

Improving Physician Adoption of CPOE Systems

Lessons Learned from the Field

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Introduction

In the vast and complex world of healthcare technology, we must ask ourselves — what is the best way to deliver the benefits of the latest technology? If healthcare decisions are cars, then physicians are the drivers. They dictate the place healthcare is delivered, the time frame of delivery and the amount of money spent on it. Physicians affect fully 80 cents of every dollar spent on healthcare. So, it is easy to see why a system integral to healthcare delivery cannot reach its destination without the blessing of user physicians. One such system is the computerized physician order entry (CPOE) system.

Traditionally, doctors have seen administrative efforts at implementing hospital information systems as a necessary evil, beneficial only to the hospital's financial bottom line. CPOE systems are seen as yet another burden upon physicians' already overcrowded schedules. Research by the Clinical Advisory Board says, "Physicians and nurses agreed that their attitudes toward computers were important barriers to guideline use. Physicians recounted their lack of motivation to learn the computer, implement computerized guidelines, or change their current behaviors to keep in step with constantly changing scientific evidence."¹ This lack of motivation is strong inertia to overcome. Nevertheless, without physician buy-in, participation and sense of ownership, no clinical IT program will be successful.

Physicians Are Vital to Success

McGill University reviewed CPOE implementations at three hospitals in an attempt to understand the dynamics and effect of physician resistance.² At hospital A, physician concerns were addressed well by the organization, appropriate support was instituted and the eventual outcome was successful implementation. In each of the other cases, the hospitals' responses resulted in reinforcement of physician resistance and the result was not so positive.

In hospital B, implementation was driven through despite poor effort on the part of the doctors to learn the system. An antagonistic environment developed where physicians complained and the administration threatened to deny admitting privileges to complaining physicians. In the end, a number of physicians resigned. Those who did not resign engaged their professional association in a battle against the hospital. The emergency department became inoperable, the CEO was ultimately dismissed, and the hospital was put under trusteeship. Only a fraction of the original functionality of its information system continued in place.

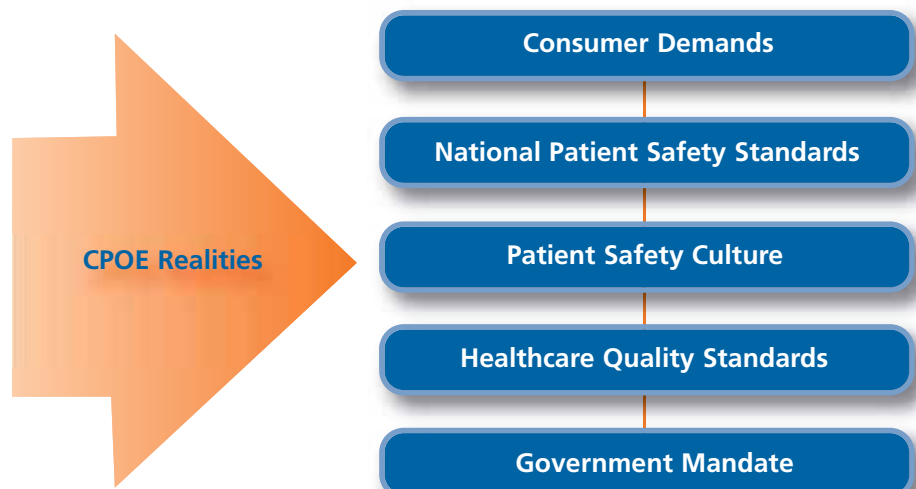
Working together to develop a physician-friendly, efficient and sophisticated CPOE system can and will bring about a dramatic and necessary improvement in our ability to provide the safe, quality care for all our patients.

In the final case, in spite of initial enthusiasm, physicians at hospital C began to complain that the system was overly complex. There was no response to their complaints. Negative feelings continued to proliferate, and physicians began to complain about “doing nurses’ work.” The nurses refused to enter physicians’ orders when asked, and resistance and antagonism grew. Eventually the physicians demanded removal of the system, and the hospital responded by threatening to reallocate beds to physicians with a more positive attitude toward the system. The doctors banded together as a whole and began refusing to admit patients. Finally the information system had to be removed entirely.

