"Mejores Prácticas en Salud Apoyadas por las TI"
William Cats-Baril, PhD
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CANIETI 2012
XXXIII Convención Nacional Anual

Agenda

1. Innovation and Best Practices: Definitions
2. Leveraging Technology for Innovation
3. Issues facing Health Care and Opportunities for I/T to Improve Health Care
4. Examples:
   i. Electronic Medical Record (EMR)
   ii. Telemedicine: Remote Intensive Care Unit (ICU) Monitoring
   iii. "Hard-Wiring" Best Practices
   iv. Alerts
   v. Bar Coding
5. Conclusions

Innovation: Definition

- **Innovation** is the creation of better or more effective processes, products, services.

- Innovation differs from invention in that innovation refers to the use of a better idea or method, whereas invention refers directly to the creation of the idea or method itself.

- Innovation differs from improvement in that innovation refers to the notion of doing something different (Lat. In-novare: "to change") rather than doing the same thing better...

- Innovation is about implementation and diffusion...

Best Practices: Definition

- Definition: A method or technique -- specific steps and rules that can be <u>documented and taught</u> -- that have consistently shown results <u>superior</u> to those achieved with other means.

    Best practices can be:

    - Wide and generic: e.g., ISO 9000, 14001; Baldrige Award.
    - Wide and specific: e.g., The Generally Accepted Accounting Principles (GAAP).
    - Narrow and specific: e.g., "Patients who are older than 65 and suffer from diabetes should get a flu shot."

Your Business: The High Jump

Best Practices Evolve…

1.59mts in 1928…

2.09mts en 2012!

Best Practices Evolve…And Lead To Better Performance…

- "Scissors" (1895)
- "Easter Cut-Off" (1912)
- "Western Roll" (1936)
- "Straddle" (1956)
- "Forsbury Flop" (1968).
- 1972 world records: **2.25m**ts (men); **1.92mts** (women)
- 2012 world records: **2.45mts (**Javier Sotomayor, Cuba**) and 2.09mts** (Stefka Kostadinova, Bulgaria)

➔ **20 centimeters over 40 years (men)…17 centimeters over 40 years (women)**
➔ **Improvement on average: 1/2 centimeter per year**

But Sometimes Not Fast Enough!

What happens when the customer asks you to jump over a bar that is 6 meters high?

The Challenge (Opportunity):

Current Best= 2.45 meters

Target=6 meters;

Gap = (6.00-2.45)= 3.55meters

Improvement rate = .5 centimeters/year

# of years to reach target?

= 355/.5

710 Years!

So?

- Continuous (linear) Improvement will not do: If we keep on doing what we are doing even if we do it better we will NOT achieve what our client wants…

- The client wants us to perform at a certain level…doesn't care how we do it as long as we do it…

- We need to <u>innovate</u> (step function improvement)!

Technology Can Help!
(TECNOLOGIA COMO PALANCA)

(6.15mts!)

AND IF YOUR "BUSINESS" IS
HEALTH CARE?

How Do We Measure Performance in Health Care?

Patient outcomes: Survival rates for all patients, plus rates of surgical complications like severe bleeding after surgery.

Patient safety: Avoiding unwanted and avoidable events like infections and falls.

Treatment Practices: A set of basic care practices that patients with common conditions (e.g., heart attack and pneumonia) should receive; developed by the National Quality Forum .

Efficiency: Length of patient stay and average expense.

Financial stability: Profit and cash-to-debt ratio.

Growth in service: an indirect measure of how satisfied patients are.

Opportunity: Far from Perfect!

- 1 million injuries and 100,000 deaths because of medical <u>errors</u> (by definition: preventable!)

- Hundreds of Millions of dollars in inefficiencies (e.g., lost charts, duplicate tests).

- $1.7 trillion (twice the OECD average per capita) but premature mortality is much greater.

Opportunity: Many Mistakes are "Simple" Mistakes

50% of Medication Errors due to:

- Insufficient information about patient and/or about the drug;

- Failure to provide specificity in the order;

- Illegibility of handwritten orders;

- Errors of calculation;

- Errors in transcription.

Opportunity: Complexity is High and Increasing

- More patients;
- Older, sicker patients;
- More drugs;
- More combination of drugs;
- Customization of medicine (e.g., almost 600 drugs that need customization of doses for multiple levels of renal dysfunction);
- Increasing complexity of treatments;
- Decreasing ratios of staff/patient.

Opportunity: Disparity in Performance

If all hospitals performed a the level of the Top 100 (2%), EVERY YEAR:

- More than 186,000 additional lives could be saved;

- Approximately 56,000 additional patients could be complication-free;

- More than $4.3 billion could be saved;

- The typical patient spend 10% less time in the hospital.

Opportunity: Slow Adoption

- Decentralized System of Care (no National Health Service);

- American Academy of Neurology released 10 years ago a set of guidelines for migraine treatment. However, only 2/3 of patients are treated today under those guidelines;

- **The average time that breakthrough best practices take to reach 50% of all Americans is 15 years!**

- More and more (different and updated) best practices are being issued every year...

Opportunity: No Common Measure of Quality…and No Incentives…

- To improve processes one has to be able to measure outcomes;

- However, in many conditions, diseases, and treatments there is **NO COMMON INSTRUMENT** to measure of quality (though there are common measures of <u>lack</u> of quality!);

- So then: How do we know who knows?;

- And if we did know: Why would they tell us what they know?;

- And if they did share: How do we distribute knowledge?

Opportunity: Efficiency is Trailing Other Industries

- Assuming a 4% per year increase in productivity (half of I/T enabled productivity gains in the Telecommunication Sector – because of lack of strong competition on quality and cost)

-> Potential savings of $346 billion over 5 years!

