Upper Midwest
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POLICY BRIEF

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Pharmacist Staffing and the Use of Technology in Small Rural Hospitals: Implications for Medication Safety

Overview

Adverse drug events are associated with increased lengths of stay, additional costs, and increased mortality among hospitalized patients.[1] Research has shown that pharmacists can play an important role in implementing medication safety initiatives in hospitals.[2] Computer programs that allow pharmacists to check for appropriate dosing, contraindications, and drug interactions have also been demonstrated to significantly reduce adverse drug events.[3]

To assess the capacity of rural hospitals to implement medication safety practices that reduce the likelihood of serious adverse drug events, a national telephone survey of a random sample of rural hospitals was conducted in March to May 2005. A total of 387 hospitals responded to the survey for a response rate of 94.6 percent. Pharmacists were asked about the hospital's pharmacy staffing, use of technology, implementation of protocols and medication safety practices, and medication safety priorities.

The results of this study indicate that many small rural hospitals have limited hours of on site pharmacist coverage. The majority of hospitals surveyed are using pharmacy computers, but a significant proportion either do not have a pharmacy computer or are not using it for clinical purposes. Implementation of protocols related to medication use and key medication safety practices are areas where small rural hospitals could improve.

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Pharmacy Staffing

Many small rural hospitals have limited hours of on site pharmacist coverage (Table 1). Study findings indicate that the level of pharmacist staffing is higher in rural hospitals with higher patient volume and more seriously ill patients. Hospitals with higher pharmacist staffing also are more likely to be accredited by the Joint Commission on Accreditation of Healthcare Facilities (JCAHO) and to be in better financial condition. In hospitals with limited pharmacist coverage, pharmacists may not be able to take an active leadership role or spend significant time on medication safety activities.

Table 1. Rural Hospital Pharmacist Staffing
(n = 387)

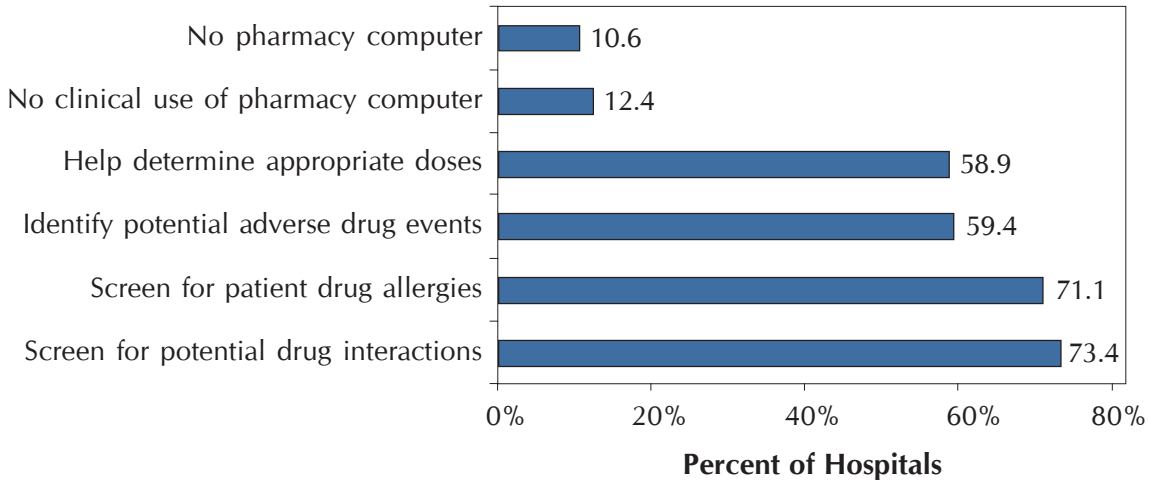
0.5 FTE or less	27.7%
0.6 to 1.0 FTE	17.8%
1.1 to 2.0 FTEs	19.9%
2.1 to 3.0 FTEs	20.2%
More than 3.0 FTEs	14.5%

Note: 1 FTE = 40 hours/week

Use of Technology

The majority of small rural hospitals (77%) are using pharmacy computers, but a significant proportion either do not have a pharmacy computer or are not using it for clinical purposes such as helping to determine appropriate doses, or screening for patient drug allergies and potential drug interactions (Figure 1). Hand-held software devices are used by pharmacists in 45% of the hospitals, while only 3% of hospitals use bar code technology for bedside medication administration.