These are extreme examples. High stakes in the present day healthcare industry translates to high stress and emotion. It is imperative that all stakeholders operate from a common vision in an environment of mutual respect and purpose. Any and all resistance must be recognized, validated and dealt with in positive ways. Otherwise, the atmosphere becomes bitter and adversarial, and everyone loses. Working together to develop a physician-friendly, efficient and sophisticated CPOE system can and will bring about a dramatic and necessary improvement in our ability to provide the safe, quality care for all our patients.

Success Is Not Optional

In our current information age, the public can immediately scrutinize medical errors as well as their frequency and cause. More often the articles cite the 2006 report from the Institute of Medicine that states that every year the number of patients hurt or killed by medication errors is measured in the millions.³ Physicians are crucial to an effective medication safety strategy. Lucian Leape of the Harvard School of Public Health, speaking with Peter Buerhaus, who directs Vanderbilt University’s Center for Interdisciplinary Health Workforce Studies, said, “[N]o organization can make the significant changes that are necessary to develop a culture of safety without vigorous leadership at the top.” Buerhaus agreed. Leape followed with comments on the need for a unified approach and the need for a change in motivation: “[Physician-nurse relationships need] to improve if we are to make major strides in improving patient safety. ... What we need now is the will to make it happen.”⁴



If the rate of errors is to be reduced, can this reduction be effected through “traditional” means? Are we to expect physicians, nurses and other clinicians to “be more careful,” and to work harder and longer hours? We don’t think so. More so now than ever before, those of us who pursue a career in healthcare do so as a calling, rather than a simple career choice. Our very identities are defined by the quality of the care we deliver to our patients. We already work as hard and as carefully as we can to avoid any possible error. The inevitable conclusion then is that an improvement is required in the *system* itself if we hope to improve the quality, consistency and safety of patient care. Clinicians’ attitude and approach to technological tools will become increasingly more positive as a result of the push for patient safety as a goal of CPOE technology.⁵

Additionally, the Bush administration has funded the U.S. Office of the National Coordinator for Health Information Technology (NCHIT). The administration has set a goal for the health records of Americans to be electronic by 2014. Successful integration of a CPOE system is crucial to meeting this goal.

Overall Success Factors:

- 1) *Emphasis on patient safety*
- 2) *Strong leadership*
- 3) *Willingness to address physician "pain"*
- 4) *Appropriate resources*
- 5) *Public pressure*
- 6) *Peer pressure*
- 7) *Reason and logic*
- 8) *Optimization of existing physician systems*
- 9) *Thorough education, training and support*
- 10) *High-quality technology*

Overall Success Factors

From the authors' collective experiences, the following factors are "front and center" in every successful CPOE implementation:

Emphasis on Patient Safety

Frankly, patient safety is easy to "sell." It is a truly unifying concept throughout healthcare and helps keep the focus on the real purpose of all the hard work and sacrifice. The concept of improving patient safety provides a vision against which all aspects of the program should be measured, as well as a "rallying cry" around which all can gather. Further, if participants really believe improvement in patient safety and quality of care along with a decrease in errors is the goal, it becomes much easier to ask physicians to tolerate the difficult learning curve.

Strong Leadership

Leadership is a basic tenet of successful change management. Physicians, in particular, must feel they are being led by someone they respect and trust. We often hear, "Doctors are so resistant to change!" In fact we would submit the very opposite is the case. Physicians actually seek out change and are only resistant to change without purpose. They are always looking for any way to provide better, safer care for their patients. Physicians spend thousands of dollars in a variety of ways each year to learn what is new in their field. A key to successful CPOE implementation then becomes the ability to present the program to physicians in such a way that it is seen in the same way as peer-reviewed journals and CME. The most effective way to be sure doctors see the program in this light is to be certain it is presented to them by colleagues they respect and trust and in a context that reflects evidence-supported improvement in care.

