

EPR/EMR Impacts on Bedside Caregivers: Verification of Favourable Clinical, Cost, Satisfaction Outcomes



Steven H. Shaha, PhD, DBA

Professor, Center for Policy & Public Administration
Principal Outcomes Consultant, Allscripts

Diane Gilbert-Bradley, MD

Chief Quality & Outcomes Officer, Allscripts

Disclosures & Bio

Prof. Steven H. Shaha, PhD, DBA

Professor, Center for Policy & Public Administration

Principal Outcomes Consultant, Allscripts

Former Dir. KLAS Research/Performance Insights

130+ peer-reviewed publications, 380+ peer-reviewed presentations, 3 books

Advisory and consulting work for 11 govt.s in Asia, Australia, Europe and No. America

Advisory and consulting to over 50 non-healthcare organisations, among them:

Disney, Ritz-Carlton, Coca-Cola, New Line Cinema, IBM, AT&T, Time Warner

Employment history includes: Coca-Cola, RAND Corporation, UCLA Medical Center, Intermountain HC, Gartner

Education:

PhD, Research Methods & Applied Statistics

DBA, Business Administration (PhD)

MA, MEd, BS

Prof. Steven H. Shaha, PhD, DBA



Sample of Peer-reviewed Journals

- Advance for Health Information Executives
- Advances in Patient Safety
- Agency for Healthcare Res & Qual (AHRQ Journal)
- American Journal of Ob & Gynecology
- American Journal of Sports Medicine
- Applied Clinical Informatics
- Archives of Otolaryngology, Head & Neck Surg
- Breast Cancer Research and Treatment
- British Medical Journal of Quality & Safety
- Epidemiology and Infection
- Health Management Technology
- Healthcare Financial Management
- Healthcare Technology Management
- Intl. Journal of Medical Informatics
- Intl. Journal of Pediatric Otorhinolaryngology
- Intl. Journal for Quality in Health Care
- Journal of Arthroscopic and Related Surgery
- Journal of Clinical Ultrasound
- Journal of Emergency Nursing
- Journal of Mat, Fetal & Neonatology Med
- Journal of Neurosurgery
- Journal of Obstetrics and Gynecology
- Journal of Orthopedic Trauma
- Journal of Pediatric Emergency Care
- Journal of Perinatal Medicine
- Journal of Perinatology
- Journal of Shoulder and Elbow Surgery
- Journal of the Am Acad of Ped Ophth & Strab
- Journal of Ultrasound in Medicine
- Journal of Ultrasound in Ob & Gynecology
- Laryngoscope
- Nurse Executive Watch
- Nurse Leader
- Nursing Economics
- Pediatric Critical Care Medicine
- Pediatric Emergency Care
- Pediatrics
- RN Magazine
- Spine
- Intl. Journal of Pediatric Otorhinolaryngology
- The Journal of Bone & Joint Surgery
- Ultrasound in Obstetrics & Gynecology

The Dynamics in Healthcare

Pressure on every aspect of performance



“Safety, quality and value-based delivery.”



“Do more with less.”

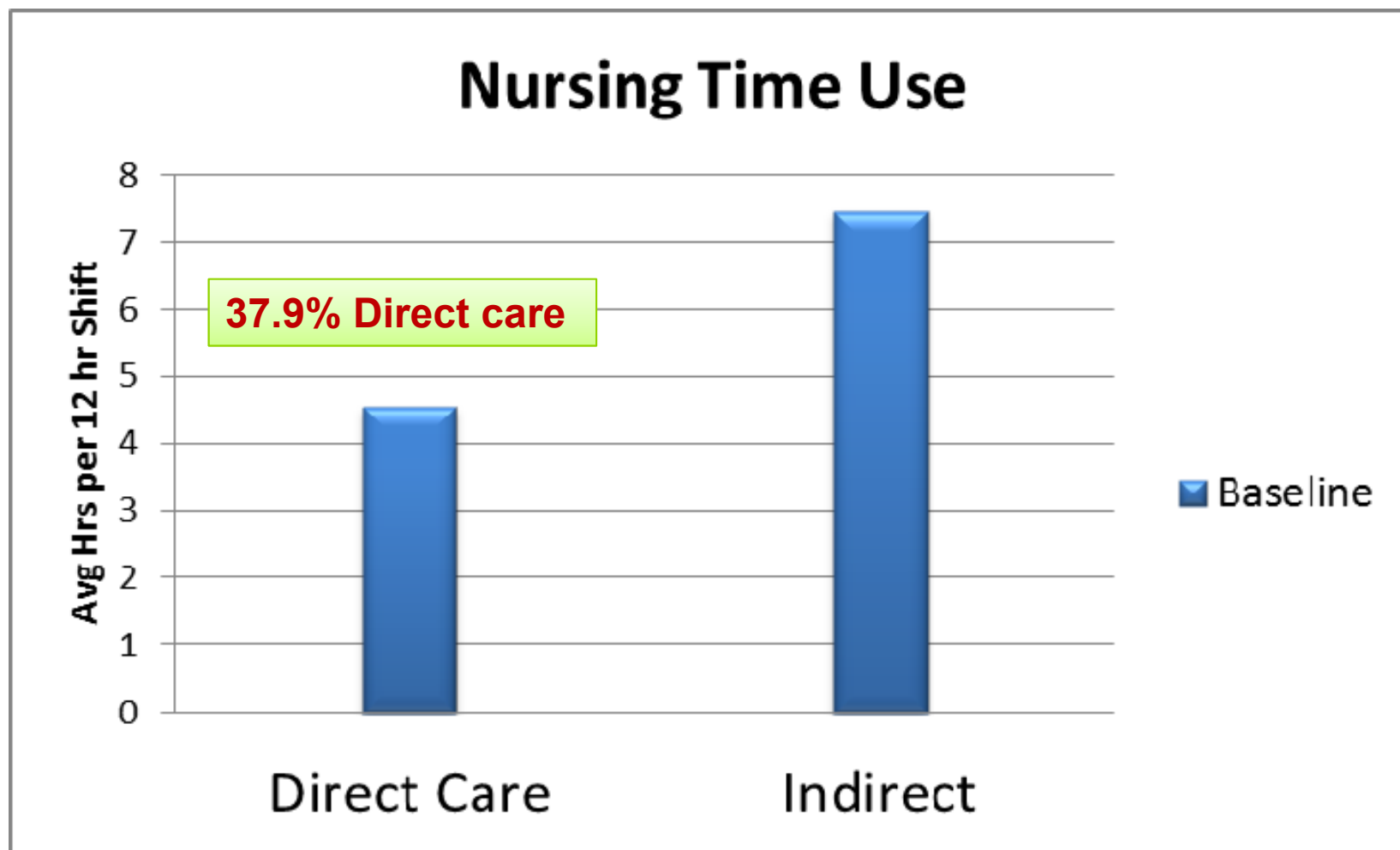


“Variable demand with fixed capacity & poor patient flow.”



