 2017.

Cases were ascertained prospectively from the Paediatric Emergency Department, University Hospital of Wales, Cardiff, Wales and the Paediatric Emergency Department, Children's Hospital Colorado in Denver.

These two sites represent urban areas in high income countries, with a broad demographic spread. Children's Hospital Colorado serves a population of 680,000 (extends to 3 million when surrounding suburbs are included) with 75,000 attendances at its ED annually. It is a regional paediatric burn centre that receives patients from seven states. University Hospital Wales serves an estimated adult and child population of 450,000, without an onsite burns unit, and a children's ED with an annual attendance of 32,000 children.

All children and young people (0 to <16 completed years) who attended with a burn (excluding house fires and fatalities) were eligible, and a proforma, (Burns and Scalds Assessment Template or BASAT) was completed for 500 participants at each site by the clinician or a research assistant. Denver research assistants enrolled patients between 7am and midnight, seven days/week, and physicians were encouraged to complete the BASAT for patients who presented outside of these hours. In Cardiff, the BASAT was completed by the clinician as part of routine practice. The BASAT is an evidence based proforma detailing demographics, developmental skills up to age three, clinical aspects of the burn, its circumstances and severity together with the timing and nature of first aid given [32]. Study data were collected and managed using REDCap (Research Electronic Data Capture) tools hosted at the University of Bristol and the University of Colorado [33].

2.1. *Categorisation of first aid*

For this analysis first aid was classified as anything *applied* to the burn by anyone other than a medical professional. We did not include removal of clothing or use of analgesics in our analysis.

Table 1 – First aid cooling and covering advice available from leading authorities in the United Kingdom (UK), United States of America (USA) and internationally. * indicates burns first aid advice considered to be optimal in that country.

First aid provider	Cooling	Covering	Additional recommendations	Year published (or updated) and website
UK				
BBA* [16]	Running water for 20 min	Plastic wrap (or where this is not available, a clean cloth or non-adherent dressing)	Burn gel wraps may be used to provide analgesia, but only after adequate cooling has occurred	2014
NHS choices [17]	Running water for 20 min	Plastic wrap or a clean plastic bag could also be used for burns on your hand		2015
Patient.co.uk [18]	Running water or cool compress for 20 min	Plastic wrap or a clean plastic bag as an alternative if no cling film available	Do not apply cream, oils, ointments	2015
St. John Ambulance [19]	Running water for at least 10 min or until the pain feels better	Plastic wrap or another clean, non-fluffy material, like a clean plastic bag	Do not use ice, creams or gels	Not stated
British Red Cross [20]	Cool the burn under cold running water for at least ten minutes	Plastic wrap or clean plastic bag		Not stated
USA				
American Burn Association* [21]	Running water for at least 5 min	A sterile gauze bandage or clean cloth	For small area burns use lotions that contains aloe vera. Do not use any butter, ointments or other home remedies on the burn	Not stated
American Red Cross [22]	Running water at least until pain is relieved	Cover loosely with sterile dressing	Do not use ice, ointment, or other dressings	2011
American College of Emergency Physicians. First aid manual [23]	Cold water for at least 10 min, or until pain is relieved	Plastic wrap	Antibiotic, such as bacitracin	2014
Mayo Clinic [24]	Running water for 10–15 min, or until pain eases, or apply a clean towel dampened with cool tap water	Bandage or a clean cloth.	Apply moisturiser or aloe vera lotion or gel	2018
International				
World Health Organisation – burns fact sheet [4]	No time stated	Clean cloth or sheet		2018
European resuscitation council [25]	Minimum of 10 min duration using water	Sterile dressing	There are no scientifically supported recommendations for the specific cooling temperature, the method of cooling (e.g. gel pads, cold packs or water) or the duration of cooling	2015
'Up-to-Date' e resource for health professionals and parents [26]	Until pain relief or maximum 5 min, or wet gauze	Gauze	Aloe vera gel or cream, or an antibiotic cream. Should not be applied for longer than approximately five minutes to avoid macerating the wound	2017
Royal Children's Hospital Melbourne, Australia [27]	20 min	Plastic wrap	Do NOT apply hydrogel burn products (e.g. Burnaid®) as a first aid measure UNLESS there is no access to a water source. Cold water compresses are less effective than running water to cool a burn wound and must be changed frequently.	Not stated

