



## Characteristics and outcomes of patients who discharge against medical advice from Australian and New Zealand burns services

Marcel Chua <sup>a,b,\*</sup> , Lindsay Damkat-Thomas <sup>c</sup>, Belinda J. Gabbe <sup>a,d</sup> , Bronwyn Griffin <sup>e,f</sup> , Courtney Ryder <sup>g,h</sup> , Lincoln M. Tracy <sup>a</sup>

<sup>a</sup> School of Public Health and Preventive Medicine, Faculty of Medicine, Nursing and Health Sciences, Monash University, 553 St Kilda Road, Melbourne, Victoria 3004, Australia

<sup>b</sup> Department of Plastic and Reconstructive Surgery, Monash Health, 246 Clayton Road, Melbourne, Victoria 3168, Australia

<sup>c</sup> National Burn Service, Middlemore Hospital, 100 Hospital Road, Auckland 2025, New Zealand

<sup>d</sup> Population Data Science, Swansea University Medical School, Swansea University, Singleton Park, Swansea SA2, United Kingdom

<sup>e</sup> School of Nursing and Midwifery, Griffith University, 170 Kessels Road, Nathan, Queensland 4215, Australia

<sup>f</sup> Centre for Children's Burns and Trauma Research, Queensland Children's Hospital and Health Service, 62 Graham Street, South Brisbane, Queensland 4101, Australia

<sup>g</sup> Flinders Health and Medical Research Institute, College of Medicine and Public Health, Flinders University, Kaurna Yerta, Adelaide 5000, Australia

<sup>h</sup> School of Population Health, University of New South Wales, Gadigal, Sydney 2000, Australia



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### ABSTRACT

Burns patients with recorded discharges against medical advice (DAMA) face potential medical and financial consequences associated with future readmissions. This study aimed to investigate the characteristics and outcomes of patients with recorded DAMA from burns services in Australia and New Zealand. In an observational study using data from individuals aged  $\geq 16$  years captured by the Burns Registry of Australia and New Zealand with a burn-related admission between July 2009 and June 2022, 325 patients (1.4 %) had recorded DAMA. A greater proportion of patients with recorded DAMA were aged 30–44 years, of Australian Aboriginal and Torres Strait Islander origin, from outer regional Australia, had pre-existing mental health conditions, with substance use, and sustained their injury through suspected assault or abuse. Injuries in patients with recorded DAMA were more severe. Compared to patients without DAMA, a greater proportion of patients with DAMA were readmitted within 28 days of discharge (13.8 % versus 4.9 %), with failed discharge processes (45.5 %) and infection (18.2 %) being the most frequently recorded reasons. They required readmission to the intensive care unit (20 % versus 8.6 %) with longer lengths of stay. Outcome findings remained similar in a matched cohort analysis between those with and without recorded DAMA. These findings highlight the consequences of DAMA, necessitating primary measures to address modifiable, cultural, and social factors preemptively to prevent DAMA among disadvantaged individuals, and secondary measures to minimize the impact of DAMA (e.g., adequate pain and wound discharge management, follow-up care, community-based treatments, etc.).

### 1. Introduction

Discharge against medical advice (DAMA) is defined as a patient voluntarily leaving the hospital prior to a treating clinician recommending discharge, and accounts for approximately 1–2 % of all hospital admissions [1–3]. Some patients may choose to discharge prior to having fully healed or appropriately recovered, such that their treatment is incomplete. This can lead to increased readmission rates, financial costs, and morbidity and even mortality [1,3,4]. In burns patients, these

consequences could be substantial, where undertreatment is associated with wound contractions causing functional limitations, through to infection and eventually sepsis [5,6].

For healthcare providers, DAMA can pose ethical, legal, and financial challenges. Clinicians have reported ethical challenges in respecting a patient's autonomy versus exercising a duty of care. These challenges include the assessment of a patient's understanding of the potential risks associated with electing to DAMA, and the documentation of their decision, which does not completely mitigate their legal liabilities [1,7].

\* Corresponding author at: School of Public Health and Preventive Medicine, Faculty of Medicine, Nursing and Health Sciences, Monash University, 553 St Kilda Road, Melbourne, Victoria 3004, Australia.

E-mail address: [marcel.chua@monash.edu](mailto:marcel.chua@monash.edu) (M. Chua).