DOES AN EPR/EMR BENEFIT
NURSING AND BEDSIDE CARE?

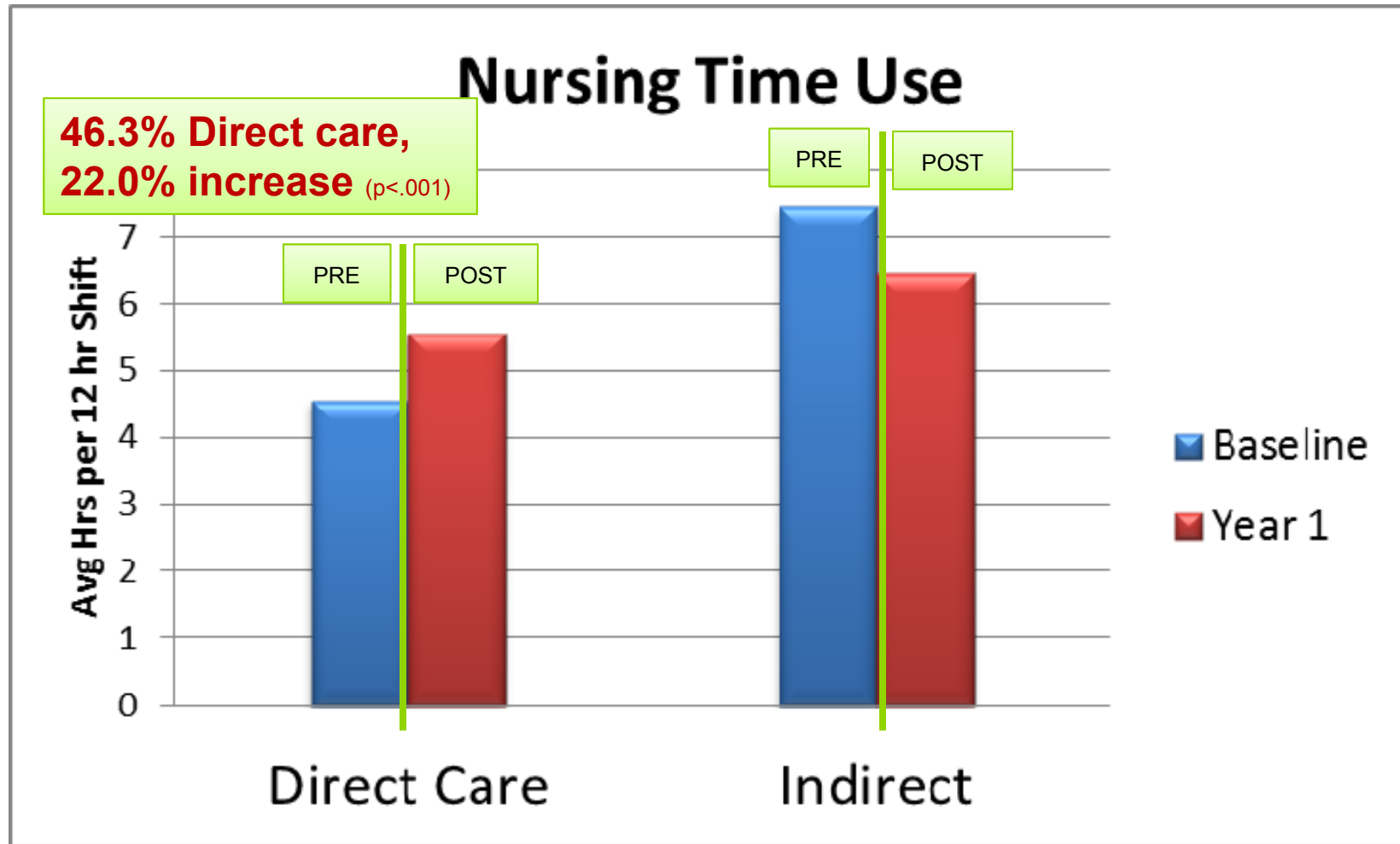
Changes in Nursing Care



Authier D, Bradshaw P, Hickman L, Shaha SH (2012). Mythbusters: Three Studies Reveal Nurses True Attitudes About Transitioning to EHR Systems. *Healthcare Technology Management*, October 2012.