First aid was broken down into the following categories: cooling with water; 'covering' involved several techniques and was subcategorised into: plastic wrap (domestic sheet plastic used for covering food i.e. cling-film/Saran wrap); dressings (although many guidelines specify non-adhesive dressings, it was not possible to isolate these in our data so we included both non-adhesive and adhesive in one category); wet cloth (any wet cloth, tissues, clothing or compress); dry cloth (any dry fabric or tissue used to cover the burn, including clothing worn over the burn); aloe vera (any product containing aloe vera); ointment or gel (including antibiotic, antiseptic and moisturising creams, burn sprays, moisturisers and after sun lotion); ice (including frozen vegetables, cool packs and snow); food/oil/toiletries (including any food product, toothpaste, herbal or cooking oil); other (anything else put on the burn e.g. hot water, chemicals or alcohol).

The proportion of cases that had any first aid performed was calculated for each site. First aid was classified as consistent with national guidelines. For the UK, recommendations from the British Burn Association (BBA) were used and for the USA, guidance from the American Burn Association (ABA) were chosen (Table 1, labelled with an asterisk (*)).

Potentially harmful agents were identified from previous literature as those that could worsen the burn, result in increased pain, or increase the risk of harm (i.e. infection, systemic illness, scarring). For the purpose of our analysis, anything in the, 'food/oil/toothpaste', or 'other' category was considered potentially harmful.

2.2. *Statistical analysis*

The proportion of children attending hospitals in Cardiff and Denver with a burn, who received some form of first aid, were compared between and within the two cities using risk ratios (RR) and confidence intervals (CI). Data were analysed by age group, gender, depth of burn, TBSA, location and who was present with 95% Wilson confidence intervals. Quality of the first aid performed was also compared between cities.

2.3. *Ethical approval*

Ethical approval was gained in Cardiff along with approval from the Confidentiality Advisory Group (CAG) to allow collection of data without parental/carer consent. (MREC No. 13/WA/0003, 15/WA/0259 CAG- 1-06 (PR7)/2013,15/CAG/0203/2016). In Denver, ethics approval was granted from the Colorado Multi-Institutional Review Board, with waiver of informed consent.

3. Results

A total of 500 cases were ascertained at each site, representing 79% (500/633) and 68% (500/732) of childhood burn visits in Cardiff and Denver, respectively, during the period of the study.

Attendances at each site were similar in terms of gender and age (Table 2). Scalds were the most common burn type in both cities, and the proportion of these were similar; however, Cardiff had significantly more contact burns than Denver.

Table 2 – Comparison of children presenting to the Emergency Departments in Cardiff and Denver with a burn. Significant differences in proportions between the two sites are shown *(p < 0.05) and **(p < 0.01).

	Cardiff		Denver	
	n	%	n	%
Gender				
Girls	232	46.4	230	46.0
Boys	268	53.6	270	54.0
Age				
<5 years	329	65.8	322	64.4
5 to <11 years	98	19.6	122	24.4
11 to <16 years	73	14.6	54	10.8
Unknown	0	0.0	2	0.4
Type of burn				
Scald	237	47.4	254	50.8
*Contact	217	43.4	156	31.2
Sunburn	20	4.0	7	1.4
Chemical	12	2.4	8	1.6
Flame	5	1.0	48	9.6
Electrical	0	0.0	18	3.6
Explosion	5	1.0	0	0.0
Friction	3	0.6	6	1.2
Unknown	1	0.2	3	0.6
Supervision				
**Adult supervision	398	79.6	362	72.4
**No adult supervision	90	18.0	134	26.8
Unknown	12	2.4	4	0.8

Table 2 shows the differences in burn types between the two sites. Burn injuries presenting at Denver had occurred without adult supervision significantly more frequently than in Cardiff.

