Final Report of the Eighth National Burns Annual Mortality Audit (2022)
United Kingdom and Republic of Ireland
Held Monday, 25th April 2022

In April 2022, the 8th annual specialised burns audit meeting was held, and almost all specialised burn services from across the UK and Ireland participated. This document sets out the background and context to the audit meeting, provides a short synopsis of the event and makes proposals for future national audit meetings.

1 Introduction

1.1 The British Burn Association National Standards for Burn Care requires all burn services and networks to undertake an annual, Morbidity and Mortality audit. This first national audit for burn services in England and Wales, took place in 2015, and since 2016, an invitation to participate has been extended to all services in the United Kingdom and Republic of Ireland.

1.2 The purpose of the audit is to add an additional layer of governance and scrutiny to the existing burn service & network audit function, and to support services and networks in sharing experiences and good practice, with the aim of improving patient outcomes and quality of care.

1.3 The April 2022 Audit meeting covers the inclusive calendar year, January to December 2021 and was hosted by the Midlands Burn Care Network, held on Microsoft Teams as a web event.

Dr. Marc Jeschke, Chair in Burn Research, Ross Tilley Burn Centre, Toronto, chaired the meeting, and over 150 senior burns clinicians attended, representing burn services in England, Wales, Scotland and Ireland.

2 Methodology and Process

2.1 This 2022 audit has continued the established process of selecting cases. Since 2016, it has been agreed that for services in England and Wales, the mortality audit cases would be chosen at each of the Burns Operational Delivery Network (ODN) audit meetings. Each ODN holds an annual mortality audit and *all* deaths are presented. It was agreed that these local ODN meetings were an appropriate way of identifying cases that were “outliers” or were unusual in some other way. It was agreed that the Burn Injury Database (iBID) would be utilised to help “validate" the cases that services presented.

It has been agreed that all Serious Untoward Incidents (involving the care of adults or children) and all paediatric deaths will be presented.

Services in Scotland, Northern Ireland and Ireland were invited to identify cases in a similar way, although it was recognised that iBID was not available to them to validate their cases.

2.2 At the April 2022 meeting, services presented their cases using a template originally developed by the burn centre at Morriston Hospital, Swansea. This included:

- An overview summary of all new referrals in each burn service (in-patients and out-patients), for adults and children and categorised by the size of the burn injury(%TBSA).
- A summary of all paediatric and adult resus / ventilated cases.
- A summary of all serious incidents investigated under the NHS Serious Incident Framework.
- A summary analysis of all deaths, providing high-level details of all burn mortalities in 2021, including demographic and clinical information and the Modified Baux score.
- A presentation time-line for the cases identified as outliers, showing the key events and interventions during the patient episode.

2.4 ***As is the case for all of the network and national M&M Audit meetings, there are no formal or published written notes of the meeting. This is because the audit discussions relate to confidential patient information.***

3 Chair's Report

3.1 It was an honour for me to participate as the chair of your 8th National Burn Annual Mortality Audit. I absolutely applaud leadership and the staff of all burn centres across United Kingdom and Ireland for their incredible dedication, the case presentation, the diligence, the thoughtfulness, and the discussions. I do envy the system where you have discussions about complex patients at a national level, which is fantastic. I think this initiative is absolutely phenomenal. I believe this will really help improve the care of burn patients across the continuum.

There were 26 cases presented and there were various signals that I believe may offer some room for improvement.

Particularly given the fact that in last year's report by Dr. Chung, there were issues about transfer and communication and outreach amongst centres. There was also measures for fluid resuscitation to be added, as well as addition to resuscitation matrices to the registry. I think that the fluid resuscitation quality measures and matrices have been added and are beneficial. I think that transfer issues and communication issues still have room for improvement currently.

3.2 First the signals that I saw are around transfer. The lack of capacity, and lack of burn beds, leads to challenge in transfer sometimes, and delay of transfer of significantly burned patients. I also saw the delay result in hypothermia with numerous consequences such as bleeding, difficult ventilation, and critically ill patients that are very difficult to control. I think that the communication issues persisted, that there are still issues around communication between different burn centres, and I think there should be standardized transfer protocols or guidelines how patients can be transferred, and when to transfer. Communication needs to occur.