There are also additional resources and costs that health services are required to allocate for patients with recorded DAMA, as these patients have an increased chance of representing at different hospitals with a more exacerbated condition, requiring more complex and expensive treatments [4,8].

In trauma patients, a knowledge base exists surrounding predictive factors of DAMA, including male sex, younger age, particular ethnicities, mental health conditions (e.g., psychosis), history of illicit drug or alcohol misuse, history of previous DAMA, and minor injuries [2–4, 9–11]. However, there is limited knowledge surrounding factors associated with DAMA in burns patients, a unique type of trauma that may differ from other trauma subtypes. The limited evidence in burns focused on single centres, a narrow spectrum of population (e.g., un-housed population), or on a single predictor (e.g., costs) [8,12,13]. To comprehensively expand on this existing knowledge base, this study aimed to describe the frequency, characteristics, and outcomes of Australian and New Zealand burns patients for which DAMA was reported. A comprehensive understanding of DAMA for burns patients in Australia and New Zealand provides an opportunity to identify areas of support and prevention, particularly for overrepresented groups, suggesting opportunities to mitigate the risk or severity of burns complications.

## 2. Methods

### 2.1. Data source

A retrospective observational cohort study was conducted with data sourced from the Burns Registry of Australia and New Zealand (BRANZ), a bi-national clinical registry that collects data from 17 burn services across Australia and New Zealand. The inclusion criteria included patients aged  $\geq 16$  years old who met the BRANZ inclusion criteria (Supplementary Table 1) and had a recorded DAMA following admission to a specialist burn service between July 2009 and June 2022 [14]. Patients without a recorded DAMA episode (e.g., discharged to their home or usual residence) were included as a comparison group. Patients  $< 16$  years were excluded from the current study.

### 2.2. Data management

The frequency, demographic (e.g., age at the time of injury, gender, ethnicity, socioeconomic status and insurance status, comorbidities), injury characteristics (e.g., cause, place, activity, intent, severity) and outcomes (e.g., readmission frequency) of all included patients were extracted from the BRANZ. Readmission data, including surgical intervention(s) and/or intensive care unit (ICU) admission during the readmission episode, were also extracted.

Age at the time of injury was calculated using the date of birth from the date of injury. Patient gender was categorised as male or female/intersex/indeterminate. Ethnicity was described as Non-Indigenous Australian, Non-Indigenous New Zealander, Aboriginal and Torres Strait Islander, Māori and Other Indigenous (including South Sea Islander). Socioeconomic status was classified using the Index of Relative Social Advantage and Disadvantage (IRSAD), mapped from residential postcode (Australian patients only) [15]. Geographic remoteness where the injury occurred was classified using the Accessibility/Remoteness Index of Australia (ARIA), mapped from the injury event postcode (Australian patients only) [16]. The fund source was categorised as public (e.g., Medicare in Australia or the Accident Compensation Co-operation in New Zealand) or private (e.g., private health insurance, self-funded, workers compensation, motor vehicle third party personal claim, Department of Veterans Affairs, Department of Defence, etc.). Total time spent in ICU was calculated by subtracting ICU admission date and time from ICU discharge date and time. ICD-10-AM diagnosis codes were used to identify medical comorbidities, pre-existing mental health and substance use disorders. The primary

cause of injury was categorised as flame, scald, contact, or other specified causes. Place of injury was collapsed into home or other known place (including work-related and public areas). Intent of injury was categorised into unintentional, intentional self-harm, suspected assault or abuse, or other specified intent. The total body surface area (TBSA) was grouped as  $< 10\%$ ,  $10\text{--}19.9\%$ , or  $\geq 20\%$ . In readmitted patients, the readmission reason was described as wound infection, failed wound healing, skin graft or substitute, failed discharge process (e.g., inadequate analgesia or antibiotics on discharge, lack of wound care education or supplies or the lack of support services or follow-up organised), planned procedures/grafting, or others/inadequately described.