The frequency and nature of first aid attempted varied between cities (Figs. 1 and 2). Children attending hospital with a burn in Cardiff were 1.47 times more likely (RR 1.47; CI 1.36, 1.58), to have had some form of first aid than those in Denver.

The overall standard of first aid was poor in both cities, with only 26% (128/500) of children in Cardiff and 6% (31/500) of children in Denver, receiving first aid consistent with their local recommendations as indicated by * in Table 1 and Fig. 2. In Cardiff 5% (24/500) and in Denver 10% (51/500) of children received first aid that was potentially harmful (denoted by † in Fig. 2).

Of the children who had any first aid attempted, those from Denver were 4.7 times more likely to have a dressing (RR 4.71, CI 2.78, 7.96) and twice as likely to have had the burn covered with ointment/gel or aloe vera (RR 2.09, CI 1.48, 2.97) than those in Cardiff. This is consistent with the difference in recommendations between the two countries.

The wide range of items put on the burn, and varying combinations, are highlighted in Fig. 2. While food/oil/toiletries were used in a relatively small number of cases, a wide range of inappropriate products were applied. These included butter, honey, flour, yoghurt, oils, tomato, egg, pickle juice, mustard, toothpaste and shampoo often in combination. For example, one case used potato skin, salty water and toothpaste on the same burn. Further to the use of multiple foods was the use of multiple items, which in one case

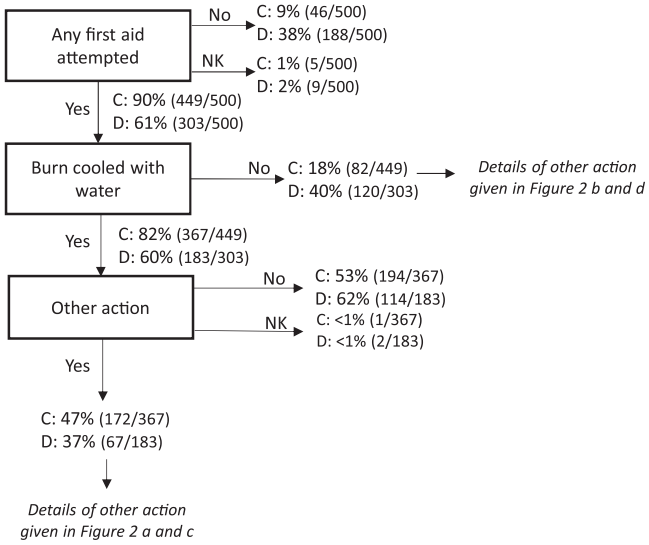

Fig. 1 – First aid flow chart. Breakdown of the type of first aid attempted for 500 Cardiff (C) and 500 Denver (D) cases attending the Emergency Department with a burn. Proportion given as %, and total number of children given in brackets. NK, not known. Varying denominators reflect missing data.

included a cold wet compress, hydrogen peroxide, alcohol and antibiotic cream.

Of the burns that had been cooled with water, 64% [(235/367, Cardiff)] and 57% [(104/183, Denver] had been cooled with running water, whereas 25% [(90/367, Cardiff] and 16% [(29/183, Denver)] had been cooled by immersion. In both cities the majority of cooling times were reported as 10 min or less (Table 3).

In Denver, the proportion of burns for which any first aid was given was not significantly different when analysed by age, gender (Fig. 3), size, depth or type of burn, nor who was present (Fig. 4). Results for a partial thickness vs full thickness burn (RR 1.52, CI 0.99, 2.35), and burns that occurred in a dwelling vs those that occurred outside (RR 1.5, CI 0.99, 2.14) were also not significant.