3.3 Second, I truly believe there is room for improvement to improve the pre-hospital care via protocols. I think the implementation of nationally based pre-hospital care protocols, such as how to keep patients warm, what lines to place, when to resuscitate, when to secure tubes, and when to do escharotomies, will be of great benefit to the pre-hospital care leading then ultimately to transfers. I do think that this is an essential step in improving the subsequent admission and care of these patients.

3.4 Thirdly, I think that it would be a suggestion on my part if pictures of burn patients or injured patients could be transferred prior to sending. I think this would give the receiving end a very good estimation of the burn size and burn depth, and that would also open the door for communication leading to an improved transfer protocol. I also believe that these images could be added to the national review to give some good idea how deeply and severely the burns were. If images are not available I would suggest to add to the review process a copy of the burn diagram to have the burn size as well as burn location clearly delineated.

3.5 Regarding hypothermia, I think a strong adverse indicator for many cases were hypothermic episodes. I believe that should be attempted to be avoided, as it is very challenging to control critically ill patients once they are profoundly hypothermic. Again pre-hospital care protocols would improve this aspect which ultimately in my mind will improve subsequent outcomes such as infection and sepsis.

3.6 The last signal that was very strong, was concerns around elderly care. The increased admission of elderly patients, with the lack of clear protocols and guidelines, represents a challenge not only in the UK but globally. Regarding elderly care, when to treat and when not to treat, at what points to palliate and when not to palliate, when to go to the OR, what to feed to pre-hab, or not to pre-hab, are key questions that need to be answered.

I think that the UK network has an ideal platform to investigate and to determine elderly care protocols in terms of monitoring and capturing the data. The signal was very clear that the UK has very similar issues as other countries, with an increasing elderly population, that requires specific treatment plans, but at this time, none are very much available. Therefore I would challenge the national burn initiative to develop protocols and monitor specific aspects, not only frailty but also pre-existing conditions as well as various interventions. I think this is ultimately very essential and important to improve outcomes of these patients.

3.7 Otherwise I truly enjoyed being a part of this fascinating review, and I very much appreciate you involving me.

Marc Jeschke, MD PhD FACS FCAHS FCCM FRCS(C)
Chair of the 2022 Audit Meeting
Chair in Burn Research
Sunnybrook Health Sciences Centre,
Ross Tilley Burn Centre, Toronto

4 Transfer Times And Their Impact On Burn Mortality In LSEBN

4.1 In 2018-2019, clinicians in the London & South East Burns network undertook a retrospective audit for transfer times and their impact on burn mortality. The audit looked at cases over a two year period to March 2018 and concluded the following:

- Mortality was not shown to be linked to transfer times
- Majority of patients were indirect admissions from other hospitals; heavy reliance on secondary transfers
- Hypothermia was a confounding factor in resuscitative burn patients

The audit was presented at the 2019 national audit meeting and it was agreed that the audit should be undertaken across all services in England and Wales. Due to workload pressures during the pandemic, the work was delayed until late 2021.

4.2 The LSEBN undertook a second cycle of audit on this subject, this time with a prospective study over a short period (3 months ending February 2022). This enabled clinicians to test the data collection tool and provided sufficient data to provide meaningful analysis.

4.3 Ms Alexandra Murray presented the results to the 2022 Audit meeting, including the following conclusions:

- Transfer times for resuscitation level burns in LSEBN are variable but can be very high (up to 18 hours)
- Transfers via MTCs are currently significantly longer than from non-MTCs within LSEBN
- Hypothermia (significantly) and time to resus fluids commencing continue to negatively impact on survival
- Of the 'at scene' or peripheral ED intubations, only half of these were then diagnosed with inhalational injury. This group had a higher mortality.

4.4 The presentation generated considerable interest and discussion at the meeting and it was agreed that the audit must be repeated across all services / networks, over an extended 6 month period.

5 Summary and conclusions

5.1 This year's annual burns mortality audit was a great success, with high attendance numbers and constructive discussions about cases and themes.