Dr. Lawrence Prybil, professor of Health Management and Policy and senior advisor to the dean at the University of Iowa College of Public Health, and his colleagues found a very strong correlation between hospital performance and physician representation on the board of trustees.⁶ Similarly, Solucient found much higher clinical scorecard values in hospitals with active physician leadership in clinical quality improvement.⁷ This kind of commitment to physician leadership is a must for CPOE planning and implementation. While there must be physician leaders who are tightly identified with the CPOE program and function as champions for the cause and as "change agents," the administration must be seen as fully supportive of the physician-driven improvement in the quality of patient care. The alliance between administration, information technology and medical staff must be strong and perceived always as entirely united. In one study, this leadership mandate is referred to as "the triumvirate."⁸

Willingness to Address Physicians' "Pain"

Time away from practice. Physicians are increasingly forced to focus on productivity. In most cases, we find our physician clients are working much harder for significantly less reimbursement. Any significant time spent on the promotion and implementation of CPOE translates quite frankly into lost income. In today's healthcare economy, any institution wishing to implement a successful CPOE program and enjoy a strong return on its investment must consider paying key physicians (e.g., members of clinical IT committees, dedicated physician champions). It is simply no longer realistic to expect physicians to simply contribute their time, even when they realize it is "the right thing to do."

Reimbursement. Billing and reimbursement are two of the most onerous, tedious and worrisome burdens for today's physicians. Take whatever steps are practical in building the content of your CPOE system to maximize the potential for full reimbursement from third-party payors. While perhaps a mundane consideration compared with the potential for saving lives, by clarifying appropriate reimbursement and by linking orders and clinical decision support to disease states, CPOE can be a significant tool in this regard. Physician perception of the system as an aid in their billing process is a big boost to acceptance and adoption, as well as a strong motivator during the "learning curve."

Compliance. Similarly, one of the major advantages of a good CPOE system is the ability to structure compliance with externally imposed standards. Whether these are imposed by governmental agencies, payors or the Joint Commission, be sure to develop system content that substantially reduces physicians' compliance efforts. Also, as "pay for performance" becomes increasingly prevalent, the criteria for measuring "performance" can often be incorporated into the system.

Quality. Quality of care is a strong motivator of physician support. All physicians want to believe the quality of the care they provide their patients is the very best possible. To the extent doctors really believe their CPOE system allows an improvement in care that would be impossible without the added technology, commitment to the system and motivation toward full adoption are virtually guaranteed.

Reduced "Hassle." We see a nearly universal frustration among physicians over the enormous increase in the amount of time spent on things that are not directly related to patient care. Anything that allows physicians a shortcut through these issues is welcome. Build into your system anything you can think of to simplify physicians' lives. Examples include:

1. *Order outlines.* Provide an easy way to enter multiple, standardized orders simultaneously, such as common lab or imaging studies

While it is common for both doctors and nurses to worry that technology comes between them and/or their patients, it seems quite the opposite is the case. Now more than ever patients equate state-of-the-art technology with quality care.

2. *True “just-in-time” clinical decision support (CDS).* Well-designed, evidence-based and referenced CDS can be very helpful for such things as antibiotic selection, imaging options and evidence-based “best practice” admission orders. As long as this support is perceived as physician-developed and monitored, it will be welcomed. These aids speed physicians’ processes and workflow, and enable them to spend more time with patients.
3. *Remote access.* The ability to enter orders remotely (from home, office, surgery center, etc.) can also help streamline a physician’s day and allow great flexibility in dealing with patient care issues whenever they arise.

Appropriate Resources

The successful implementation of a CPOE program is quite commonly the largest and most comprehensive undertaking a hospital has ever set out to accomplish. It is essential that adequate resources be allotted — financial resources as well as personnel. In fact we recommend to clients they avoid the use of the term “project,” which suggests a temporary initiative with an endpoint, in favor of “program,” reflecting the ongoing process of updating, improving and enhancing the capabilities of this valuable tool indefinitely.

