

**STATE COMMISSION ON PATIENT SAFETY
ROUND ONE RECOMMENDATIONS
MAY 26, 2005**

Category D: Implementing Safety Systems in HCOs

Code 23 (InfoTech) – Information Technology: The submitted testimony recommends use of information technology to improve the safety of patient care.

Recommendation: D3

An appropriate state level entity should identify and convene stakeholders that can potentially (a) gain from investment in clinical information technology and (b) provide some means of financial support to healthcare delivery organizations to purchase, install, train and implement improved technology that is applicable and usable by all providers in Michigan. These improved technologies should be compatible within and across providers to support an efficient exchange of information, while complying with all the applicable rules of confidentiality.

Recommendation: D3a. *All healthcare delivery organizations should execute/maintain the processing of electronic medical records, bar-coding, computerized physician order entries, automated drug safety monitors and electronic prescribing across the continuum of care. Systems should be designed to prompt clinicians to consider evidence-based practices and patient safety alerts.*

Recommendation: D3b. *All healthcare delivery organizations should conduct a thorough assessment of patients at discharge by licensed nurses; implement/enhance their internal surveillance process to investigate infections and create a system to monitor medication compliance by their patients.*

Recommendation: D3c. *Care needs to be coordinated between the mail order pharmacies and community pharmacies in Michigan through technology systems. Calling upon the local community pharmacies during acute conditions of patients only, leads to fragmented care delivery and hazardous safety concerns.*

Recommendation: D3d. *All healthcare delivery organizations should consider implementing a “passport” type electronic medical record, whereby a brief history of patient information is maintained and transmitted by the patient to various providers at different points of service.*

**STATE COMMISSION ON PATIENT SAFETY
ROUND ONE RECOMMENDATIONS
MAY 26, 2005**

Rationale:

Quality of care is a primary concern in today's health care system. One factor that impedes optimal quality is the growing changes in information technology (IT). The expansion of new medical technologies has fostered greater complexity in care. As the Robert Wood Johnson Foundation (1996) noted the current health care delivery system cannot meet the expectations of the patients and their families.¹ The fact that health care technologies have developed more rapidly than the health care provider's ability to use them safely and efficiently, is indeed a growing dilemma.¹ However, as identified by the Institute of Medicine (IOM) (2001), quality problems do not generally originate from insufficient training, knowledge, or effort by health care professionals. The concern lies in the rapid development of technology. Considering the plethora of new medical information and technology emerging daily, it is impossible for each clinician to retain the knowledge that is essential for evidence-based practice.² Further, the IOM (2001) suggests that the problems which have been arising because of advances in technology will only continue to intensify if changes are not made to health care delivery in the United States.²

While the benefits of IT are well documented, the overreaching concern is financial feasibility. In order for this recommendation to be enacted, it is necessary to find the appropriate funding. As the IOM (2001) states, the health care delivery system will require "a significant financial investment in information technology—far greater than current investments by most health care organizations"² (p. 174). Funds will need to be secured by Michigan health care organizations to purchase, install, and train health care providers on the new technology.

Certain health care organization, such and not-for-profit and small physician groups will have difficulty securing funds.² Health care organizations such as these will benefit significantly from support from IT stakeholders. Additionally, these types of health care organizations will benefit from IT stakeholders if larger for-profit organizations invest in new IT systems. Without the backing of stakeholders, small organizations will not have the means necessary to adopt the IT systems chosen by the larger health care organizations. If there is no funding, there will be no incentive to adopt the system.² Obtaining support from varying financial sources will allow these health care organizations to further the goal of adopting IT systems in the state of Michigan. Currently, only 2% of the health care industry invests their gross revenues to IT. This is a sharp distinction to other information industries where they use 10% of their revenues for IT systems.³

**STATE COMMISSION ON PATIENT SAFETY
ROUND ONE RECOMMENDATIONS
MAY 26, 2005**

Rationale for Recommendation D3a:

The need to address confidentiality of electronic systems was first addressed in 1996, when the Health Insurance Portability and Accountability Act (HIPPA) was put in place. This created federal mandates for the development of all electronic health transmissions.⁴ Additionally, this law required recommendations to be created by the Secretary of Health and Human Services which would address further privacy issues of identifiable patient information. While these recommendations were created in 1997, Congress failed to enact them by the 1999 deadline. Therefore in 2000, the Department of Health and Human Services announced regulations based on the recommendations made to Congress in 1997.⁵ Since the enactment of HIPPA, concerns still come up surrounding privacy issues. For the enactment of this recommendation, further protections to ensure safety would need to be determined and incorporated.