In Cardiff, there was no significant difference in the proportion of first aid given according to burn size (Fig. 4) or burn depth, although a greater proportion of first aid was given for erythema than a full thickness burn, which fell just outside of being significant (RR 1.20, CI 0.99, 1.46). Cardiff children were more likely to receive first aid for a burn that occurred indoors than outside (RR 1.28; CI 1.02, 1.61) and if there was a parent, rather than peer or sibling present (RR 1.22; CI 1.01, 1.47). They were also more likely to receive first aid for a scald (RR 2.86, CI 1.28, 6.37), contact (RR 2.72, CI 1.22, 6.07) or sunburn (RR 2.33, CI 1.00, 5.39) than for a chemical burn. Girls of all ages were more likely to have first aid than boys over 11 years of age in Cardiff (age <5 years RR 1.37, CI 1.08, 1.73; age 5 to <11 RR 1.30, CI 1.01, 1.67; age 11 to <16 RR 1.29, CI 1.00, 1.67).

4. Discussion

This study has shown that there is poor application of recommended first aid for burns in two cities in high income countries. While 90% in Cardiff and 61% in Denver attempted first aid, only 26% and 6% of caregivers followed their country's national recommendations. Even more worryingly, 5% in Cardiff and 10% in Denver administered a potentially harmful treatment. Thus, there is a clear knowledge gap around appropriate first aid, despite a willingness to apply it. These results suggest that caregivers wish to do something immediately to moderate the effects of the burn, but do not know what the optimal first aid is.

In Denver, there was no significant difference between those receiving first aid and those not for any of the variables assessed (i.e. age/gender/size/depth/burn type/dwelling/who present). For Cardiff, some variables were noted to be significant. Children with burns were statistically more likely to receive first aid if a parent was present, if the burn occurred inside a dwelling and if they had any burn other than a chemical burn. Boys aged 11–16 were statistically the least likely to receive first aid, while girls younger than five years were the most likely, in the Cardiff cohort. These results may help to inform future education strategies.

The reported percentages of first aid provided for burns in the literature varies, ranging from 41 to 86% [34]. The Royal Children's Hospital in Brisbane in 2005 noted 86.1% of children with a burn received first aid, 8.7% did not, with 5.2% unknown. While 80.2% used cold water, only 12.1% did so for the recommended 20 min. In 2014, a repeat of the study identified a similar use of cool water (79.8%), but an increase in those receiving it for the recommended duration (33.6%) [35]. These latter figures are similar to the Cardiff data in this study.

As the majority of burns occur in young children, who are dependant on an adult for first aid administration, it is perhaps unsurprising to note similar attempts at first aid in adult studies, varying from 25% to 72% of patients [36,37]. A 2010 U.S. study reported 72.7% of adults cooled their burn before presentation, with only 22.2% applying a dressing [37].

Non-adherence to first aid recommendations may reflect a willingness to administer treatment but a lack of knowledge of

