

ASHP Statement on the Pharmacist's Role in Informatics

Position

The American Society of Health-System Pharmacists (ASHP) believes that pharmacists have the unique knowledge, expertise, and responsibility to assume a significant role in medical informatics. As governments and the health care community develop strategic plans for the widespread adoption of health information technology, pharmacists must use their knowledge of information systems and the medication-use process to improve patient care by ensuring that new technologies lead to safer and more effective medication use.

ASHP has long recognized pharmacy informatics as a unique subset of medical informatics that focuses on the use of information technology and drug information to optimize medication use. The purpose of this statement is to reaffirm the responsibilities of the pharmacist and the pharmacy informaticist in medical informatics.

Background

Medical informatics was first defined during the 1960s.¹ Since then, the term informatics has been redefined several times, reflecting the dynamic nature of the health care information technology environment. The National Library of Medicine defines medical informatics as the “field of information science concerned with the analysis, use and dissemination of medical data and information through the application of computers to various aspects of health care and medicine.”² The central purpose of medical informatics is the dissemination of two core types of information: (1) patient-specific information created in the care of patients and (2) knowledge-based information, which includes the scientific literature of health care.³ Most researchers consider medical informatics an interdisciplinary or heterogeneous field, made of individuals with diverse backgrounds and levels of training with an inconsistently defined set of skills.⁴ The broad definition of medical informatics and the number of disciplines potentially involved present an opportunity for the growth of subspecialties within the field. One of these subspecialties is pharmacy informatics, which can be defined as the use and integration of data, information, knowledge, technology, and automation in the medication-use process for the purpose of improving health outcomes.

The potential for medical informatics to improve health outcomes has prompted the health care industry, large health care purchasers, and state and federal governments to undertake sweeping health information technology initiatives that commonly include the following applications⁵:

- Computerized prescriber-order-entry systems integrated with electronic health records (EHRs) and pharmacy information systems,
- Clinical decision-support tools that bring best-practice information and guidelines to clinicians at the time they need them and rule-based systems for monitor-

ing, evaluating, responding, and reconciling medication-related events and information,

- Pharmacy information systems that allow electronic validation of medication orders in real time, provide the data flow needed to update both the medication administration record and order-driven medication dispensing systems, and support such operational activities as supply-chain management and revenue compliance,
- Automated dispensing cabinets and robotics integrated or interfaced with pharmacy information systems,
- Integrated medication administration management systems that enable the administration of bar-coded medications and use of “smart” infusion pumps, and
- Integrated medication surveillance applications for the reporting of medication incidents and adverse events.

Development of these applications requires organizations to reengineer existing medication-use processes by introducing additional technologies and applications to support the end-to-end management of medications across the continuum of care. The drive to create a seamless environment for real-time sharing of medication- and patient-related information across all levels of care has highlighted the importance of medical and pharmacy informatics in health care. Traditional pharmacy systems that focus on the transcribing, preparation, and distribution phases of the medication-use process are often considered the foundation, or hub, for communicating meaningful information outside the pharmacy domain. The creation of such systems requires a unique blend of medication management and technology-related skills and draws new attention to the need for pharmacy informaticists.

Federal Initiatives

Reports issued by the Institute of Medicine^{6,7} and subsequent research validating the importance of technology in health care led the federal government's launch of two important health care technology initiatives. In summer 2004, the Department of Health and Human Services released a 10-year plan entitled *The Decade of Health Information Technology: Delivering Consumer-Centric and Information-Rich Health Care*.⁸ The plan was specifically designed to transform the delivery of health care by building a new health information infrastructure that links health care records nationwide. The plan describes the pressing need to achieve “always-current, always-available electronic health records for Americans.” These EHR systems would allow physicians and other health professionals to share valuable health care information at the point of care. The report identified four major goals⁸:

1. *Inform clinical practice.* Bring information tools to the point of care, especially by investing in EHR systems in physicians' offices and hospitals.
2. *Interconnect clinicians.* Build an interoperable health information infrastructure so that records follow the

patient and clinicians have access to critical health care information when treatment decisions are being made.

3. *Personalize care.* Use health information technology to increase consumers' access to information and involvement in health care decisions.
4. *Improve population health.* Expand the capacity for monitoring public health, measuring quality of care, and accelerating implementation of research advances into medical practice.

The Centers for Medicare and Medicaid Services and the Department of Health and Human Services have published standards for an electronic prescription drug program under Title I of the Medicare Prescription Drug, Improvement, and Modernization Act of 2003 (MMA).⁹ These standards are the first step in adopting final standards to address the MMA objectives of delivering cost-effective, efficient, safe, and high-quality patient care.

