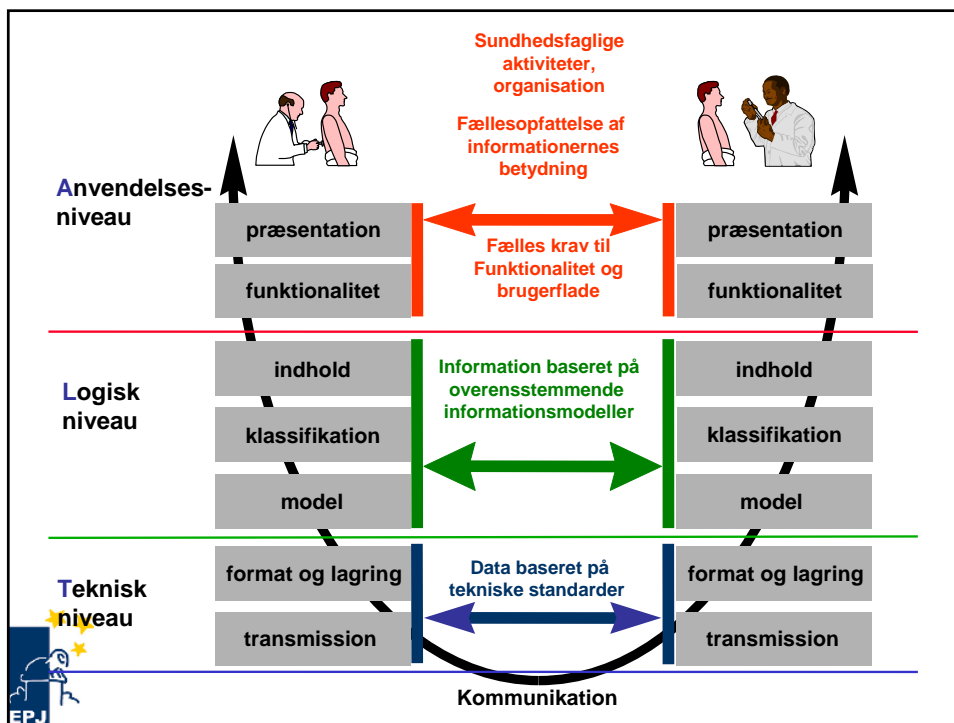


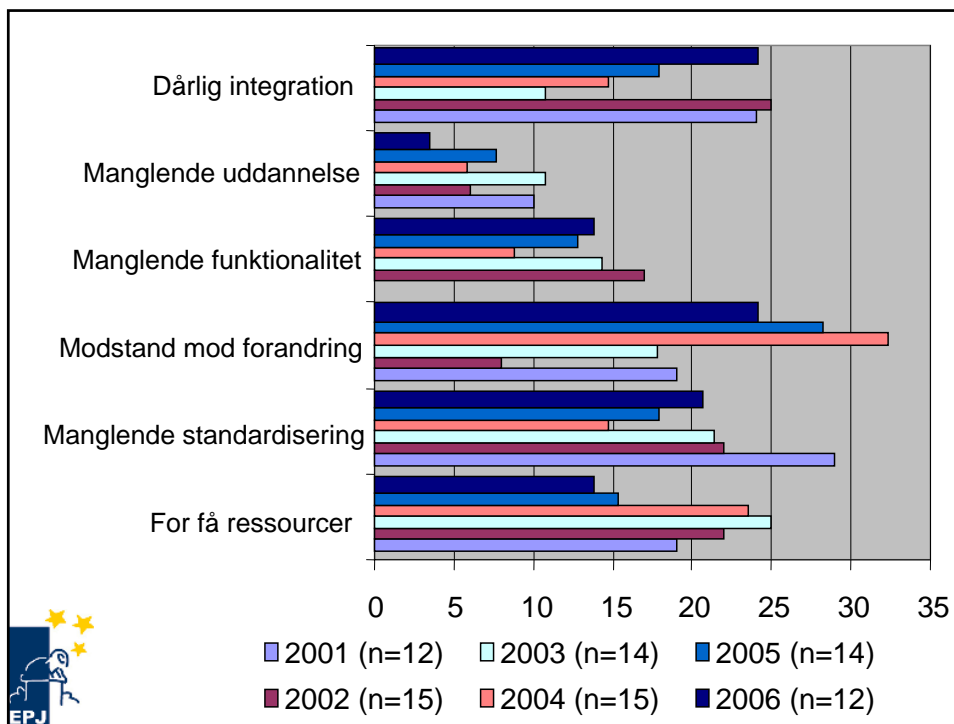
EPJ-Observatoriets årskonference 2006

Hvordan kan viden og data anvendes af brugerne?



