Does a double check for IV medication improve patient safety?

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Background

- Many reports highlight error as a problem
- Medication error is the largest subset of medical error
- Legacy Trusts had policy differences regarding medicines administration
Medication Error

(Coordinating Council for Medication Error Reporting and Prevention)

- “any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the healthcare professional, patient or consumer. Such events may be related to professional practice, healthcare products, procedures and systems, including prescribing; order communication; compounding; dispensing; distribution; administration; education; monitoring; and use.”

- Administration errors are defined as a dose administered to a patient that deviates from that prescribed.
Literature

- **Taxis and Barber (2003)**
  - Error identified in 49% IV drug preparation or administration
    - 1% of all errors severe
    - 29% moderate

- **Parshuram et al (2008)**
  - Morphine infusion preparation
    - 34.7% contained greater than 10% error in concentration
    - 1.2% calculations had 10-fold error
Single vs. Double check

- Limited evidence for one system over another
- Largely opinion based information
- What constitutes a ‘double check’
- NPSA
In summary…….

- Evidence weak/non-existent
- Largely based on opinion
- Diluted responsibility
- Influence of hierarchy and deference to authority
Objectives

- Observe medication preparation and administration on 2 wards to identify errors
- Identify which area has the least errors
- Determine the safest method of administration
Method
Audit against criteria by a single pharmacist observer

**Preparation**
- Correct diluent
- Correct dose according to the prescription
- Correct formulation (where applicable)
- Correct solvent (including date and volume used)
- Correct & in date drug

**Administration**
- Correct patient
- Patient not allergic to it
- Correct duration for administration
- No dose omissions
- Appropriate time for administration
Results

- 30 drug rounds
- 150 observations

<table>
<thead>
<tr>
<th></th>
<th>Single check</th>
<th>Double Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. Observations</td>
<td>77</td>
<td>73</td>
</tr>
<tr>
<td>Errors</td>
<td>39</td>
<td>34</td>
</tr>
<tr>
<td>Probability</td>
<td>0.6178</td>
<td></td>
</tr>
</tbody>
</table>
## Results – Summary of errors

<table>
<thead>
<tr>
<th></th>
<th>Single check area (n=77)</th>
<th>Single check area % (95% CIs)</th>
<th>Double check area (n=73)</th>
<th>Double check area % (95% CIs)</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorrect admin. rate</td>
<td>14</td>
<td>18.1 (11.2-28.2)</td>
<td>32</td>
<td>43.8 (33.1-55.5)</td>
<td>0.0007</td>
</tr>
<tr>
<td>Incorrect solvent</td>
<td>5</td>
<td>6 (2.8-14.3)</td>
<td>1</td>
<td>1.4 (0.2-7.0)</td>
<td>n/a</td>
</tr>
<tr>
<td>Incorrect flush</td>
<td>2</td>
<td>2.6 (0.7-9.0)</td>
<td>1</td>
<td>1.4 (0.2-7.4)</td>
<td>n/a</td>
</tr>
<tr>
<td>Incorrect calculation</td>
<td>1</td>
<td>1.3 (0.2-7.0)</td>
<td>0</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Errors identified</td>
<td>1</td>
<td>1.3 (0.2-7.0)</td>
<td>2</td>
<td>2.8 (0.7-9.5)</td>
<td>n/a</td>
</tr>
</tbody>
</table>
## Complexity of drug preparation

<table>
<thead>
<tr>
<th></th>
<th>No Manipulation</th>
<th>Single manipulation</th>
<th>&gt;1 manipulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single check area</td>
<td>22</td>
<td>13</td>
<td>42 (necessary in 30 cases)</td>
</tr>
<tr>
<td>Double check area</td>
<td>28</td>
<td>31</td>
<td>14</td>
</tr>
</tbody>
</table>
## Results continued – early/late doses

<table>
<thead>
<tr>
<th></th>
<th>Single check area (n=85)</th>
<th>Single check area % (95% CIs)</th>
<th>Double check area (n=84)</th>
<th>Double check area % (95% CIs)</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late &gt; 60mins</td>
<td>23</td>
<td>27.1 (18.8-37.4)</td>
<td>20</td>
<td>23.8 (15.0-34.0)</td>
<td>0.63</td>
</tr>
<tr>
<td>Early &gt; 60mins</td>
<td>11</td>
<td>12.9 (7.4-21.7)</td>
<td>24</td>
<td>28.6 (20.0-39.0)</td>
<td>0.012</td>
</tr>
</tbody>
</table>
Discussion of Results

- High incidence of error 49.7% of doses overall (not including timing error)
- Rate of administration error – difference between the 2 areas
  - Differences in practice – drug choice and bolus vs. infusion
- Early/late doses
  - Influence of check?
- What is a double check?
Limitations

- Effect of observer
- Single observer – equal bias
- Fit around role – hence largely early/lunchtime rounds
- Total doses observed
Conclusions

- Intravenous errors continue to be a problem despite national strategies to reduce them.

- Most common errors
  - Incorrect duration of administration
  - Incorrect administration times

- Further need for larger studies to resolve the problem – no difference demonstrated here.
References

