How to measure and reduce plastic in healthcare – experiences at North Bristol NHS Trust
Southmead Hospital, North Bristol, UK

- 900 beds, 75% individual bedrooms, 25% 4-bed bays
- 48 Intensive Care beds
- Regional Trauma Centre
- 8000+ staff
- 2841 tonnes of waste 2019-20
- Sustainability team-led audits
**Process - planning**

- COVID-Green wards selected: Orthopaedic and Neurosurgery, Neurology, Spine & VT departments
- Opted for paid resource to complete audits, not volunteers
- Organised suitable venue and PPE/equipment, risk assessment
- Organised waste collection, labelling, storage, movement
The Audits

Process - delivery

- Collected 48 hrs of waste from 2 wards (267kg)
- Conducted the audits over 2 days
- Team of 6 led by the Axion advisor
- Examined each ward’s waste, a stream at a time – offensive hygiene, general waste and recycling
The Audits

Process - delivery
The Audits

- 372 separate weights logged!

- Example of data entries: source, waste stream, type of product, product category…

<table>
<thead>
<tr>
<th>Department Source</th>
<th>Waste Stream</th>
<th>Type of Product</th>
<th>Product</th>
<th>Plastic</th>
<th>Manufacturer</th>
<th>Country of</th>
<th>No Items</th>
<th>Weight of all items (g)</th>
<th>Weight loss container (g)</th>
<th>Other information (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neurosurgery, Neurology off</td>
<td>MD Medical Item</td>
<td>MD10 other</td>
<td>Mixed materials</td>
<td>365.6</td>
<td>Optimum Medical Solutions</td>
<td>2.4</td>
<td>7.7</td>
<td>Lective by Norgine 130g sachet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neurosurgery, Neurology off</td>
<td>PK Packaging</td>
<td>PK13 medical packaging</td>
<td>NK unknown</td>
<td>360.4</td>
<td>Metalised films - packaging</td>
<td>2.4</td>
<td>2.4</td>
<td>Metalised films - packaging</td>
<td></td>
<td></td>
</tr>
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<td>PK Packaging</td>
<td>PK13 medical packaging</td>
<td>NK unknown</td>
<td>360.3</td>
<td>Metalised films - packaging</td>
<td>2.3</td>
<td>2.3</td>
<td>Metalised films - packaging</td>
<td></td>
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<td>PK16 medical packaging</td>
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<td>2.3</td>
<td>2.3</td>
<td>Metalised films - packaging</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orthopaedic off</td>
<td>MD Medical Item</td>
<td>MD14 Surgical gown / apron</td>
<td>L3 LDPF</td>
<td>360.3</td>
<td>DuPont</td>
<td>2.4</td>
<td>2.4</td>
<td>Tyvek sheeting</td>
<td></td>
<td></td>
</tr>
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<td>MD Medical Item</td>
<td>MD14 Wipes</td>
<td>Mixed materials</td>
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<td>DuPont</td>
<td>2.4</td>
<td>2.4</td>
<td>Tyvek sheeting</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Findings

Waste Composition

The total sample was weighed and categorised according to the department and waste stream source.

<table>
<thead>
<tr>
<th>Material Source</th>
<th>Total Mass (Kg)</th>
<th>% of department sample</th>
<th>% of total sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orthopaedic</td>
<td>167.25</td>
<td>62.63%</td>
<td>62.63%</td>
</tr>
<tr>
<td>General</td>
<td>114.02</td>
<td>68.17%</td>
<td>42.70%</td>
</tr>
<tr>
<td>Offensive</td>
<td>34.10</td>
<td>20.39%</td>
<td>12.77%</td>
</tr>
<tr>
<td>DMR</td>
<td>19.14</td>
<td>11.44%</td>
<td>7.17%</td>
</tr>
<tr>
<td>Neurosurgery, Neurology, Spine and VT</td>
<td>99.79</td>
<td>37.37%</td>
<td>37.37%</td>
</tr>
<tr>
<td>Offensive</td>
<td>62.79</td>
<td>62.92%</td>
<td>23.51%</td>
</tr>
<tr>
<td>General</td>
<td>34.34</td>
<td>34.41%</td>
<td>12.86%</td>
</tr>
<tr>
<td>DMR</td>
<td>2.66</td>
<td>2.67%</td>
<td>1.00%</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>267.04</strong></td>
<td><strong>100.00%</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>

Table 1 gives the breakdown of material audited showing that the largest proportion (43%) of the mass attained in the sample was general waste generated in the Orthopaedic Ward (overall 63% of total sample).
The Findings

Waste composition: top 10 plastic item product types by mass

- Wipes – 24%
- Nitrile gloves – 21%
- Aprons/gowns – 16%
- Medical packaging – 7% (of this, 57% mixed materials, 27% PP)
- Black trays – 7%
  (Catering regeneration oven trays)
Problems & lessons learned

- COVID – restricted what we wanted to do
- Capacity issues resulted in paying for staffing to support the audits
- Lack of expertise in identifying plastic types...
- Being one of the UK hospitals meant we could have the Advisor on site
- The audits highlighted a variety of waste-related issues
- Bag labelling was poor
Using the audit results

- Recruiting plastic champions & engaging stakeholders
- Holding workshops to discuss audit findings
- Using results to engage staff on correct use (wipes & gloves) and alternatives (e.g., paper towels/spray vs. wipes), Gloves Off
- Using results to engage procurement – non-plastic wipes, re-usable gowns
- Develop action plan
- Further audits – Neonatal intensive care
- Repeat audits – under ‘normal’ conditions, post-COVID