Background
The FEAST trial (Maitland et al 2011) suggested that large-volume fluid boluses are harmful for non-malnourished children with impaired circulation in low-resource settings.
- WHO shock criteria: cold extremities, CRT>3 sec, weak & fast pulse
- Are FEAST results applicable in “typical” MSF settings? Patient-level clinical data and outcomes are not routinely analyzed.
- Before considering future studies, it is prudent to describe current practice.

Methods
Prospective data collection from July 2015 – June 2016
- Target: all patients admitted to resuscitation room, pediatric ICU and nutritional ICU
- Data collected during first 24 hours of ICU stay, at ICU discharge and at hospital discharge
- Study nurses extracted data from charts onto a standardized, de-identified form

Data analysis
- Preliminary data are presented; all diagnoses are according to clinician’s judgement and not yet verified
- Risk ratios calculated with log-binomial regression

Results (I)
3729 children were admitted to ICUs (Fig 1).

Results (II)
Table 1. ICU admissions and in-hospital mortality by service and presence of shock

<table>
<thead>
<tr>
<th>Service</th>
<th>Patients</th>
<th>In-hospital mortality</th>
<th>Case Fatality Ratio (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red ICU</td>
<td>2553</td>
<td>212</td>
<td>9.1</td>
</tr>
<tr>
<td>Neonatal ICU</td>
<td>840</td>
<td>140</td>
<td>17.0</td>
</tr>
<tr>
<td>Reanimation</td>
<td>595</td>
<td>62.1</td>
<td>27.1</td>
</tr>
</tbody>
</table>

Shock diagnosis in chart
- Septic: 118
- Hypovolemic: 67
- Cardiogenic: 3
- Unspecified: 19
- Overall: 288

Overall hospital mortality by service
- Overall: 177

The relative risk of death was higher among children who received the most fluids in the first 3 hours of ICU care (Table 2).

Table 2. Fluids received in the first three hours and relative risk of in-hospital mortality among ICU patients

<table>
<thead>
<tr>
<th>Quintile of fluids received</th>
<th>Equivalent fluids (in mg/kg)</th>
<th>Relative risk of in-hospital mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowest</td>
<td>0.3</td>
<td>Reference</td>
</tr>
<tr>
<td>25th</td>
<td>4</td>
<td>1.0</td>
</tr>
<tr>
<td>50th</td>
<td>10</td>
<td>1.0</td>
</tr>
<tr>
<td>75th</td>
<td>20</td>
<td>1.0</td>
</tr>
<tr>
<td>90th</td>
<td>40</td>
<td>1.0</td>
</tr>
<tr>
<td>95th</td>
<td>60</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Conclusions
- A large and detailed dataset has been collected.
- Preliminary results suggest differences in in-hospital mortality based on the amount of fluid received but causality cannot be inferred.
- Fluid management in critically ill children remains controversial.
- These data will help provide a better understanding of current practice and outcomes.

Next steps
- Full analysis of this dataset to further explore trends by
  - Admission diagnosis
  - Nutritional status
  - Age
- Consider whether interventional studies looking at fluid management are necessary / desired / possible

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Sydney Medical Unit

Fluid management and mortality in pediatric intensive care
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