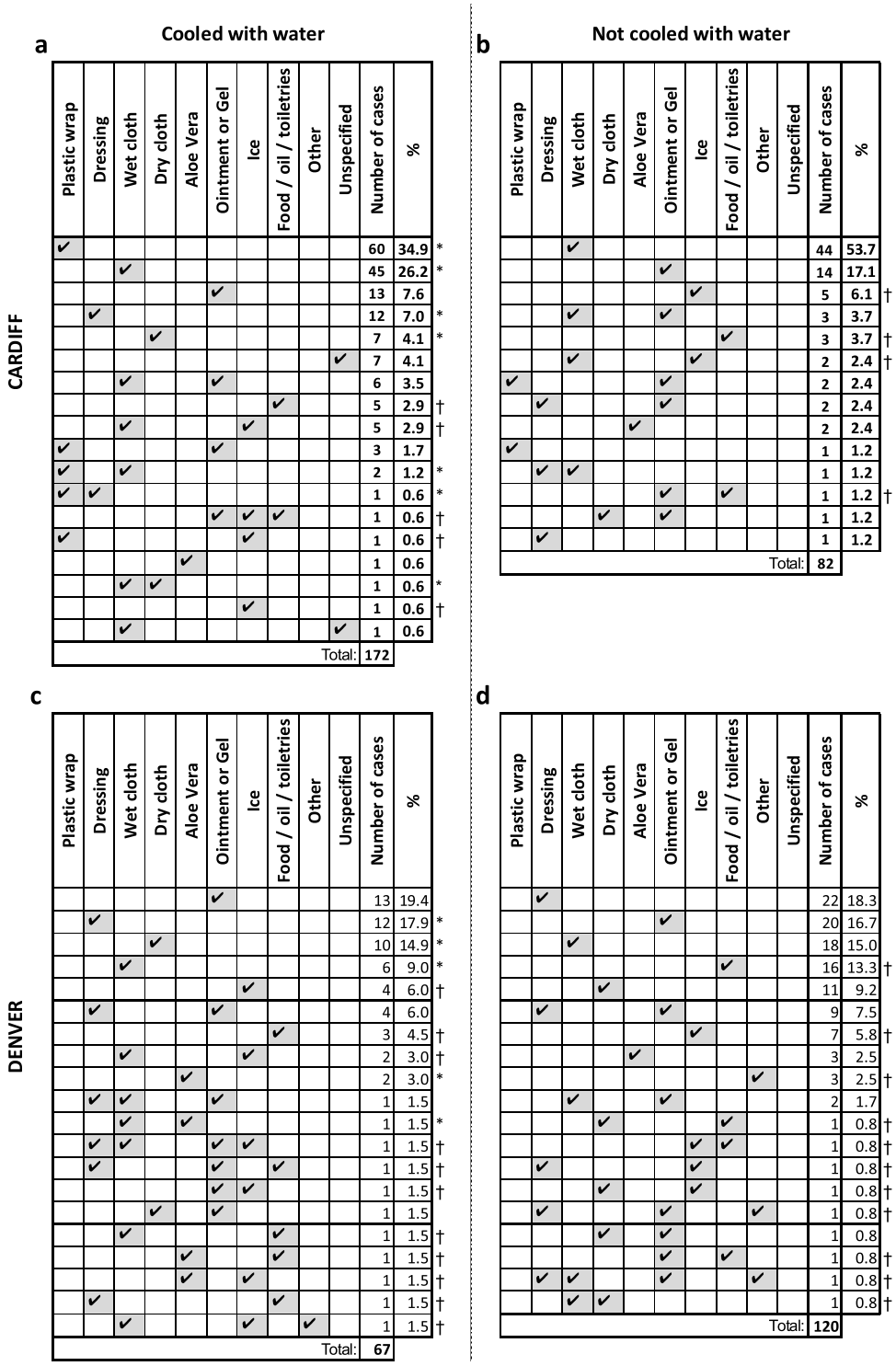

Fig. 2 – Summary of items put on the burn in Cardiff (a and b) and Denver (c and d) separated by whether the burn was cooled with water (a and c) or not (b and d). * denotes first aid in line with local first aid guidance. † denotes cases where something potentially harmful was used.

the correct sequence. This hypothesis is supported by studies assessing adult knowledge of burns first aid. A UK study noted 43% of parents had poor or no knowledge of burns first aid [38]. In terms of action, a further study noted 73% of parents would place the burn under cool water with only 35% cooling for an 'adequate' length of time [39]. An Australian study reported similar findings with 82% reporting that they would cool a burn with water, but only 9% for the recommended 20 min [40].

