Final Report of the Fourth National Burns Annual Mortality Audit (2017-2018)
United Kingdom and Republic of Ireland
2nd July 2018

In 2015, burn services from England and Wales came together for the first time to undertake a national mortality audit. In June 2018, the 4th annual audit meeting was held, and on this occasion, services from Scotland and the Republic of Ireland also participated. This document sets out the background and context to the audit meeting, provides a synopsis of the event and makes proposals for future national audit meetings.

1 Introduction

1.1 The NHS England National Standards for Burn Care requires all burn networks to undertake an annual, Morbidity and Mortality audit. In late 2014, it was agreed by the Clinical Leads for the four burns Operational delivery Networks that a nationally consistent approach to M&M audit would be made for the audit year, 2014-2015. In addition, it was also agreed that there should be a first, national mortality audit.

1.2 This first truly national audit, held in June 2015, was very successful and it was agreed at that meeting, that an annual event would take place. Since 2016, an invitation to participate has been extended to all services in the United Kingdom and Republic of Ireland.

1.3 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.

1.4 The 2018 audit meeting was again hosted by the Midlands Burn Care Network and held at the Queen Elizabeth Hospital, Birmingham.

Dr. David Herndon, Director of Burn Services at the Shriners Hospital, Galveston, Texas chaired the meeting, and over 100 senior burns clinicians attended, representing every burn service in England, Wales, Scotland and the Republic of Ireland.

2 Methodology and Process

2.1 This 2018 audit has continued the process of selecting cases. In February 2016, it was 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 (scored) or were unusual in some other way. It was agreed that the iBID system would be utilised to help “validate" the cases that services presented. This would serve two purposes:

- As a baseline of knowledge for all services, as they made preparations for the network audit;
- As a tool to measure the accuracy and utility of the IBID system itself.

Services in Scotland, Northern Ireland and Republic of 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 2018 meeting, each service presented their cases using a template originally developed by the burn centre at Morriston Hospital, Swansea, and amended following the 2017 meeting. 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 severity);
- A summary of all paediatric resus / ventilated cases;
- A summary of all serious incidents investigated under the NHS Serious Incident Framework;
- A summary of all deaths, providing high-level details of all burn mortalities in 2017-2018, including demographic and clinical information, including the Modified Baux score.
- A presentation time-line for the cases identified as outliers, showing the key events and interventions during the patient episode.

3 Dr David Herndon – Chair's Report

3.1 I was particularly honoured to participate. There was an open, honest, frank presentation of selected deaths and complications from each unit that had previously been reviewed by regional groups and selected for national audit review.

Analysis of each and every one of these cases was thorough and lessons to be learned were enunciated by the presenters and greatly added to by participation throughout the audience. Interaction was vigorous and in the vein of improving national healthcare.

3.2 Particular areas that were identified that brought healthy discussion from national perspective were:

3.2.1
- *Issues with transfers from one centre to another and from non-centres to centres. Primarily the issues were related to delays and scanty information prior to and during transfers.*
- *A direction to improve was to develop communication between senior attending to senior attending in the form of frank open discussions about each transfer to try to identify potential areas of difficulty, delay, to identify methods to more safely transfer.*

3.2.2
- *One particular issue that was recurrently identified in transfers was development of hypothermia in transit and lasting for prolonged periods of time at ultimate referral centres.*
- *Vigorous discussion about treatment of hypothermia identification and maintenance of warmth in transport will direct efforts and stimulate improvement in methods and communications around transfers.*

3.2.3
- *Another related issue had to do with staffing at some units, during weekends, not being as adequate as week time staffing, making acceptance and treatment massively injured patients more difficult.*
- *Solutions to allow full staffing on weekends were alluded to.*
- *There was much discussion about the number of centres and whether fewer centres, fully staffed, might address this kind of issue.*

3.2.4
- *One closely related area that raised considerable comment were the number of paediatric patients requiring ventilatory support for over 48 hours that were treated at various burn centres.*
- *There was discussion that perhaps there were only sufficient critically injured paediatric burn patients to justify the presence of three paediatric burn centres in England as opposed to the current system of having multiple centres designated for paediatrics.*

3.2.5
- *Related to both of these issues were multiple episodes in which there was no, or difficult, availability of beds at major units allowing situations where major burns had to shop around amongst many different units to try to find an available bed for a patient of acuity requiring burn centre care.*

- *Some discussion was had about a system for triaging less acutely injured individuals from centres to have available beds for new acute patients when required. All of these issues would require guidelines produced at a national level, discussed and agreed upon.*

3.2.6 - *A central registry of bed availability published and available by some online technique kept up to date.*

3.3. Other major issues that were identified by the National Audit that are beginning to confront all units are the emergence of multiply resistant pseudomonas and Acinetobacter primarily transferred in from foreign countries but had caused epidemics at multiple centres resulting in closing of units and redefinition of infection control practices.

