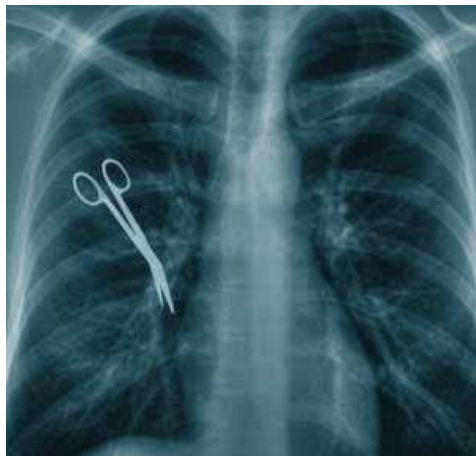


Contributing factors

- Lack of communication
- Lack of coordination
- Inadequate staffing
- IPP / standards not followed
- Insecure access of patient information
- Lack of knowledge
- Failure to follow up
- Lack of proper check
- Improper assessment / reassessment
- No / inadequate resources or supplies
- Look alike medications
- Illegible handwriting



CPOE Benefits

- $\geq 50\%$ of none-intercepted serious MEs rate decreased significantly (Bates et al, 1998).
- 81% reduction of medication errors (Bates et al, 1999).
- Decreased patients LOS (Rothschild, 2004).
- Improves medication reconciliation process (Vira et al, 2006).
- Improves the prescribers' compliance (Cunningham et al , 2008).
- Decreases mortality rate by 20% per month (Longhurst et al, 2010).
- Improves patients satisfaction (Spalding et al, 2011).



CPOE Impact

- Facilitates 22 new types of medication errors (Koppel et al, 2005).
- Lack of information systems compatibility, configuration and usability with end users (Colpaert and Decruyenaere, 2009; Rothschild, 2004).
- A significant increase of mortality rates post CPOE (Han et al, 2005).



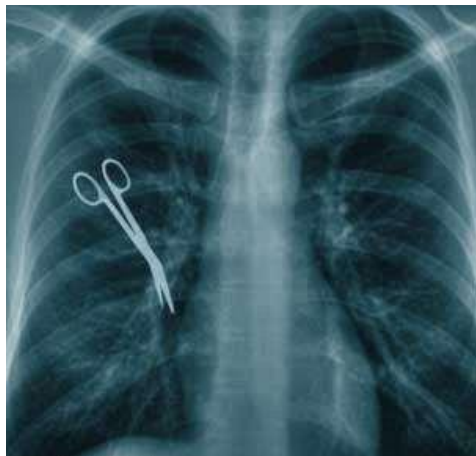
Informatics Benefits

1. Tracking system
2. Effective communication and coordination
3. Prompt alerts and notifications
4. Decision support system
5. Manage data and store information
6. Secured access and defined privileges
7. Protocol guided and standardized practices
8. Accessible documentations
9. Legible orders, requests, and reports
10. Integrated care delivery
11. Support Lean processes toward more efficient workflows
12. Facilitate productivity measurements and monitoring
13. Reduce medication errors
14. Shortened length of patients' hospitalisation due to effective enhancement of antimicrobial management .
15. Reinforce clinicians compliance on evidence-based practices.



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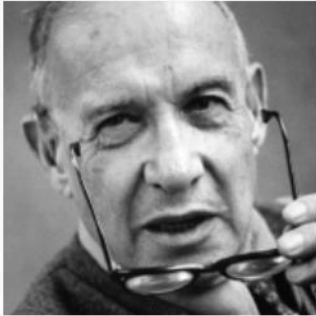
Barriers to technology implementation

- Cost (**36%**)
- Difficulties in proving quantifiable benefits and ROI (**32%**)
- Vendors inability to provide satisfactory products or services (**27%**)
- Lack of standardization with integration and interfaces. (HL7, NAHIT)
- Level of system evolution needed to meet growing demand on technology advancements
- People



Benefits

Peter F. Drucker



Born 19 November 1909
Kaasgraben, Vienna, Austria-Hungary

Died 11 November 2005 (aged 95)
Claremont, California

*You can't manage
what you can't
measure!*



Take Home Messages for Safer Health System



What Medical Informatics tools can?...

- Improve communication
- Make knowledge more readily accessible
- Assist with calculations
- Perform checks in real time
- Assist with monitoring
- Provide decision support
- Require key pieces of information (dose, e.g.)