Public Pressure

Most physicians know modern patients are rarely naive about medical errors and the ability of technology to reduce them. Patients often come into a hospital or physician’s office armed with “scorecards,” obtained from the Internet, or other measures of hospital and physician performance. Despite the fact these do not always reflect reliable facts, patient expectations have surely changed. While it is common for both doctors and nurses to worry that technology comes between them and/or their patients, it seems quite the opposite is the case. Now more than ever patients equate state-of-the-art technology with quality care.

Peer Pressure

Peer pressure is a powerful motivator among physicians as long as it is seen to be coming consistently and persistently from respected “thought leaders” or “champions.” In fact this is a well-established learning mechanism for physicians and should be fostered enthusiastically in the context of CPOE implementation. CME credit should be given as physicians learn more and more about this powerful tool and its potential to improve patient care. Many approaches can and should be used to enhance physician learning (e.g., paper-based tutorials, one-on-one sessions, small groups, e-learning etc). A strong secondary benefit of the CME process is that it helps to reinforce the legitimacy of this course of action.

Reason and Logic

As long as the information is coming from a trustworthy source, CPOE can and should be presented in such a way that it simply “makes sense.” This approach is a very necessary component of the adoption process for physicians who are taught to be skeptical of new and different approaches. We must recognize, validate and overcome cognitive inertia in situations they feel are being dealt with “perfectly well” with current methods.

Optimization of Existing Physician Systems

Physicians’ expectations and therefore their inclination toward adoption are largely determined by their experience with existing systems. It is well worth the effort to optimize all current electronic systems before CPOE implementation is begun, with particular concentration on physician workflow and thought processes. Being certain physician use of and satisfaction with existing systems is carefully measured and acceptable prior to introducing CPOE is a strong predictor of CPOE success.

Thorough Education, Training and Support

Key characteristics of effective physician training include the following:

1. Develop a plan for training to be done repeatedly. Expect retraining to be a necessity.
2. Provide access to personalized training wherever and whenever physicians are working. (This goes a long way toward proving an institution’s commitment to physician support.)
3. Provide support and secondary training “at the elbow” of the physician users, especially during the first two weeks after go-live. This goal can be accomplished with super users and often with a well-planned nursing implementation of the same CPOE system prior to physician implementation.

High-Quality Technology

Technology is often less important to physician adoption than any of the above factors. Nevertheless, there should be easy, ubiquitous access, remote access in compliance with existing policies, and agreements relating to information exchange. A variety of devices will very likely be required to enhance and support the variety in physician style and workflow. Physicians must have both the right type of device and an adequate number of devices to meet varying demands of diverse specialties and preference. If doctors are forced to wait in line for a device, morale and likelihood of adoption will take a huge hit. Device numbers and locations must be planned to meet fully the needs of peak physician rounding. This is best monitored and adjusted by one or more full-time clinicians in the role of application specialist and analyst. We have seen nurse informaticists fill this role well. In addition, a strong vendor partnership and support are essential. Both the institution and the vendor must be equally committed to success as measured by adoption.

Key components of CPOE preparedness include objective evaluations of:

- *Leadership and proposed governance structure*
- *Physician engagement and commitment*
- *Change management strengths and challenges*
- *Opportunities for CPOE to enhance the existing order entry process*
- *Real and perceived barriers*
- *Technological readiness*
- *Training and support infrastructure*
- *Nursing and ancillary engagement*