- e-Documentation

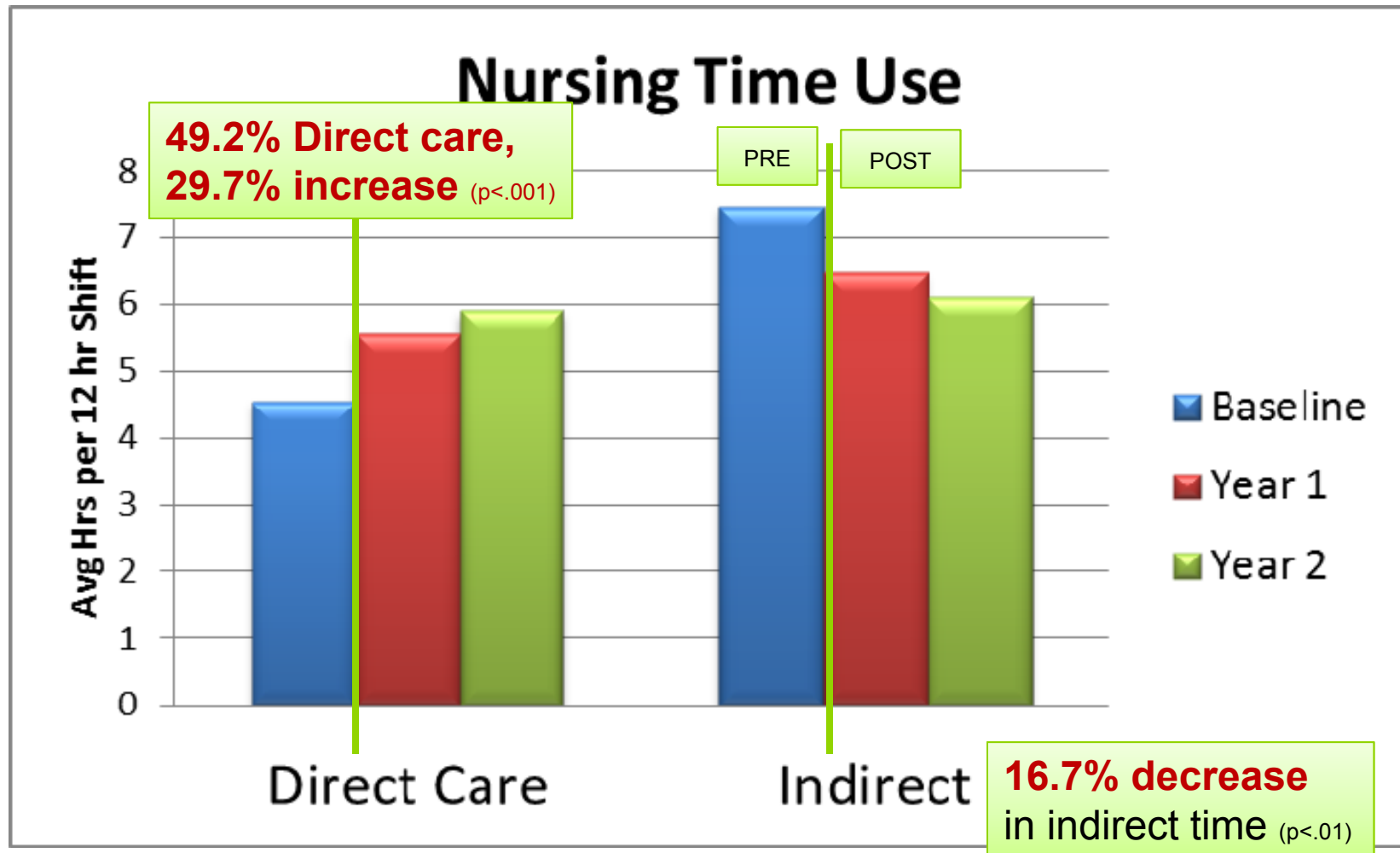
Changes in Nursing Care



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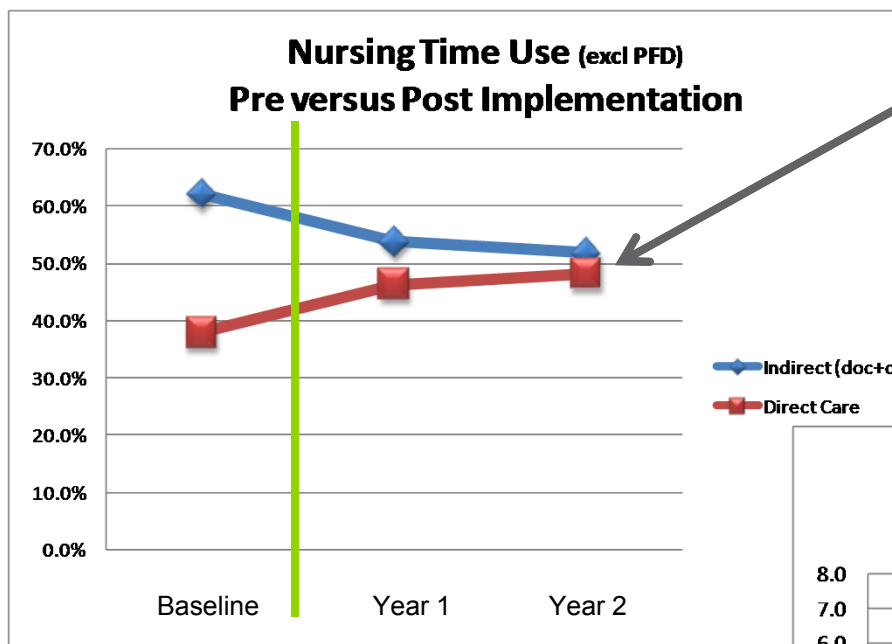
Changes in Nursing Care

- e-Documentation
- Bar-code Med Admin



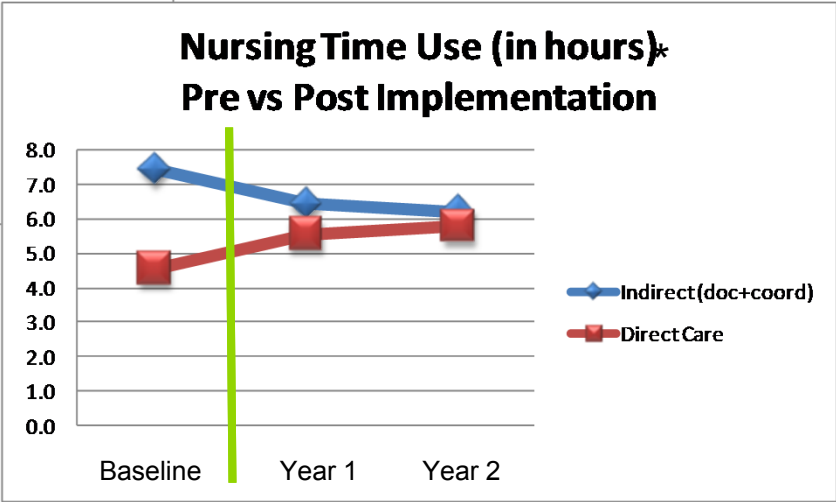
Authier D, Bradshaw P, Hickman L, Shaha SH (2012). Mythbusters: Three Studies Reveal Nurses True Attitudes About Transitioning to EHR Systems. *Healthcare Technology Management*, October 2012.

Changes in Nursing Care



Direct care is approaching 50% of Nursing time, a **29.7% increase** in patient-direct time ($p < .01$)

Indirect time fell by **16.7%** ($p < .01$)



Meaning **1¼ hours More** direct patient care per shift ...