Christian Nøhr
Aalborg Universitet





Unexpected Increased Mortality After Implementation of a Commercially Sold Computerized Physician Order Entry System

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Robert S.B. Clark, MD*‡§; R. Scott Watson, MD, MPH*‡§||; Trung C. Nguyen, MD*‡; Hülya Bayir, MD*‡;
and Richard A. Orr, MD*‡§

ABSTRACT. *Objective.* In response to the landmark 1999 report by the Institute of Medicine and safety initiatives promoted by the Leapfrog Group, our institution implemented a commercially sold computerized physician order entry (CPOE) system in an effort to reduce medical errors and mortality. We sought to test the hypothesis that CPOE implementation results in reduced mortality among children who are transported for specialized care.

Methods. Demographic, clinical, and mortality data were collected of all children who were admitted via interfacility transport to our regional, academic, tertiary-care level children's hospital during an 18-month period.

computer software, health care delivery/access, interhospital transport, outcome.

ABBREVIATIONS. CPOE, computerized physician order entry; CHP, Children's Hospital of Pittsburgh; ADE, adverse drug event; PRISM, Pediatric Risk of Mortality; OR, odds ratio; CI, confidence interval.

In their landmark report *To Err is Human: Building a Safer Health System*, members of the Institute of Medicine estimated that medical errors contributed to between 44,000 and 98,000 deaths annually in the United States.



Pediatrics Vol. 116 No. 6 December 2005

Afdelingen for pædiatrisk intensiv medicin på Childrens Hospital of Pittsburgh, Pennsylvania, USA Sold Computerized Physician Order Entry System

1942 børn overført fra andre lokaliteter til
intensivafdelingen i en 18 måneders periode
fra 4. kvartal 01 til 1. kvartal 03.

ABSTRACT. *Objective.* In response to the landmark 1999 report by the Institute of Medicine and safety initiatives promoted by the Leapfrog Group, our institution implemented a commercially sold computerized physician order entry (CPOE) system in an effort to reduce medical errors and mortality. We sought to test the hypothesis that CPOE implementation results in reduced mortality among children who are transported for specialized care.

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Implementeringen tog 6 dage og var komplet
29.oktober 02

