Prevalence of Safe Medication Practices in Small Rural Hospitals

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Background

- Despite evidence-based safe medication practices...
  - Adverse drug events most common adverse event
  - Medication errors widespread
- Field work in 25 Critical Access Hospitals (CAHs) revealed variation from best practices in medication use and medication error reporting
- Previous research: positive relationship between pharmacy support and reporting near misses
- ASHP national survey of pharmacy practice—floor effect of small hospitals < 50 beds
Sample Map of Medication Use

Prescribing

Order generated by physician; other qualified personnel

Written policy to write down and read back to the provider verbal or telephone orders.

Order written in chart, dated, timed. No specific policy not to use inappropriate abbreviations or blanket orders, following 0s, used

Written order?

YES

Order written in chart, dated, timed. No specific policy not to use inappropriate abbreviations or blanket orders, following 0s, used

Written policy to write down and read back to the provider verbal or telephone orders.

NO

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Written order?
Research Questions

• To what extent have hospitals with fewer than 50 beds implemented evidence-based safe medication practices and systematic voluntary medication error reporting?

• Hypotheses: Average daily census related to implementation of safe medication practices, extent of voluntary medication error reporting, pharmacy support, and accreditation by JCAHO
Instrument Development

- Review of literature
- Collaboration with ASHP
- Pilot tested among sample of 5 DONS
- Domains
  - Medication use
  - Medication error reporting
  - Practices reflecting culture of safety
  - Pharmacy support
Methodology

- Combined…
  - List of CAHs from Flex Monitoring Team
  - List of hospitals on ORHP web site eligible for small rural hospital (SRH) improvement grants
  - AHA database to obtain hospital characteristics
- Generated random sample of 474 CAHs and 312 small SRHs with 26 – 49 beds
- Mail survey using Dillman method Aug – Oct ’05
- Target respondent—Director of Nursing
- Compare results to ASHP national sample (all or large > 400 beds)
Methodology

• Overall response rate 53% (408/775)

• CAH response rate 55% (261/472)

• SRH response rate 49% (147/303)

• Compare to ASHP response rate of 43.5%

Katrina Effect: 9 SRHs and 2 CAHs across MS and AL removed from sample
## Nonresponse Bias?

<table>
<thead>
<tr>
<th>Factor</th>
<th>Respondents</th>
<th>Nonrespondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accredited by JCAHO*</td>
<td>24%</td>
<td>33%</td>
</tr>
<tr>
<td>Not for Profit*</td>
<td>97%</td>
<td>93%</td>
</tr>
<tr>
<td>Contract Managed</td>
<td>30%</td>
<td>31%</td>
</tr>
<tr>
<td>Medicare Inpatient DCs</td>
<td>464</td>
<td>508</td>
</tr>
<tr>
<td>FTE RNs</td>
<td>31</td>
<td>32</td>
</tr>
<tr>
<td>Average Daily Census*</td>
<td>24</td>
<td>29</td>
</tr>
</tbody>
</table>

*Statistically significant difference at p < 0.05
Sample Characteristics

- **Size**
  - 24% reported avg daily census 0-5
  - 26% reported avg daily census 6 – 10
  - 50% reported avg daily census >= 11

- **Type**—64% Critical Access Hospital

- **Ownership**—95% not for profit

- **JCAHO accreditation**—28%
Medication Use/Prescribing

*Statistically significant difference between smaller hospitals

Comparison of Prescribing Practices by Census

- Read back verbal orders *
  - ASHP All Hospitals: 45%
  - Avg Census 6 - 49 (n=296): 66%
  - Avg Census <= 5 (n=94): 79%

- Admission orders reconciled with home meds
  - ASHP All Hospitals: 66%
  - Avg Census 6 - 49 (n=296): 76%
  - Avg Census <= 5 (n=94): 79%

- Pharmacist rounds with physicians *
  - ASHP All Hospitals: 35%
  - Avg Census 6 - 49 (n=296): 8%
  - Avg Census <= 5 (n=94): 2%
Comparision of Documenting Practices by Census

- Handwritten MAR*: 22% ASHP >= 400 beds, 72% Avg Census 6 - 49 (n=296), 90% Avg Census <= 5 (n=94)
- Electronic MAR from pharmacy software*: 12% ASHP >= 400 beds, 38% Avg Census 6 - 49 (n=296), 2% Avg Census <= 5 (n=94)
- MAR verified against order before drug prep: 44% ASHP >= 400 beds, 54% Avg Census 6 - 49 (n=296), 0% Avg Census <= 5 (n=94)