### 2.3. Statistical analyses

Demographic, injury characteristics, and clinical outcomes were described using descriptive statistics (i.e., frequency and percentages for categorical variables, medians and interquartile ranges or mean and standard deviation for continuous variables). A cross-comparison was undertaken across patients with and without recorded DAMA, using appropriate statistical tests depending on the number of patients who DAMA and the skewness of data (i.e., chi-square tests, independent samples *t*-tests, Mann-Whitney U tests). To account for the expected size difference between the two cohorts, a matched cohort analysis was performed where a cohort of patients was matched on age, gender, cause of injury, TBSA and intent of injury to a cohort of patients who have no recorded DAMA. In this matched cohort analysis, the outcomes of readmission were examined. All statistical analyses were performed using the software Stata version 17.0 MP-Parallel edition (Statacorp, College Station, Texas, USA). A *p*-value of  $< 0.05$  was considered statistically significant.

### 2.4. Ethics approval

Ethics approval for this study was obtained from the Monash University Human Research Ethics Committee (project ID 40225). The Monash University Indigenous Ethics and Integrity Office and the Indigenous Research Team were consulted to achieve compliance with the Australian Institute of Aboriginal and Torres Strait Islander Studies Code of Ethics.

## 3. Results

Out of 22,526 patients included in this study during the study period, 325 (1.4 %) had recorded DAMA.

### 3.1. Demographic and injury characteristics

The demographic and injury characteristics of the DAMA group compared to the non-DAMA group are presented in Table 1. Compared to the non-DAMA group, a greater proportion of the DAMA group were aged 30–44 years old, identified as Aboriginal and Torres Strait Islander, sustained their injuries in outer regional Australia, were in the most socioeconomic disadvantaged percentiles, were funded by public sources or agreements (e.g., Medicare), and were reported to have a pre-existing mental health, drug or alcohol misuse disorder.

Compared to the non-DAMA group, a greater proportion of the DAMA group sustained flame or contact burns, sustained the injury through intentional self-harm or suspected assault or abuse, had injuries affecting  $> 10\%$  TBSA, and sustained an inhalation injury.

### 3.2. Outcomes

The outcomes of the DAMA group compared to the non-DAMA group are presented in Table 2. Compared to the non-DAMA group, a greater proportion of the DAMA group were readmitted within 28 days of discharge, generally from a wound infection or failed discharge process.

**Table 1**

Demographics and characteristics of DAMA cases compared to Non-DAMA cases.

	DAMA (N = 325)	Non-DAMA (N = 22,201)	p-value
Age			< 0.001
16–29 Y	105 (32.3 %)	7399 (33.3 %)	
30–44 Y	133 (40.9 %)	6153 (27.7 %)	
45–59 Y	68 (20.9 %)	5052 (22.8 %)	
≥ 60 Y	19 (5.8 %)	3597 (16.2 %)	
Gender			0.11
Male	243 (74.8 %)	15,707 (70.7 %)	
Female/Intersex/Indeterminate	82 (25.2 %)	6494 (29.3 %)	
Ethnicity <sup>a</sup>			< 0.001
Non-Indigenous Australian	177 (67.0 %)	12,802 (80.0 %)	
Non-Indigenous New Zealander	16 (6.1 %)	1574 (9.8 %)	
Aboriginal and Torres Strait Islander	55 (20.8 %)	677 (4.2 %)	
Maori and Other Indigenous (including South Sea Islander)	16 (6.1 %)	956 (6.0 %)	
Remoteness <sup>b</sup>			0.011
Major cities of Australia	132 (53.2 %)	9614 (57.0 %)	
Inner regional Australia	46 (18.5 %)	3894 (23.1 %)	
Outer regional Australia	51 (20.6 %)	2509 (14.9 %)	
Remote or very remote Australia	19 (7.7 %)	864 (5.1 %)	
IRSAD quintile <sup>c</sup>			0.045
1 (most disadvantaged)	70 (25.4 %)	3564 (18.9 %)	
2	47 (17.0 %)	3622 (19.2 %)	
3	60 (21.7 %)	3969 (21.1 %)	
4	51 (18.5 %)	3470 (18.4 %)	
5 (most advantaged)	48 (17.4 %)	4220 (22.4 %)	
Fund source <sup>d</sup>			< 0.001
Public	302 (94.4 %)	17,371 (79.6 %)	
Private or other forms of compensation	18 (5.6 %)	4446 (20.4 %)	
Pre-existing mental health, drug or alcohol misuse disorder <sup>e</sup>	77 (33.9 %)	2341 (13.6 %)	< 0.001
Primary cause of injury <sup>f</sup>			0.022
Flame	144 (44.9 %)	9039 (40.9 %)	
Scald	69 (21.5 %)	6361 (28.8 %)	
Contact	62 (19.3 %)	3479 (15.7 %)	
Other specified cause	46 (14.3 %)	3246 (14.7 %)	
Place of injury <sup>g</sup>			0.21
Home	177 (60.2 %)	11,949 (56.6 %)	
Other places including work and public area	117 (39.8 %)	9177 (43.4 %)	
Intent of injury <sup>h</sup>			< 0.001
Unintentional	258 (80.9 %)	20,991 (95.0 %)	
Intentional self-harm	18 (5.6 %)	587 (2.7 %)	
Suspected assault or abuse	34 (10.7 %)	310 (1.4 %)	
Other specified intent	9 (2.8 %)	218 (1.0 %)	
Maximal depth recorded <sup>i</sup>			0.19
Superficial dermal	42 (15.0 %)	2784 (14.1 %)	
Mid-dermal	73 (26.1 %)	5581 (28.3 %)	
Deep dermal	70 (25.0 %)	5714 (28.9 %)	
Full thickness	95 (33.9 %)	5669 (28.7 %)	
TBSA burned <sup>j</sup>			0.026
< 10 %	250 (79.6 %)	18,245 (84.7 %)	
10–19.9 %	42 (13.4 %)	2343 (10.9 %)	
≥ 20 %	22 (7.0 %)	956 (4.4 %)	
Inhalation injury <sup>k</sup>	37 (11.5 %)	836 (3.8 %)	< 0.001