5.2 As noted earlier in this report, details of individual cases are not explored in the report, but the following themes and key topics were reported:

5.2.1 Impact of delayed transfers

- As in previous years, cases discussed at the national meeting continued to highlight delays in the transfer of patients to a burn care service. This was a recurring theme at the last few years' national audits. Although this mostly due to lack of burn bed capacity, especially burns critical care beds nationally, mitigating other causes would improve that patients' care and outcomes.

- Communications, clear guidance on resuscitation, intubation, vascular access, when to do escharotomies, photography, and avoidance of hypothermia, were all noted by Dr Jeschke, the audit chair, to be important part of an agreed national protocol.

- The suggested national audit of exploring the root cause analysis and recommended nationally agreed protocols will certainly improve outcome. In addition, this audit will identify examples of excellent, swift and safe transfers that can be disseminated nationally.

5.2.2 Frailty as a predictor of mortality

- The revised Baux score (rBaux), has been used for many years at the national audit to identify the unexpected mortality cases, together with frailty score and other comorbidity. Future use of IBID "real-time" VLAD (incorporating TBSA%, age, inhalation injury, comorbidity and frailty) as a trigger to initiate a local audit or investigation, can be useful tool to identify cases of both unexpected survivors, and mortalities to be discussed locally, regionally and nationally.

5.2.3 <u>The concept of "PREHAB"</u>

- Dr Jeschke introduced the PREHAB concept that is now widely used in other disciplines. In burn care, optimising our patients prior to surgical intervention is important for better outcomes. This could mean physical or pharmacological modulation of the metabolic response.

5.2.4 <u>Utilising the National Burn injury Database (IBID)</u>

- For the first time, the 2022 national audit template included analysis of fluid resuscitation (fluid input and urine output) for the first 48 hours, post injury. There was considerable support for collecting and analysing these data, but there was also recognition that recovering figures was extremely difficult and that in future, the figures should be collected prospectively. It was acknowledged that accurate recording of fluid given prior to admission to burn services is challenging. However, this should a part of the routine handover at the final destination. It was agreed that IBID should be approached, to consider whether volume of fluid administered could be included within the dataset.

- The meeting also discussed the IBID report for "unexpected mortalities", generated as part of the NHS England Specialised Service Quality Dashboard (burns, all ages). Since 2016, the national audit meeting has allowed burn services and burn networks to select the cases for the national meeting. In the years since that time, the accuracy of the IBID has greatly improved and consideration should now be given to using the IBID as the "first cut" for cases, identified as outliers of mortality (unexpected deaths).

5 Actions

5.1 ❖ **The LSEBN audit of transfer times will be undertaken by all specialised burn services in England and Wales. This will be a six month study, beginning in July or August 2022. The aim of the audit is to understand the impact on patient outcomes and to identify common themes for service improvement.**

5.2 ❖ **The National Burns ODN Group will take the following actions:**
- **Work with IBID, to consider how figures for fluid resuscitation can be collected and analysed.**
- **Work with IBID, to utilise the Quality Dashboard report for unexpected mortalities, to inform the selection of cases for the national meeting.**

5.2 ❖ **The 9th National UK and Ireland Burns Audit meeting will be held on Monday 3rd April 2023, between 09.00 and 16.00h.**
❖ **The meeting will be held in Birmingham at the Queen Elizabeth Hospital. It is expected that the event will a "hybrid" with delegates able to join in person and remotely via MS Teams.**

Mr Naiem Moiemen
Burns and Plastic Surgeon,
Queen Elizabeth Hospital Birmingham
Clinical Lead, Midlands Burn ODN

Pete Saggers
LSEBN Network Manager
Chair, National Burns ODN Group

June 2022

APPENDIX 1 – Participating Services

England and Wales	
Northern Burn Care Network:	– Pinderfields, Wakefield – Alder Hey Hospital, Liverpool – Royal Victoria Infirmary, Newcastle – Manchester Burns Services – Mersey Burns Services – Sheffield Burns Services
London & South East of England:	– St Andrews, Broomfield Hospital, Chelmsford – Queen Victoria Hospital, East Grinstead – Chelsea & Westminster Hospital – Stoke Mandeville – Oxford John Radcliffe Hospital
South West UK Burn Care Network:	– Morriston Hospital, Swansea – Southmead Hospital – Salisbury General Hospital – Derriford Hospital, Plymouth
Midland Burn Care Network:	– Birmingham Children's Hospital – Nottingham University Hospital – University Hospital Birmingham