Summary

- Fundamental problem in medical care (a 24/7 business) is <u>inconsistent</u> execution:
  - Variability in practices;
  - Data Rich, Information Poor;
  - Disparity of Knowledge: New knowledge evolves rapidly but is diffused and adopted slowly.
- Complexity is such that providing consistent, reliable, efficient, individualized care requires a mastery of data and coordination that can be only achieved through Information Technology.
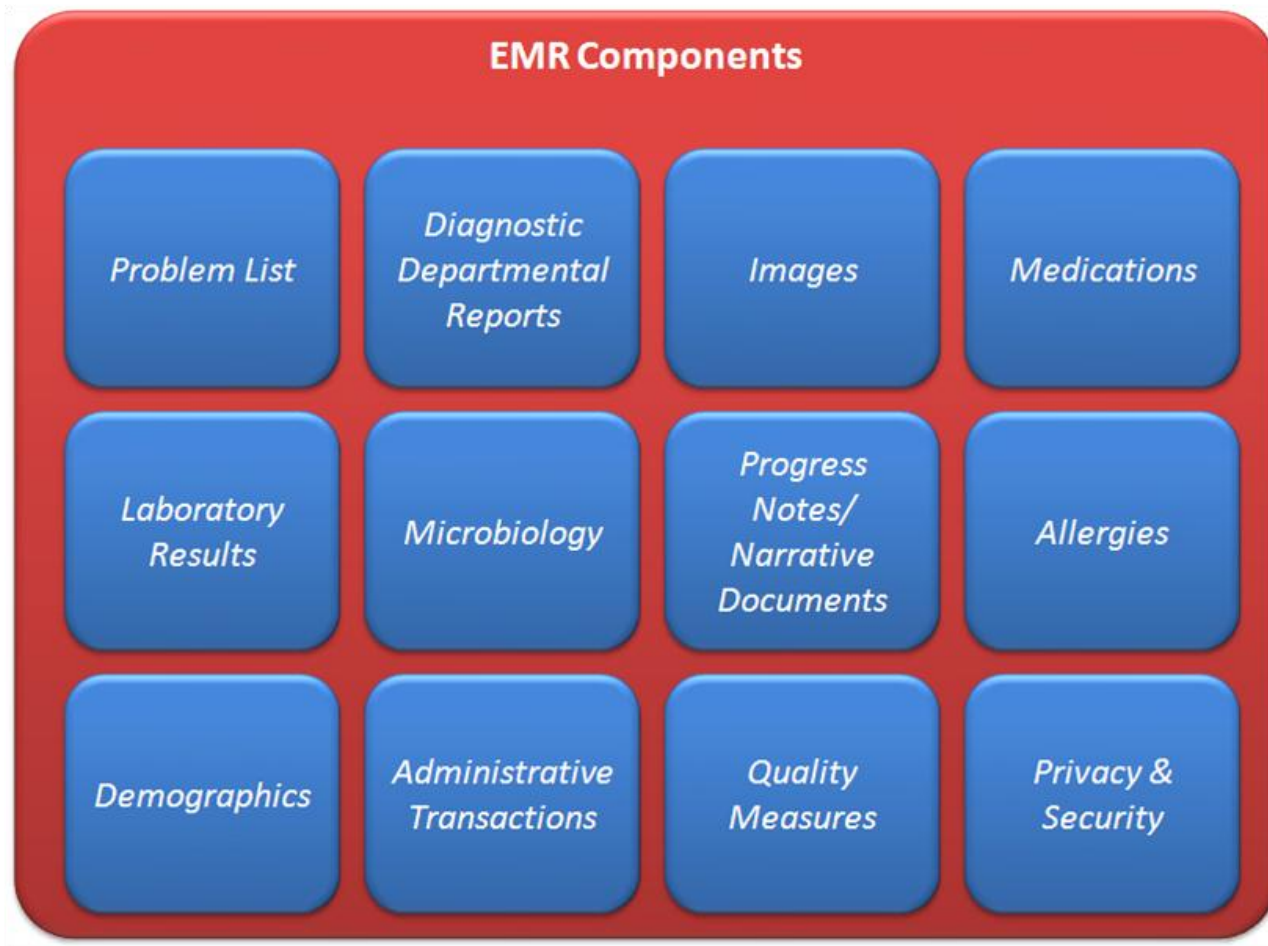
Hypothesis

Information technology can substantially improve medical care by:

1. Preventing adverse events (e.g., errors, complications) by structuring and enforcing consistent actions;

2. Catching, tracking and analyzing adverse events early: Sifting through large amounts of clinical data to identify key changes or abnormal situations;

3. Bringing latest evidence-based, best practices to the point of care and improve customization of care.
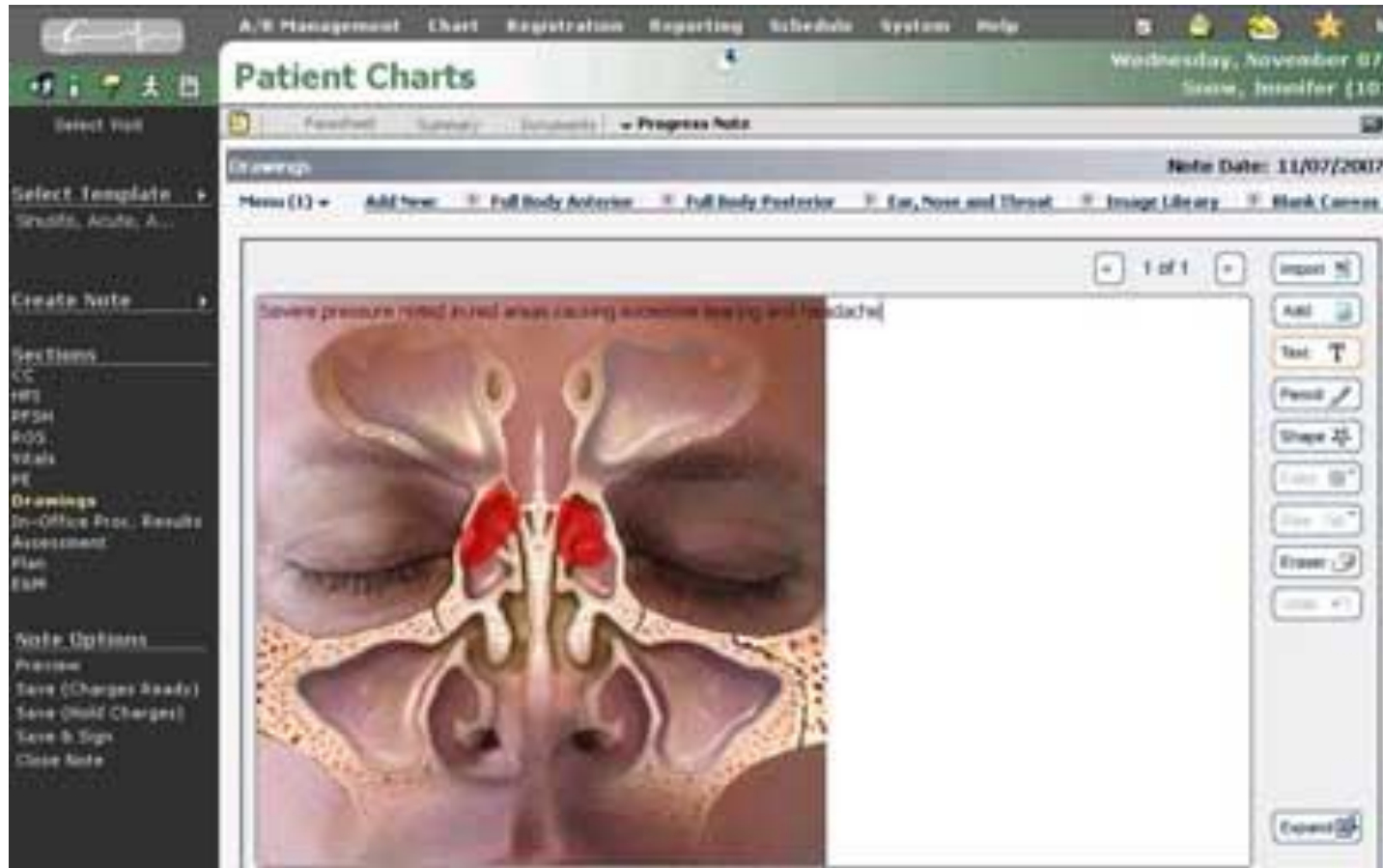
Five Examples of I/T