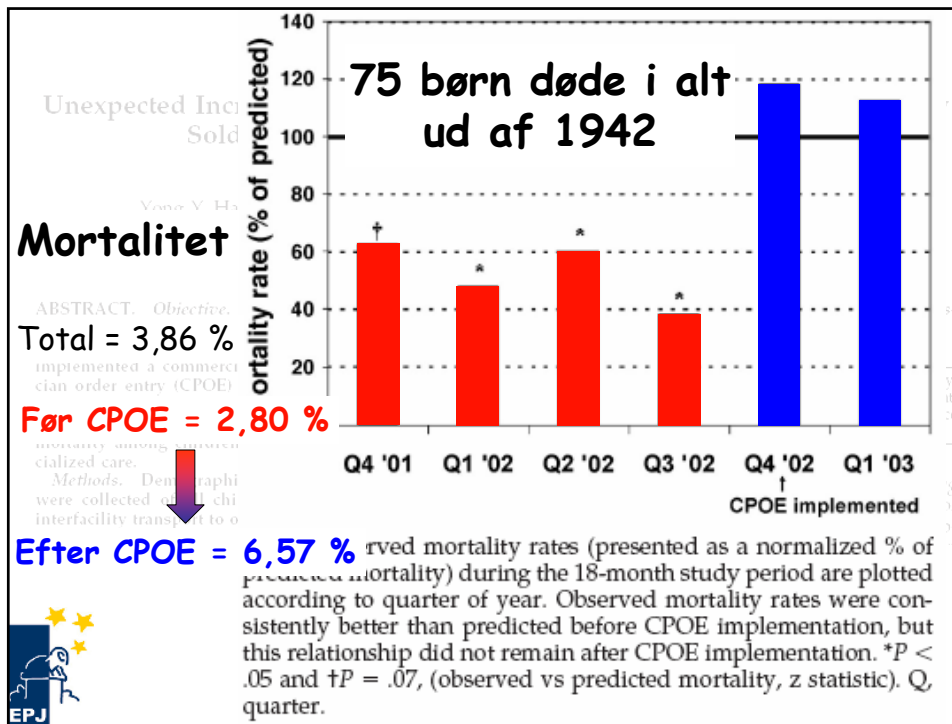


TABLE 3. Factors Independently Associated With Increased Odds of Mortality

| Variable | Mortality OR | 95% Confidence Interval | P |
|---------------------------------|--------------|-------------------------|-------|
| Model adjusted for PRISM score* | | | |
| Shock | 6.24 | 2.94-13.26 | <.001 |
| CPOE | 3.71 | 2.13-6.46 | <.001 |
| GCS score ≤ 8 | 3.43 | 1.88-6.25 | <.001 |
| Surgical referral | 3.29 | 1.73-6.28 | <.001 |
| Prematurity | 3.28 | 1.56-6.91 | .002 |
| Cardiovascular | 2.66 | 1.31-5.41 | .007 |
| PRISM score | 1.11 | 1.07-1.14 | <.001 |
| Secondary analysis† | | | |
| Shock | 6.74 | 3.37-13.51 | <.001 |
| GCS score ≤ 8 | 5.16 | 2.95-9.00 | <.001 |
| Admitted to ICU | 4.68 | 1.77-12.34 | .002 |
| Surgical referral | 3.84 | 2.04-7.26 | <.001 |
| Cardiovascular | 3.63 | 1.84-7.16 | <.001 |
| Prematurity | 3.51 | 1.71-7.20 | .001 |
| CPOE | 3.28 | 1.94-5.55 | <.001 |
| ECMO referral | 3.27 | 1.14-9.40 | .028 |

* A stepwise logistic regression analysis that included variables whose P values were $<.25$ in univariate analysis was performed. Additional regression analyses demonstrated that variable interactions were not significantly associated with outcome.

† PRISM score was excluded from this regression model.

Pediatrics Vol. 116 No. 6 December 2005



Hvad kan vi lære?

Effekter skal måles på **outcome** parametre

- Vanskeligt at fastholde associationen
- Kræver klinisk indsigt

Ikke tilstrækkeligt at måle effekter på **proces** parametre

- Proces parametre kan forbedres uden effekt på outcome

Slet ikke tilstrækkeligt at måle på **strukturelle** parametre

- Kan vanskeligt overføres til andre sammenhænge



Computerized Provider Order Entry Implementation: No Association With Increased Mortality Rates in an Intensive Care Unit

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Children's Hospital and Regional Medical Center, Seattle, Washington

The authors have indicated they have no financial relationships relevant to this article to disclose. Drs Del Beccaro and Eisenberg belong to the general users group for the Cerner Corporation (Kansas City, MO), as is customary for any institution with information systems.

ABSTRACT

OBJECTIVE. Our goal was to determine if there were any changes in risk-adjusted mortality after the implementation of a computerized provider order entry system

www.pediatrics.org/cgi/doi/10.1542/



Pediatrics Vol. 118 No. 1. July 2006

**Children 's Hospital and Regional Medical Center,
Seattle, Washington**

250 senge + 20 PICU senge
11.000 indlæggelser om året heraf 1100 PICU
hvoraf 10% transport fra andre institutioner
Samme CPOE system som i Pittsburgh

Studiet gennemført fra 1.oktober 2002
til 31 december 2004:

13 måneder før implementering og
13 måneder efter implementering

Resultater

97 børn døde ud af 2533

Mortalitet:

Total: 3,83

Før CPOE implementering: 4,22



Efter CPOE implementering: 3,46

Hvad var forskellen på de to steder Og hvad kan vi lære?