Automated Clinical/ Electronic Medical Records

Since the human mind cannot process all of the current medial data required to effectively care for every patient, electronic medical records (EMRs) help alleviate this burden.³ EMRs offer numerous health care providers access to patient information simultaneously, seven days a week, 24 hours a day. Through these systems, the information can be accessed anywhere; it can always be found and is legible, which is contrary to written records.³ Automated medical records or EMRs provide the potential for increased efficiency, reduced costs, and improved patient care according to the U.S. General Accounting Office.² The GAO felt it was necessary that standards be developed to create uniform recording and transmission all medical information. In 1993 the GOA created a report that called for leadership to advance the development of standards for automated medical records.² It is through these automated medical records that clinical and administrative data can be obtained and applied to research. Assessment of clinical outcomes, benchmark standards, and the identification of new methods for health care delivery services also lie within the scope of automated medical records.² These systems are also in use in primary care offices, however, as Bates et al. (1999) state, only 5% use them.³

While it is hard to see the true benefits of EMRs currently, they do offer many that will be more visible once they are adopted.⁷ Dictation costs, chart pulls, decision support to show cost of laboratory tests and drugs are only some of the cost saving features of EMRs.⁷ In fact, a study conducted by Bates et al. (1999) showed the EMRs reduced patient medication prescribing errors by 80%.⁶ The benefits also extend to emergencies such as a bioterrorism attack because providers will be able to have health care data that is linked to public surveillance.³

**STATE COMMISSION ON PATIENT SAFETY
ROUND ONE RECOMMENDATIONS
MAY 26, 2005**

Physician/ Medication Order Entry Systems and Safety Monitoring

It is imperative that health care providers administer the appropriate medication. In the United States, 7,000 deaths occur annually from medication errors that take place either within or outside of the hospital setting.⁷ Research has shown that medication errors can be reduced by the use of computerized drug prescribing.⁸ More specifically, medication order entry systems, which offer data

on known drug allergies, drug interactions, current medications and the patient's diagnosis, have shown to reduce the number of errors made when prescribing medications.⁹ These types of systems also reduce errors made because of drug dosing.¹⁰ Safety monitoring through such processes as service reminders and drug dosing systems have been linked to improved clinical decisions.¹¹

Exchange and Confidentiality of Information

As mentioned previously, confidentiality of medical information is a primary concern when addressing issues of transfer and exchange between providers as well as patients. The IOM (2001) proposed that health care systems in the 21st century should allow their patients to have access to both scientific and personal information. This information should be available to the patient without restriction or permission by another entity.² In the current system used by many health care organizations, the data is seen as retrospective or a record of the clinical care. This type of system is largely a protective mechanism from lawsuits.² Under the new approach of technological exchange, the health care information should be treated as a tool to build the patient and clinical relationship. The information should be seen as interactive and prospective.² Additionally, as recommended by the IOM (2001) there should be an audit log that list all those who have access to the patient's identifiable information.²

The recommendation speaks to ensuring the privacy of information when using IT systems. However, while the issue of confidentiality must be considered, it is important to note that the sharing of clinical data among health care team members can improve care.¹²

Rationale for Recommendation D3b:

Information technology opens the door to many quality avenues. The creation or implementation of supportive information systems such as patient registries would be effective in providing the tools for preventive care reminders, necessary follow-up information, and provide feedback to the provider about patient compliance.¹³

**STATE COMMISSION ON PATIENT SAFETY
ROUND ONE RECOMMENDATIONS
MAY 26, 2005**

Rationale for Recommendation D3c:

The evidence supports use of information technology to create collaboration among health care providers; including pharmacies in the state of Michigan. However, as will be identified in the board barriers to information technology, the endeavor of creating an IT system that is shared across providers will face privacy issues as well as the difficult of standardizing common language.