*Statistically significant difference between smaller hospitals
Medication Use/Dispensing

*Statistically significant difference between smaller hospitals

Comparison of Dispensing Practices by Census

- **Pharmacist review of orders w/in 24 hours***
  - ASHP >= 400 beds: 100%
  - Avg Census 6 - 49 (n=296): 85%
  - Avg Census <= 5 (n=94): 48%

- **Tall man lettering for look/sound alikes***
  - ASHP >= 400 beds: 97%
  - Avg Census 6 - 49 (n=296): 37%
  - Avg Census <= 5 (n=94): 18%

- **Majority of oral meds in unit dose***
  - ASHP >= 400 beds: 97%
  - Avg Census 6 - 49 (n=296): 62%
  - Avg Census <= 5 (n=94): 90%
Tall Man Lettering

Zyprexa
Zebeta
zYPReXa
zEBetTa
Unit Dose or Bulk Stock
Medication Use/Dispensing

*Statistically significant difference between smaller hospitals

Comparison of Dispensing Practices by Census

- **ASHP >= 400 beds**
- **Avg Census 6 - 49 (n=296)**
- **Avg Census <= 5 (n=94)**

<table>
<thead>
<tr>
<th>Practice</th>
<th>ASHP &gt;= 400 beds</th>
<th>Avg Census 6 - 49</th>
<th>Avg Census &lt;= 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar code medication administration system</td>
<td>0%</td>
<td>4%</td>
<td>17%</td>
</tr>
<tr>
<td>Future plans to implement bar coding*</td>
<td>11%</td>
<td>37%</td>
<td>67%</td>
</tr>
<tr>
<td>Automated dispensing cabinet*</td>
<td>42%</td>
<td>93%</td>
<td></td>
</tr>
</tbody>
</table>

Percent of Hospitals
Medication Use/Administering

*Statistically significant difference between smaller hospitals

Comparison of Administering Practices by Census

<table>
<thead>
<tr>
<th>Practice</th>
<th>ASHP All Hospitals</th>
<th>Avg Census 6 - 49 (n=296)</th>
<th>Avg Census &lt;= 5 (n=94)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meds routinely selected/administered by same person*</td>
<td>28%</td>
<td>62%</td>
<td>62%</td>
</tr>
<tr>
<td>Two identifiers (excluding room no.) used to est. patient identity*</td>
<td>0%</td>
<td>80%</td>
<td>80%</td>
</tr>
<tr>
<td>Unopened unit dose verified with MAR at bed*</td>
<td>33%</td>
<td>52%</td>
<td>86%</td>
</tr>
</tbody>
</table>

Percent of Hospitals

0% 20% 40% 60% 80% 100%
Medication Error Reporting
*Statistically significant difference between smaller hospitals

Comparison of Medication Error Reporting by Census

<table>
<thead>
<tr>
<th>Category</th>
<th>Avg Census 6 - 49 (n=296)</th>
<th>Avg Census &lt;= 5 (n=94)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error reports NOT placed in personnel files</td>
<td>89%</td>
<td>93%</td>
</tr>
<tr>
<td>NCC MERP taxonomy used to categorize severity*</td>
<td>49%</td>
<td>63%</td>
</tr>
<tr>
<td>Near misses routinely reported*</td>
<td>61%</td>
<td>77%</td>
</tr>
<tr>
<td>Medication errors discussed at medication safety committee*</td>
<td>34%</td>
<td>51%</td>
</tr>
<tr>
<td>Conducted root cause analysis within last year*</td>
<td>37%</td>
<td>64%</td>
</tr>
</tbody>
</table>

Percent of Hospitals

0%  20%  40%  60%  80%  100%
Safe Culture Practices

*Statistically significant difference between smaller hospitals

Comparison of Safe Culture Practices by Census

<table>
<thead>
<tr>
<th>Practice</th>
<th>Avg Census 6 - 49 (n=296)</th>
<th>Avg Census &lt;= 5 (n=94)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggregate medication error data compared to external database*</td>
<td>7%</td>
<td>20%</td>
</tr>
<tr>
<td>Aggregate medication error data shared with hospitals of similar size</td>
<td>12%</td>
<td>10%</td>
</tr>
<tr>
<td>Survey of patient safety culture conducted in past year*</td>
<td>28%</td>
<td>41%</td>
</tr>
<tr>
<td>Harmful errors disclosed to patients/families</td>
<td>5%</td>
<td>43%</td>
</tr>
<tr>
<td>Accredited by JCAHO*</td>
<td>5%</td>
<td>36%</td>
</tr>
</tbody>
</table>