- Medicinen blev ikke fjernet fra afdelingerne (opretholdt lokale lagre)
- Ikke vente på godkendelse fra apoteket
- Patienter der blev overført preregistreres
- Flere standardordinationer i Seattle
- Standardordinationerne justeret efter implementeringen



Implementeringen af et CPOE system er mere end blot at sætte systemet i drift



Mulighederne for at få hjælp til at lave evalueringer er til stede

Elske Ammenwerth UMIT
<http://evaldb.umat.at>



Technology Evaluation ■

Return on Investment for a Computerized Physician Order Entry System

RAINU KAUSHAL, MD, MPH, ASHISH K. JHA, MD, CALVIN FRANZ, PhD, JOHN GLASER, PhD, KANAKA D. SHETTY, MD, TONUSHREE JAGGI, BA, BLACKFORD MIDDLETON, MD, MBA, MSc, GILAD J. KUPERMAN, MD, PhD, RAMIN KHORASANI, MD, MPH, MILENKO TANASJEVIC, MD, MBA, DAVID W. BATES, MD, MSc, Brigham and Women's Hospital CPOE Working Group

Abstract Objective: Although computerized physician order entry (CPOE) may decrease errors and improve quality, hospital adoption has been slow. The high costs and limited data on financial benefits of CPOE systems are a major barrier to adoption. The authors assessed the costs and financial benefits of the CPOE system at Brigham and Women's Hospital over ten years.

Design: Cost and benefit estimates of a hospital CPOE system at Brigham and Women's Hospital (BWH), a 720-adult bed, tertiary care, academic hospital in Boston.

Measurements: Institutional experts provided data about the costs of the CPOE system. Benefits were determined from published studies of the BWH CPOE system, interviews with hospital experts, and relevant internal documents. Net overall savings to the institution and operating budget savings were determined. All data are presented as value figures represented in 2002 dollars.

Results: Between 1993 and 2002, the BWH spent \$11.8 million to develop, implement, and operate CPOE. Over ten years, the system saved BWH \$28.5 million for cumulative net savings of \$16.7 million and net operating budget savings of \$9.5 million given the institutional 80% prospective reimbursement rate. The CPOE system elements that resulted in the greatest cumulative savings were renal dosing guidance, nursing time utilization, specific drug guidance, and adverse drug event prevention. The CPOE system at BWH has resulted in substantial savings, including operating budget savings, to the institution over ten years.

Conclusion: Other hospitals may be able to save money and improve patient safety by investing in CPOE systems.

■ J Am Med Inform Assoc. 2006;13:261-266. DOI 10.1197/jamia.M1984.



Brigham and Women's Hospital
i Boston, MA –
Universitetshospital
med 720 senge

Eget udviklet CPOE system
implementeret i 1993

Cost og benefits analyseret
over en ti årig periode



Metode

Udgifter:

- Hardware, software, netværk, ledelse og uddannelse.
- Diskonterede udgifter 7% p.a. fra begyndelsen af en periode

Benefits:

- Identificerede vigtige interventioner gennem:
 - litteraturstudier,
 - interne dokumenter
 - interview med nøglepersoner
- Diskonterede benefits 7% p.a. fra slutningen af en periode



Kaushal R. et al: *Return on Investment for a CPOE system*
Journal of the American Medical Informatics Association
Volume 13 Number 3 May / Jun 2006