Evidence and/or information on comparable initiatives being carried out in other states:

States have a number of options to focus their efforts to improve health care delivery through information technology. Mendelson and Miller-Salinsky (1997) identify these as (1) providing meaningful state decision makers; (2) disseminating information collected by state governments; (3) coordinating services delivered by government providers; (4) coordinating services delivered by government providers; (5) creating transactions systems for the public and private sectors; and (6) supporting telemedicine services (p. 107-108).¹⁴ Brief descriptions of these options are described below, which are taken from Mendelson and Miller-Salinsky (1997):

- 1.) **Providing Data.** State executive information systems offer health care providers the ability to gain access to health care data that has been traditionally housed in a number of separate data sets. Georgia's Division of Public Health created their Executive Health Information System that meets this goal.²⁰
- 2.) **Disseminating Public Information.** States have the opportunity to offer access of health care data to the purchasers, consumers, providers, and researchers. Along with health care data, states can also seek to provide performance measurement standards that offer data to inform the employer, improve quality, and help the consumer choose health care providers. A number of private sectors have already established these systems such as the National Committee for Quality Assurance (NCQA's) Health Plan Employer Data and Information Set (HEDIS), the Foundation for Accountability's (FACCTs) quality measures, and the Agency for Health Care Policy and Research (AHCPR's) Hospital Quality Indicators (p.109).²⁰
- 3-4.) **Improving the Coordination.** Since public health services are offered by a number of providers the need for coordination of this information is essential. The Illinois Department of Public Health created a Cornerstone system to help coordinate health care delivery to their clients. This system allows the health care provider access to all available services that assists in streamlining appointments for the client.²⁰

**STATE COMMISSION ON PATIENT SAFETY
ROUND ONE RECOMMENDATIONS
MAY 26, 2005**

- 5.) **Facilitating Health Transactions.** The need for healthy information infrastructures that allows the private and public stakeholders access to health care data has been a vision since HIPPA. States such as Wisconsin, Utah and Minnesota have helped to create these systems in the private sector.²⁰
- 6.) **Supporting Telemedicine.** Telemedicine communicates health care information, such as medical images, consultation, and education to various health care providers. These system have been effective in rural settings where resources are limited. Georgia, California, Colorado, Kansas, and Nebraska have implemented some type of telemedicine system.²⁰

As mentioned earlier, health care organizations across the country have adopted varying types of information technology systems. In the attempt to remain current over the years, some organizations have adopted systems, which by today's standards, would be considered out dated. Such systems that use a mainframe are not as advanced as those that utilize the Internet. While some organizations have attempted to advance their systems, the majority of health care organizations have yet to adopt IT systems.

Larger organizations such as the Department of Veterans Health Affairs have adopted electronic record systems.

Many organizations have made attempts to become paperless and have adopted clinical information systems that include order entry and laboratory data.¹⁵

Legislative efforts have been put forth by more the two-thirds of the states to incorporate information technology.¹⁶ These efforts have not been consistent and illustrate the complexity of placing legal ramifications on IT systems. Other regulatory efforts have been put into place that adopt IT systems to current regulatory structures, which only adds to the confusion and ineffectiveness of promoting IT systems.²

There has been a push for information technology systems to be community based. In other words, systems have been created to network data that could be shared by community providers. The data created would be able to measure cost and quality. The first system, Community Health Management Information System (CHMIS), offered these services and was created by the Hartford Foundation. Soon after it was introduced, states began to adopt this system and incorporate it into their initiatives for health care reform. One of the first states to mandate CHMIS was Iowa and was adopted in 1992. Vermont attempted to follow suit in the same year by drafting legislation that called for the creation of a unified health care database.¹⁷ The Minnesota Health Data Institute was charged to create a CHMIS for the state of Minnesota in partnership with the