A lack of correct first aid knowledge may explain the use of potentially harmful traditional remedies, which we hypothesise are passed down from older generations or the wider community. If the recommended first aid is not taught

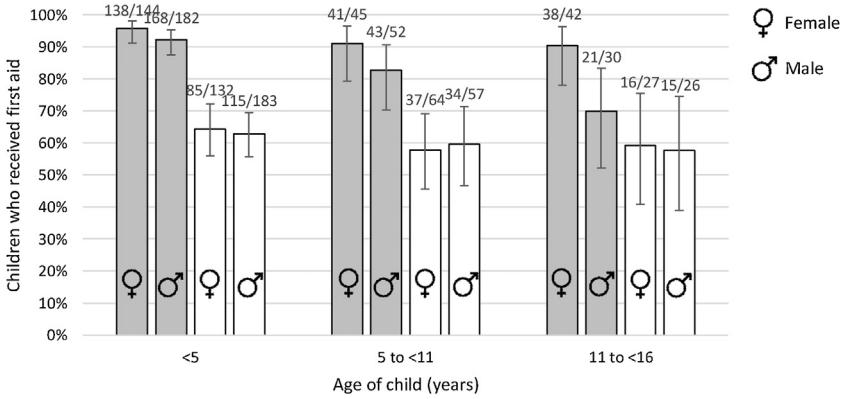

Fig. 3 – Proportion of children, by age and gender, presenting with a burn to an Emergency Department who had received some form of first aid. Children attending Emergency Departments in Cardiff, UK and Denver, USA represented by grey and white bars respectively.

effectively, then this may be the only 'solution' offered due to ignorance of the potential harm caused by these agents.

In the UK there is evidence-based guidance for the initial management of acute burn injuries from the BBA [16], yet there is still variation between other advisory bodies (Table 1). While the majority recommend cooling for 20 min, other agencies vary in the recommended duration of cooling—from 10 min duration or 'until the pain settles', offering an inconsistent message for first aiders. The US recommendation regarding duration of cooling varies widely, ranging from 5 to 15 min, depending on the agency. The US recommendations further advise the use of topical agents such as aloe vera and anti-bacterial ointments or creams. This difference is borne out in our results, where children in Denver were almost twice as likely to have had a cream/aloe vera applied than in Cardiff. There are discrepancies in the description of covering materials, ranging from plastic wrap to a dry dressing (clean cloth), to a sterile, non-adherent dressing or gauze. Whilst plastic wrap has the advantage of being non-stick, clean and transparent, such that the burn itself can be easily visualised, an inappropriate dry dressing has the potential to stick to the burn. Some parents used a wet cloth. Whilst this may have been chosen to maintain on-going cooling or non-adherence, there is the potential to introduce infection. Further clarification of the covering material is called for.

Looking at the wider international advisory bodies, inconsistencies still abound. The Australian guidelines adhere to 20-min cooling and covering with plastic wrap [27]. The World Health Organisation does not clearly state a cooling time and recommends covering the cooled burn with a clean cloth or sheet [4]. These recommendations may be aimed at low income nations, but with no evidence cited.

The first aid message that is issued by the advisory bodies varies, not only internationally but also within individual nations. The evidence base that supports some recommendations is inconsistent, lacking robust studies to validate their use [41,42]. There is an urgent need to address this short fall and to create a standardised evidence-based burns first aid guideline with international. This would ensure that a consistent message is provided for dissemination, promoting the use of the recommended first aid practices and simultaneously addressing the potential harm associated with some non-traditional methods. When developing these recommendations, we would recommend the stakeholders reflect on previous successful first aid campaigns. The Heimlich manoeuvre and cardio-pulmonary resuscitation have both proved successful, promoting a clear, simple and unified message [30,43]. A failure to act will result in continued detrimental first aid for burns, with the associated increase in morbidity that may accompany this.

How patients and caregivers access first aid information is a variable and may influence which recommendations are utilised [44]. Traditional methods of education have included word of mouth, manuals and courses to name a few. With the growing presence of digital healthcare information, however, caregivers have immediate access to multiple platforms to electronically access first aid advice [29]. Unfortunately, many health-related websites are not evidence based and may disseminate inappropriate advice [45]. Furthermore, advertising may adversely influence search results. For example, upon entering 'first aid advice USA' into Google (by S.Mu.), the first result was an advertisement for an anti-bacterial cream.