1. Electronic Medical Record (EMR)
2. Telemedicine: Remote Intensive Care Unit (ICU) Monitoring
3. "Hard-Wiring" of Best Practices
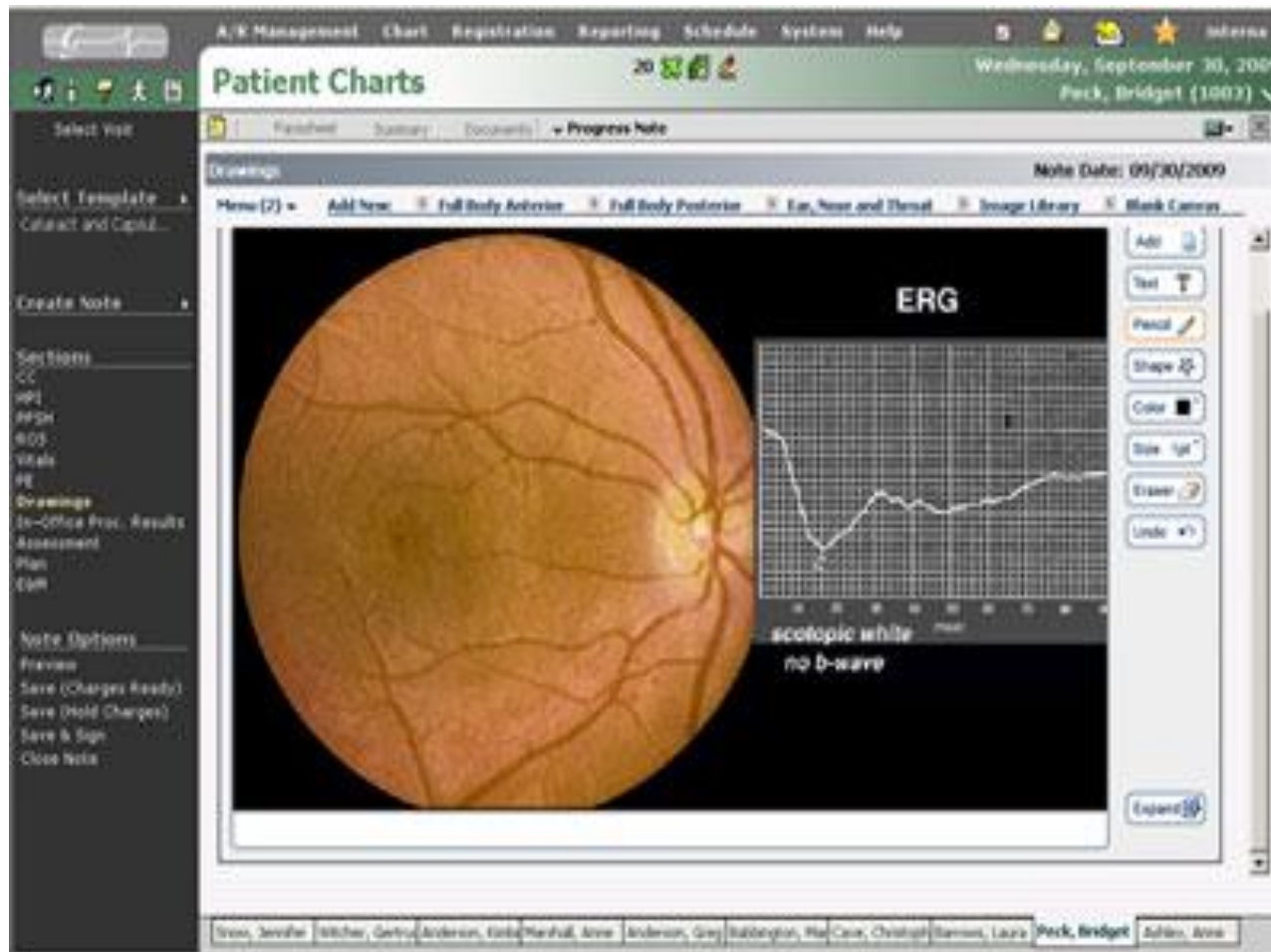4. Alerts
5. Bar Coding

EMR: Integration!