Figure 1. Clinical Use of Computers in Rural Hospital Pharmacies

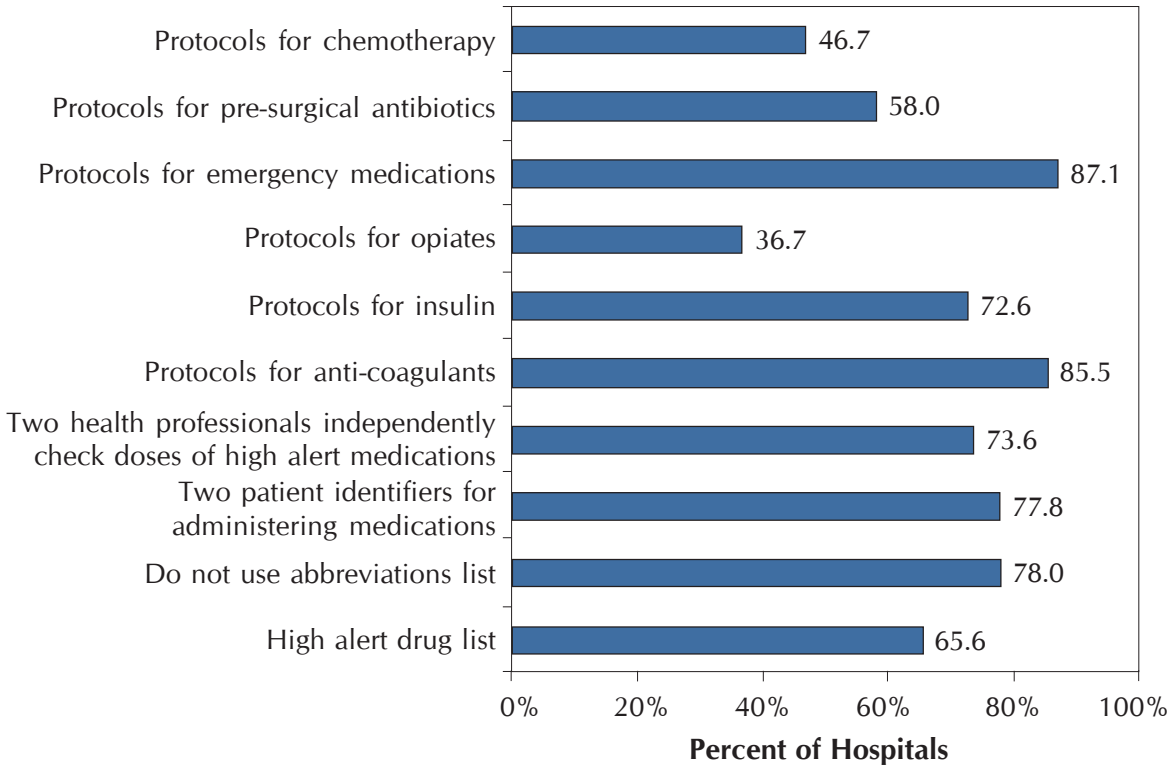


Use of a pharmacy computer for clinical purposes is more likely among rural hospitals that have higher patient volume, are JCAHO accredited, and are in better financial condition. Cost is a major reason given by survey respondents for not implementing specific medication safety-related technologies. Other reasons for not using technology include computer system and software problems; limited pharmacy hours/pharmacist time; and belief that the hospital is too small and technology is not needed or not a priority.

Implementation of Protocols and Medication Safety Practices

The proportion of surveyed hospitals that have implemented protocols addressing specific categories of drugs range from 27 percent for opiates to 87 percent for emergency medications. Less than half of the hospitals that provide chemotherapy services have implemented protocols for those drugs, while 58 percent of hospitals that provide surgery have implemented protocols for pre-surgical antibiotic prophylaxis.

Figure 2. Implementation of Medication Safety Practices in Rural Hospitals



Note: Questions regarding chemotherapy and pre-surgical antibiotics protocols were only asked of hospitals that provide chemotherapy and surgery.

The majority of hospitals in the survey have implemented a do-not-use-abbreviations list (78%); a policy of using two patient identifiers for administering medications (78%); a policy of having two health professionals independently check doses of high alert medications (74%); and a high alert drug list (66%). However, only half of the hospitals have implemented all four practices. Hospitals that have implemented the four practices are more likely to be JCAHO accredited and be in better financial condition. They are also more likely to have a medication safety or patient safety committee with active pharmacist participation.

Top Priorities for Improving Medication Safety

When asked what one thing they would do to improve medication safety in their hospital, 26% of respondents say they would implement bar code technology. Other top priorities include increasing pharmacist staffing (17%); implementing or improving an automated medication dispensing system (14%); and obtaining a pharmacy computer system or improving their existing computer system (11%).

