INTRODUCTION

- Key performance indicators (KPIs) are applied during UK endoscopy training to determine quality and safety of endoscopy.
- However, the measurement of sedation KPIs differed between JETS certification criteria and UK colonoscopy guidelines (Table 1).
- To align standards, 2 changes were made to JETS:
  1. Median vs. mean for averaging doses of sedation (when used)
  2. Reducing average midazolam threshold (when used) in patients aged 70+ from a mean of 2.5mg to a median of 2mg.
- We aimed to assess the potential impact of these changes on trainee certification.

<table>
<thead>
<tr>
<th>Averaging method</th>
<th>JETS</th>
<th>UK / NED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Age</td>
<td>Mean</td>
<td>Median</td>
</tr>
<tr>
<td>&lt;70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>70+</td>
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<td></td>
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<tr>
<td>Midazolam</td>
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<td>≤2.5mg</td>
</tr>
<tr>
<td>≤5mg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fentanyl</td>
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<td>≤50mcg</td>
</tr>
<tr>
<td>≤100mcg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pethidine</td>
<td>≤50mg</td>
<td>≤25mg</td>
</tr>
<tr>
<td>≤50mg</td>
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</table>

Table 1: Differences between JETS and NED KPIs

METHODS

- A validation cohort was selected, comprising trainees awarded provisional colonoscopy certification (PCC) between June 2011-2016.
- Calculations were applied to JETS entries in the 50 procedures before PCC to determine impact on PCC.
- Normality testing was performed using the Shapiro-Wilk method, where p<0.05 was suggestive against a normal distribution, which would favour use of median over mean as the averaging method.
- KPI data calculated from means and medians were compared using Wilcoxon and McNemar’s tests.

RESULTS

- 36,650 procedures were analysed for 733 trainees.
- Midazolam was used in 76%, fentanyl in 50% and pethidine in 25%.
- At trainee-level, the change from mean to median resulted in a significant reduction in average doses of midazolam, fentanyl and pethidine (Figure 1), with lower estimates in 42%.
- Use of median was supported by normality testing, which indicated the skewed distribution of sedation doses (Shapiro-Wilk: p<0.001).
- Less trainees exceeded the 2.5mg midazolam JETS criterion in patients aged 70+ (Table 2) when averaged with median (4.4%) vs. mean (8.1%) (p<0.001).
- The proportion of trainees who exceeded sedation thresholds increased from 8.1% (JETS criteria) to 10.7% (UK/NED criteria), suggesting that the alignment may impact certification in 1 out of 38 trainees.

CONCLUSION

- As sedation doses follow a skewed distribution, sedation KPIs should be calculated using medians.
- Endoscopists are more likely to exceed sedation KPI thresholds when averaged using means.
- Measurements of JETS sedation KPIs have aligned with 2016 UK guidelines, which may impact on colonoscopy certification.
- All endoscopy trainees and trainers should be aware of this alignment, particularly with midazolam use in patients aged 70+.

Figure 1: Differences between mean and median KPI calculations

Figure 2: Distribution of sedation dosages (midazolam)

Table 2: Impact of sedation KPI calculations on trainee metrics