Scotland	– Glasgow
Ireland	– Dublin

National M Audit April 2022

In attendance:

Jennifer Greenhowe	Aberdeen
Ben Lakin	Alder Hey Childrens Burns Centre
Catherine Raraty	Alder Hey Childrens Burns Centre
Joanne Moore	Alder Hey Childrens Burns Centre
Louise Campbell	Alder Hey Childrens Burns Centre
Natalie Holman	Alder Hey Childrens Burns Centre
Sian Falder	Alder Hey Childrens Burns Centre
Susan Burgess	Alder Hey Childrens Burns Centre
Abdulrazak Abdulsalam	Birmingham Burn Centre
Alan Kay	Birmingham Burn Centre
Amberley Prince	Birmingham Burn Centre
Aqsa Khattak	Birmingham Burn Centre
Arash Rafie	Birmingham Burn Centre
Azzam Farroha	Birmingham Burn Centre
Beth Howard	Birmingham Burn Centre
Craig Nightingale	Birmingham Burn Centre
Darren Lewis	Birmingham Burn Centre
Elizabeth Chipp	Birmingham Burn Centre
Evangelia Vlachou	Birmingham Burn Centre
Ezekwe Amirize	Birmingham Burn Centre
Kirsty Floodgate	Birmingham Burn Centre
Malcolm Clayton	Birmingham Burn Centre
Naiem Moiemen	Birmingham Burn Centre
Ridwanal Hassan	Birmingham Burn Centre
SHIV CHAVAN	Birmingham Burn Centre
Tomasz Torlinski	Birmingham Burn Centre
Yvonne Wilson	Birmingham Burn Centre
Federica D'Asta	Birmingham Children's Hospital
Lisa Hyde	Birmingham Children's Hospital
Ralph Jepson	Birmingham Children's Hospital
Vicky Wright	Birmingham Children's Hospital
Anthony Sack	Bristol Burn Unit
Nicola Mackey	Bristol Burn Unit
Sankhya Sen	Bristol Burn Unit
Shirin Pomeroy	Bristol Burn Unit
Agnes Watson	Broomfield, Chelmsford
Christopher Van Wyk	Broomfield, Chelmsford
David Barnes	Broomfield, Chelmsford
Emma Borrows	Broomfield, Chelmsford
Joanne Lloyd	Broomfield, Chelmsford
Martin Palmer	Broomfield, Chelmsford
Niall Martin	Broomfield, Chelmsford
Rachel Wiltshire	Broomfield, Chelmsford
Sue Boasman	Broomfield, Chelmsford
Victoria Dudman	Broomfield, Chelmsford
Marc Jeschke	Chair

Carolyn Young	Chelsea and Westminster
Hodan Abdi	Chelsea and Westminster
Isabel Jones	Chelsea and Westminster
Joanne Atkins	Chelsea and Westminster
Nicole Lee	Chelsea and Westminster
Helen Nolan	Dublin
Odhran Shelley	Dublin
Kirsty Munro	Dundee
Patricia Odonoghue	Dundee
Stuart Waterson	Dundee
Claire Tait	East Grinstead
Gary Chow	East Grinstead
Gary Chow	East Grinstead
Kaneka Bernard	East Grinstead
Kerry Stenning	East Grinstead
Michelle Dubber	East Grinstead
Nora Nugent	East Grinstead
Omar Dawood	East Grinstead
Tania Gibson	East Grinstead
Hadyn Kankam	East Suffolk and North Essex
Christopher McGovern	Glasgow Royal Infirmary
Nikolaos Arkoulis	Glasgow Royal Infirmary
Jennifer Greenhowe	Grampian
Elaine Cotton	Manchester Burns Service
Gavin Reid	Manchester Burns Service
Humayun Jhan	Manchester Burns Service
Jacky Edwards	Manchester Burns Service
Jenny Anderson	Manchester Burns Service
Joanne Miller	Manchester Burns Service
Karen Brady	Manchester Burns Service
Nadeem Khwaja	Manchester Burns Service
Nicola Cross	Manchester Burns Service
Samantha McNally	Manchester Burns Service
Vicky Edwards	Manchester Burns Service
Zeeshan Sheik	Manchester Burns Service
Alison Smith	Mersey Burns Centre
Anirban Mandal	Mersey Burns Centre
Ascanio Tridente	Mersey Burns Centre
Dilnath Gurusinghe	Mersey Burns Centre
Laura Cappuyns	Mersey Burns Centre
Liby Phillip	Mersey Burns Centre
Tracey Walker	Mersey Burns Centre
Alison McKenzie	Newcastle Burns Centre
Christopher Lewis	Newcastle Burns Centre
Claire Woods	Newcastle Burns Centre
Emma Forster	Newcastle Burns Centre
Emma Lawson	Newcastle Burns Centre
Thejasvin K	Newcastle Burns Centre
Fiona Toland-Mitchell	Newcastle Burns Centre
Ian Clement	Newcastle Burns Centre