EMR Components

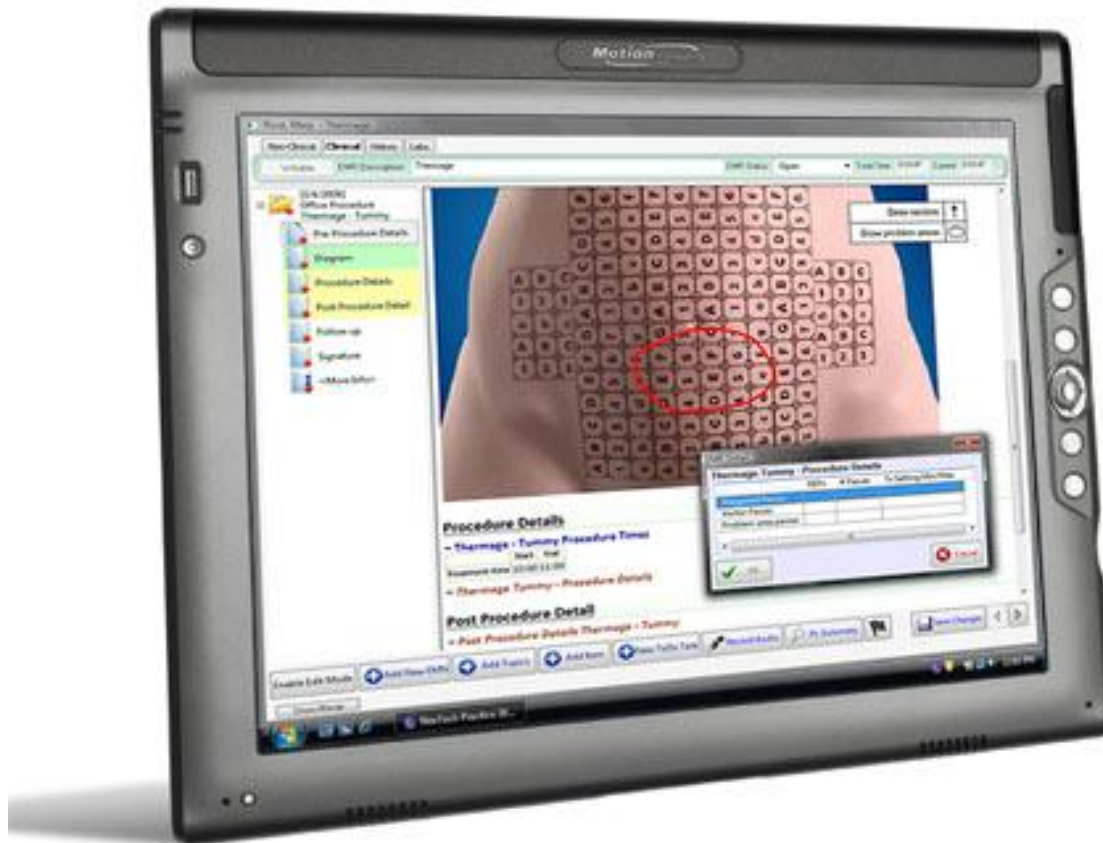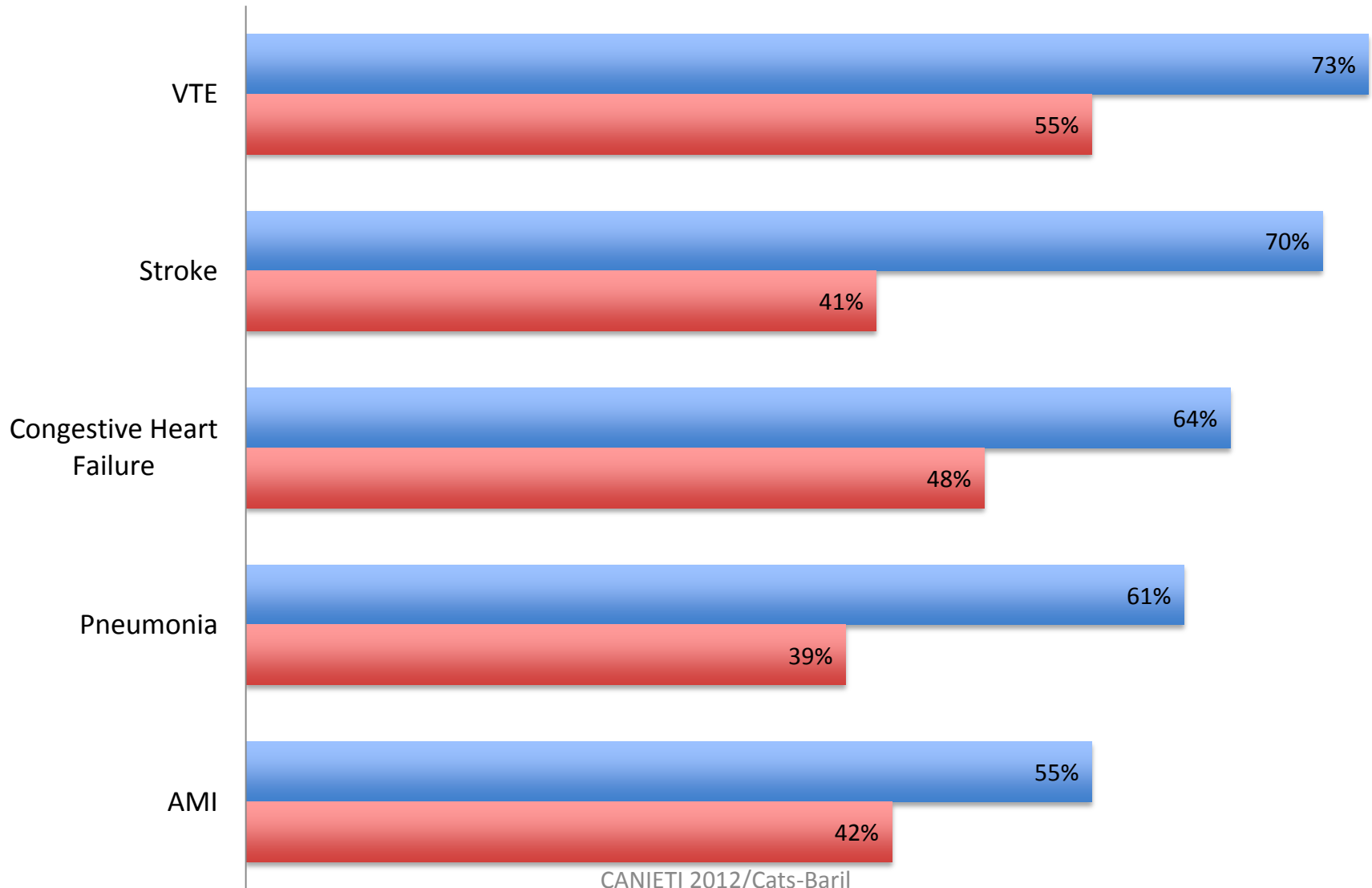|			
Problem List	Diagnostic Departmental Reports	Images	Medications
Laboratory Results	Microbiology	Progress Notes/ Narrative Documents	Allergies
Demographics	Administrative Transactions	Quality Measures	Privacy & Security

EMR: Better Notes

EMR: Better Notes

EMR: Portable

5 Top Quality Benefits

■ What existing external/internal quality metrics did you target for improvement with your EMR implementation?

■ Have you realized and documented any of the following benefits as part of your hospital EMR use?

VTE
- 73%
- 55%

Stroke
- 70%
- 41%

Congestive Heart Failure
- 64%
- 48%

Pneumonia
- 61%
- 39%

AMI
- 55%
- 42%

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(The Advisory Board Company and HIMSS Analytics, 2012)