CPOE Preparedness Strategy

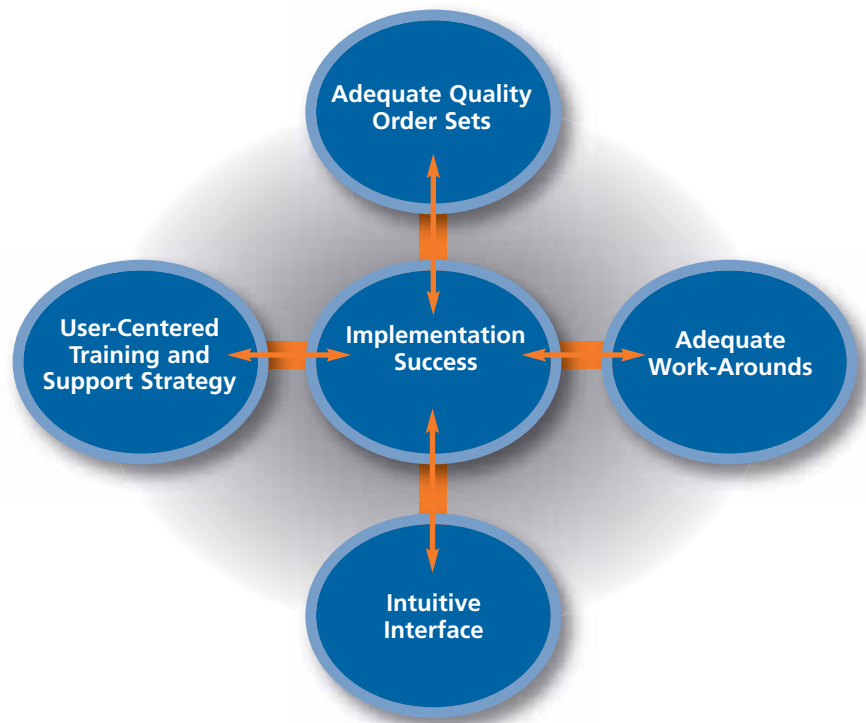
Prior to any CPOE implementation, significant effort must be made to assure clinicians that resources are prepared to move ahead. With any far-reaching initiative, a broad snapshot of organizational preparedness should be developed based on data review and multidisciplinary interviews along with detailed analysis of existing and proposed future workflow. This snapshot provides the guide and roadmap for CPOE preparation based on the organization's key strengths as well as opportunities for improvement. The process must be based on the current industry understanding of what it takes to be most successful. Often an experienced and expert consulting team can provide the most objective assessment.

Implementation

Regardless of the strategy and need surrounding a CPOE initiative, implementation is where the rubber really meets the road. Certain common threads closely correlate with success during the implementation phase of the CPOE program. One key factor revolves around institutional development of order sets or standardized orders. Order set management and prioritization are strategic clinical initiatives that are essential before, during and after content building. It is crucial to begin the process toward standardization early in the program. Physicians must reach consensus about strategies for achieving "best practice" and "evidence-based medicine" rather than "cookbook medicine." Again, the most persuasive argument is the most "sensible" argument. Medical knowledge continues to mushroom logarithmically. No single physician can stay up-to-date alone.

Well-researched and carefully thought-out order sets can become a physician's "checklist," just as a professional pilot has a written "checklist" for even the most routine flight. With this understanding, a physician will begin to approach the order set or protocol as his or her personal tool. Many even consider it proactive proof of best quality care, should a bad outcome suggest legal worries down the line. Evaluating current order sets and protocols using a consistent methodology lays the groundwork for the CPOE governance structure, a crucial milestone for both short- and long-term success of the CPOE program.

Key CPOE Implementation Factors



CPOE implementation success requires a structured plan for order sets development and strategies to address workflow changes and user interface.

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If the CPOE application does not have an intuitive user interface, the application’s successful adoption is headed toward ineffective adoption and failure. Physicians have little tolerance for processes they perceive hinder their workflow. The user interface must be easy to learn and must “make sense” as part of physicians’ everyday routine. The time to consider interface usability and adoptability is during the selection process for the CPOE software. Some CPOE applications can be customized to allow for variability in user approaches and preferences. If the application allows for it and it does not affect order content, standardized best-practice or order completion, then reasonable flexibility should be encouraged during implementation.