Policy Implications

While expansion of pharmacist coverage in small rural hospitals would likely have a significant positive impact on medication safety, efforts to increase pharmacist staffing in rural hospitals must take into account evidence of a continuing national shortage of pharmacists, and the fact that rural hospitals have greater difficulty recruiting pharmacists than those in urban settings.

Shared staffing across hospitals is one option that may allow smaller hospitals to obtain the expertise of a hospital pharmacist, but may not be practical in isolated rural areas. Although 17 percent of the hospitals in the current study are sharing pharmacists with another hospital, many of these hospitals still have very limited hours of pharmacist coverage. Other potential strategies to achieve additional pharmacist coverage include greater utilization of telepharmacy arrangements that allow smaller rural hospitals to connect to the 24 hour pharmacist resources of larger hospitals, and expanding the role of the hospital-based pharmacist to include managing drug therapy in ambulatory care, long term care, hospice and home care patients, as well as in the inpatient setting.

Investment in health information technology is a key component of the Institute of Medicine Committee on the Future of Rural Health Care's strategy to address quality challenges in rural communities.[4] The results of this survey support a continuation of efforts to encourage the use of information technology in rural

hospitals, such as the Agency for Healthcare Research and Quality health information technology initiative, which is targeting grant funds and other resources to rural health care systems.

The survey findings suggest that implementation of protocols related to medication use and key medication safety practices are areas where small rural hospitals could improve. While achieving full compliance with medication safety practices is challenging, all hospitals should be working towards implementation, and multiple resources are available on the Internet to help hospitals assess and improve their medication use systems.

Of particular interest to policymakers, two factors - JCAHO accreditation and hospital financial status - are significantly related to pharmacist staffing, use of a pharmacy computer, and implementation of four key medication safety activities. Small rural hospitals historically have been less likely than larger urban facilities to be JCAHO accredited. Improving implementation of key medication safety practices among non-accredited hospitals will likely require a comprehensive approach that includes increasing awareness of the importance of implementing the practices, as well as targeted provision of technical assistance and financial incentives.

Cost-based Medicare reimbursement has contributed to the financial viability of critical access hospitals (CAHs) and has been an important factor in the ability of CAHs to fund a range of post-conversion activities to improve quality of care and patient safety. The finding of significant relationships between financial status and pharmacist staffing, use of technology, and implementation of medication safety practices supports a continuation of Medicare policies to help ensure financial stability for small rural hospitals through cost-based reimbursement as a means of helping to support quality and patient safety activities.

Footnotes

[1] Classen, D., Pestontnik, S., Evans, R., Lloyd, J., and Burke, J. Adverse Drug Events in Hospitalized Patients. Excess Length of Stay, Extra Costs, and Attributable Mortality. *Journal of the American Medical Association*, 277:301-306, 1997.

[2] Kaushal, R. and Bates, D. "The Clinical Pharmacist's Role in Preventing Adverse Drug Events." In Shojania, K. et al., *Making Health Care Safer: A Critical Analysis of Patient Safety Practices*. AHRQ Publication No. 01-E058. Rockville, MD: AHRQ, 2001.

[3] Agency for Healthcare Research and Quality (AHRQ). *Reducing and Preventing Adverse Drug Events to Decrease Hospital Costs*. Research in Action, Issue 1. AHRQ Publication No. 01-0020. Rockville, MD: AHRQ, 2001.

[4] Institute of Medicine, Committee on the Future of Rural Health Care Quality, Board on Health Care Services. *Quality Through Collaboration: The Future of Rural Health Care*. Washington DC: National Academies Press, 2005.

About the Study

Forty-three percent of the responding hospitals have 25 or fewer staffed beds; 33 percent have between 26 and 50 beds, and 25 percent have over 50 beds. Ten percent of the hospitals are for-profit; the rest are government (46%) or not-for-profit (44%) hospitals. Forty-three percent are designated Critical Access Hospitals (CAHs); 40% are members of multi-hospital systems; and 47% are accredited by JCAHO.

The survey interviews were conducted by the Survey Research Center at the University of Minnesota. For the analysis, the survey data were linked to American Hospital Association Annual Survey data on hospital characteristics, and to Medicare Cost Report and case mix index data from the Centers for Medicare and Medicaid Services.

Multivariate analyses were conducted to examine the relationships between hospital organizational characteristics and financial indicators and 1) the amount of pharmacist staffing; 2) the use of pharmacy computers for medication safety activities; and 3) the implementation of medication safety practices.

The information in this policy brief is based on Upper Midwest Rural Health Research Center Working Paper #1 by Michelle Casey, MS; Ira Moscovice, PhD, and Gestur Davidson, PhD. The Working Paper is available at http://www.uppermidwestrhrc.org/

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