Other reasons for poor adherence to first aid guidance are possible. It is important to acknowledge that in some settings first aid resources may have been inaccessible. In Denver, 4% of the burns occurred at camp sites, areas potentially devoid of clean running water, sterile agents to cover the wound or alternate recommended treatments. In these instances, the lack of first aid performed would reflect inadequate resources and not necessarily poor knowledge. It is also possible that first

Table 3 – Estimated time for which childhood burns in Cardiff and Denver were cooled with water, as a percentage of total cases cooled with water.

Minutes cooled	Cardiff (n=367)	Denver (n=183)
≤5	77 (21%)	70 (38%)
6-10	85 (23%)	11 (6%)
11-15	33 (9%)	7 (4%)
16-20	32 (9%)	1 (1%)
>20	72 (20%)	5 (3%)
Missing	68 (19%)	89 (49%)

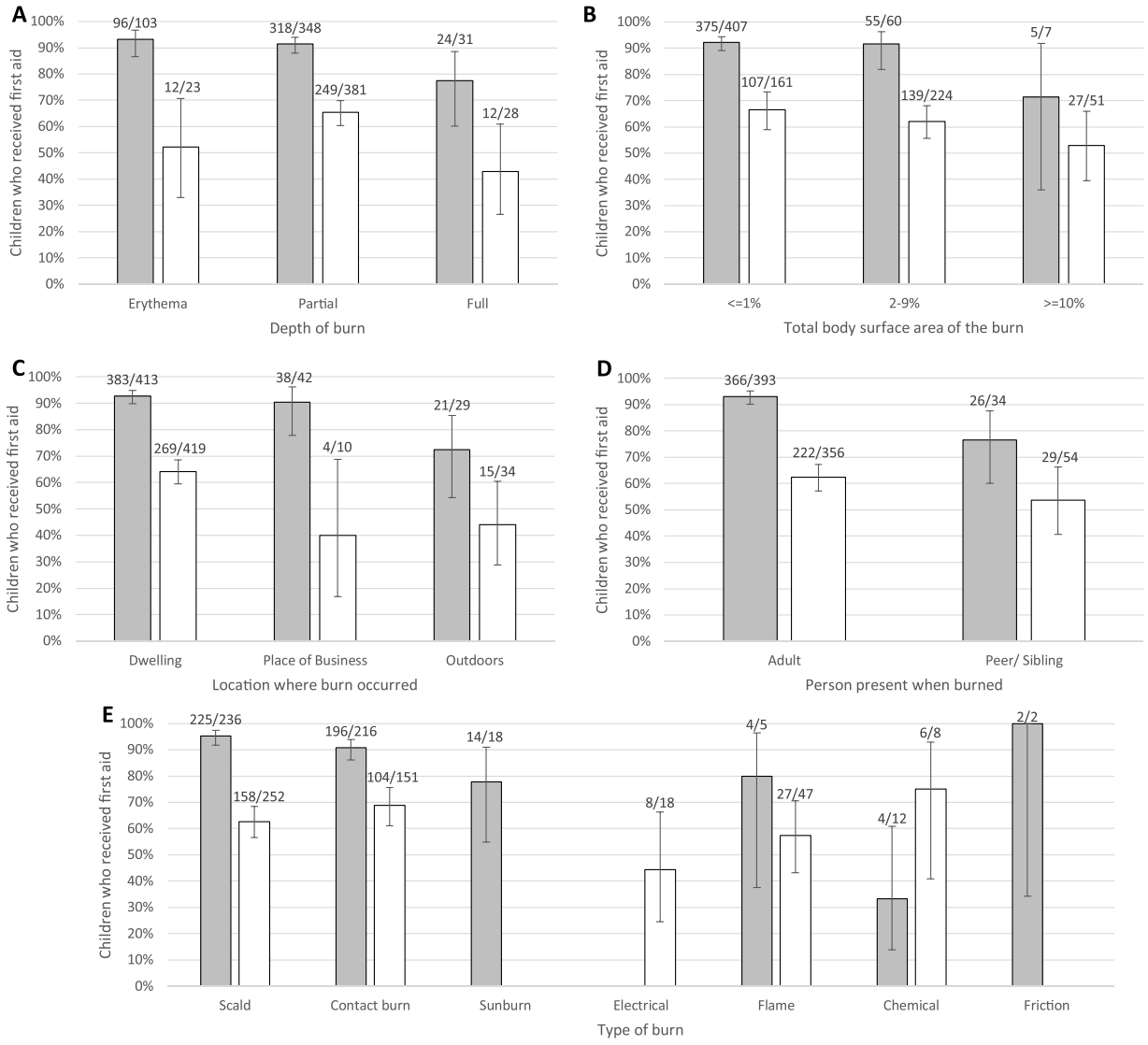

Fig. 4 – Proportion of children attending the Emergency Department with a burn in Cardiff and Denver, who received any first aid according to: depth of burn (A), total body surface area (B), location where burn occurred (C), person present (D) and type of burn (E). Children in Cardiff and Denver represented by grey and white bars respectively with Pearson confidence intervals. Number of children who received first aid/total number is indicated above bars.

aid may not have been performed due to an incorrect assessment of the injury by the patient or caregiver.

In Cardiff 18% (90/488) and Denver 27% (134/496) of burns occurred in the absence of adult supervision. In the event that an adult attended some time later, it is unclear if the general public are aware that first aid may be effective for up to three hours after burn.

Limitations to this work include the fact that it reflects those who attended paediatric emergency departments with a burn, thus may not be representative of all burns cases. This analysis considers data from two specific sites, Cardiff and Denver, and the results may not be generalisable outside these sites to the wider U.K. and U.S. populations. The centres differed in burns attendances. In Cardiff, patients presented for primary emergency care. In Denver, however, patients were often transferred for evaluation at a paediatric burn centre, potentially influencing the population. A strength of the study was the prospective data collection, utilising a standardised proforma, with each centre having a high completion rate.

