Barriers and Facilitators to the Diffusion of CPOE Systems in US Hospitals: *Voices from the Trenches*

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Agenda

- Barriers to the implementation of CPOE
- Unintended consequences to CPOE implementation
- Overcoming the barriers to implementing CPOE

Background

- Medication Errors are:
  - Common – 1.4 per patient admission
  - Expensive – $4600 per preventable ADE
  - Preventable
- Computerized Physician Order Entry has proven efficacy
  - 55% reduction in serious medication errors
  - Favorable cost-benefit
  - Identified by Leapfrog group as one of 3 patient safety 'leaps'.

So what's the problem?

- Only 10-15% of hospitals across the country have active CPOE systems
- High stakes
    - Enormous institutional investment
    - Well-publicized 'failures'
    - Reports of adverse outcomes with poor implementations

Identification of Barriers to CPOE Implementation

- Up to 3 top management officials (or designate) interviewed:
  - CIO
  - 2 of : CEO, CMO, COO, CFO
  - Variety of hospitals at various stages of CPOE implementation
- 30-minute taped, semi-structured interviews conducted over the phone by 2 MD interviewers
- All interviews transcribed
  - 48 total transcripts

Content of Interviews

- Domains:
  - Current state of CPOE adoption
  - Anticipated Benefits of Adoption
  - Barriers to Adoption
  - Facilitators to Adoption
  - National Policy Options
- Summary Assessments
  - Top 3 Barriers
  - Top 3 Facilitators

Data Analysis

- Iterative development of code list
- Coding of all transcripts
- Iterative formation of explanatory model

Significant Barriers – Most Frequently Cited as Top 3 Barriers

Domain	n	%
Physician and Organizational Resistance	61	54%
High Cost/Lack of Capital	33	29%
Product/Vendor Immaturity	19	17%
Total	113	100%

Poon, et al. Health Affairs July/August 2004

Negative Impact on MD workflow

- CIO: 'I can't look anybody in the eye and say, "Dr, I'm gonna save you time putting your order in the computer." That's not possible. It's gonna take longer to put the order into the computer than it is to scribble on the chart.'
- "I actually saw a 20% loss of efficiency, and in some cases closer to 30% to 40%"
- "We had physicians who didn't know what a mouse was. They could be *brilliant* surgeons, but if you put them in front of a computer, they're like deer in headlights"
- "They [the designers] don't understand what physicians really go through."

Fear of MD rebellion

- "How fast and how far can you push a group of people who are not your employees?"
- Q: "If CPOE was mandated in your hospital in spite of physicians' reluctance to use it, what would happen?" A: "The CEO will get fired."

Product Immaturity

- CIO: "If you look at the big companies, [Company A] has a product that now getting right to be 2 years mature—and it still has a lot of work to do. [Company B] has a brand new product out there from [University X], but boy, that's leading edge brand-new software just *effectively* being rewritten. You wouldn't put 8 or 10 million dollars in one of [Company C's] old products for fear they'll disappear, so you put [your money] into their new product, and the paint's still wet on that. And that's less solid than [Company B's] basic product. [Company D], well, their forte is pretty much considered to be outpatient systems. Now, I'm starting ot run out of names of real solid companies."

Cost and Competing Priorities

- "The number one [barrier] is cost. I have been doing hospital software for 29 years, and this is the most expensive project I've ever done"

- "Hospitals that are going out of business or are ¼ or ½ percent in the black are not going [to undertake] a five six seven eight million dollar project"

- "We had to do a hard sell job on some of the [physicians] because these people were told that there was no money in the pot for their pet project, and then they see money being put into [CPOE]."

Uncertain ROI/Cost Benefit Analyses

- "We called a hospital that has CPOE and asked them how to do a cost-benefit study. The finance person at that hospital said, " Well, if you're calling because you want to cost justify CPOE, then you might as well hang up now and stop and go do something else", CIO

- "It's so full of speculation about how much money you may save from reducing errors, and the track record's not good enough. It's all crap to me.", CFO

- "[CPOE] may save a lot of money [for] the health care system overall, but [the money] is not being collected by the hospital."

Unintended Consequences of CPOE

Campbell, Sittig, Ash, Guappone, Dysktra
JAMIA 2006

What are Unintended Consequences?

- Events or outcomes that are neither anticipated *nor* the specific goals of the associated CPOE project.

- Focus is the impact of CPOE on healthcare personnel who use, maintain, or manage CPOE systems.