There was an identified need to share experiences over epidemiologic control and infectious disease processes to prepare for the eventuality of more multiply resistant organisms appearing in the United Kingdom.

3.4 A discussion about the devastating occurrences that are sporadic and infrequent but need to be prepared for of Toxic Shock Syndrome was pursued.

Toxic Shock Syndrome, after small burns, was identified in the United Kingdom over 20 years ago and pursued such that a central laboratory – Sheffield, United Kingdom – has the ability to do assay techniques for toxins common in this disease process.

Awareness in all burn centres of its occurrence has been good and vigilance persistent. However, repeat discussions were considered necessary to heighten awareness that even very small burns can become rapidly sick from this syndrome and follow up techniques should be re-established routinely with vigilance.

3.5 Multiple discussions, about varying definitions of frailty and futility in the treatment of burns in the elderly, were had. Who to treat, when to treat, and how to move the bar in decreasing mortality and burn injury with the elderly and frail were subjects of multiple discussions.

3.6 A suggestion for upcoming audit which might improve the ability to identity in a common way determinant of futility was to develop a larger list of causes of deaths in the audit to be able to track natural changes over time and causes of death in units to develop an equal playing field for what cases are to be considered outliers and not outliers for further discussion and national action.

3.7 Chair's summary

I was honoured to be able to be present at this national conversation, which is unique in the world, focusing on morbidity and mortality to improve care of a national system.

This yearly audit served to focus multiple areas for improvement of national health care and should serve as a shining example to the world of continuous quality improvement at the highest level in a profession.

The audit was characterized by a team approach, congeniality, and passion for improvement in care which can only serve to improve health care in the United Kingdom and Ireland.

Thank you for allowing me to participate.

Dr. David Herndon,
Director of Burn Services
Shriners Hospital, Galveston, Texas

4 Joanne Bowes - Paediatric Resuscitation

4.1 Fortunately, the number of children who die each year in the UK from burn injuries is very low. With this in mind, the NBODNG decided this year to look at other outcome measures in addition to mortality in children, focusing on children who required intubation and ventilation as part of their burn injury management.

Please note, the following data is slightly different to that presented at the national morbidity and mortality meeting in June 2018, incorporating additional information from Alder Hey.

4.2 Table 1
Paediatric burn injured patients >10% TBSA in England and Wales April 2017 to March 2018:

Service	Number of patients	Number of patients intubated
St Andrews	39	11
Birmingham	21	8
Chelsea and Westminster	18	0
Manchester	12	5
Alder Hey	10	2
Bristol	7	0
Newcastle	3	3
Nottingham	3	0
Swansea	1	0
Total:	**114**	**29**

4.3 Table 2
Length of intubation / ventilation:

Time	Number of patients	%
< 24 hours	7	24
24-48 hours	4	14
>48 hours	18	62
Total	**29**	

Range of ventilated days 1-33, Mean 5.6 days.

4.4 **Table 3**
Total number of days intubated / ventilated:

Service	Number of ventilator days	Days intubated / % TBSA
St Andrews	36	0.15
Birmingham	81	0.29
Manchester	18 (+3 days RIP)	0.29
Alder Hey	11	0.64
Newcastle	14	0.28
Total	**163**	

4.5 **Discussion:**
As can be seen, the number of children with burn injuries who require intubation and ventilation is very small, with a correspondingly low total number of ventilated days.

7 patients (24%) required intubation for less than 24 hours, those present at the meeting discussed this and the possibility that these patients may not have required intubation.

The consensus was that this is an acceptable figure in light of EMSB teaching of "if in doubt, intubate".

Clearly a small number of services are caring for the majority of burn injured children >10% TBSA, those present noted this and await the outcome of the paediatric burn services review with interest.

