**BACKGROUND**

- Low and middle-income countries (LMIC) and Sub-Saharan Africa in particular make up **hotspots** in the burn epidemic.
- Burns in Sub-Saharan Africa have an estimated mortality rate of 15-20%.
- Poor outcomes relate to mainly **socioeconomic factors**: housing, cooking, healthcare literacy, traditional medicine.
- Healthcare provider capacity to appropriately manage burns is limited: resources, materials, infrastructure.
- Burn scorings have been used in high-income countries to predict mortality and risk stratify burn patients.
- However, these mortality-predicting burn scorings have not been adjusted for low-resource settings, although this is where the need for timely burn management is the greatest.

**OBJECTIVES**

- To apply burn scoring systems to a low-resource setting.
- To calibrate their breakpoints to accurately predict burn mortality.

**OUTCOMES**

- A total 229 burn patients included (172 for the ABSI scoring).
- Mortality 15.5%, TBSA median 20% (IQR 2), median age 3 yo (IQR 17).
- **Old breakpoints** (Table 2-3):
  - ABSI 8-9, median score in this population was 2 (IQR 2).
  - BOBI 6, median 1 (IQR 1).
  - Coste et al. 85, median 20 (IQR 19).
  - mBaux 113, median 28 (IQR 28).
  - Predicted 0%, 0%, 11.7%, and 8.8% of mortalities.
- **Revised breakpoints** (Table 2-3):
  - ABSI = 5
  - BOBI = 2
  - Coste et al = 30
  - mBaux = 28
  - Predicted 65.2%, 58.8%, 88.2%, and 70.6% of mortalities, resp.

**CONCLUSION**

- Patients die at critically lower burn scoring breakpoints in Uganda than in high-income countries.
- Burn scoring breakpoints must be appropriately calibrated to the context to accurately risk-stratify burn patients in LMIC.
- Appropriate risk stratification might facilitate early and aggressive management of high-risk burn patients.
- Breakpoint distances can potentially decrease burn-associated morbidity and mortality and optimise the consumption of habitually scarce resources for burn and trauma care in LMIC.
- There is a need for improved clinical record-keeping in LMIC.

**METHODS**

- We applied four standardised burn scoring systems: **mBaux, Coste et al., BOBI, and ABSI** (Table 1).
- Patient data from 229 consecutive burn injury admissions (Aug 2013-Jan 2017) at Mbarara Regional Referral Hospital.
- Patient records abstracted from the Surgical Services Quality Assessment Database (SQUAD), a validated electronic registry.
- Receiver Operating Characteristic (ROC) curve analysis to determine the overall fit of existing burn scorings and assign new mortality-predicting breakpoints.
- Statistical analyses were performed using the programming language R (R version 3.5.0).

**LIMITATIONS**

- Only in-hospital mortality, no morbidity weighting.
- Sample size included in high-income countries.
- Record-keeping: missing data points.
- Severity bias: record-keeping better for the most ill patients.
- Generalisability: single-site, retrospective.

**Table 1. Burn Scoring Systems.**

<table>
<thead>
<tr>
<th>Score</th>
<th>Predicted mortality (%)</th>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
<th>PPV (%)</th>
<th>NPV (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSI 8-9</td>
<td>0</td>
<td>94</td>
<td>100</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>BOBI 6</td>
<td>0</td>
<td>100</td>
<td>88</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Coste et al. 85</td>
<td>0</td>
<td>100</td>
<td>88</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>mBaux 113</td>
<td>0</td>
<td>94</td>
<td>100</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**Table 2. Performance and calibration of burn scorings to the Ugandan cohort.**

<table>
<thead>
<tr>
<th>Score</th>
<th>Predicted mortality (%)</th>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
<th>PPV (%)</th>
<th>NPV (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old breakpoints</td>
<td>0</td>
<td>94</td>
<td>100</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>New breakpoints</td>
<td>0</td>
<td>100</td>
<td>88</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

**Table 3. Predicted deaths by the old and new breakpoints.**

<table>
<thead>
<tr>
<th>Score</th>
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<th>Specificity (%)</th>
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<td>1</td>
</tr>
</tbody>
</table>

**Figure 1. Receiver Operating Characteristic (ROC) curves for four burn scorings.**

- The area under the ROC curves to the left indicate the ability of each respective burn scoring to predict mortality in a population.
- In blue, the Coste et al. score had the best mortality-predicting accuracy (0.894) for the included Mbarara burn population.
- 0.8-0.9 indicates near perfect fit.