The term “work-around” is often considered to be a sign of system failure or lack of functionality. It can reflect a means to allow unwilling or resistant physicians a technique to avoid learning to use the application. Yet it is prudent to provide mechanisms to facilitate the gradual transformation from a paper-based system to electronic and for the inevitability of dual systems that must remain in place temporarily. Thinking ahead to consider which processes might need a well thought-out work-around can serve to improve adoption in the long run.

Training and support strategy development is also critical to any successful CPOE implementation. We have found in the course of our work that most physicians prefer “at the elbow” training and support and that this approach is the most effective and long-lasting technique. Physicians also tend to find classroom computer training unappealing and prefer one-on-one instruction. Further, many older and less computer savvy physicians need both training and support that allows them to learn at their own pace and to avoid feeling slow relative to their peers. CDs, Web-based training and “hands on” learning of the application in a training environment are excellent ways to provide physician-friendly education.

Common Barriers

Unfortunately, barriers often exist to adoption. Recognizing these challenges early in the process and developing a strategy to overcome them will provide an opportunity to achieve greater success with provider adoption.

One common barrier is limited or nonexistent executive sponsorship of the CPOE program. While it is critically important to keep a “physician face” on all clinical aspects of the program, successful adoption demands committed C-suite sponsorship, an encouraging board, medical staff leadership support, and an accessible and visible physician leader. With these leadership elements in place, the likelihood of the program’s success is greatly enhanced.

Most common barriers to adoption include:

- 1) **Limited or nonexistent executive sponsorship**
- 2) **Physicians' suspicious of executives' motives and respect for physician practice and autonomy**
- 3) **Physicians' perception of "cookbook medicine" as opposed to "evidence-based best practice"**
- 4) **Physicians' skepticism regarding the value of computers for patient care**
- 5) **Multiple logins/passwords to access patient information systems**
- 6) **The time, effort and costs of changing workflow to adapt to new systems**
- 7) **Little perceived value related to investment of time and cost during the learning curve**
- 8) **Device saturation during the patient rounding peak hours on the nursing floor stations**
- 9) **Slow network speed and inadequate bandwidth for wireless coverage of mobile devices**

Physicians can be suspicious of executives' motives for CPOE implementation. Often CPOE and other information technology initiatives are seen as threatening to physicians' autonomy and practice. However, physicians will embrace useful technology and clinical advances that improve the care of their patients. Most physicians now recognize the benefit of care standardization (e.g., common orders for community acquired pneumonia), which can alleviate suspicions. Similarly, physicians often assail CPOE and other attempts to make patient care more uniform as "cookbook medicine" instead of embracing it as "evidence-based practice." This notion can also be put to rest with proper education and attention to legitimate concerns of individual physicians.

With constant time pressure and many other external demands facing today's clinicians, it can be difficult to overcome physicians' skepticism regarding the patient care benefits of health information technology. By engaging physicians early and attending to their legitimate concerns, the usefulness and merit of improving patient care through adoption of information technology can be demonstrated. For example, many complex orders like sliding scale insulin, heparin dosing protocols and PCA orders can be entered more accurately, quickly and easily with CPOE. All clinical information technology initiatives should be presented as a means to accomplish better patient care and improved safety.

Finally, attention needs to be given to common technological obstacles that can derail CPOE early in the implementation of the program. Most hurdles can be avoided by proper system design, training and education. If a system has multiple logins/passwords to access patient information, then most clinicians, if not all, will be frustrated. Device saturation and lack of availability during peak patient rounding times at nursing stations will also frustrate clinicians. Device planning needs to ensure adequate and accessible devices for *peak times*.

Slow network and application speed and inadequate bandwidth for wireless coverage for mobile devices will also unnecessarily aggravate all users. Frank communication – before implementation – about realistic system expectations as well as clear and simple mechanisms for addressing issues will go a long way toward acceptance of the time, effort and costs of changing physician workflow while adapting to new systems.

Also, it is important to recognize, acknowledge and address physician resistance due to the lack of perceived value vs. the investment of time and cost during the learning phase of the program. The best way to address this resistance is a peer-to-peer review of the very real value of CPOE to patients

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and physicians, and to reinforce education and training efforts to shorten the learning process. Quicker “time to value” is always a boon to physician adoption of information technology.

Conclusion

Successful physician adoption of CPOE is the sine qua non of success. Successful adoption is a mission-critical outcome that must be achieved to move toward a health information technology infrastructure that ensures quality medical care and improves patient safety. Despite known and unforeseen barriers that will, at times, inhibit physician adoption, CPOE can be implemented effectively.

Simply put, a proactive plan addressing obstacles must be developed and followed through all stages of implementation. Physician ownership and leadership, long-term C-suite commitment, financial and training support, and effective change management are vital to realizing the goals of any CPOE program. In the end, with a renewed look at physicians’ use of health information technology with a systems management approach, errors will be reduced significantly, and patients whom we have the privilege and calling to serve will be cared for more efficiently, more effectively and more safely.

End Notes

- ¹ S. S. Lyons et al., “Information Technology for Clinical Guideline Implementation: Perceptions of Multidisciplinary Stakeholders,” *JAMA* 12, no.1, (January-February 2005): 64–71 (Clinical Advisory Board analysis).
- ² L. Lapointe, S. Rivard, “Getting Physicians to Accept New Information Technology: Insights from Case Studies,” *CMAJ* 174, no. 11 (May 23, 2006): 1573-78.
- ³ P. Aspden, J. Wolcott et al., *Preventing Medication Errors* (Washington D.C.: The National Academies Press, 2006).
- ⁴ P. Buerhaus, “Is Hospital Patient Care Becoming Safer? A Conversation with Lucian Leape,” *Health Affairs* 26, no. 6, 687-96.
- ⁵ M. R. Chassin and R. W. Galvin, “The Urgent Need to Improve Health Care Quality: Institute of Medicine National Roundtable on Health Care Quality,” *JAMA* 1998; 280: 1000-1005; L. T. Kohn, J. M. Corrigan and M. S. Donaldson, eds., *To Err Is Human: Building a Safer Health System* (Washington, D.C.: National Academy Press, 2000).
- ⁶ L. Prybil, R. Peterson et al., *Governance in High-Performing Organizations: A Comparative Study of Governing Boards in Not-For-Profit Hospitals* (Chicago: HRET, 2005).
- ⁷ Solucient 100 Top Hospitals, Performance Improvement Leaders, 3rd Edition, 2006, <http://www.100tophospitals.com>
- ⁸ J. Chenoweth and K. Safavi, “Leadership Strategies for Reaching Top Performance Faster,” HCT Project 4 (January 30, 2007), www.HCTProject.com.

References

Aspden P., J. Wolcott, J. L. Bootman, and L. R. Cronenwett. 2006. *Preventing Medication Errors*. Washington, D.C.: The National Academies Press.

Buerhaus, P. I. 2007. "Is Hospital Patient Care Becoming Safer? A Conversation with Lucian Leape." *Health Affairs* 26, no. 6, 687-96.

Chassin, M. R., and R. W. Galvin. 1998. "The urgent need to improve health care quality: Institute of Medicine national Roundtable on Health Care Quality." *JAMA* 280:1000-1005

Chenoweth J., and K. Safavi. 2007. "Leadership Strategies for Reaching Top Performance Faster." HCT Project 4 (January 30).

Kohn, L.T., J. M. Corrigan, and M. S. Donaldson, eds. 2000. *To Err Is Human: Building a Safer Health System*. Washington, D.C.: National Academy Press.

Lapointe L., and Rivard S. 2006. "Getting Physicians to Accept New Information Technology: Insights from Case Studies." *CMAJ* 174, no.11 (May 23): 1573-78.

Leapfrog Group. 2008. www.leapfroggroup.org.

Lyons, S. S., et al. 2005. "Information Technology for Clinical Guideline Implementation: Perceptions of Multidisciplinary Stakeholders," *JAMA* 293: 64-71. Clinical Advisory Board analysis.

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