We intend to repeat this audit for the period April 2018 to March 2019 and are delighted that the Glasgow service also wish to participate.

Joanne Bowes
Consultant Anaesthetist
Morriston Hospital, Swansea

5 Overall Conclusions and Recommendations

5.1 Clinicians attending the meeting agreed that this 2018 audit event had again been an overwhelming success. A number of common themes, highlighted in the Chairs report, emerged from the meeting:

- Transfers: improving the process to ensure a safer transfer of patients to and from burn services;
- Toxic shock syndrome: the need to develop new clinical protocols;
- Staffing: an acknowledgement that the number of services providing centre-level care needs to be reviewed;
- Multi-resistant organisms and infection: an opportunity to do things differently;
- Bed availability: making the National Burns Bed Bureau work.

It was agreed that the audit process and methodology should again be refined for future years.

5.2 At the October meeting of the National Burns ODN Group, the following actions were agreed:

- **The National Audit template will be amended to include the clinical cause of death. This must be recorded for all mortality cases;**
- **The paediatric resus audit will be repeated in 2018;**
- **An audit of patient transfers will be undertaken during 2018-2019 and presented at the 2019 Audit meeting;**
- **Service and National Protocols for TSS will be reviewed, with the aim of developing a consistent approach across England and Wales, and;**
- **The NBODNG will conduct a workforce survey across all burn services in England and Wales. The survey must be designed to identify vacancies and other gaps in provision.**

5.2 The 2019 National Burns Mortality Audit will be held on Monday 1st July 2019.

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

November 2018

APPENDIX 1

Attendance

Abigail	Ford	Queen Elizabeth Hospital Birmingham
AJ	Stephenson	Sheffield Adult & Paediatric Burns Units
Alan	Phipps	Pinderfields Wakefield
Alex	Munro	Mersey Burn Unit - Whiston Hospital
Alex	Murray	Stoke Mandeville Hospital
Alison	Smith	Mersey Burn Unit - Whiston Hospital
Amrik	Virdi	Newcastle University
Amy	Symonds	Queen Elizabeth Hospital Birmingham
Andrea	Cronshaw	Queens Hospital, Nottingham
Anirban	Mandel	Mersey Burn Unit - Whiston Hospital
Anne	Baines	Lancashire Teaching Hospital - Royal Preston
Anthony	Fletcher	City Hospital Nottingham
Anthony	Sack	Queen Elizabeth Hospital Birmingham
Anuraag	Guleria	Manchester University NHS Foundation Trust
Azzam	Farroha	Queen Elizabeth Hospital Birmingham
Barry	Noble	Northern Burns Centre
Behrad	Baharlo	Queen Elizabeth Hospital Birmingham
Bill	Tunnicliffe	Queen Elizabeth Hospital Birmingham
Bin	Shu	
Brendan	Sloan	Pinderfields
Catherine	Spoors	St Andrews Centre, Broomfield Hospital
Charlotte	Wilson	Stoke Mandeville Hospital
Claire	Woods	Northern Burns Centre
Claire-Louise	Ware	Welsh Centre for Burns and Plastics
Clare	Thomas	Birmingham Children's Hospital
Cressida	Darwin	Queen Elizabeth Hospital Birmingham
Daniel	Markeson	Stoke Mandeville Hospital
Darren	Lewis	Queen Elizabeth Hospital Birmingham
David	Barnes	St Andrews Centre, Broomfield Hospital
David	Herndon	Shriners Hospital, Galveston, Texas
David	Knights	Birmingham Children's Hospital
David	Ralston	Sheffield Adult & Paediatric Burns Uints
David	Wilson	Queen Elizabeth Hospital Birmingham
Deborah	Raynor	City Hospital Nottingham
Dhruv	Parekh	Queen Elizabeth Hospital Birmingham
Donnas	Wilkinson	Mersey Burn Unit - Whiston Hospital
Elizabeth	Chipp	Queen Elizabeth Hospital Birmingham
Elizabeth	Pounds-Cornish	Stoke Mandeville Hospital
Elizabeth	Shale	Queen Elizabeth Hospital Birmingham
Elly	Breuning	Alder Hey Children's Hospital
Emma	Forster	Newcastle