Electronic prescribing (e-prescribing) is the process of using a computer to enter, modify, review, and output or communicate prescriptions electronically to a patient's pharmacy.¹⁰ E-prescribing with EHR systems further enhances the quality of care and patient safety by integrating the medication order into the overall process of medical care delivery.⁸ Real-time access to patient information across the continuum of care and the provision of evidence-based clinical decision-support programs among stakeholders in the medication-use process offer opportunities to improve the quality of care, reduce errors, and improve workflow efficiency.

Pharmacists' Responsibilities

Pharmacists have unique, comprehensive knowledge about the safe and effective use of medications. More importantly, pharmacists understand core pharmacy operations and have developed expertise in end-to-end medication-use management, including communication with other information systems.⁴ Pharmacists provide the expertise to effectively translate and seamlessly communicate the language of medication use across the continuum of care. They can interpret and implement requirements to ensure the safe and comprehensive communication of medication orders. An experienced pharmacist is skilled in the use of electronic medication-order-entry systems and has knowledge of human factor issues (e.g., interpretation of ambiguous clinical data) and the development of interfaces to disparate applications and systems.

Currently, there are many paths to becoming a pharmacy informaticist, with a growing number of training and residency programs focusing on this area. Although some pharmacy informaticists have formal academic or experiential training, the typical pharmacy informaticist is a pharmacist who has knowledge of computer systems, medication-use processes, safety issues, clinical management of medications, drug distribution, and administration and has developed extensive expertise in using technology to support these activities. Pharmacy informaticists are well suited to address the myriad issues involved with health care technology initiatives and provide leadership in the field of medical informatics. The pharmacy informaticist's responsibilities include active participation and leadership in all medical informatics activities that support medication use; education of pharmacy students, pharmacists, pharmacy technicians,

health care colleagues, and administrators; and research on the core areas of medical informatics.

Participation. The active participation of pharmacists in all aspects of medical informatics that support the medication-use process is imperative for safe and effective medication use. Such participation must be collaborative and comprehensive across the entire health care organization. It begins with system identification and vendor selection and includes identification of system requirements, as well as application design, development, implementation, and maintenance. Pharmacists must also be involved in the development and implementation of standards for medication-related vocabularies and terminologies to ensure safety and optimize deployment of activities related to clinical decision support.

Pharmacy informaticists are uniquely qualified to serve as liaisons between the pharmacy department and others involved in systems development, including vendors and other departments. The pharmacy informaticist's skills are needed to

- Work closely with information systems and pharmacy staff to develop system programming requirements while understanding system capabilities and limitations,
- Develop and oversee databases related to medication management systems,
- Identify, suggest solutions to, and resolve system or application problems,
- Assess medication-use systems for vulnerabilities to medication errors and implement medication-error prevention strategies,
- Actively participate in the development, prioritization, and determination of core clinical decision-support systems, and
- Assist in mining, aggregating, analyzing, and interpreting data from clinical information systems to improve patient outcomes.

The participation of pharmacy informaticists in the enhancement of the knowledge management infrastructure related to clinical decision support will make it possible for more providers to access high-quality references, rules, and guidelines that are comprehensive, usable, actionable, and configurable. Enhancing the vocabulary and terminology infrastructure will make broadly applicable research on the effectiveness of specific clinical decision-support methods possible.¹¹ Depending on the size of the organization and its scope of medication services, one or more pharmacists assigned and responsible for pharmacy informatics may provide the best means for attaining the level of participation required for safe and effective information systems.

Leadership. Pharmacists are responsible for patient safety throughout the medication-use process and need to take a leadership role in medical informatics at all levels of health care to ensure that health information technology supports safe medication use. Pharmacy informaticists must use their skills to

- Provide leadership to the institution's committees (e.g., practice, safety and quality, technology, pharmacy and therapeutics),
- Collaborate with other health care technology and clinical leaders to ensure that medication-related sys-

tems support interoperability and transportability of clinical information while maintaining patient safety and confidentiality,

- Attain key leadership roles within the health care technology industry, professional practice associations, and health care technology organizations, and
- Lead governmental and regulatory groups to sound conclusions regarding the use of technology in medication management, particularly as it relates to setting standards.

Education. Pharmacy informaticists need to develop a set of practical informatics competencies to manage medication-related data and information challenges across the continuum of health care.¹² Only a small percentage of U.S. pharmacy students currently receive the level of exposure to medical informatics needed to prepare for the dawning “decade of health information technology.”⁴ Pharmacy informaticists are responsible for providing strategic road maps for pharmacy educators that outline educational goals and objectives for training in medical informatics. Pharmacists actively involved in medical informatics within their own organizations are responsible for educating pharmacy staff and the institution’s leadership about their role, particularly as it relates to using information technology to improve medication safety and quality of care. The education of leadership and staff must also include the inherent risks and negative aspects of implementing medication-use technologies. Their educational responsibilities include

- Supporting the continued growth of ASHP-accredited informatics residency training programs by serving as informatics residency program directors and preceptors,
- Coordination and implementation of staff development programs and curricula in pharmacy departments designed to teach fundamental concepts related to technology and outline those areas of medical informatics in which pharmacists are critical to the development process (e.g., electronic prescribing and ordering, clinical decision support, drug administration), and
- Training pharmacy technicians in the use of medication-related computer systems and technology in an effort to develop roles for credentialed pharmacy technicians to support pharmacy informaticists and other pharmacy staff.