Study Methods

- Expert panel identified 79 unintended consequences
- Field study of 5 hospitals with CPOE
  - Intensive on-site observations and interviews
  - Identification of additional 245 unintended consequences
- Categorized into major groups

Workflow:
More work/New work/Shifts in Work

- New steps
  - More steps in ordering
  - More data beget more work
- Shift in workflow:
  - Some gain, some lose (particularly physicians)

Communication

- Better access to information
  - Remote access
  - Constant access
- Loss of face-to-face communication
  - Inadequate communication between physicians and nurses

Overdependence on Technology

- Challenges during downtime
  - 'Managed chaos'
- Challenges during resumption of service

Shift in Power

- Perceived loss of autonomy by physicians
- Gain in power by administration
- Elevation of responsibilities for IT department

New Errors

- Wrong patient
- Errors of omission
- Communication errors
- Transitions
- Abuse of technology
- Loss of vigilance

Never Ending Demands

- Maintenance, training, and support
  - 'It takes an army'
- Increasing appetite for decision support and order sets

Emotion

- Spans the spectrum
  - Positive
  - Negative

Overcoming the Barriers to CPOE Implementation

Significant Facilitators

- Leadership within hospital
  - Hospital's commitment towards patient safety
  - Project Management
- Housestaff Presence
- Better economic analyses
- External Influences
  - IOM/leapfrog
- Vendor Industry
  - Vendor commitment to improve product
  - Maturation of the vendor industry
  - IT Infrastructure

Leadership

- "Solving the technological issues gets you 25% there. You need leadership to provide the vision to take you the rest of the way."

- "Commitment of key leadership is as important as the quality of the technology"

- "If leadership isn't clear in its conviction, clear in its communication, and clear in its steadfastness, then I think your chances of success start to drop rapidly."

- "[You] had to be a believer [in CPOE], because you cannot give an inch on the vision side"

Commitment to Patient Safety

- "Patient safety is just a better way to do business."
- "[CPOE] is going to be a marketing tool for us"
- "Patient safety drives all of our decisions. We're proud of that attitude.", CFO

The Housestaff Advantage

- "[At our hospital], 90 to 95% of orders are written by residents, so the chief medical officer tells us that he doesn't see acceptance being an issue for our hospital"

- "The house staff is not concerned at all about productivity."

- "These kids that are coming out of medical school now are *much* more computer-literate—they've grown up with the technology."

- "A lot of the young residents that come in now don't look at this as something they have to do, they almost look at it as an *entitlement*."

Role of IOM Reports and Leap Frog

- "What has been enormously helpful [in the decision to implement CPOE] has been the public recommendations that you need to go to CPOE to reduce errors… When Leapfrog came out, that pushed us over."

- "The external forces of Leapfrog and [the] IOM report clearly weighed upon people, and I think that was sort of the push–the final push [towards implementing CPOE]."

Finding the Good Vendor

- "The screen we have are ours, and are totally customizable."

- "Trust. They were honest with us. Eclipsis showed us their warts and their strenghts."

- "We have been watching the marketplace for CPOE for the last several years, and we decided to take the plunge this year because we believed that the products were finally getting mature enough that it's worth the risk."

Building Standards, Infrastructure and Common Knowledge Base

- "You just can't buy anything that works out of the box from the vendors. Smaller hospitals will not be able to afford to customize the products to suit their needs."
- "If there is a realistic, non-vendor-based assessment of the [CPOE] technology and where it will be in 2-3 years, then I as a leader could leverage my political capital with some reassurance that there's gonna be some flesh on the bones."
- "It would be helpful if hospitals interested in CPOE can share the contract or RFP, so that nobody has to re-invent the wheel when they deal with the vendors."
- "Think of the VA model."

Could Government Intervention Be the Answer?

- "My view is that if the government is in it, then I want *out*. If you shove this process down somebody's throat, and you don't do the right training, have the right committees and get everybody fired up positive, it can fall on its fanny."

- "If [a hospital] has no money, but CPOE was mandated, then the hospital would choose the cheapest system that may not be cost-effective."

- "All we need is another unfunded mandate from the government like HIPAA"

Summarizing

Twin Peaks Theory

CPOE

Commitment to
Patient Safety

Better ROI
analyses

Learning

Housestaff
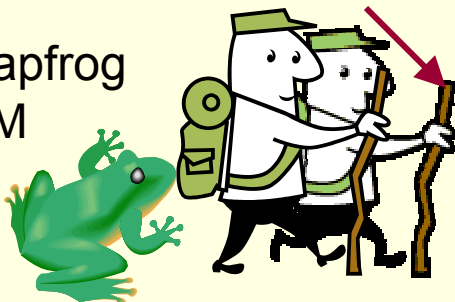
MD Resistance

Costs

Leadership

Project Mgt

Leapfrog
IOM

Maturation of
Vendors; IT
infrastructure

Vendor
commitment to
improve product

Value add to
MD

Final Thoughts

- Large gap between theoretical efficacy and real-world effectiveness
- Don't underestimate the demands of CPOE implementation
  - Likely the hardest thing a hospital can undertake
- CPOE implementation is not an event, but a long-term commitment

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