



## CPOE Initiative

New England Healthcare Institute  
and Massachusetts Technology Collaborative  
Cambridge, MA

### **BACKGROUND**

In 2004, the Massachusetts Technology Collaborative (MTC), in partnership with the New England Healthcare Institute (NEHI), created the Massachusetts Hospital CPOE Initiative, a six-year-long campaign to speed adoption of a computer technology that can drastically reduce the scourge of harmful medication errors. The Initiative's groundbreaking research revealed that one in every ten patients in a Massachusetts community hospital suffers a serious but preventable medication error. The findings spurred the Massachusetts Legislature, the state's private payers and later the US Congress to enact policy changes encouraging or requiring the use of Computerized Physician Order Entry, or CPOE. NEHI and MTC estimate that statewide hospital adoption of CPOE will prevent 55,000 medication errors and save \$170 million annually in Massachusetts alone. Improving patient safety by preventing harmful medication errors will continue to be an issue of paramount importance as Massachusetts and the nation engage in health reform.

### **PROBLEM**

The quality of healthcare in the United States suffers from a high rate of medical errors, making patient safety a critical concern. Every year, an estimated one million medication errors occur and as many as 100,000 people die from medical mistakes. It is estimated that the costs associated with these medication errors reach \$2 billion a year. Many of those injuries, deaths and costs are actually preventable – and yet they still occur at alarming rates.

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Injuries that are caused by medications – such as severe allergic reactions or harmful interactions among medications – are known, in medical parlance, as adverse drug events. Preventable adverse drug events are caused by human error, such as prescribing or administering the wrong dose of a drug. These avoidable yet widespread calamities occur for a variety of reasons, ranging from confusion by a doctor, nurse or pharmacist in deciphering illegible handwritten prescriptions to a physician's failure to check a patient's record for drug allergies or medications already being taken by the patient.

In 2001, a report by the Agency for Healthcare Research and Quality concluded that up to 95 percent of adverse drug events “can be prevented by reducing medication errors through computerized monitoring systems.”

The agency was referring to a technology known as Computerized Physician Order Entry, or CPOE. CPOE is a computer application used by physicians and other caregivers to enter diagnostic and therapeutic orders for tests and drugs for hospital patients. The system assures accuracy through clinical decision support which provides physicians with knowledge of potential medication errors and recent test results, as well as prompts for standard screening tests, so that the most common errors are avoided.

Despite the potential of these systems to improve clinical outcomes, save lives and save money, only a small percentage of hospitals have acquired and implemented CPOE. Of the 73 hospitals in Massachusetts, for instance, only 13 had CPOE systems in 2005, leaving 60 hospitals, their doctors and their patients without the benefits of this valuable technology.

## **SOLUTION**

The Massachusetts Hospital CPOE Initiative was launched in 2004 by MTC and NEHI, with the ambitious goal of improving patient safety and lowering hospital costs through implementation

of CPOE in every Massachusetts hospital within four years. Early on, NEHI and MTC realized that collaboration was critical to the success of the project and brought in key stakeholders including the Massachusetts Hospital Association and the Massachusetts Council of Community Hospitals, as well as senior hospital executives and the leadership of health plans, public payers, health care quality organizations and the business community.

The goal was to research and assess the potential of CPOE to save lives and save money, and then to speed the adoption of CPOE, first throughout the state's hospital system and then nationwide. The initiative began by conducting an assessment of the readiness of all hospitals in Massachusetts to adopt CPOE, developing CPOE standards to ensure that the computer systems contain the necessary capabilities, and estimating what it would cost individual hospitals to adopt CPOE. Then, two key efforts were commissioned to demonstrate CPOE's potential clinical and financial benefits: a clinical baseline study of the existing level of medication errors in Massachusetts community hospitals, and a financial analysis on the potential impact of CPOE on the hospitals and their payers.

The clinical research, conducted by Dr. David Bates of Brigham & Women's Hospital, revealed a shocking reality: one in every ten patients in a Massachusetts community hospital suffered a serious but preventable medication error. Furthermore, the clinical and financial research found that if CPOE were implemented statewide, 55,000 dangerous medication errors would be prevented and \$170 million saved annually in Massachusetts alone.

As a result of the research, NEHI and MTC recommended that all Massachusetts hospitals implement CPOE within the four-year period ending in 2011, and that policymakers adopt incentives for hospitals to meet that goal. Additionally, the Initiative pledged to continue to provide ongoing implementation support to Massachusetts hospitals

at all stages of CPOE planning, adoption and operation.

## **COSTS AND BENEFITS**

It was critical for the CPOE Initiative to fully assess the financial costs and savings associated with CPOE implementation because hospitals had long cited financial barriers as reasons for not acquiring CPOE. PricewaterhouseCoopers undertook this assessment, including the capital, one-time operating costs and on-going operating costs of CPOE implementation, as well as an estimate of the payback period as a way of determining the hospitals' recoupment of their investment.

In general, the majority of the savings from implementing CPOE derive from avoiding adverse drug events; the consequence of each adverse drug event is based on an additional and costly 4.6 days of hospitalization. With patients whose care is paid for on a prospective (fixed) payment basis, those daily variable costs that are avoided accrue directly to the hospital. With patients whose care is paid for on a fee-for-service basis, the public and private payers experience a reduction in cost, but the hospital revenues are then decreased by an equal amount. These savings were calculated according to each of the six study hospital's payer mix.

The key financials for a Massachusetts community hospital are:

- Capital and one-time costs of CPOE acquisition and implementation: \$2.1 million
- Annual ongoing operating costs: \$435,000
- Annual reduction in operating costs: \$2.7 million
- Payback period: 26 months
- Annual benefit to payers: \$900,000

Given the 26-month payback demonstrated by the financial analyses, implementation of CPOE by all Massachusetts hospitals should be affordable.

Hospitals can use their own funds, apply for a loan either through conventional means such as banks or through tax exempt financing through the Massachusetts Health and Educational Facilities Authority (HEFA), or go to an investment bank to get a bond issuance. Additionally, smaller critical access hospitals (less than 25 beds) have their own reimbursement methodology and may qualify for other types of federal funds. Neither NEHI nor MTC provided any specific CPOE grants to hospitals.

CPOE also received a boost in the federal Stimulus Bill, which provides financial incentives to hospitals to adopt electronic health records that have the capability of providing clinical decision support and physician order entry – the key elements of the MTC/NEHI patient safety initiative. The legislation reduces Medicare payments for non-adopting hospitals beginning in 2016.

## **CONCLUSION**

When analysis of the clinical and financial studies began in 2007, there were 18 Massachusetts hospitals with CPOE in various stages of development. In 2009, there are 27 – a 50 percent increase in two years. There are another 27 hospitals with signed contracts for a total of 51 out of 73 in two years – a 70 percent increase.

The 2008 publication of the research findings spurred two major policy changes in the Commonwealth. The first occurred when the private payers, led by Blue Cross Blue Shield of Massachusetts, made hospital adoption of CPOE a condition of their quality reimbursement programs. The second occurred when the Legislature passed, and the governor signed into law, legislation making hospital adoption of CPOE by 2012 a condition of licensure. This provision was included in the 2008 amendments to Chapter 58, the Massachusetts Health Reform Bill.

NEHI and MTC are now also involved in an effort to bolster support for CPOE by demonstrating significant benefit within hospitals that have implemented

the technology, in terms of clinical and financial outcomes. This evidence, in turn, would support the enactment of the kinds of policies described above and represent a significant advance in the safety of hospital patients nationwide.



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