Keeping in Range
Oxygen Targets and Delivery in Respiratory Inpatients

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1) INTRODUCTION
Iatrogenic hyperoxia is increasingly associated with morbidity and mortality in the general medical take, pre-hospital, critical care and A&E system (where target SpO2 should be prescribed). 

The latest BTS Oxygen audit was in 2015 revealing poor levels of prescription and adherence. It did not study patients without oxygen who might need it.

This audit aims to identify the proportion of patients in a specialist Respiratory ward receiving the appropriate level of supplemental oxygen; and where found to be inappropriate the various factors contributing from target setting to delivery.

2) STANDARDS
British Thoracic Society Oxygen use guidelines. Targets set as:
- 95% on oxygen to have valid prescription
- 95% of patients to be within target range
- 100% of those found out of range to have action taken

3) METHOD
Location: D5/D6 Southampton General Hospital (Specialist Respiratory Wards)
Timing: August 2018 - January 2019; 15 individual timepoints performed both in and out of hours

Patients: All patients on these wards with a set of observations in the last 2 hours regardless of diagnosis and oxygen use. No exclusion criteria.

Recordings: use of oxygen, prescription of oxygen, documented target in medical notes, current saturation, evidence of action taken if saturation was out of range.

Where no prescription/written target was documented, the investigator determined an appropriate target saturation for the patient based on clinical history.

When a patient's saturations were out of range, "Action taken" was counted if there were:
- Any change in amount of oxygen delivery method
- Confirmation from nursing staff (written or verbal) of action
- Any trigger for medical staff review

4) RESULTS

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL PATIENTS</td>
<td>169</td>
<td>-</td>
</tr>
<tr>
<td>RECEIVING OXYGEN</td>
<td>39</td>
<td>-</td>
</tr>
<tr>
<td>with prescribed target range</td>
<td>12</td>
<td>(31%)</td>
</tr>
<tr>
<td>In target range</td>
<td>29</td>
<td>(74%)</td>
</tr>
<tr>
<td>NOT RECEIVING OXYGEN</td>
<td>130</td>
<td>-</td>
</tr>
<tr>
<td>In target range</td>
<td>113</td>
<td>(87%)</td>
</tr>
<tr>
<td>REQUIRING CHANGE TO OXYGEN</td>
<td>27</td>
<td>-</td>
</tr>
<tr>
<td>No Action Taken</td>
<td>24</td>
<td>(89%)</td>
</tr>
</tbody>
</table>

5) A SYSTEM FAILURE?
The high percentage of patients without a prescribed oxygen target range and the very high percentage where no action was taken when SpO2 was out of range is of concern; particularly considering that this was a specialist respiratory area. It seems likely that that they causes are multifactorial.

One issue may be due to IT system fragmentation: UHS uses an ePrescribing system (where target SpO2 should be prescribed) which is only accessible to nurses, doctors and trained staff. Yet observations are recorded in a different electronic system, and usually by HCAs who do not have access to the ePrescribing system. Thus it is, impossible for an HCA to know a) whether there is a prescribed target range, or b) if the SpO2 is in the prescribed range. Therefore it is not surprising that nursing staff are both giving oxygen without a prescription, and not taking the appropriate action when SpO2 is out of range.

6) RECOMMENDATIONS
Round 1 recommendations currently undergoing stepwise implementation. Next re-audit in 6-12 months.

- Target saturation to be visible at time of recording observations
- Simultaneous trust wide education for prescribing and administering oxygen

Round 2 to consider mandatory target prescribing.

References: