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Prevalence of Evidence-Based Safe Medication Practices in Small Rural Hospitals

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Introduction

This issue brief presents the findings of a national survey whose purpose was to describe the prevalence of evidence-based safe medication practices, including the use of voluntary medication error reporting, in the nation's smallest hospitals. The survey included questions related to all phases of the medication use process—prescribing, documenting, dispensing by a pharmacist (medication acquisition by nursing), administering, and monitoring (Figure 1).

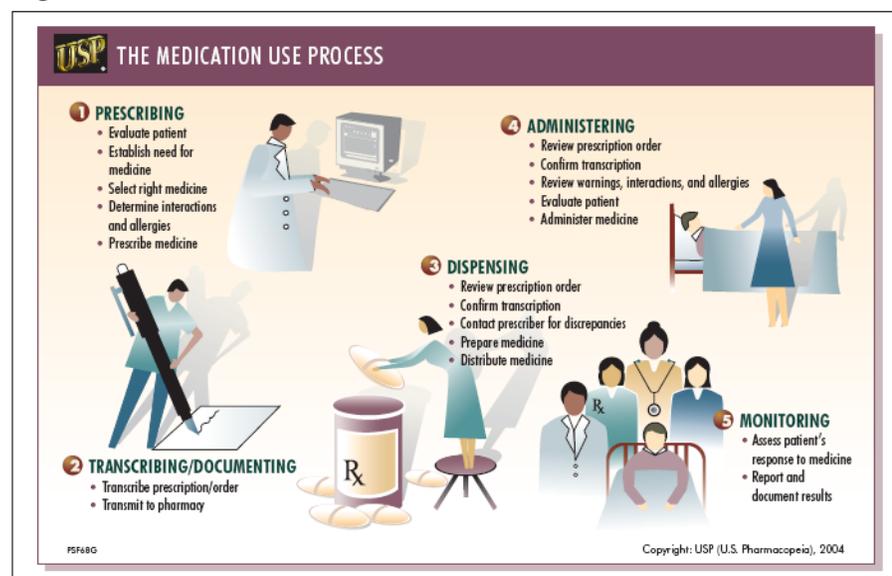
Key Findings

- Hospitals with an average daily census of six or more patients were more likely to report having adopted safe medication practices than were hospitals with an average daily census of five or fewer patients.
- Hospitals with pharmacists on-site more than five hours per week were more likely to

report having adopted safe medication practices.

- The majority of hospitals with an average daily census of five or fewer patients do not systematically analyze medication errors or conduct a root cause analysis.
- Approximately one in five of the nation's smallest hospitals have knowledge-based processes in place that can consistently achieve the following: (1) a pharmacist review of orders within 24 hours, (2) a double check of transcription to the medication administration record (MAR) before obtaining the initial dose of a drug, (3) an independent double check of the selected medication within the pharmacy or medication room prior to administration, and (4) verification of the five rights of medication administration by the nurse at the bedside using an unopened unit dose and the MAR.

Figure 1.



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Background and Methods

Approximately 1,800 hospitals with fewer than 50 acute care beds, including, as of December 2007, 1,292 (obtained from flexmonitoring.org on March 2, 2008) Critical Access Hospitals (CAHs) with 25 or fewer acute care beds, currently serve rural America. Low volume, insufficient information technology, and limited human resources are characteristics of all hospitals with fewer than 50 beds and are barriers to identifying and correcting system sources of error (Calico, Dillard, Moscovice, & Wakefield, 2003). Research regarding the structure and process of evidence-based safe medication practices in rural hospitals has demonstrated the role of pharmacists in implementing best practices in medication dispensing and administration and a relationship between hospital size and prevalence of best practices (Casey, Moscovice, & Davidson, 2006). We build on that work in this policy brief by describing the prevalence of evidence-based safe medication practices in different size groupings of hospitals with fewer than 50 beds; we focus on knowledge-based (not dependent on technology) practices.

We developed a survey instrument consisting of 44 items, which were categorized within four domains — medication use, medication error reporting, practices reflecting a culture of safety, and pharmacy support. From August to October 2005, we used the Dillman (2007) tailored design method to conduct a mailed survey of 472 CAHs and 303 hospitals with 26 to 49 beds. We define the latter group of hospitals with 26 to 49 beds as small rural hospitals (SRHs), which are eligible for the Office of Rural Health Policy's Small Rural Hospital Improvement (SHIP) Grant program but which were not designated as CAHs. The target recipient for the survey was the

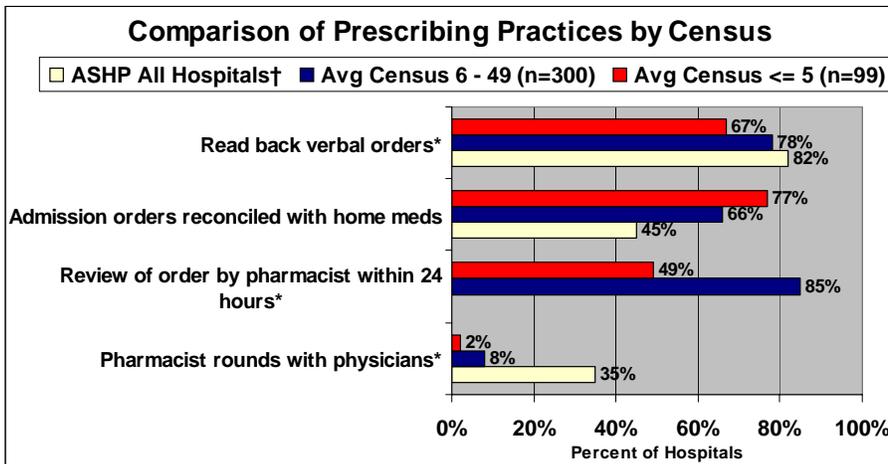
director of nursing — who is the individual likely to be the most knowledgeable about the overall process of medication use within rural hospitals that have limited pharmacist support.

Survey Results

Fifty-three percent of the sample of 775 hospitals completed and returned a survey. Characteristics of non-respondent CAHs and SRHs did not differ significantly from those of respondents. Responses for individual items are summarized in Figures 2 through 10. Statistical comparisons were made between hospitals based on average daily census. The figures include comparisons of our sample to hospitals from survey research of all general community hospitals conducted by the American Society of Health-System Pharmacists (ASHP) (Pedersen, Schneider, & Scheckelhoff, 2005; Pedersen, Schneider, & Scheckelhoff, 2006). In most cases, the ASHP data were stratified by size — including hospitals with 400 or more beds. In a few instances, responses from all hospitals — both large and small — were reported instead. When available, for purposes of comparison to large hospitals expected to have the resources to implement all processes, we compared our survey results to those from hospitals of 400 or more beds.

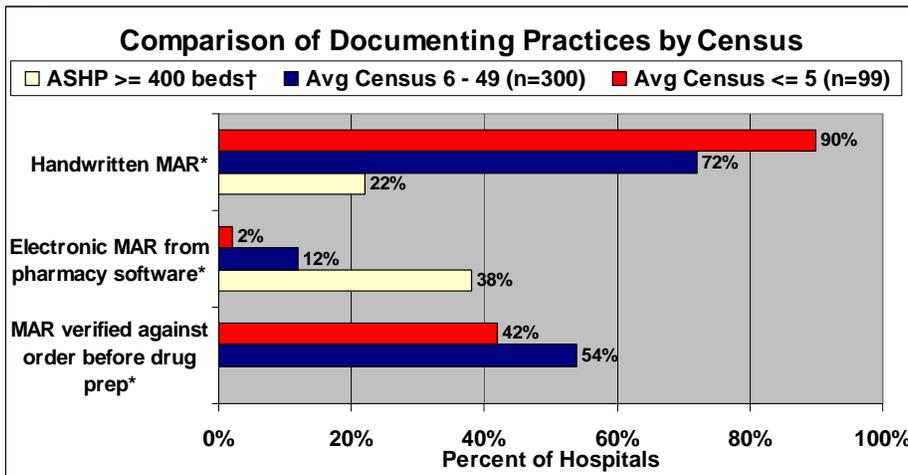
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Figure 2.



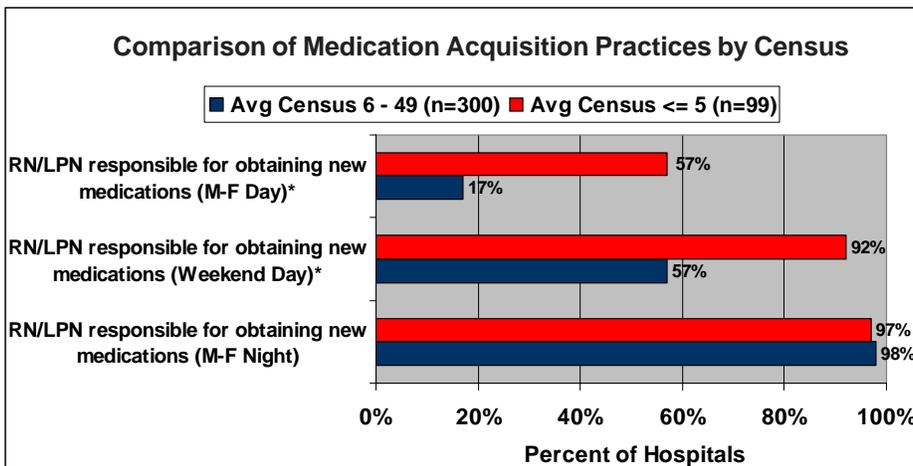
†Pedersen, Schneider, & Scheckelhoff, 2005; Pedersen, Schneider, & Scheckelhoff, 2006.
 *Statistically significant difference between smaller hospitals at p < 0.05.

Figure 3.



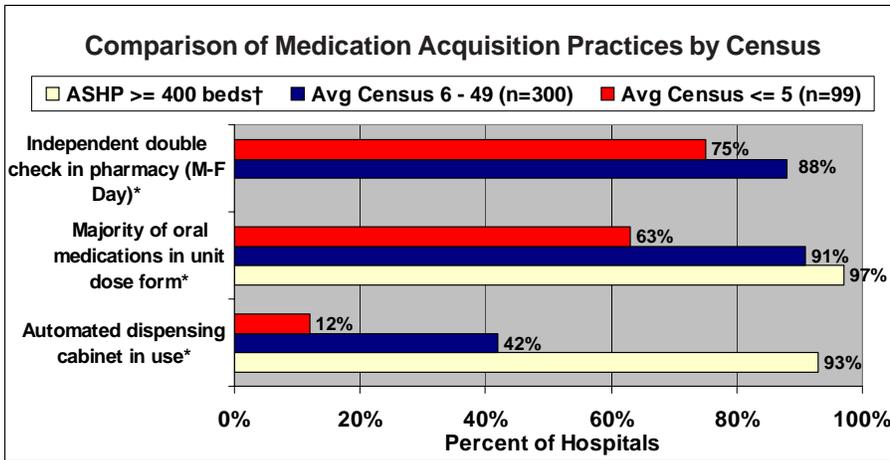
†Pedersen, Schneider, & Scheckelhoff, 2005; Pedersen, Schneider, & Scheckelhoff, 2006.
 *Statistically significant difference between smaller hospitals at p < 0.05.
 Note: MAR refers to the medication administration record.

Figure 4.



*Statistically significant difference between smaller hospitals at p < 0.05.

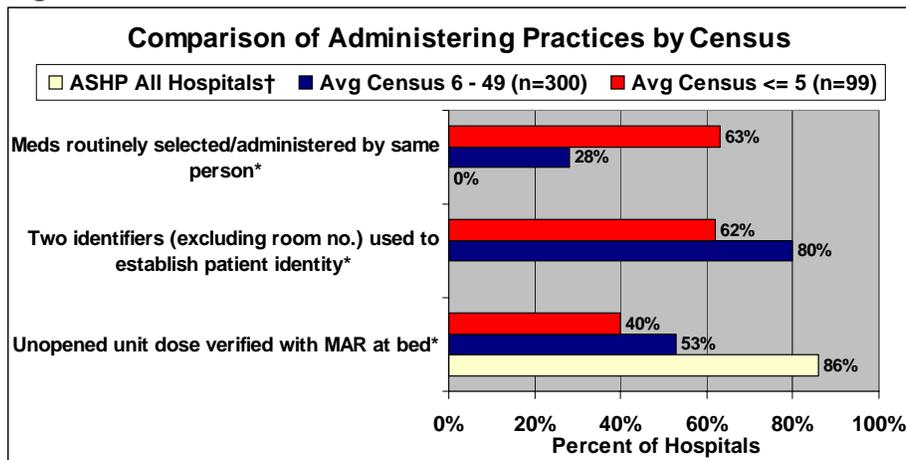
Figure 5.



†Pedersen, Schneider, & Scheckelhoff, 2006.

*Statistically significant difference between smaller hospitals at p < 0.05.

Figure 6.

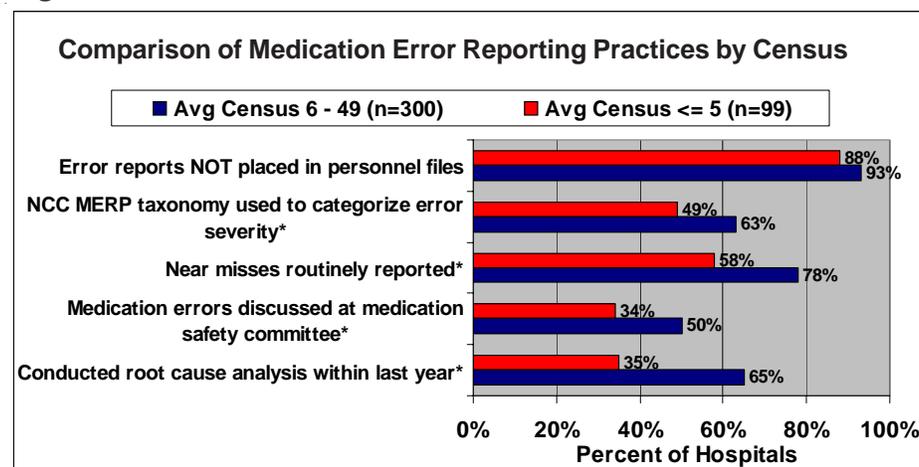


†Pedersen, Schneider, & Scheckelhoff, 2006.

*Statistically significant difference between smaller hospitals at p < 0.05.

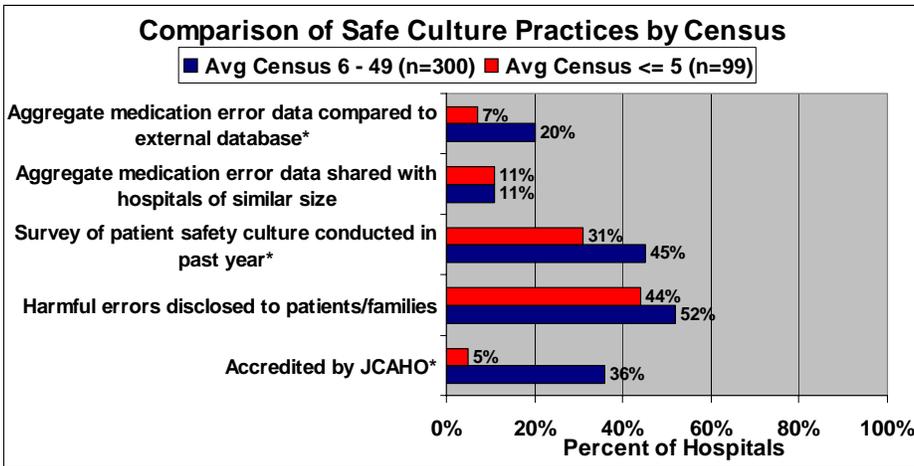
Note: MAR = medication administration record.

Figure 7.



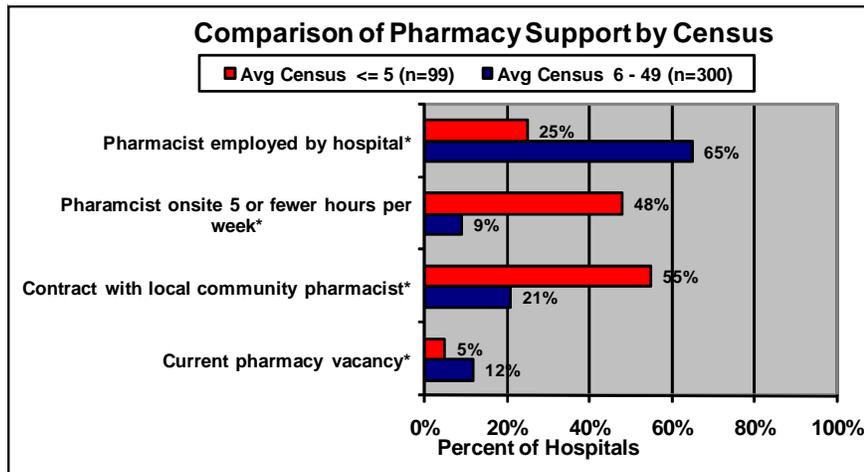
*Statistically significant difference between smaller hospitals at p < 0.05.

Figure 8.



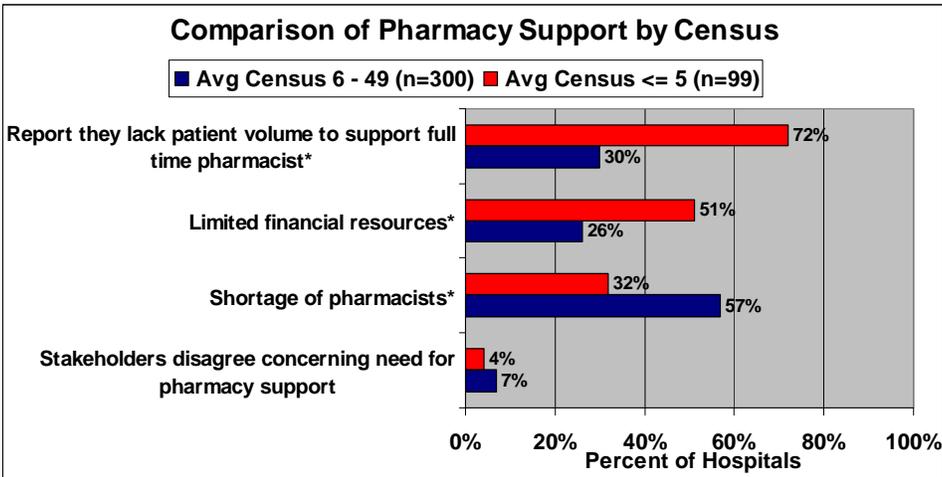
*Statistically significant difference between smaller hospitals at $p < 0.05$.

Figure 9.



*Statistically significant difference between smaller hospitals at $p < 0.05$.

Figure 10.



*Statistically significant difference between smaller hospitals at $p < 0.05$.