5 Top Safety Benefits

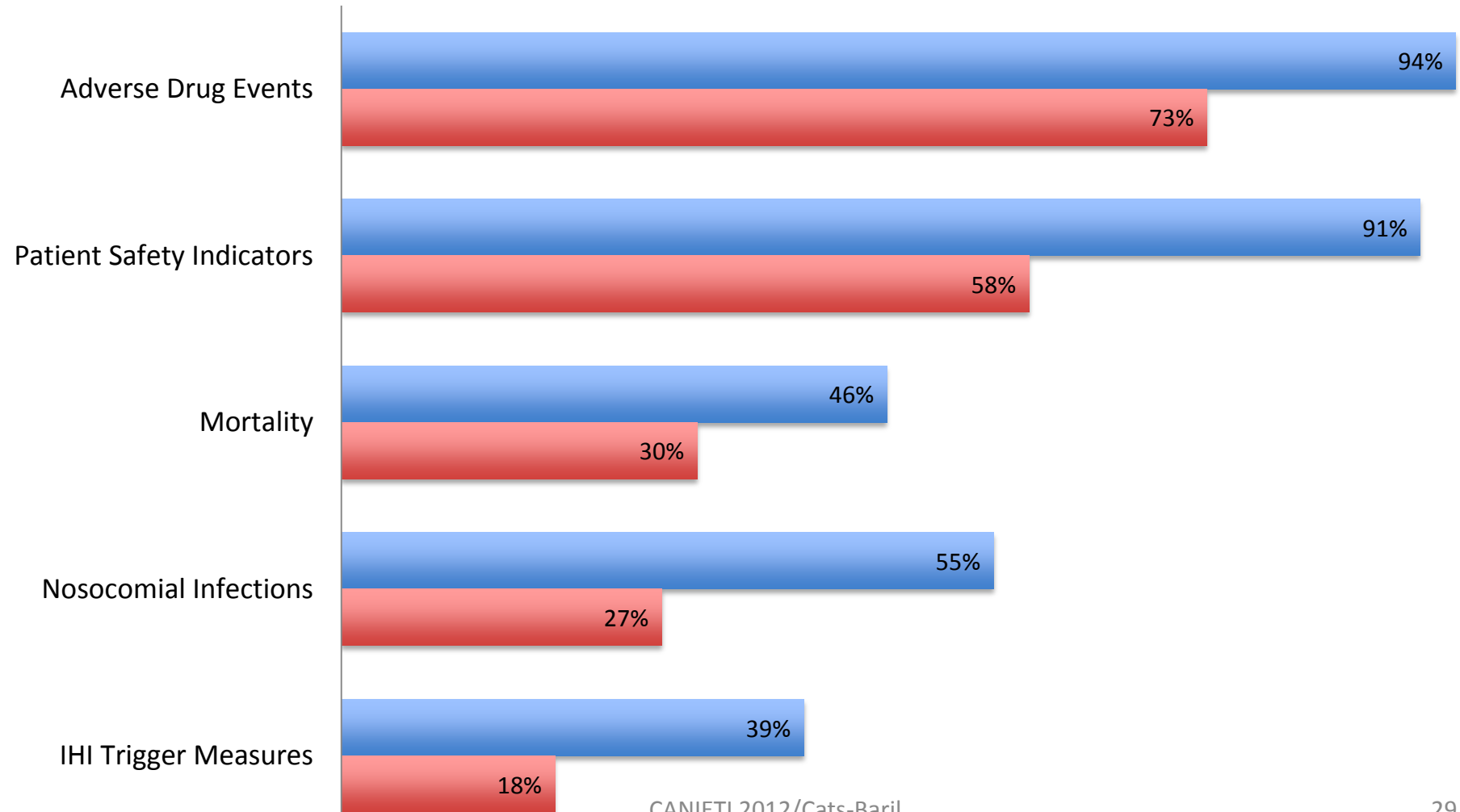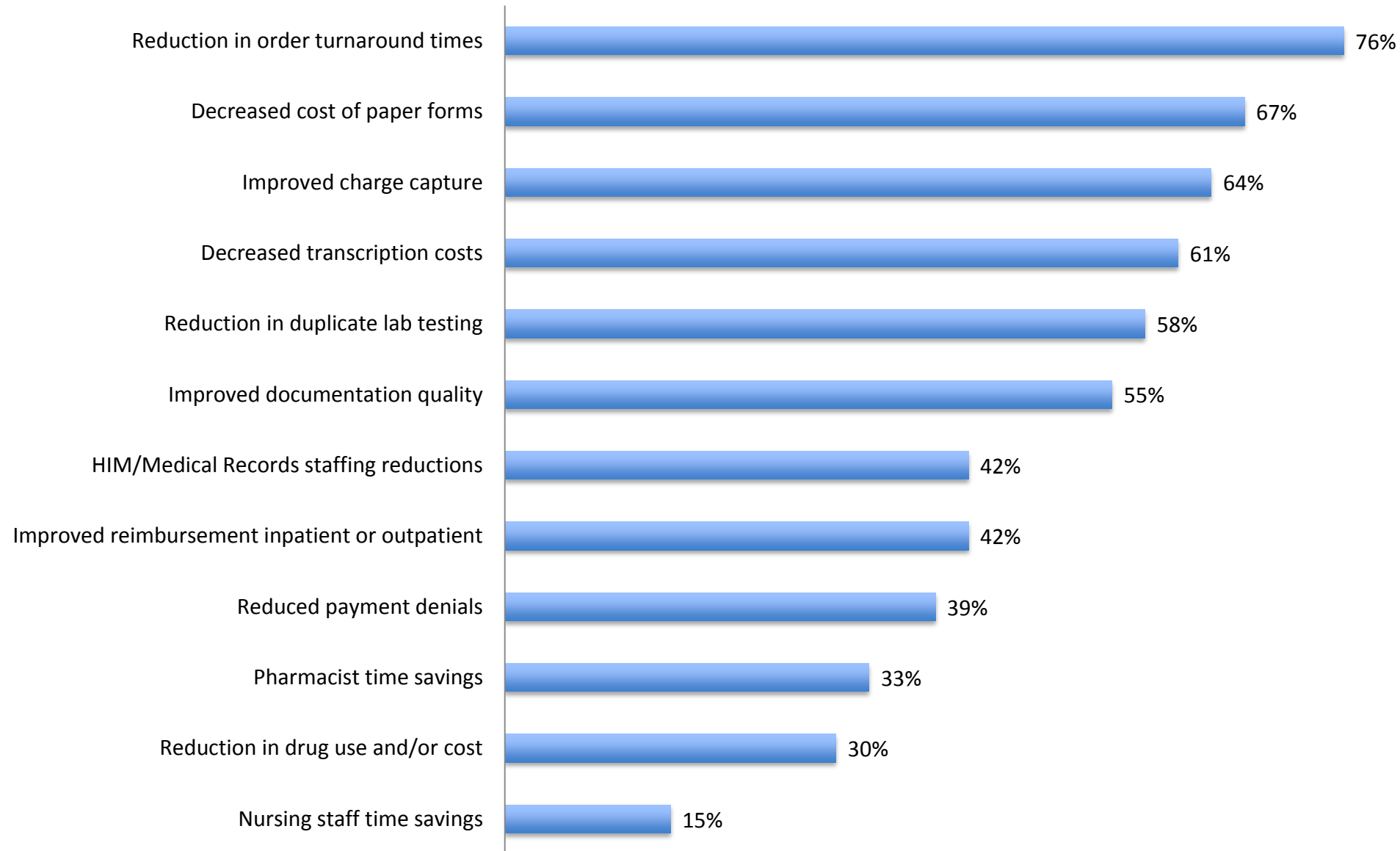- ■ What existing external/internal quality metrics did you target for improvement with your EMR implementation?
- ■ Have you realized and documented any of the following benefits as part of your hospital EMR use?

Category	Targeted (blue)	Realized (red)
Adverse Drug Events	94%	73%
Patient Safety Indicators	91%	58%
Mortality	46%	30%
Nosocomial Infections	55%	27%
IHI Trigger Measures	39%	18%

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(The Advisory Board Company and HIMSS Analytics, 2012)

Top Efficiency Benefits

Benefit	Percentage
Reduction in order turnaround times	76%
Decreased cost of paper forms	67%
Improved charge capture	64%
Decreased transcription costs	61%
Reduction in duplicate lab testing	58%
Improved documentation quality	55%
HIM/Medical Records staffing reductions	42%
Improved reimbursement inpatient or outpatient	42%
Reduced payment denials	39%
Pharmacist time savings	33%
Reduction in drug use and/or cost	30%
Nursing staff time savings	15%

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(The Advisory Board Company and HIMSS Analytics, 2012)

Example: Impact of EMR

- Can Eliminate 200,000 adverse events;
- Save $1 billion dollars per year if implemented across all hospitals with more than 100 beds;
- Better quality comes from being able to analyze information on one patient across millions of medical records (it will get even better as databases become bigger)…

Example: Telemedicine: Remote ICU Monitoring

Hospital ICUs

Data Base
(Clinical Information Systems)