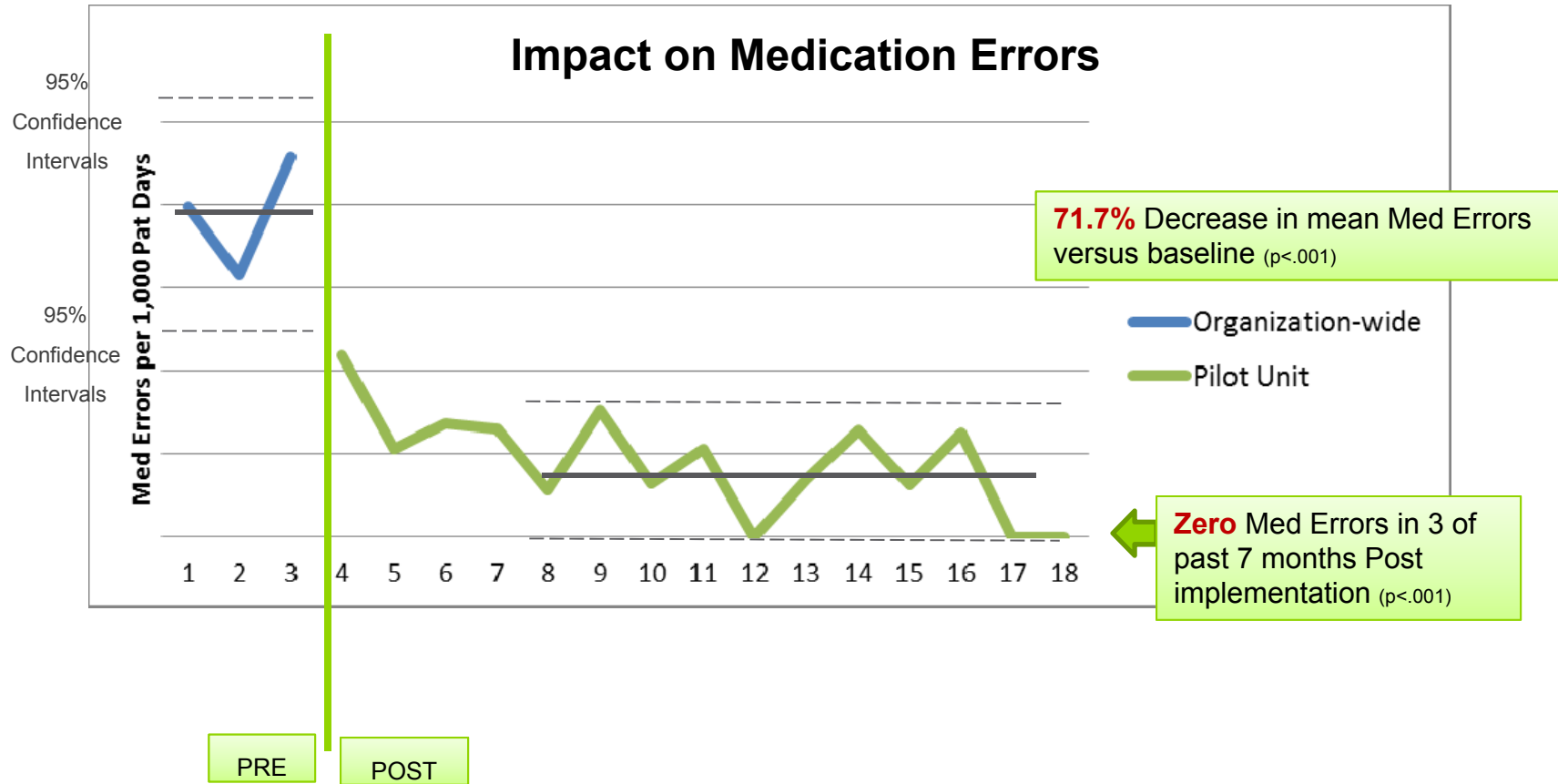
...and **1¼ hours LESS** of indirect time

Authier D, Bradshaw P, Hickman L, Shaha SH (2012). Mythbusters: Three Studies Reveal Nurses True Attitudes About Transitioning to EHR Systems. *Healthcare Technology Management*, October 2012.

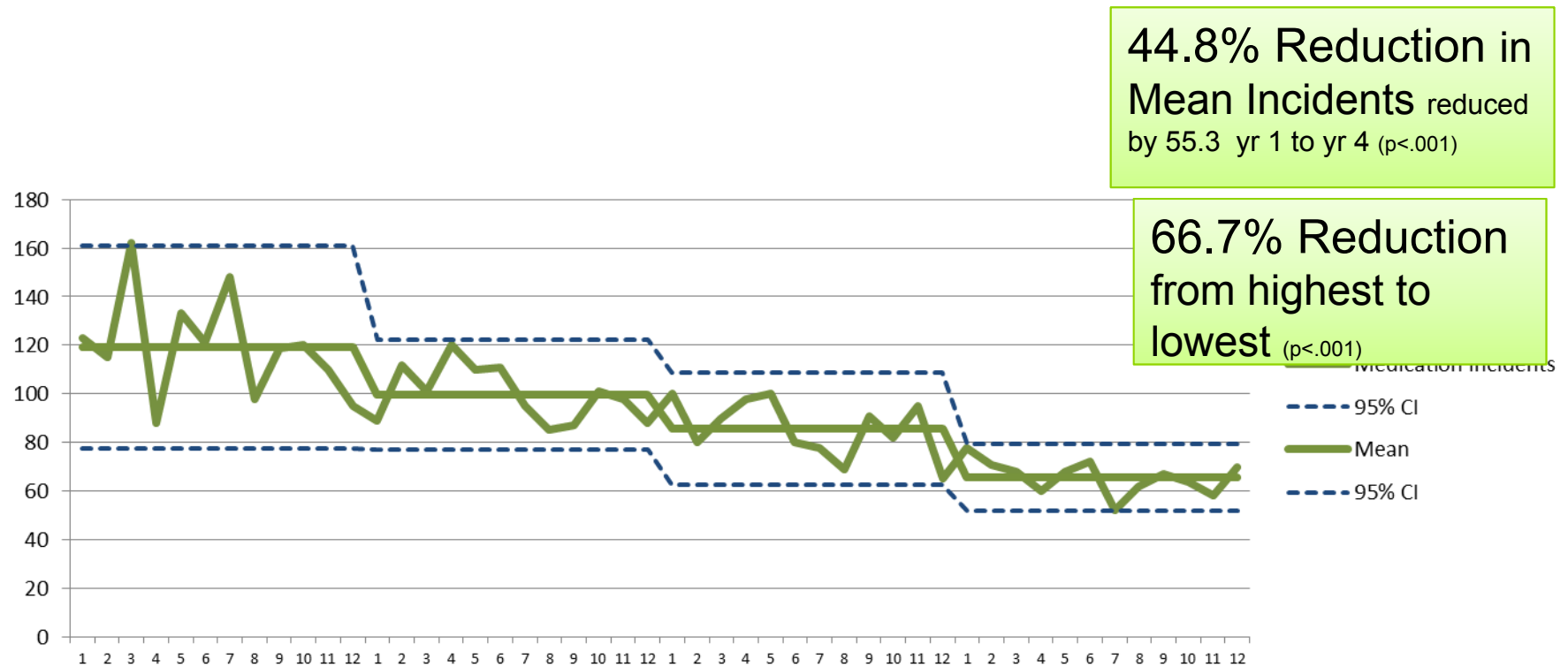
* Reflects 12-hour shifts

But does that make for better patient care?