Data presented as frequency (percentage).

Data missing for <sup>a</sup>6253 cases, <sup>b</sup>5397 cases, <sup>c</sup>3405 cases, <sup>d</sup>389 cases, <sup>e</sup>5073 cases, <sup>f</sup>80 cases, <sup>g</sup>1106 cases, <sup>h</sup>101 cases, <sup>i</sup>2498 cases, <sup>j</sup>668 cases, and <sup>k</sup>73 cases.

DAMA = discharge against medical advice, NZ = New Zealand; IRSAD = Index of Relative Socioeconomic Advantage and Disadvantage; TBSA = Total Body Surface Area.

**Table 2**

Outcomes of DAMA cases compared to Non-DAMA cases.

	DAMA (N = 325)	Non-DAMA (N = 22,201)	p-value
Readmitted within 28 days of discharge			< 0.001
No	280 (86.2 %)	21,111 (95.1 %)	
Yes	45 (13.8 %)	1090 (4.9 %)	
Readmission reason <sup>a</sup>			< 0.001
Wound infection	8 (18.2 %)	150 (14.1 %)	
Failed wound healing, skin graft or substitute	< 5	423 (39.7 %)	
Failed discharge process	20 (45.5 %)	65 (6.1 %)	
Planned procedures/grafting	< 5	138 (13.0 %)	
Others/Inadequately described	11 (25.0 %)	289 (27.1 %)	
In-theatre management during readmission <sup>b</sup>	32 (71.1 %)	728 (67.2 %)	0.59
ICU admission during readmission <sup>c</sup>	9 (20.0 %)	93 (8.6 %)	0.009
ICU LOS (hours), median (IQR) <sup>d</sup>	87.9 (45.9, 188.1)	49.5 (26.3, 118.0)	< 0.001
Hospital LOS (days), median (IQR)	4.9 (2.1, 8.9)	4.1 (1.7, 8.9)	0.026

Data presented as frequency (percentage) unless otherwise specified.

Data missing for <sup>a</sup>26 cases, <sup>b</sup>7 cases, <sup>c</sup>3 cases, and <sup>d</sup>1 cases.

DAMA = discharge against medical advice; ICU = Intensive Care Unit; IQR = interquartile range; LOS = Length of Stay.

A greater proportion of DAMA patients also required an ICU admission during the readmission episode. DAMA patients had a longer median ICU and total hospital LOS compared to non-DAMA patients. There was no statistical difference regarding the proportion of patients requiring in-theatre management during the readmission episode.