**STATE COMMISSION ON PATIENT SAFETY
ROUND ONE RECOMMENDATIONS
MAY 26, 2005**

Hartford Foundation. The state of Washington also created legislation in 1993 that mandated all health care providers and insurers comply with CHMIS. However important the CHMIS systems are, they lost momentum when Congress did not pass Bush's comparative value programs or Clinton's regional data centers. When the reform for a national infrastructure collapsed, so did the role of CHMIS in most states. In the state of Washington, it was dropped altogether.

Pros:

The adoption of information that is electronic and automated offers the benefit of eliminating cumbersome paper records. When patients request to see their medical records they are given photo copies of the paper versions, which are either complex or abbreviated.¹⁸ It is difficult for the patient to decipher the large unorganized record that is often incomplete, inaccurate and filled with medical jargon.² Not only are paper medical records a burden for the patient to navigate through, they also create great difficulties in collecting and tracking longitudinal data.¹⁹ The traditional medical record also does not always contain information regarding patient preferences or the patient's contribution.²

A considerable advantage of implementing new information technology is the ease of Internet-based applications. Because of the flexibility with storing Internet information, it can be held digitally in a number of locations. This information can be accessed by the health care provider, the patient, or anyone else the patient permits to see the information.²⁰

As the IOM (2001) suggested, the Internet and information technology systems offer many benefits across the continuum of care. These benefits are outlined below:

- *Consumer Health.* The explosion of Internet use has allowed consumers to search health care information, seek out providers, and find health care support groups.
- *Clinical Care.* The importance placed on reminder systems²¹ and online prescribing²² will play a large impact in the health care delivery system. Additionally, the Internet will play a large role in the transmission of scientific publications, practice guidelines, and other evidence-based practice tools.²
- *Administrative and Financial Transactions.* Information systems will prove to be beneficial in improving administrative and financial transactions. The two most important factors that will be addressed through IT systems are service improvements and efficiency.²

**STATE COMMISSION ON PATIENT SAFETY
ROUND ONE RECOMMENDATIONS
MAY 26, 2005**

- *Public Health.* As the IOM (2001) proposed, IT systems will be able to improve public health through incident reporting, disease surveillance, patient registries and answer public health concerns between providers.²
- *Professional Education.* The use of the Internet is and will be a strong force in health education for the future. Virtual classrooms, teleconferences, and simulations are available for educational purposes that are accessible through the Internet.²
- *Research.* Multiple facets of research will be improved by the use of the Internet. From accessing the most recent literature on health care issues to sharing databases, advancement in research will be more readily available to not only colleagues, but the public as well.

Barriers:

Privacy

While many barriers stand in the way of Michigan adopting information systems that offer the providers and public invaluable access to health care information, the overwhelming concern is that of privacy. Based on public opinion polls, Goldman (1998) found that during the last 10 years, people have become more concerned with privacy issues, which has force some to withhold personal information from their health care providers.²³ The fear of hackers being able to alter personal health information is a large deterrent to a public acceptance of this type of statewide system. Some reassurance in these systems are given to the availability of encryption and authentication from the receiver and sender.² Additionally, legal ramifications will help to deter unauthorized users.²

Undoubtedly, there is concern that the privacy of the information may be violated; however, concern is also raised that the protections of privacy may lead to limitation on the future of IT uses.²⁴ With higher protections and regulations to ensure privacy, it may inhibit health care organizations from adopting these systems.²²

Commonality of Language

As numerous studies have suggested, a large barrier in the adoption of a universal information systems is the many different methods, standards, and definitions for collecting, coding and exchanging data.²⁵ Since the data will be shared between providers, it is necessary that everyone speaks the same language. As cited by IOM (2001) there have been a number of groups that have sought to create a commonality among IT standards such as "American National Standards Institute's Healthcare Informatics Standards Board, High Level 7, the American Society for Testing and Material, the American Standards Committee, the Institute of Electrical and Electronics Engineers."²⁶