Accredited by JCAHO*
Pharmacy Support

*Statistically significant difference between smaller hospitals

Comparison of Pharmacy Support by Census

<table>
<thead>
<tr>
<th>Reason</th>
<th>Avg Census 6 - 49 (n=296)</th>
<th>Avg Census &lt;= 5 (n=94)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack patient volume to support full time pharmacist*</td>
<td>30%</td>
<td>70%</td>
</tr>
<tr>
<td>Current pharmacy vacancy*</td>
<td>12%</td>
<td>4%</td>
</tr>
<tr>
<td>Pharmacist onsite 10 or fewer hours per week*</td>
<td>21%</td>
<td>66%</td>
</tr>
<tr>
<td>Contract with local community pharmacist*</td>
<td>21%</td>
<td>54%</td>
</tr>
<tr>
<td>Pharmacist employed by hospital*</td>
<td>65%</td>
<td></td>
</tr>
</tbody>
</table>
All or None Measurement
Nolan & Berwick. JAMA, 295 (10): 1168-1170

- Multiple discrete measures define quality
- Determine the “indisputable basics” that determine the standard of care
- Numerator
  - “0” if any one element of care missing
  - “1” if all of care provided
- Denominator
  - Patients eligible for care
  - Organizations providing care
All or None Measurement

• Advantages
  – Patient-centered
  – System perspective
  – Sensitive scale for assessment of improvements

“The indisputable basics”

Donald Berwick, M.D.
President and CEO, Institute for Healthcare Improvement
“The Indisputable Basics”

- **Ordering**
  - Pharmacist review within 24 hours

- **Documenting**
  - Transcription to MAR double-checked before drug obtained

- **“Dispensing”**
  - Selection of medication independently double-checked within pharmacy or med room

- **Administering**
  - Nurse verifies unopened unit dose at bedside with MAR
Overall All or None = 18%

<table>
<thead>
<tr>
<th>Category</th>
<th>All or None = 1</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Census 0 - 5</td>
<td>10%</td>
<td>0.015</td>
</tr>
<tr>
<td>Census &gt;= 6</td>
<td>21%</td>
<td></td>
</tr>
<tr>
<td>Not accredited by JCAHO</td>
<td>13%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>JCAHO accredited</td>
<td>31%</td>
<td></td>
</tr>
<tr>
<td>CAH</td>
<td>18%</td>
<td>0.929</td>
</tr>
<tr>
<td>SRH</td>
<td>18%</td>
<td></td>
</tr>
<tr>
<td>&lt;= 5 hrs pharmacy support/week</td>
<td>1%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>&gt; 5 hours pharmacy support/week</td>
<td>22%</td>
<td></td>
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</table>
Multivariate Logistic Regression

Dependent Variable = Achievement of all or none measure

<table>
<thead>
<tr>
<th>Factor</th>
<th>Odds Ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accredited by JCAHO</td>
<td>2.3</td>
<td>1.3 – 3.9</td>
</tr>
<tr>
<td>More than 5 hours of pharmacy support per week</td>
<td>14.9</td>
<td>2.0 - 110.5</td>
</tr>
</tbody>
</table>
Conclusions

• The majority of the nation’s smallest hospitals can make significant improvements
  – Use of knowledge-based safe medication practices across all phases
  – Development of a systematic approach to reporting and learning from medication errors
  – Measuring and achieving a culture of safety
• The greatest room for improvement is in those hospitals with avg daily census of 5 or fewer
Conclusions

- 18% of the nation’s smallest hospitals have knowledge-based processes in place that can consistently achieve the indisputable basics of medication use across all phases.
- Consistency of knowledge-based practices should be determined prior to implementation of technology-based interventions.
- Accreditation by JCAHO and the professional driver of a minimal amount of pharmacy support are predictors of consistency in small rural hospital medication use.
Conclusions

• Further adoption of safe medication practices, systematic medication error reporting, and building a culture of safety in the nation’s smallest hospitals may require a combination of regulatory, professional, and market drivers.
Conclusions

• Regulatory…changes in Medicare COP to require review of orders, use of unit dose?
• Professional…
  – achievement of true multidisciplinary approach to medication use with access to pharmacist judgment in all hospitals
  – IOM: “Quality through Collaboration” …QIOs, universities, state associations, network hospitals to obtain tools & improve knowledge of systems approach to error prevention
• Market…transparency in event reporting
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