5. Conclusions

While childhood burns remain extremely common, it is clear that the type and manner of burn first aid at the immediate location of the burn injury is sub-optimal across two cities in the UK and USA. With 90% in Cardiff, and 61% in Denver attempting first aid, but only 26% and 6% respectively actually delivering first aid consistent with national recommendations, parents and young people need far better information, consistently and easily provided, to improve this standard of care. There is an urgent need for the international Burns community to agree on a single evidence based First Aid

strategy for burns, which should be widely disseminated. We would recommend that all practitioners involved in the care of children, including schools, day-care, youth activities, and children themselves, should learn appropriate first aid information. This should be clearly displayed in such settings, and in food outlets serving hot beverages, as well as campsites and other leisure areas.

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Denver: Children's Hospital Colorado Emergency Department (L Bajaj) and Burns Unit (S Moulton).

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Conflict of interest

The authors declare that they have no conflict of interest.

Authors' contribution

C. Verity Bennett: Lead author, contributed to the conception and design of the study, drafting article, analysis and interpretation of data, and reviewed drafts.

Sabine Maguire: Contributing to the conception and design of the study, drafting article and reviewed final version.

Diane Nuttall: Contributed to the conception and design of the study, acquisition of data, analysis and interpretation of data, and reviewed drafts.

Daniel Lindberg: Contributed to the conception and design of the study, acquisition of data, drafting article and reviewed final version.

Steven Moulton: Contributed to analysis and interpretation of data, acquisition of data and reviewed drafts.

Lalit Bajaj: Contributed to the conception and design of the study, drafting article and reviewed final version.

Alison M. Kemp: Contributed to the conception and design of the study, drafting article and reviewed final version.

Stephen Mullen: Contributed to the conception and design of the study, drafting article and reviewed final version.

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