**STATE COMMISSION ON PATIENT SAFETY
ROUND ONE RECOMMENDATIONS
MAY 26, 2005**

The Department of Health and Human Services is also a part of the development for national standards that address the collection, coding, definitions, and exchange of information.² The problem is that slow progress has led to the inability to adopt a comprehensive standard.² Another concern is that the time frame many laws would require these systems to be adopted by are thought to be unrealistic by many health care executives.²⁷

Governance

Deciding who will be responsible for IT efforts is a barrier that will need to be faced before any type of implementation. The governance of these systems may come from single agencies, state legislation, cross-agency collaborations, or partnerships between public and private sectors (p.114).²⁰ Problems could arise within the adoption of each of these options. For instance, most state initiatives usually do not lie within one agency. If a single agency is charged with the task of implementing IT systems, they may encounter the problem of leading the private sector without the support of the government.²⁰ Cross agencies are an attractive option, however few IT systems have been created in this fashion.²⁰ Using state legislation to implement IT systems runs the risk of falling to political pressure and budgetary constraints (p.115).²⁰ Finally, private and public partnerships have been cited as the most advantageous. They offer the ability to gain consensus from both the public and private stakeholders, which reduces cost and increases efficiency. They also allow for more independent operation, which is often a problem government agencies face.²⁰

Management

States will have to build an IT system through the use of technical expertise and senior leadership.²⁰ However, the merging of these two forces may cause difficulties in "...communication efforts [that] include restrictions on salaries, organizational complexity of state governments, and the need for both political and technical leadership" (p. 115).²⁰

Cost

The cost of implementing IT systems will remain throughout the entire process. Start up costs, system construction, continued operation, and improvement costs will be incurred over time. However, cost saving will also be seen. The Wisconsin Health Information Network, which allows access to direct clinical and administrative data, was able to incur an average annual cost saving of \$17,000-\$68,000 for physician practices and \$398,000-\$1,061,000 for hospitals.²⁸

**STATE COMMISSION ON PATIENT SAFETY
ROUND ONE RECOMMENDATIONS
MAY 26, 2005**

Culture

IT research has been and is still currently seen by clinicians and policy makers as less important than research efforts including such immediate and tangible results as medications or medical devices.²⁹ Cultural reluctance is also seen in physicians' acceptance of these systems. Physicians are concerned with their reliability and privacy.³⁰

Implementation Steps: TBD

Cost: TBD, The cost of IT will depend on the type of support given to the recommendations and what organization(s) will offer financial support to the endeavor (i.e., public/private sectors, governmental funding, grants).

¹ The Robert Wood Johnson Foundation (1996). *Chronic Care in America: A 21st Century Challenge*. Princeton, NJ: The Robert Wood Johnson Foundation, Online. Available at <http://www.rwjf.org/library/chrcafe/> [accessed Sept. 19, 2000], as cited in IOM (2001) *Crossing the quality chasm: A new health system for the 21st century*. Washington DC: National Academy Press.

² IOM (2001) *Crossing the quality chasm: A new health system for the 21st century*. Washington DC: National Academy Press.

³ Bates, D., Ebell, M., Gotlieb, E., Zapp, J., Mullins, H.C. (2003), A proposal for electronic medical records in U.S. primary care. *Journal of the American Medical Informatics Association*, 10(1), 1-10.

⁴ Health Care Financing Administration. (2000). "Medicare EDI (Electronic Data Exchange)." Online. Available at <http://www.hcfa.gov/medicare/edi/edi.htm> [accessed Jan. 3, 2001], as cited in IOM (2001) *Crossing the quality chasm: A new health system for the 21st century*. Washington DC: National Academy Press.

⁵ *Press Briefing on Final Privacy Regulation* (2000).. Washington, D.C.: U.S. Department of Health and Human Services, 2000. Released on December 20, 2000. Online. Available at <http://www.hhs.gov/ocr/briefs.html> [accessed Jan. 30, 2001] as cited in IOM (2001) *Crossing the quality chasm: A new health system for the 21st century*. Washington DC: National Academy Press.