Resultater

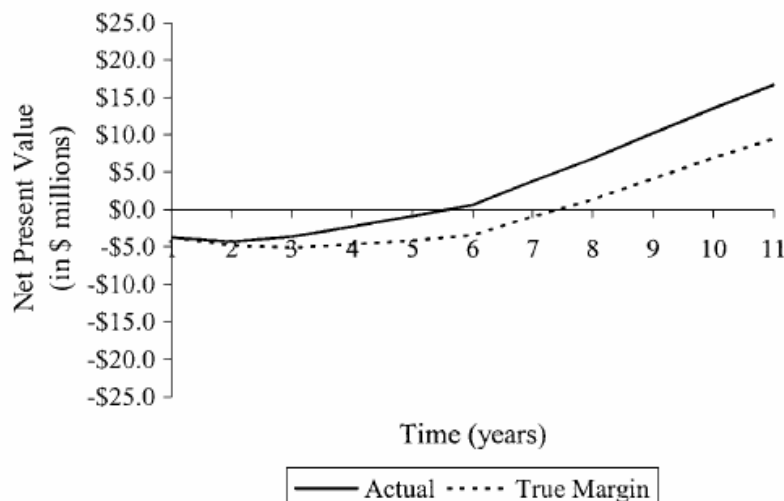
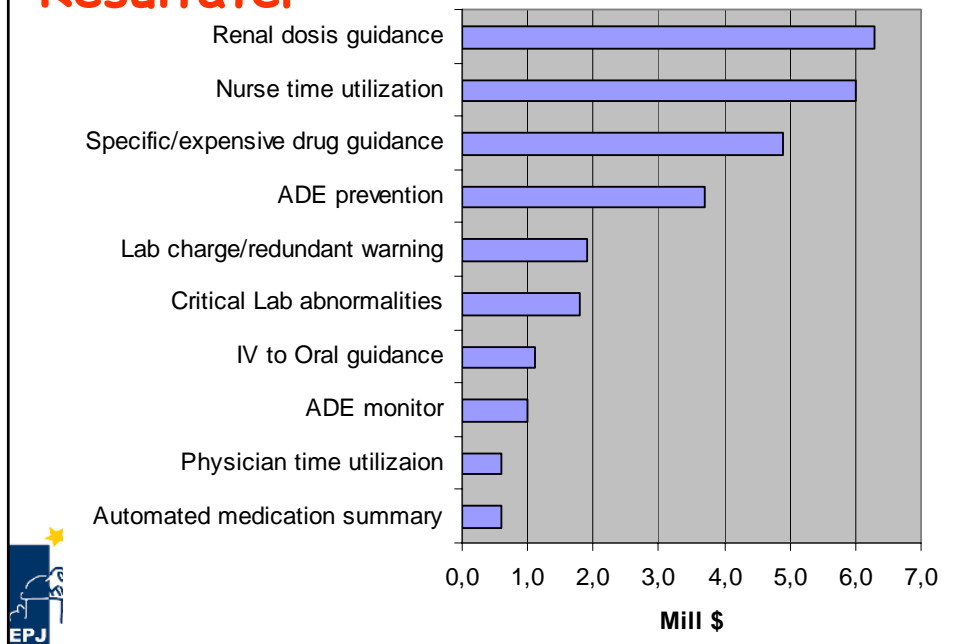


Figure 1. The net cumulative present value of computerized physician order entry (CPOE) at Brigham and Women's Hospital (BWH) from 1992 to 2002 given an 80% prospective

Resultater



Diskussion

- Det tog over fem år før netto benefits viste sig
- Hovedparten af besparelserne stammer fra få interventioner
- Vejledningen i dyre behandlinger kun for få præparater
- Inkluderer kun de elementer der har et godt estimat af besparelser
- Forudsætter at alle læger anvender systemet
- Godt designede beslutningsstøttelementer
- Effektiv interface til apotek, laboratorie og medicin administration

Begrænsninger i studiet:

- Kliniker tid medgået i udviklingen ikke medtaget som cost
- Inkluderer ikke forhindrede sagsanlæg som følge af fejlbehandlinger
- Systemet er udviklet i organisationen og ikke en hyldevare



Kaushal R. et al: *Return on Investment for a CPOE system*
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Beslutningsstøtte

Niveau 1: Samle oplysninger sammen

Niveau 2: Beregn og vis tendenser

Niveau 3: Alarm for threshold

Niveau 4: Avanceret inference



Efter inspiration fra Branko Cesnik, Monash University, Melbourne

MandagMorgen 2. oktober 2006

vilge midler til området, mener Leif Vestergaard Pedersen:

“Vi er desværre i en situation, hvor der er så få penge til udvikling, og vi er så bange for kritik, at vi får alting beskrevet til at være en stor succes. Og nogle gange skyldes det, at de, der har fået ideen, også er dem, der evaluerer den. Det skyldes både, at der ikke er plads til fiaskoer i sundhedsbudgettet, og at man kan blive hængt ud i pressen,” erkender han.