Knowledge Base
(Expert Systems; Alerts; Algorithms)
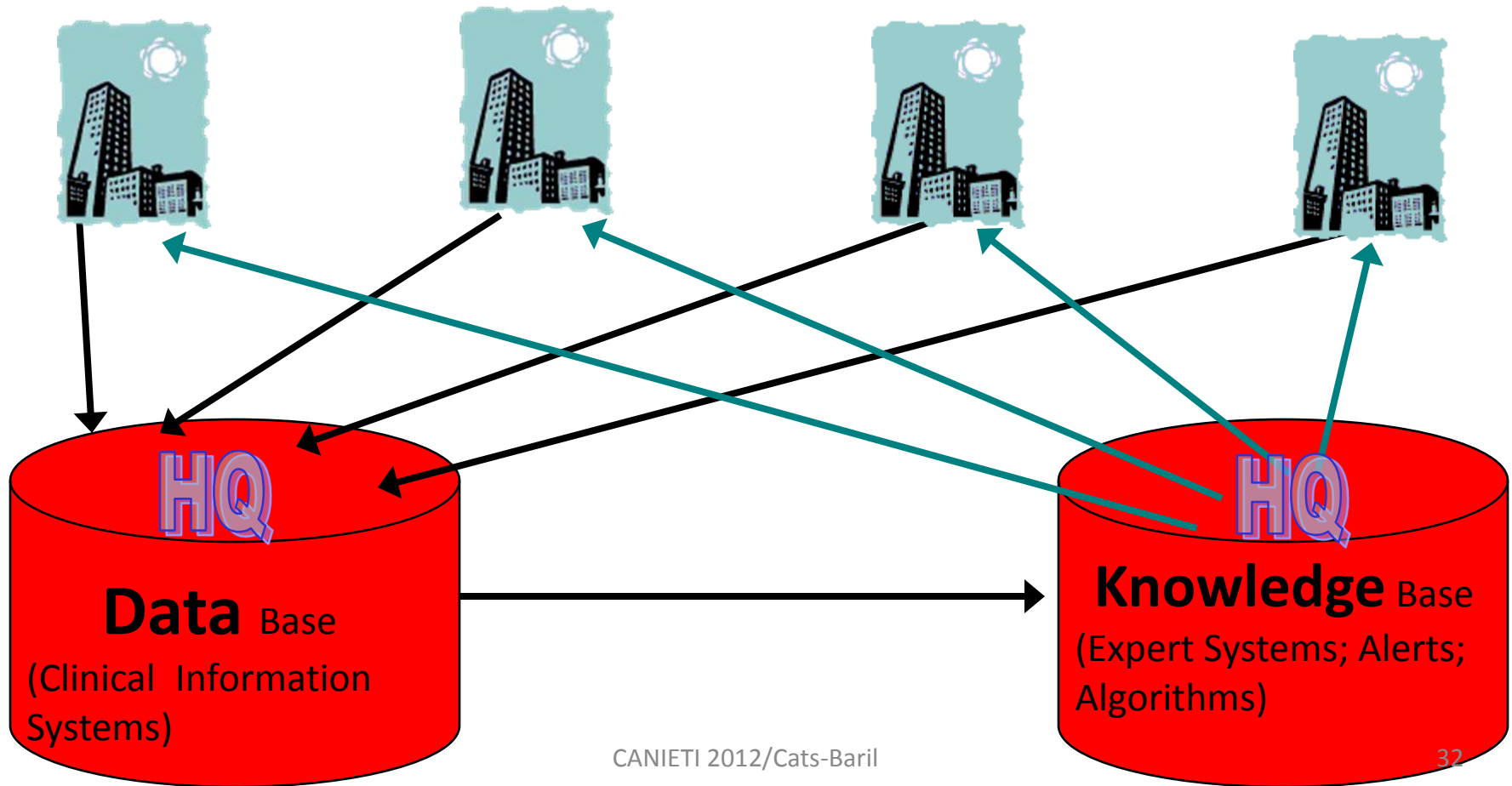
Example: Telemedicine: Remote ICU Monitoring

Technology-enabled remote monitoring reduce mortality by 68% and average length of stay and costs were reduced by 33%.

Example: "Hard-Wiring" Best Practices to Prevent Errors

Building decision rules into Clinical Information Systems to:

– Provide decision support (e.g., expert systems to show how to place a catheter, how to clean a surgical wound, the assessment of abdominal pain, chest pain, psychiatric emergencies, interpretation of radiologic images and tissue specimens);

– Make knowledge more readily available (e.g., www.epocrates.com);

– Require key pieces of information (e.g., double signatures on prescriptions);

– Assist with calculations (e.g., checking dose strength);

– Perform continuous monitoring in real time (e.g., smart monitors);

– Improve communication (e.g., immediate notification of critical lab result).

"Hard-Wiring" for Allergies

Example: Automatic Alerts Lab Results
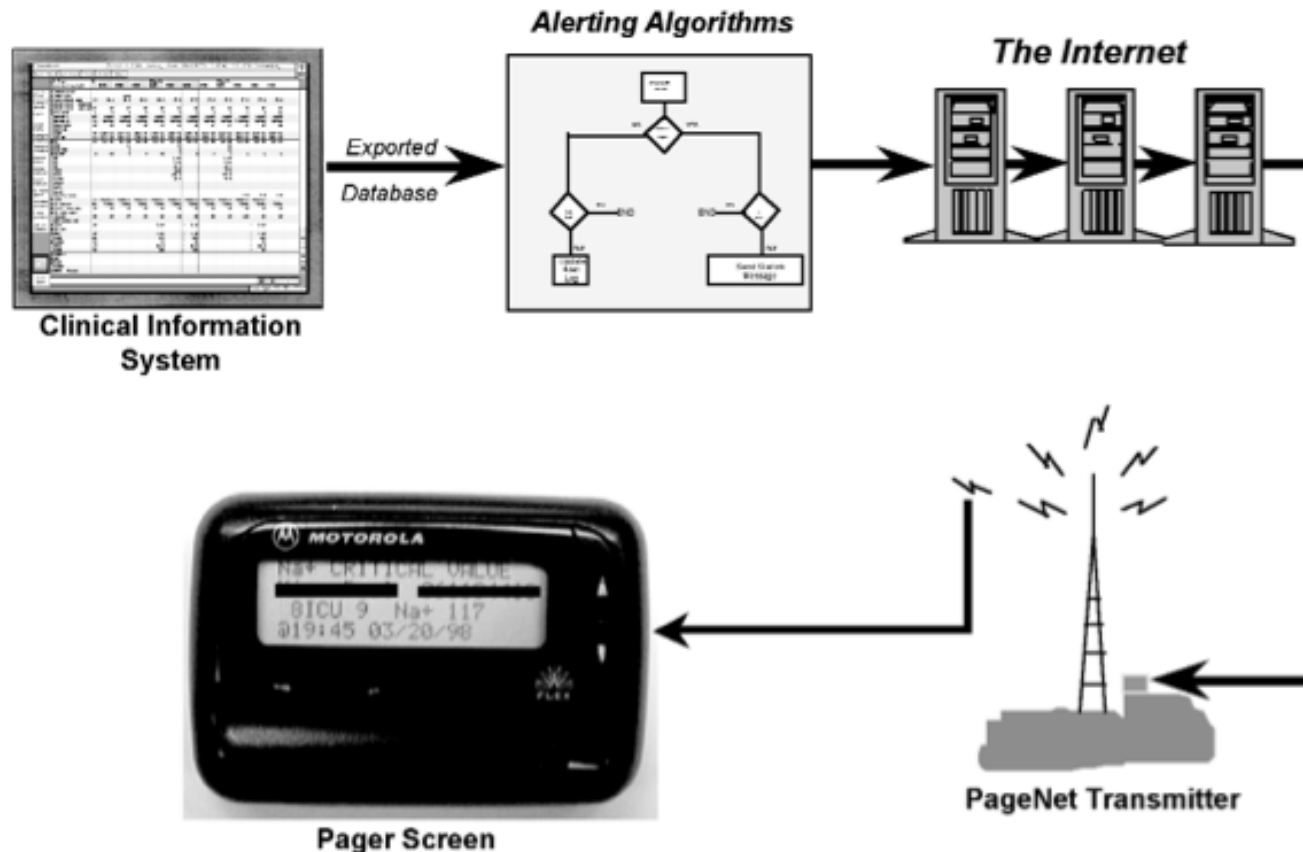
Wireless alerting system. In the Cedars-Sinai system, alerts are initially detected by the clinical system, then sent to a server, then via the Internet, then sent over a PageNet transmitter to a two-way wireless device.