### 3.3. Matched analyses of patients who had DAMA compared to patients who did not DAMA

The matched analyses of outcomes are presented in Table 3. After cohort matching between patients with recorded DAMA compared to those without DAMA, a greater proportion of the DAMA group was readmitted within 28 days of discharge. Wound infections or a failed discharge process were the most common reasons for readmissions in the current cohort. However, the matched analyses did not show a statistical difference regarding the proportion of patients requiring ICU

**Table 3**

Matched analyses of outcomes of DAMA cases compared to Non-DAMA cases.

	DAMA (N = 280)	Non-DAMA (N = 280)	p-value
Readmitted within 28 days of discharge			0.003
No	241 (86.1 %)	262 (93.6 %)	
Yes	39 (13.9 %)	18 (6.4 %)	
Readmission reason <sup>a</sup>			< 0.001
Wound infection	7 (18.4 %)	< 5	
Failed wound healing, skin graft or substitute	< 5	10 (58.8 %)	
Failed discharge process	18 (47.4 %)	< 5	
Planned procedures/grafting	< 5	< 5	
Others/Inadequately described	9 (23.7 %)	< 5	
In-theatre management during readmission <sup>b</sup>			0.40
No	11 (28.2 %)	< 5	
Yes	28 (71.8 %)	14 (82.4 %)	
ICU admission during readmission <sup>c</sup>			0.41
No	34 (87.2 %)	17 (94.4 %)	
Yes	< 5	< 5	

Data presented as frequency (percentage) unless otherwise specified.

Data missing for <sup>a</sup>505 cases, <sup>b</sup>504 cases, and <sup>c</sup>503 cases.

DAMA = discharge against medical advice; ICU = Intensive Care Unit.

admission during their readmission episode.

#### 4. Discussion

Consistent with previous studies with medical, paediatric, and trauma patients, this study found a small proportion (1.4 %) of patients had reported DAMA [1,2,4,17]. This study also suggests that patients who have reported DAMA, compared to those without, have different demographic and injury characteristics and outcome profiles, which should be considered in targeted DAMA prevention or support strategies. Additionally, findings of outcomes, particularly the reasons for readmission, could suggest secondary prevention strategies to reduce the risk or severity of complications from burns injury after reported DAMA.

Adults aged 30 – 44 years made up the greatest proportion of reported DAMA for burn injuries, which was similar to findings from Powell et al., in the United States, who reported that patients of 30 – 39 years made up 40.5 % of reported DAMA [12]. This is further supported by studies across medical and other trauma studies, which on average reported that DAMA tend to be recorded in patients younger than 45 years of age [1,11,17–19]. Similar to other studies in burns and trauma, male sex was most commonly associated with reported DAMA cases [4, 12,13,17].

We also found that a greater proportion of First Nations patients, Aboriginal and Torres Strait Islander, Māori, Other Indigenous, had reported DAMA for their burn injuries. These findings were consistent with national reporting in Australia, which indicates up to 5 % of Aboriginal and Torres Strait Islander patients have reported DAMA [2, 20]. These results indicate the systemic and ongoing inequities First Nations patients face in being able to access culturally safe health services and care [19]. These findings support the need to reduce DAMA events in burn injuries for First Nations patients, which requires cultural capability of clinical staff in burns units, along with a representative workforce, to create meaningful change and ensure that First Nations patients and families are part of decision-making processes [19].

A higher level of socioeconomic disadvantage, as suggested by the IRSAD, was associated with increased rates of DAMA [15]. This was similarly reported in other studies, particularly in individuals sleeping rough [1,13,17,18,21]. The outcomes in this study also support other studies surrounding DAMA regarding healthcare funding, with DAMA cases more likely to be reported in public funding facilities [3,11,17].

Another finding in this study was the higher proportion of patients with pre-existing conditions, such as mental health or substance use, in those with recorded DAMA. Multiple studies have presented strong evidence of the relationship between substance use and DAMA cases, including a large-scale systematic review suggesting substance use through illicit drugs as a significant predictor of DAMA [9–11,17,22,23]. In the context of excess alcohol consumption, Marcoux et al. reported a prevalence of 33 % in patients with recorded DAMA after a traumatic brain injury [10]. This is supported by Cho et al., Menendez et al., and Jasperse et al., who reported at least a two-fold increase in the odds of DAMA among alcohol misusers compared to non-misusers, in the orthopaedic and general trauma populations [9,11,17]. It was speculated that addiction was the likely driver of DAMA, as remaining inpatient requires abstinence from the misused substance [24]. These findings suggest the need for tailored support programs for known substance users to treat their substance withdrawal, in mitigating the risk of DAMA.