James Lennard	Newcastle Burns Centre
Lihan Zhang	Newcastle Burns Centre
Louise Johnson	Newcastle Burns Centre
Peter Hodgkinson	Newcastle Burns Centre
Thomas Cairns	Newcastle Burns Centre
Rachel Pearson	Northern Burn Care Network
Andrea Cronshaw	Nottingham Burns unit
Debbie Raynor	Nottingham Burns unit
Mary Kennedy	Nottingham Burns unit
Skaria Alexander	Nottingham Burns unit
Lorna Murray	Oxford
Salma Eltoum Elamin	Oxford
Sara Atkins	Oxford
Sara Atkins	Oxford
Alan Phipps	Pinderfields, Wakefield
Andrew Carter	Pinderfields, Wakefield
Ann Sanderson	Pinderfields, Wakefield
Brendan Sloan	Pinderfields, Wakefield
Ciara Bowers	Pinderfields, Wakefield
Claire Swales	Pinderfields, Wakefield
David Aaron	Pinderfields, Wakefield
Mohammad Anwar	Pinderfields, Wakefield
Natasha de Vere	Pinderfields, Wakefield
Orla Austin	Pinderfields, Wakefield
Preetha Muthayya	Pinderfields, Wakefield
Veronica Wagstaff	Pinderfields, Wakefield
Yvonne Wood	Pinderfields, Wakefield
Marcia Roach	Preston Hospital
Deborah Fradkin	Royal Manchester Children's Hospital
Jan Owen	Royal Manchester Children's Hospital
Mamta Shah	Royal Manchester Children's Hospital
Amy Johnson	Salisbury Hospital
Hazel Jackson	Salisbury Hospital
Natalie Fouch	Salisbury Hospital
Nicola Beavan	Salisbury Hospital
Nola Lloyd	Salisbury Hospital
Salma Eltoumelamin	Salisbury Hospital
AJ Stephenson	Sheffield Adult & Paediatric Burns Units
Debbie Smith	Sheffield Adult & Paediatric Burns Units
Kerry Nettleship	Sheffield Adult & Paediatric Burns Units
Lisa Tyler	Sheffield Adult & Paediatric Burns Units
Liz Nicholls	Sheffield Adult & Paediatric Burns Units
Michelle Morris	Sheffield Adult & Paediatric Burns Units
Alexandra Atkins-Murray	Stoke Mandeville
Clara Upson	Stoke Mandeville
Daniel Markeson	Stoke Mandeville
Sharon Standen	SW Burns Network Manager
Dai Nguyen	Welsh Centre for Burns
Daisy Ryan	Welsh Centre for Burns
Fiona Davies	Welsh Centre for Burns

Jeremy Yarrow	Welsh Centre for Burns
Jonathan Cubitt	Welsh Centre for Burns
Louise Limbert	Welsh Centre for Burns
Peter Drew	Welsh Centre for Burns
Peter Matthews	Welsh Centre for Burns
Sophie Pope-Jones	Welsh Centre for Burns
Susan Salerno	Welsh Centre for Burns