Research. Pharmacy informaticists are responsible for performing research involving the core issues of medical informatics. Such research includes the study of standards, terminology, usability, and demonstrated value involving the economics, safety, and quality of health information technology.³ Research efforts should be focused on designing and conducting research to expand informatics knowledge and its use in supporting patient care. The pharmacy informaticist, through qualitative and quantitative research, can assist in determining the balance of clinical informatics and health care system reengineering needed to optimize the medication-use process and improve patient safety and outcomes.

Conclusion

Pharmacists have the unique knowledge, expertise, and responsibility to assume a significant role in medical informat-

ics. As governments and the health care community develop strategic plans for the widespread adoption of health information technology, pharmacists must use their knowledge of information systems and the medication-use process to improve patient care by ensuring that new technologies lead to safer and more effective medication use.

References

1. Vanderbilt University Medical Center. What is biomedical informatics? www.mc.vanderbilt.edu/dbmi/informatics.html (accessed 2005 Dec 10).
2. National Library of Medicine. Collection development manual: medical informatics. www.nlm.nih.gov/tsd/acquisitions/cdm/subjects58.html (accessed 2005 Dec 10).
3. Hersh WR. Medical informatics: improving health care through information. *JAMA*. 2002; 288:1955–8.
4. Flynn AJ. The current state of pharmacy informatics education in professional programs at US colleges of pharmacy. *Am J Pharm Educ*. 2005; 69:490–4.
5. California HealthCare Foundation. Addressing medication errors in hospitals: a framework for developing a plan. www.chcf.org/documents/hospitals/addressingmederrorsframework.pdf (accessed 2006 Feb 9).
6. Committee on Quality of Health Care in America. Crossing the quality chasm: a new health system for the 21st century. Washington, DC: National Academy Press; 2001.
7. Kohn LT, Corrigan JM, Donaldson MS, eds. To err is human: building a safer health system. Washington, DC: National Academy Press; 1999.
8. Thompson TG, Brailer DJ. The decade of health information technology: delivering consumer-centric and information-rich health care. Framework for strategic action. www.hhs.gov/healthit/documents/hitframework.pdf (accessed 2006 Mar 10).
9. Centers for Medicare and Medicaid Services. Medicare program. Electronic prescription drug program; voluntary Medicare prescription drug benefit. *Fed Regist*. 2005; 70:67568–95.
10. eHealth Initiative. Executive summary—electronic prescribing: toward maximum value and rapid adoption. www.ehealthinitiative.org/initiatives/erx/document.aspx?Category=249&Document=269 (accessed 2006 Mar 10).
11. Teich JM, Osheroff JA, Pifer EA et al. Clinical decision support in electronic prescribing: recommendations and an action plan. Report of the Joint Clinical Decision Support Workgroup. www.amia.org/mbrcenter/pubs/docs/cdswhitepaperforhhs-final2005-03-08.pdf (accessed 2006 Feb 9).
12. Balen RM, Miller P, Malyuk D et al. Medical informatics: pharmacists’ needs and applications in clinical practice. *J Inform Pharmacother*. 2000; 2:306–18.

Developed through the ASHP Section of Pharmacy Practice Managers and approved by the ASHP Board of Directors on March 28, 2006, and by the ASHP House of Delegates on June 27, 2006.

Mark H. Siska, B.S. is gratefully acknowledged for leading the drafting of this statement. ASHP also gratefully acknowledges the

following individuals for their participation in drafting this statement: Louis D. Barone, Pharm.D.; James L. Besier, B.S., M.S., Ph.D.; Toby Clark, M.S., FASHP; Kevin C. Marvin, B.S., M.S.; Scott R. McCreadie, Pharm.D., M.B.A.; Sandra H. Mitchell, M.S.I.S.; John C. Poikonen, Pharm.D.; Michael D. Schlesselman, Pharm.D.; Rita R. Shane, Pharm.D., FASHP; James G. Stevenson, Pharm.D., FASHP; Perry D. Taylor, Pharm.D.

Copyright © 2007, American Society of Health-System Pharmacists, Inc. All rights reserved.

The bibliographic citation for this document is as follows: American Society of Health-System Pharmacists. ASHP statement on the pharmacist's role in informatics. *Am J Health-Syst Pharm.* 2007; 64:200–3.