In a post-hoc analysis, we selected the essential elements of knowledge-based safe medication practice from each of the four phases of the medication use process:

- Pharmacist review of medication orders within 24 hours
- Independent double check of transcription to the MAR before obtaining the initial dose
- Independent double check of a selected medication within the pharmacy or medication room prior to administration
- Verification of the five rights of medication administration by the nurse at the bedside using an unopened unit dose and the MAR

We labeled these items “the indisputable basics of medication use,” which reflects Nolan and Berwick’s (2006) “all-or-none” concept that the quality of a process should be judged by reliably completing all elements within the process. None of these four selected best practices rely on technology for implementation. Only 18% of the entire sample—9% of hospitals with an average daily census of five or fewer and 21% of hospitals with an average daily census of six or more—reported that these four evidence-based safe practices were frequently or always performed in their hospitals. The following variables were statistically significant predictors of implementing these four indisputable safe medication practices: having an average daily census of six or more, having on-site pharmacy support greater than five hours per week, and accreditation by the Joint Commission.

Conclusions and Policy Implications

The availability of resources, as represented by the size of a hospital, influences the prevalence of knowledge-based safe medication practices in hospitals. The smallest hospitals, with an average daily census of five or fewer inpatients (about 25% of all CAHs), were least likely to have implemented evidence-based safe medication practices. Hospitals that lack a full-time, on-site pharmacist were least likely to implement an independent double check between the prescribing of a medication by a physician and the administration of that medication by a nurse. Only 12.1% of all hospitals with an average daily census of five or fewer patients had a full-time (defined as 40 or more hours per week) pharmacist on-site, compared to 66.0% of hospitals with an average daily census of six or more. These hospitals without on-site pharmacy support were also least likely to have pharmacists participating in formulary management, drug utilization review, medication error reporting, and other quality improvement initiatives.

Findings from this research reveal considerable opportunity for improvement in hospitals with 49 or fewer beds to achieve evidence-based standards of medication safety. While significant investment in information technology is needed to implement some safe practices, such as computerized physician order entry and bar-code medication administration, many safe practices, such as a read-back policy for verbal orders or implementation of independent double checks, are based on knowledge, do not require technology, and can be implemented now. Some steps can be taken without a full-time pharmacist on-site by using communication technology (e-mail and fax) that enables

an off-site pharmacist to review prescriptions and assist with formulary management. During the past two years, some rural hospitals have implemented telepharmacy systems that enable a remote pharmacist to control an on-site automated dispensing machine. However, significant improvements in medication safety among SRHs will require that widespread use of telepharmacy be accompanied by reliable implementation of safe medication practices across all phases of medication use. These practices must include a read back of verbal orders; reconciliation of medications upon admission, transfer, and discharge; an independent double check of the stocking of automated dispensing machines; consistent use of two means of patient identification; and a systematic approach to medication error reporting and analysis. Rural hospitals will not be able to assess the impact of any changes in medication use without systematic voluntary medication error reporting programs and the ability to conduct effective root cause analyses.

Regardless of the use of incentives to encourage hospitals to improve their medication use processes, the smallest hospitals with the greatest opportunity for improvement will require education and assistance to prioritize improvements. Mandates for change (e.g., through Medicare conditions of participation, state regulation, or payment policies) must be accompanied by resources for education, planning, and implementation. An example of a mandated change is the requirement for a pharmacist review of medication orders prior to administration of an initial dose of a medication. The majority of hospitals with 49 or fewer beds will require financial and technical assis-

tance to implement the telepharmacy services needed to comply with such a mandate. We suggest implementation of the following initiatives before or at the same time as further regulatory action.

- Focus resources of existing programs, such as the Medicare Rural Hospital Flexibility Grant program, on the medication safety needs of the smallest rural hospitals.
- In the next scope of work, or through a special program, direct Quality Improvement Organizations to address the medication safety needs of the smallest rural hospitals.
- Engage state hospital associations and network hospitals in educational efforts to spread adoption of evidence-based safe medication practices to the smallest rural hospitals.
- Encourage other private sector programs that assist rural hospitals, such as the quality initiative of the National Rural Health Association, to focus on disseminating evidence-based safe medication practices to SRHs.
- Convene a conference of hospitals with 49 or fewer beds to focus on successes in implementing knowledge-based components of medication safety programs such as process mapping, systematic voluntary medication error reporting, education to conduct effective root cause analyses, and effective means to assess a hospital's safety culture.

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