(Bates, Leape, and Shabot, 2001)

Impact of Alerts

- Email and Pagers
- Medication were adjusted 21.6 hours earlier
- Time to therapy decreased by 11%
- Meantime to resolution decreased by 29%.

Example: Bar Coding

999975834
Doe, John
MID-AMERICA BUSINESS SYSTEMS
PH# 614-840-9971
MR# 546987

PDF-417 BARCODE

Prints PDF ID Label

Data Capture Station

Scan PDF for Labels

Scan PDF for Wristband

Dr. Jones
M AGE 22   DOB 04/15/58
MR# 549678
999971234
Mid-America Business Systems

John Doe
Dr. Jones
M AGE 22   DOB 04/15/58
MR# 549678
999971234
Mid-America Business Systems
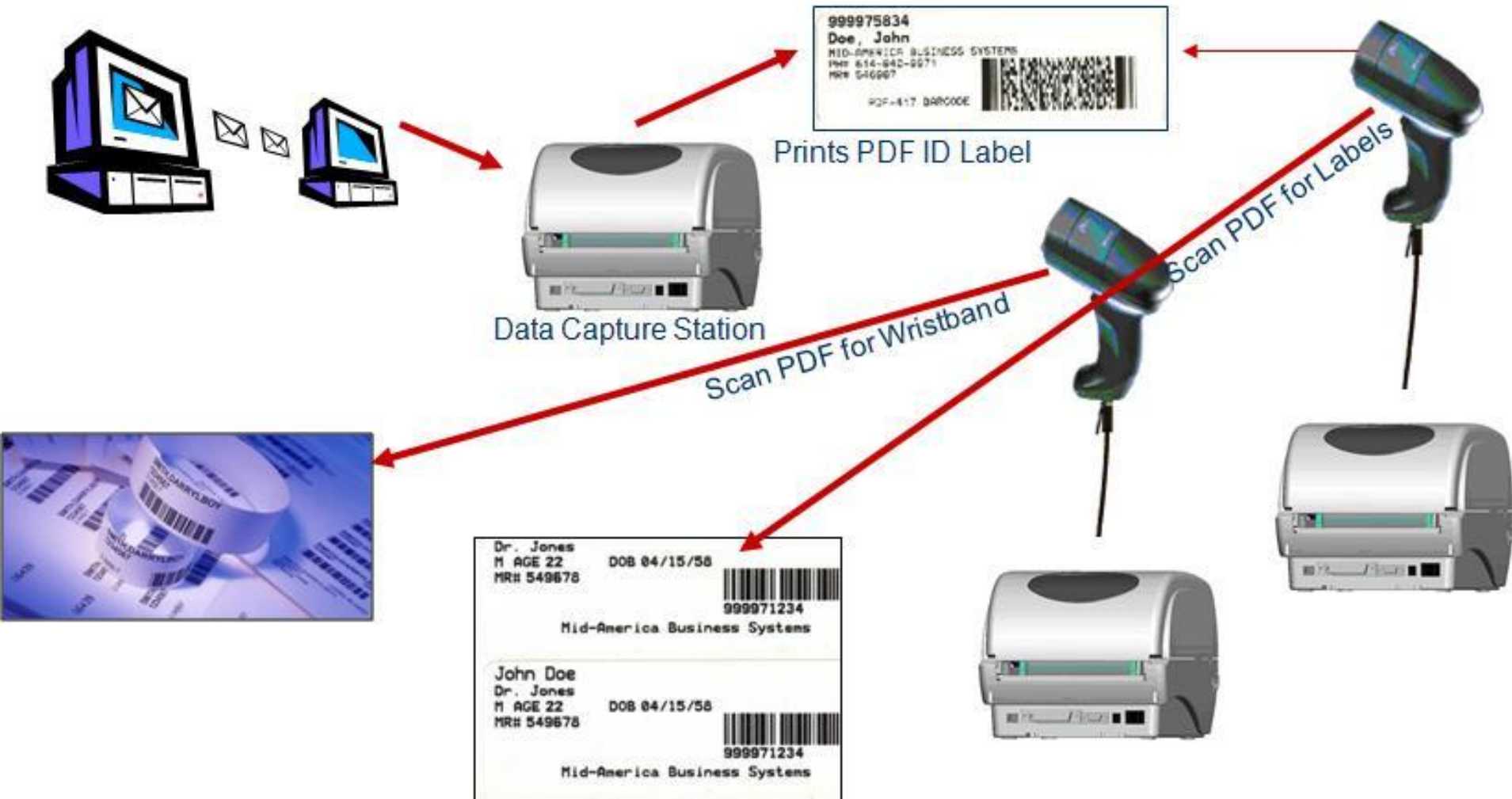
Hard-Wiring Best Practices: Prevention of Avoidable Infections

If **best practices in infection control** were applied at all US hospitals, the reductions would be:

Annually	CABSI	CAUTI	SSI	VAP	TOTAL
% preventable cases	70%	70%	55%	55%	**62.5%**
# preventable cases	44,762 to 164,127	95,483 to 387,550	75,526 to 156,862	95,078 to 137,613	**577,000 cases**
# saved lives	5,520 to 20,239	2,225 to 9,031	2,133 to 4,431	13,667 to 19,782	**44,250 lives**
Savings $ in billions	$1 to $18.2	$.2 to $1.82	$.3 to $.35	$2.19 to $3.17	**$13.44 billion**

- **CABSI**: catheter-associated bloodstream infections
- **CAUTI:** catheter-associated urinary tract infections
- **SSI:** surgical site infections; and
- **VAP**: Ventilator-associated pneumonia.

I/T

- when leveraged with Best Practices –

HAS A TREMENDOUS IMPACT!

% of US Hospitals at Each EMR-AM Stage

Legend: ■ 2007, 4th Quarter ■ 2011, 4th Quarter

	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7
2007, 4th Quarter	13.1	35.3	28.4	2.1	1.3	1	0
2011, 4th Quarter	5.7	12.4	44.9	13.2	8.4	5.2	1.2

Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7
• Lab, radiology, pharmacy systems	• Clinical data repository • HIE capable	• Nursing doc. • CDSS² • PACS	• CPOE • CDSS²	• Closed loop medication system	• Physician notes • Full CDSS² • Full R-PACS	• Complete EMR • CCD • Data warehousing

(The Advisory Board Company and HIMSS Analytics, 2012)

Primary Factors Stalling I/T

1. Cost ($20 million to $200 million);
2. Resistance from physicians;
3. Lack of staff with adequate IT expertise; and,
4. Reimbursement mechanisms (managers are more likely to invest on lab equipment that can be made up by charging patients access to it as a billable service).