Safer Medication Administration



Medication Incidents



Annualized Savings estimated between £573 k and £1.13 m



Subramanian S, et.al (2012), Immediate financial impact of computerized clinical decision support for long-term care residents with renal insufficiency: a case study. *J Am Med Inform Assoc* 2012;19:439-442.

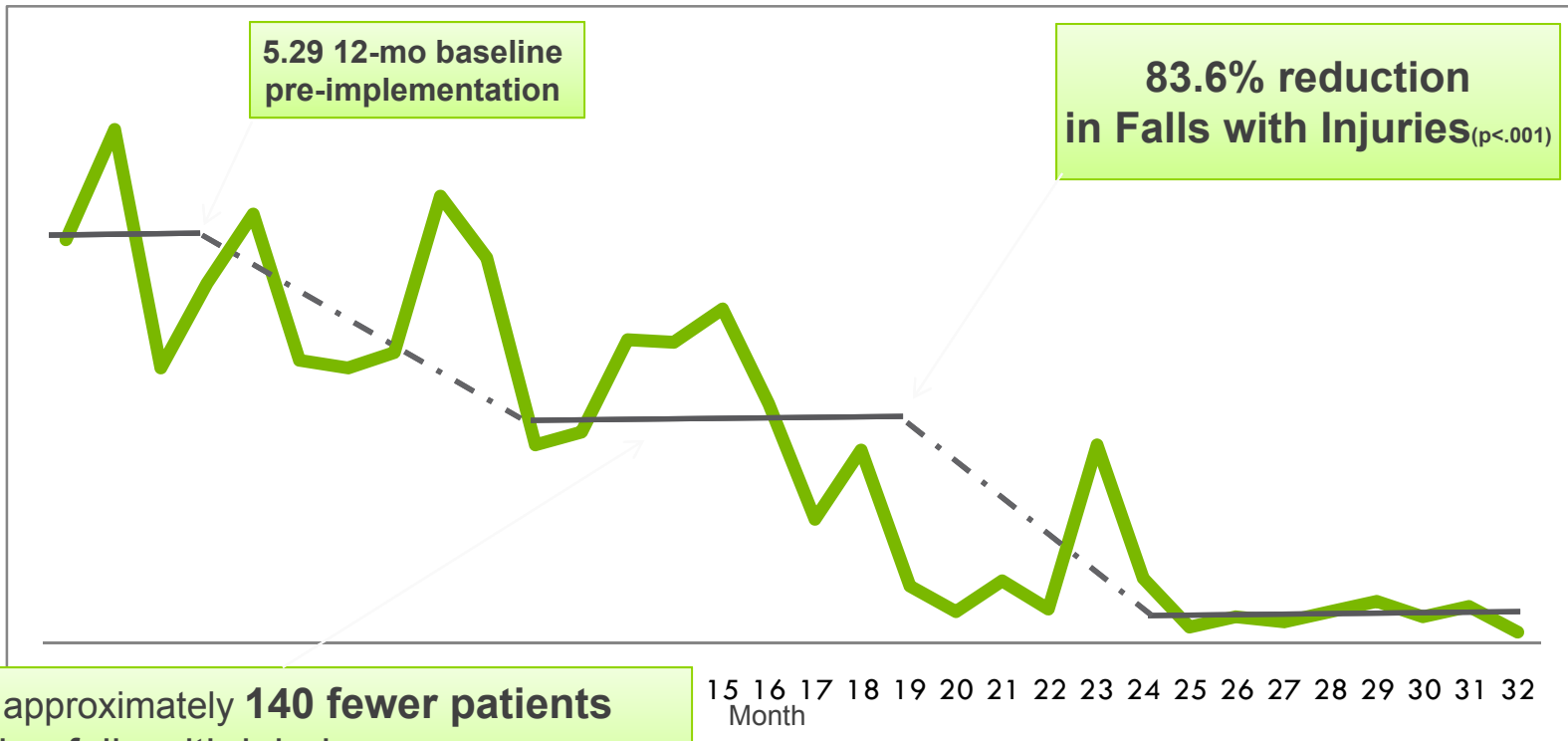
Underlying Benefits

Automated Risk Assessments and Scoring:

- Falls
- Pressure Ulcers
- DVT
- Deterioration

Significant Reduction in Fall Rates

Achieved through Advanced CDS, smart order sets and clinical documentation



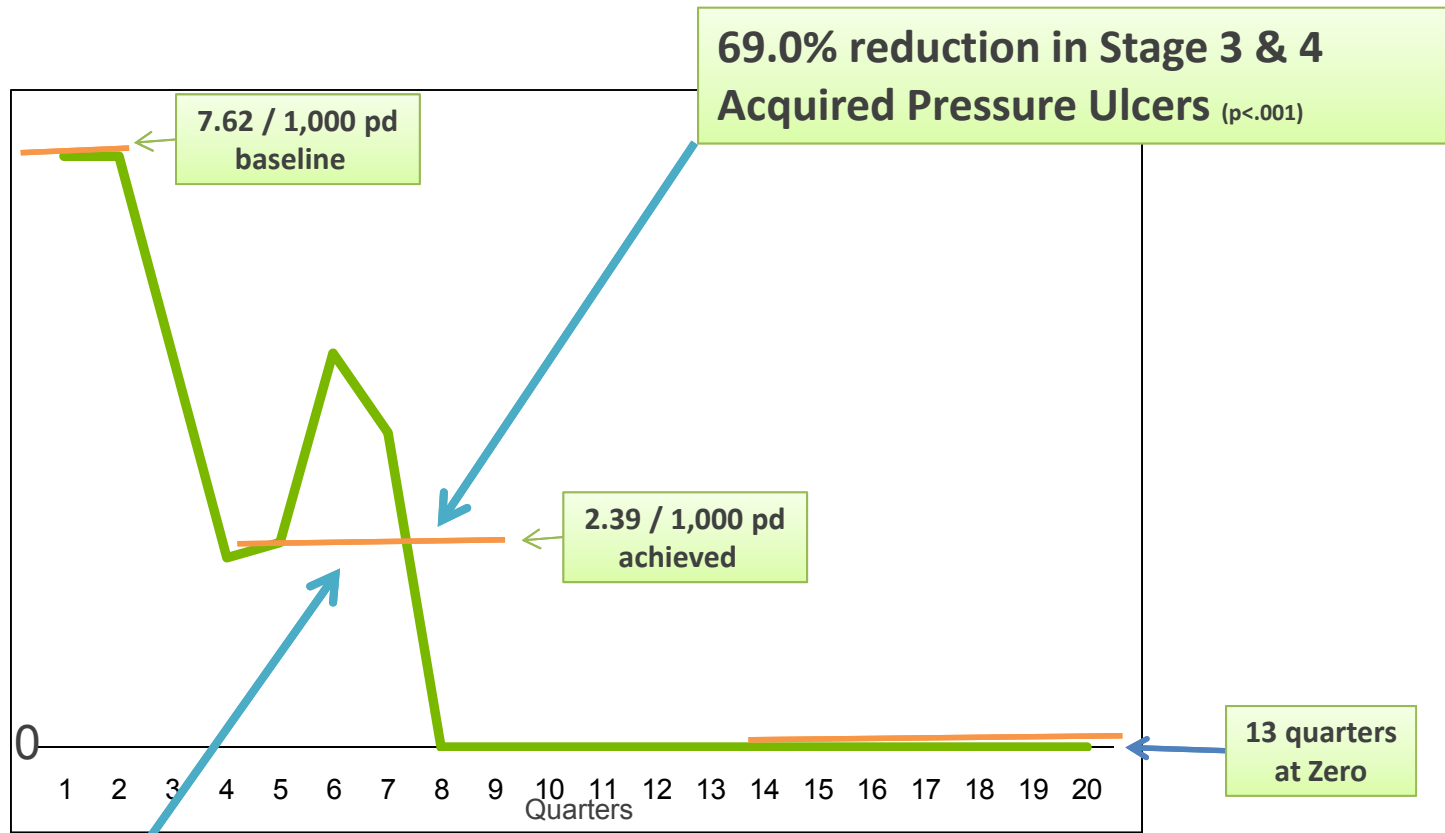
That's approximately **140 fewer patients** suffering falls with injuries each year.

And
\$1.5 M estimated 3-year financial impact

At an estimated at \$11,042 cost per fall.¹

Significant Reduction in Pressure Ulcer Rate

Achieved through Advanced CDS, smart order sets and clinical documentation



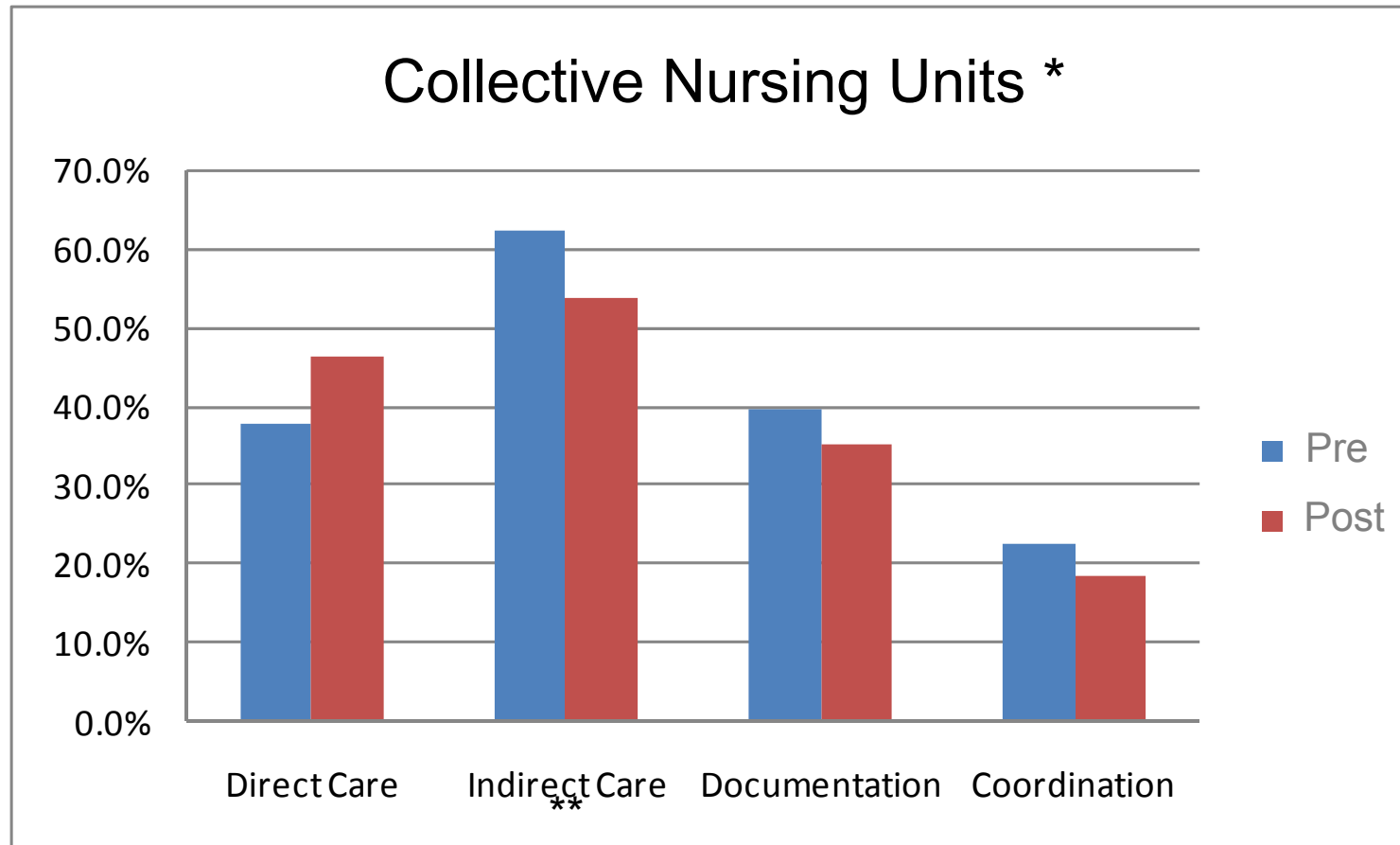
Approximately **167 fewer patients** acquiring stage 3 or 4 pressure ulcers each year.