The Accenture study

- The Accenture survey asked physicians about the extent to which they used **12** different “functions” of EMR and HIS— such as electronic entry of patient notes, electronic referrals, electronic ordering and prescribing and communicating with other physicians or patients via secure email.
- The results showed that physicians who are routine users of a wider range of healthcare IT functions have a **more** positive attitude towards the these technologies. On average across all the countries, as physicians start to use more “functions” —the more positive they are about the benefits



The Accenture study

Majority of doctors surveyed believe that healthcare IT does provide some common top benefits, including:

- better **access, quality** data for clinical research (70.9%),
- improved coordination of care (69.1 %)
- reduction in medical errors (66 %).
- average score of 61 %,
- In England, physicians perceived other healthcare IT benefits to include: increased speed of access to health services to patients (55.3 %), reduced number of unnecessary interventions and procedures (52 %).



Table 1: Assessment of Handwritten Prescriptions completeness

Information assessed	No. of prescription with omission (%)
Patient name	0 (0.0%)
Hospital no.	0 (0.0%)
Sex	64 (32.2%)
Age	132 (66.3%)
National ID	171 (85.9%)
Diagnosis	39 (19.6%)
Generic name	85 (42.7%)
Frequency	3 (1.5%)
Dose	20 (10.1%)
Duration	2 (1.0%)
Route of administration	29 (14.6%)
physician's name	12 (6.0%)
Extension and bleep	25 (12.6%)
physician's signature	7 (3.5%)
Date	12 (6.0%)
Clinic name	1 (0.5%)
Total of prescriptions were evaluated: 199 (100%)	



Table 2: Assessment of Handwritten Prescriptions Legibility

Scale*	No. of prescription (%)		% of average scale
	Pharmacist A	Pharmacist B	
1	195 (98.0%)	156 (78.4%)	88.2
2	3 (1.5%)	27 (13.6%)	7.5
3	1 (0.5%)	16 (8.0%)	4.3
Total	199 (100%)	199 (100%)	100%
Total of illegible and partially illegible [!]	4 (2.0%)	43 (21.6%)	11.8%

*1= Legible, 2= legible with effort, 3= illegible

^ pharmacist 1= expert

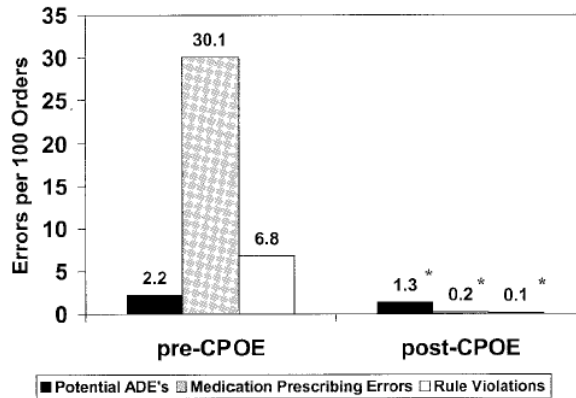
~ pharmacist2= new

[!] scale of 2 and 3



Example CPOE reduce errors

- Potts studied ADE rates in 13,828 medication orders before/after CPOE implementation at Vanderbilt Children's PICU:

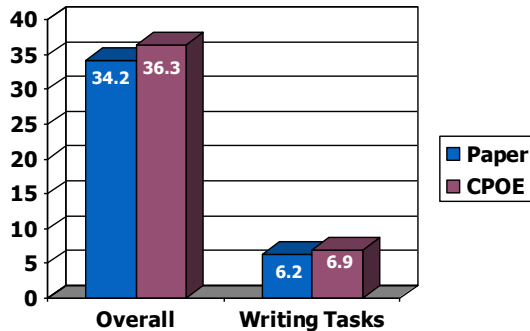


* p Value < 0.05

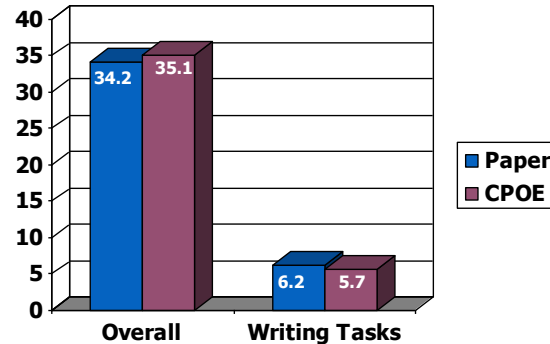


Does CPOE Take More Time?

Time Spent/Patient Encounter (minutes)



Time Spent/Patient Encounter—
Duplicate Tasks Removed (minutes)



Evidence shows that CPOE adds less than one minute to the time physicians spent writing orders and overall only added 1-2 minutes per patient encounter. As physicians gained experience with the system, the time for orders actually decreased.



Healthcare

- The healthcare industry is different from, other industries. We are talking about healing and dealing with human,
- NOT a process based, and can't just apply systems and global optimization techniques in the traditional, industrial engineering sense to the healthcare industry,
- Health is something that is very difficult to measure nor to quantify.