Required Heavy Investments Has Lead to Consolidation
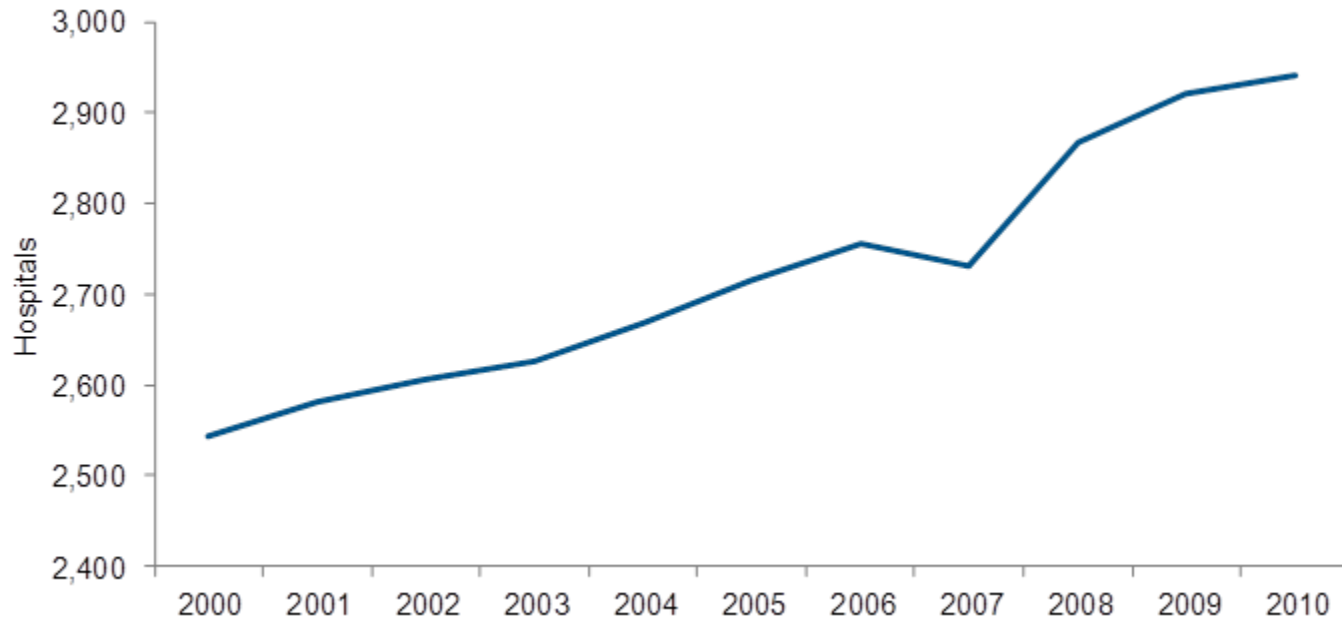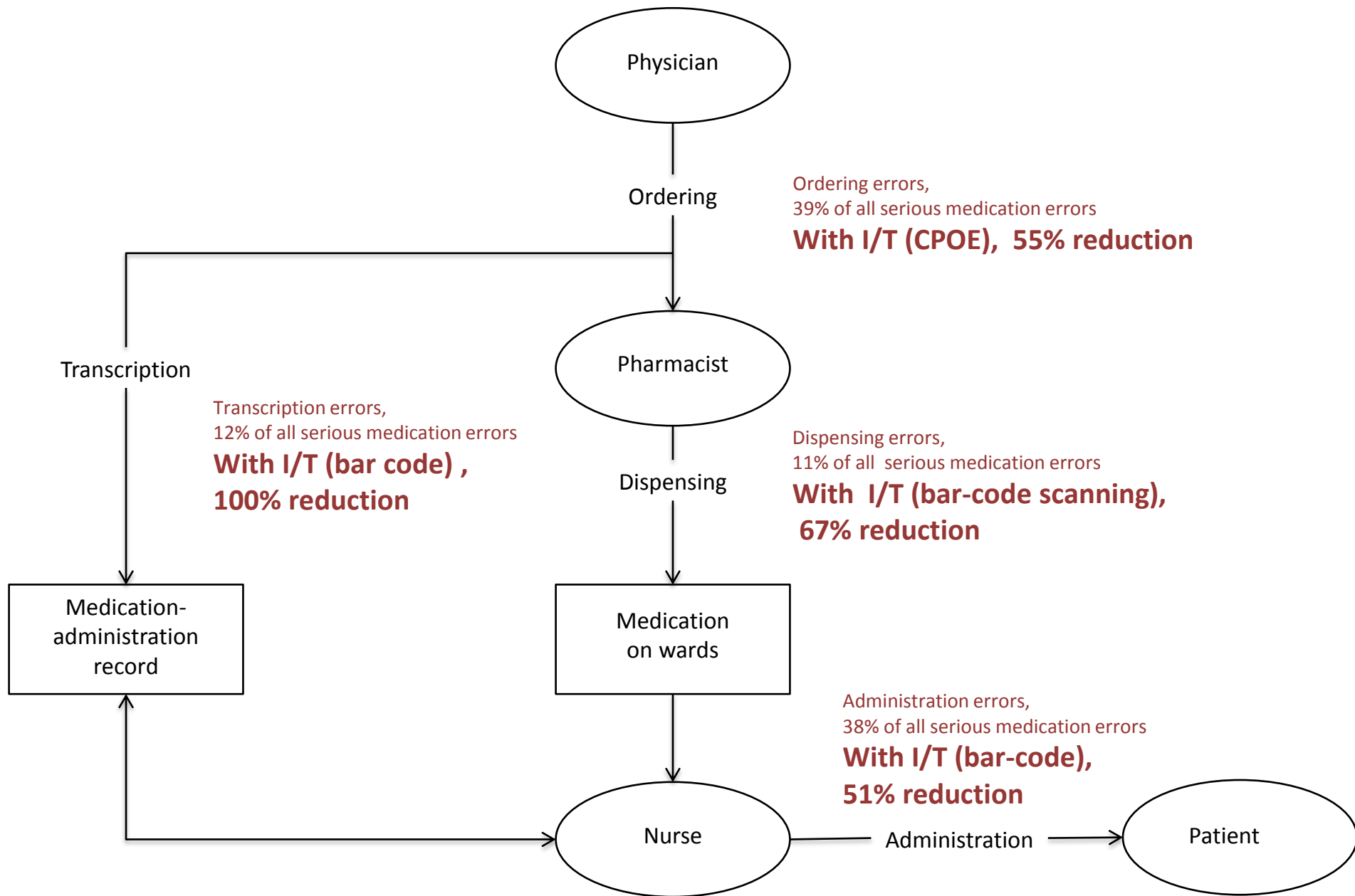

Number of Hospitals in Health Systems

Conclusions: Impact of I/T on Health Care

- **I/T when leveraged with Best Practices has an enormous impact on quality, safety, and efficiency…**

- increasing complexity of health care will only increase the urgency of implementing I/T;

- Investment is substantial (though simple tools requiring small commitment of resources can have a significant impact);

- **I/T will change competition from the "Best Doctors" to "Best Systems".**

MUCHAS GRACIAS!

Physician

Ordering

Ordering errors,
39% of all serious medication errors
With I/T (CPOE), 55% reduction

Transcription

Pharmacist

Transcription errors,
12% of all serious medication errors
With I/T (bar code), 100% reduction

Dispensing

Dispensing errors,
11% of all serious medication errors
With I/T (bar-code scanning), 67% reduction

Medication-administration record

Medication on wards

Administration errors,
38% of all serious medication errors
With I/T (bar-code), 51% reduction

Nurse

Administration

Patient

Example: Impact of Bar Coding

In the largest study (n=14,041 med admin):

- 42% reduction in errors;
- 51% reduction in adverse drug events;
- 27% reduction in timing errors in medication administration;
- 100% reduction (eliminated!) transcription errors.