\$2.2 M - \$14.8 M estimated annual impact¹

(1) DEPARTMENT OF HEALTH AND HUMAN SERVICES, Centers for Medicare & Medicaid Services, 42 CFR Parts 411, 412, 413, and 489. Medicare Program; Changes Hospital Inpatient Prospective Payment Systems and Fiscal Year 2008 Rates. Page 47205

(3) 2004 DRG manual. Average of MDC 009 (pressure ulcers) and DRG 271 (skin ulcers) charges (\$12,922 and \$16,724 respectively) divided by charge to cost ratio of 2.44.

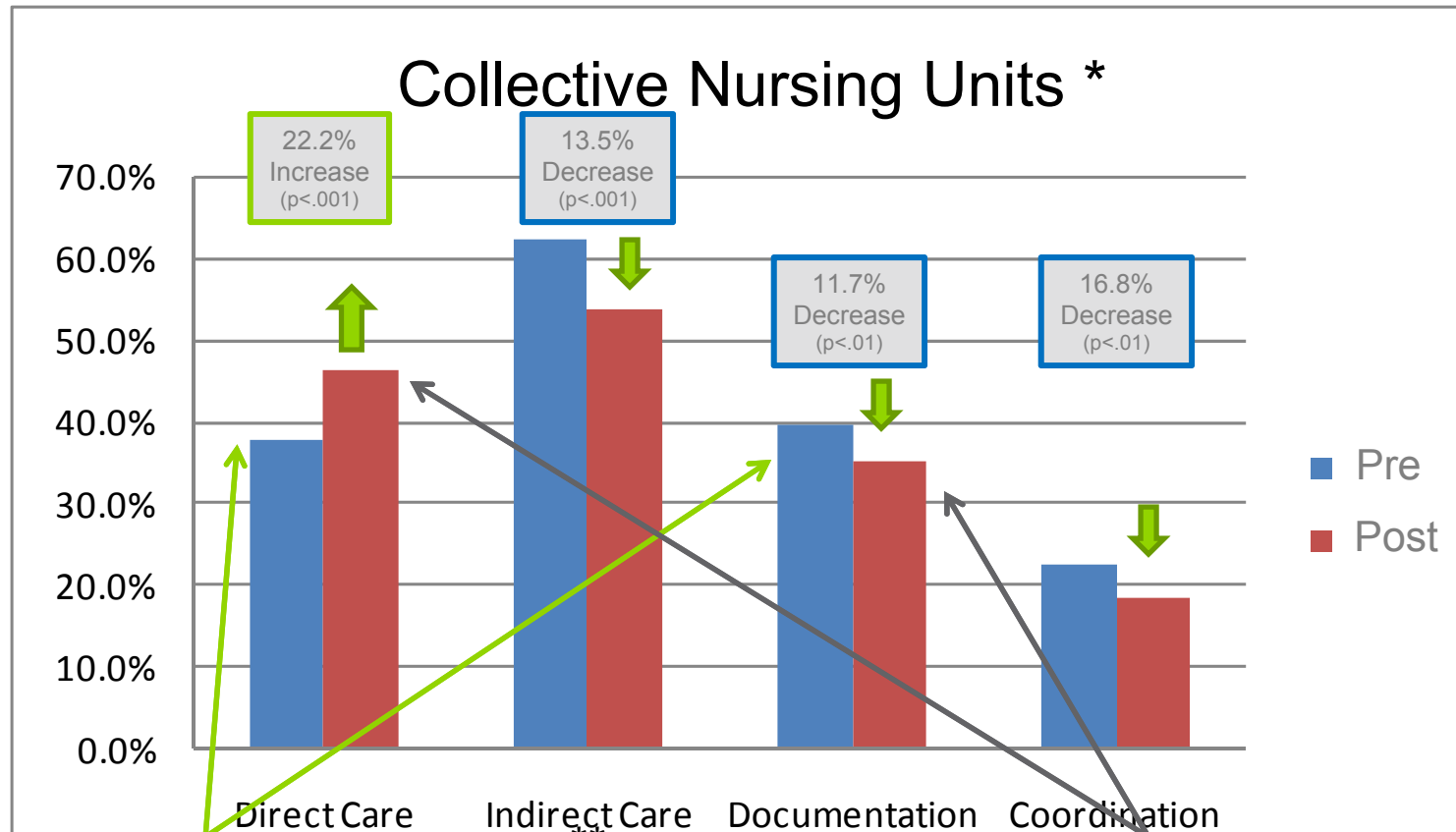
Changes in Nursing Care



* Excludes hours for personal, fatigue and delay (incl. breaks).

** Indirect is the sum of documentation and coordination.

Changes in Nursing Care



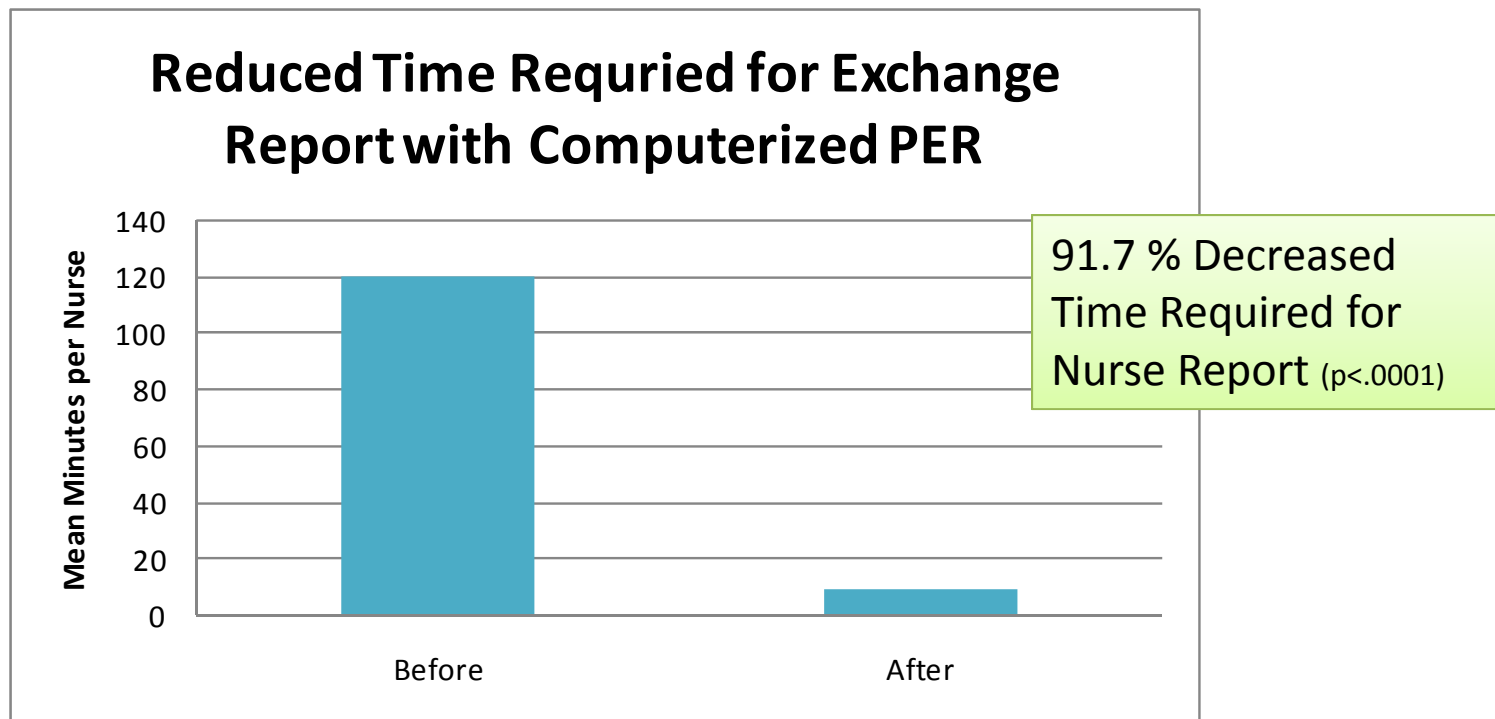
Pre, time spent on Direct Care was **4.4% less** than on documentation alone.

