Safety of medication administration in the home: Should we double check?

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Presentation Overview

• The problem
  – Medication errors
  – Home care

• A solution?

• Accuracy and feasibility study

• Plans for the future
Medication Errors: The facts

- Most common type of error to occur
- Potentially serious and harmful consequences.
- Over 1.5 million Australians experience an adverse effect from medications each year costing ~ $660 million
- 2-3% of all admissions have an adverse medication event
- Paediatrics has a high error rate reported globally
  - 3 x times more likely to result in harm
- International gold standard- Double check
Medication management cycle

- A medication order requires interpretation by many individuals.
- Each step in the medication management cycle an opportunity for error.
- Different members of the medication management team rely on other team members to detect errors and avert patient harm.

The nurse is the last line of defence before an error reaches a patient - most administration errors are preventable.

Source: National Safety and Quality Health Service Standards
Inpatient medication errors

Most Frequent Medications in Errors (n=341)

- morphine 27%
- heparin sodium 14%
- paracetamol 11%
- Glucose 5%-Sodium Chloride 0.9%
- Gentamicin Sulphate 7%
- calcium folinate 7%
- potassium chloride 9%
- Oxycodone hydrochloride 9%
- Flucloxacillin 9%

Morphine Errors

- Prescribing/Ordering 25%
- Monitoring 8%
- Administration 67%

Source: Nursing Education RCH, Medication management committee 2012
Home care

• Care provision by clinicians in a patient’s home as an alternative to care in a hospital setting
• Increasing pressure to provide home care
• Little documented evidence of medication errors
• No ability to perform double check
• Potential for even greater error?
RCH experience

• Nursing team contracted to provide home services with RCH

• Medication preparation outsourced to pharmaceutical company

• Experienced nurses caring for complex patient groups
  – Home ventilation
  – Home intravenous therapy

• Medication error - 10 x dose given IV
Centre for Online Health

• Established program of home telehealth in oncology and palliative care
Study Aim

Home care must provide the same standard of care as hospital - gold standard of double check

➢ To assess the feasibility and efficacy of using Internet-based video communication for medication double-checks
Research question

• In children who are receiving home based care, can mobile Internet video communication be used to improve the safety of medication administration?

  – Accuracy study- published ✔

  – Feasibility/ Activity- ✔

  – Costs

Literature review

- Evidence of technology to assist dispensing/calculation
- Videoconferencing to ensure compliance
- No reports of using video to double check
Methods

• Stage 1

  – Feasibility/ Accuracy of reading medication item via web camera

  – different web cameras tested

  – Integrated web camera designed to focus within closer range

  – Used for Stage 2
Methods Continued

• Stage 2
  – Volunteers (n=10) recruited
  – 30 different medication items
  – Asked to sequentially record details
  – Repeated “face to vial” on different occasion >7 days
Results - Stage 2

- 300 Items
- 100% accuracy drug name/dose/amount in syringe >1ml
- Unit Syringe 70% accuracy
- Expiry dates most challenging

<table>
<thead>
<tr>
<th>Item checked</th>
<th>Example</th>
<th>Number of observations</th>
<th>Video check - n (%) Correct</th>
<th>FTV n (%) Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printed drug dose/name (glass ampoule, bottle)</td>
<td></td>
<td>60</td>
<td>60 (100%)</td>
<td>60 (100%)</td>
</tr>
<tr>
<td>Printed expiry date (glass)</td>
<td></td>
<td>40</td>
<td>37 (93%)</td>
<td>40 (100%)</td>
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<tr>
<td>Plastic vial name</td>
<td></td>
<td>50</td>
<td>50 (100%)</td>
<td>50 (100%)</td>
</tr>
<tr>
<td>Plastic Vial embossed expiry</td>
<td></td>
<td>40</td>
<td>25 (63%)</td>
<td>40 (100%)</td>
</tr>
<tr>
<td>Drug name/dose tablet silver backing</td>
<td></td>
<td>20</td>
<td>17 (85%)</td>
<td>20 (100%)</td>
</tr>
<tr>
<td>Embossed expiry tablet</td>
<td></td>
<td>20</td>
<td>17 (85%)</td>
<td>20 (100%)</td>
</tr>
<tr>
<td>Syringe contents (unit)</td>
<td></td>
<td>10</td>
<td>7 (70%)</td>
<td>10 (100%)</td>
</tr>
<tr>
<td>Syringe contents (&gt; 1ml)</td>
<td></td>
<td>20</td>
<td>20 (100%)</td>
<td>20 (100%)</td>
</tr>
<tr>
<td>Intravenous fluid bag</td>
<td></td>
<td>40</td>
<td>40 (100%)</td>
<td>40 (100%)</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>300</td>
<td>273 (91%)</td>
<td>300 (100%)</td>
</tr>
</tbody>
</table>
Results- Stage 2 continued

• Mean overall accuracy was 91% for all items,

• Confirming efficacy of webcam and real-time Internet video for checking medication items.

• Comparator group-
  – Face to vial (FTV): 100% accuracy
Stage 3: Feasibility

• Observational study- safety
• Laptop computers and mobile Internet
• Observations of various aspects of clinical care
• Data collected on each video link
  – Items checked, confidence ratings,
  – potential to prevent travel
  – Prevent need for outsourcing medication preparation
Results- Stage 3

• Laptops not successful
  • Technology, bulky
  • Used on only 6 occasions over 3 months

• Tablets/Ipads
  – Popular with nurses
  – Added convenience of apps for drug calculation, navigation

• Used successfully daily (n=76)
  – Medication checks
  – Wound care
  – Ventilator settings
Challenges

• Lighting

• Internet connection

• Expiry dates
Future Potential

• Current practice to outsource medication preparation

• Results in delayed discharge

• Internet video in home check potential to reduce time and costs and improve safety
Conclusion

- Medication errors potentially dangerous or fatal mistakes
- Most common type of error to occur in hospital facilities
- Prudent to assume errors will occur in community based care
- Technology may have a useful role to play in processes to ensure the safe use of medications in home care
- Identified limitations
- Demonstrated feasibility and efficacy
Thank you and acknowledgements

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