⁶ Bates, D., Teich, J., Lee, J., Seger, D., Kuperman, G., Ma'luf, N. et al. (1999). The impact of computerized physician order entry on medication error prevention. *Journal of American Medical Association*, 6, 313-321.

⁷ Phillips, D., Christenfeld, N., and Glynn, L.(1998). Increase in US Medication-Error Deaths between 1983 and 1993. *The Lancet*. 351:643-644, as cited in IOM (2000). *To err is human: Building a safer health system*. Washington DC; National Academy Press.

⁸ Bates, D., Lucian L., Cullen, D., et al. (1998a). Effect of Computerized Physician Order Entry and a Team Intervention on Prevention of Serious Medication Errors. *JAMA* 280(15): 1311-6, as

**STATE COMMISSION ON PATIENT SAFETY
ROUND ONE RECOMMENDATIONS
MAY 26, 2005**

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⁹ Bates, D., Leape, L., Cullen, D. et al. (1998a). Effect of Computerized Physician Order Entry and a Team Intervention on Prevention of Serious Medication Errors. *JAMA* 280(15): 1311–6, as cited in IOM (2001) *Crossing the quality chasm: A new health system for the 21st century*. Washington DC: National Academy Press.

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¹⁰ Bates, D., Leape, L., Cullen, D. et al. (1998a). Effect of Computerized Physician Order Entry and a Team Intervention on Prevention of Serious Medication Errors. *JAMA* 280(15): 1311–6, as cited in IOM (2001) *Crossing the quality chasm: A new health system for the 21st century*. Washington DC: National Academy Press.

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¹¹ Balas, E., Weingarten, S., Garb, C., et al. (2000). Improving Preventive Care by Prompting Physicians. *Arch Int Med* 160(3):301–8, as cited in IOM (2001) *Crossing the quality chasm: A new health system for the 21st century*. Washington DC: National Academy Press.

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¹² Dickey, L. & Petitti, D. (1992). A Patient-Held Minirecord to Promote Adult Preventive Care. *J Fam Pract* 34(4):457–63, as cited in IOM (2001) *Crossing the quality chasm: A new health system for the 21st century*. Washington DC: National Academy Press.

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**STATE COMMISSION ON PATIENT SAFETY
ROUND ONE RECOMMENDATIONS
MAY 26, 2005**

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¹⁴ Mendelson, D., & Miller-Salinsky, E. (1997). Health information systems and the role of state governments. *Health Affairs*, 16(3), 106-119.

¹⁵ McDonald, Clement J., et al. (1997). The Three Legged Stool: Regenstrief Institute for Health Care. *Third Annual Nicholas E. Davies Award Proceedings of the CPR Recognition Symposium.* Computer-Based Patient Record Institute. Burr Ridge, IL: McGraw-Hill Healthcare Education Group, as cited in IOM (2001) *Crossing the quality chasm: A new health system for the 21st century.* Washington DC: National Academy Press.

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**STATE COMMISSION ON PATIENT SAFETY
ROUND ONE RECOMMENDATIONS
MAY 26, 2005**

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²¹ Alemi, F., Allemango, S., Goldhagen, J., et al. (1996). Computer Reminders Improve On-time Immunization Rates. *Medical Care* 34(10[Supplement]):OS45–51, as cited in IOM (2001) *Crossing the quality chasm: A new health system for the 21st century*. Washington DC: National Academy Press.

²² National Health Policy Forum. (2000). Physician Connectivity: Electronic Prescribing. Issue Brief, No. 752. Washington, D.C.: The George Washington University, as cited in IOM (2001) *Crossing the quality chasm: A new health system for the 21st century*. Washington DC: National Academy Press.

**STATE COMMISSION ON PATIENT SAFETY
ROUND ONE RECOMMENDATIONS
MAY 26, 2005**

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**STATE COMMISSION ON PATIENT SAFETY
ROUND ONE RECOMMENDATIONS
MAY 26, 2005**

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