Fatima	Zehta	Queen Elizabeth Hospital Birmingham
Federica	D'Asta	Birmingham Children's Hospital
Ian	Clement	Newcastle
Ian	Taggart	Glasgow Royal Infirmary
Isabel	Allison	Birmingham University
Jainen	Patel	Queen Elizabeth Hospital Birmingham
Jan	Owen	Royal Manchester Children's Hospital
Jane	Leaver	Midlands Burns Network
Jennifer	Walsh	Whiston Hospital
Jenny	Hingley	Queen Elizabeth Hospital Birmingham
Joanna	Torlinska	Newcastle University
Joanne	Bowes	Welsh Centre for Burns and Plastics
Jody	Crumpton	Queen Elizabeth Hospital Birmingham
Jorge	Leon-Villapalos	Chelsea & Westminster Hospital
Juanita	Harrison	Alder Hey Childrens NHS Foundation Trust
Julie	Morley	Mersey Regional Burns Unit
Kate	Harvey	Welsh Centre for Burns and Plastics
Katherine	Laver	Queen Elizabeth Hospital Birmingham
Kathryn	Raynor	City Hospital Nottingham
Kayvan	Shokrollahi	Mersey Burn Unit - Whiston Hospital
Keith	Allison	James Cook University Hospital
Khaled	Al-Rarrah	Birmingham University
Khurshid	Alam	Queen Elizabeth Hospital Birmingham
Lijun	Zhang	Sun Yat-Sen University, Guangzhou, China
Lindsey	Bidston	Mersey Burn Unit - Whiston Hospital
Lisa	Hyde	Birmingham Children's Hospital
Lopa	Patel	
Lorna	Burrows	Southmead Hospital
Louise	Campbell	Alder Hey Childrens NHS Foundation Trust
Louise	Johnson	Northern Burns Centre
Luke	Dowdeswell	Queen Elizabeth Hospital Birmingham
Mamta	Shah	Royal Manchester Childrens Hospital
Maria	Clarke	Stoke Mandeville Hospital
Mary	Kennedy	City Hospital Nottingham
Mav	Manji	Queen Elizabeth Hospital Birmingham
Michelle	Hayes	Chelsea & Westminster Hospital
Naiem	Moiemen	Midlands Burns Network
Neil	Abeysinghe	Queen Elizabeth Hospital Birmingham
Nicola	Mackey	Southmead Hospital
Odhran	Shelley	Dublin
Paul	Caine	Stoke Mandeville Hospital
PAUL	DRAKE	
Pete	Berry	St Andrews Centre, Broomfield Hospital
Peter	Drew	Welsh Centre for Burns and Plastics
Peter	Dziewulski	St Andrews Centre, Broomfield Hospital

Peter	Saggers	London & South East Burns Netywork
Prasenjit	Goswami	Birmingham Children's Hospital
Rachel	Chander	
Rachel	Wiltshire	St Andrews Centre, Broomfield Hospital
Randeep	Mullhi	Queen Elizabeth Hospital Birmingham
Ravi	Chauhan	Queen Elizabeth Hospital Birmingham
Rebecca	Martin	St Andrews Centre, Broomfield Hospital
Remo	Papini	Sir Charles Gairdner Hospital
Ruth	Roadley-Battin	Queen Elizabeth Hospital Birmingham
Saima	Iftikhar	Birmingham Children's Hospital
Sam	Macnally	Manchester University NHS Foundation Trust
Samuel	Teklay	Queen Elizabeth Hospital Birmingham
Sanjay	Varma	Northern Burns Centre
Sankhya K.	Sen	Bristol
Sarah	Hemington-Gorse	Swansea
Sharon	Standen	SWUK Burns ODN
Shivanand	Chavan	Queen Elizabeth Hospital Birmingham
Sian	Falder	Alder Hey Childrens NHS Foundation Trust
Simon	Kendrick	Queen Elizabeth Hospital Birmingham
Siobhan	Woods	Lancashire Teaching Hospital - Royal Preston
Skaria	Alexander	City Hospital Nottingham
Steven	Cook	Midlands Burns Network
Stuart	Watson	Glasgow Royal Infirmary
Susan	Colling	Northern Burns Centre
Susan	Nicolson	Northern Burns Centre
Tomasz	Torlinski	Queen Elizabeth Hospital Birmingham
Tracey	Walker	St Helens & Knowsley Teaching Hospitals NHS Trust
Vicky	Edwards	Wythenshawe Hospital
Yvonne	Wilson	Birmingham Children's Hospital