In contrast to some trauma studies, which found no significant difference in infection rates between their DAMA and non-DAMA groups, this study found an elevated risk of infection from burn injuries [4,17]. This highlights the elevated risk of infection from burn injuries, particularly if they are caused through contact or flame, and those with high TBSA. The elevated risk of infection in under-treated burn injuries would not be unexpected, as explained by pathophysiological states such as the loss of the protective skin barrier and impaired

immunological function [5,6]. This risk could also be potentiated by a failed discharge process, another significant reason for readmission. A failed discharge process, which is likely due to a lack of access to adequate wound care supplies, education, community support services or follow-up, suggested that burn injuries would be left potentially to worsen in their natural course [5,6]. This outcome had been similarly reported by Powell et al. where patients with recorded DAMA did not receive wound care supplies on discharge, and as such had a higher rate of emergency department presentation compared to those who received wound care supplies (72.2 % versus 47.4 %) [12].

These outcomes suggest secondary prevention strategies should target reducing the rate and severity of burns complications in the discharge process. Prior work has suggested clinicians often fail to offer adequate follow-up on DAMA, highlighting the clinicians' role in mitigating the risk of failed discharge processes [25,26]. With this in mind, the discharge process should begin early in a patient's presentation with early identification of the likelihood to DAMA [25]. This allows the opportunity for the organisation of medications including analgesia and antibiotics, wound care supplies, education, community support services (e.g., outreach wound care clinicians) and follow-up plans (e.g., appointments in a wound clinic, specialist clinic, or with general practitioner) before a patient leaves the hospital. Various safe netting measures may be employed, including providing telehealth for ongoing reviews, education, and emergency plans in case of a deterioration [27].

The limitations associated with this study must be considered. BRANZ data collection relies on the quality of the details entered into the medical record by the healthcare professionals who treat patients. Consequently, the quality of 'free-text' data (e.g., other readmission reasons) can vary between patients as a result of incomplete record keeping, which can result in missing data. Additionally, the BRANZ included data from specialist burns services in Australia and New Zealand, which might not have been reported for the same amount of time, and burn injuries presented to a non-burn service hospital, especially those in regional areas, would not have been recorded. Consequently, results from this study would likely demonstrate an underrepresentation of certain populations (e.g., First Nations). Another limitation would be that the evaluation of socioeconomic status, as mapped from residential postcode, may not be a true indication for individual patients. Finally, the demographic findings of this study, which focused on Australian and New Zealand data, might not relate internationally.

#### 5. Conclusion

The findings of disparities in the rates of recorded DAMA between populations of various ethnicities, socioeconomic statuses, and a history of pre-existing mental health, drug, or alcohol misuse disorders underscore a public health concern warranting primary prevention strategies. Secondary prevention strategies, including early detection of the risk of DAMA and intervening with early organisation of medication, wound care supplies, education, community support services and follow-up plans, could minimise the rate and severity of complications. Further qualitative studies investigating reasons to DAMA in patients who sustained self-harm or assault injuries would be beneficial in aiming to reduce DAMA occurrences in these population groups that present another public health concern.

#### Author contributions

**Marcel Chua:** Conceptualization, Methodology, Formal Analysis, Investigation, Data Curation, Writing – Original Draft. **Lindsay Damkat-Thomas:** Conceptualization, Writing – Review & Editing. **Belinda J. Gabbe:** Conceptualization, Resources, Writing – Review & Editing. **Bronwyn Griffin:** Conceptualization, Writing – Review & Editing. **Courtney Ryder:** Writing – Review & Editing **Lincoln M. Tracy:** Conceptualization, Methodology, Validation, Investigation, Resources, Data Curation, Writing – Original Draft, Supervision, Project

Administration.

## Ethics approval

Ethics approval for this study was obtained from the Monash University Human Research Ethics Committee (project ID 40225).

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The findings of this study were presented at the Australian and New Zealand Burn Association Annual Scientific Meeting 2024.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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## Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.burns.2026.107850](https://doi.org/10.1016/j.burns.2026.107850).

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