Post, time spent on Direct Care was **32.2% more** than on documentation.

* Excludes hours for personal, fatigue and delay (incl. breaks).

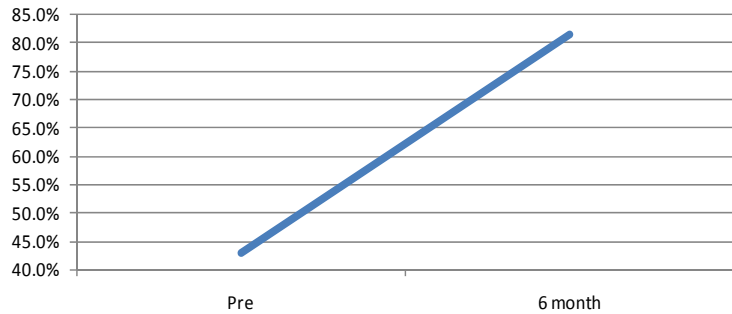
** Indirect is the sum of documentation and coordination.

Implementation of the computerized Personal Exchange Report (PER) reduced mean time required **from 120 minutes to 10 minutes** for a Med/Surg unit ($p < .0001$).

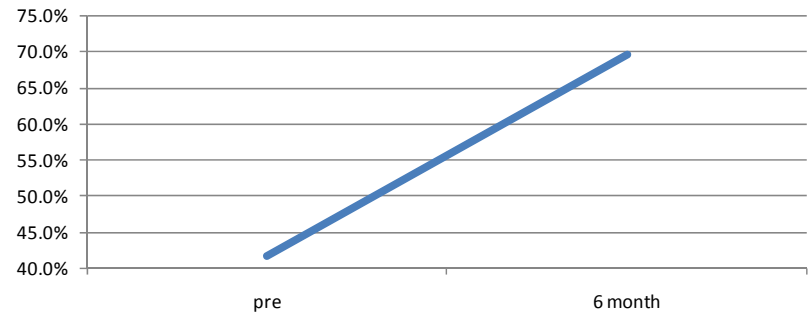


How Bedside Caregivers
perceive EPR/EMR impact ...

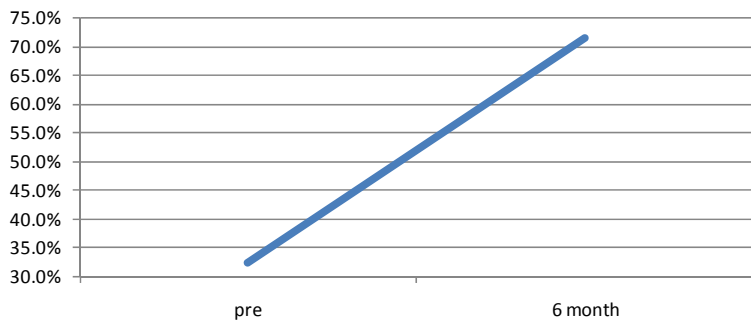
Current System Facilitates Workflow: Percent Favorable



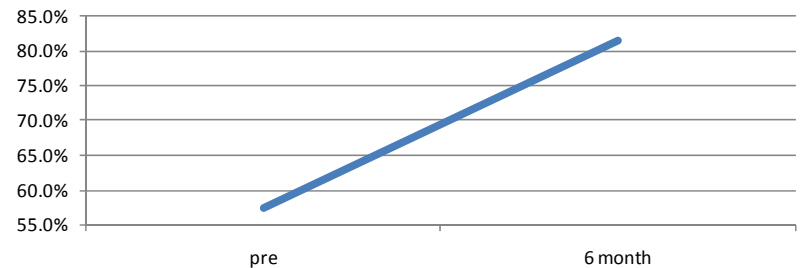
Current System Supports Efficient Transfer Between Providers: Percent Favorable



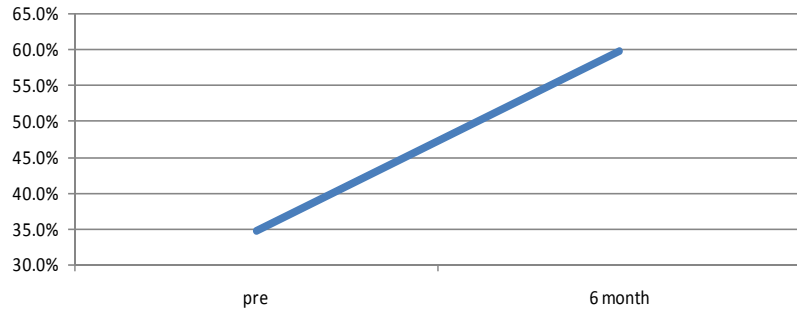
I Would Recommend the Current System: Percent Favorable



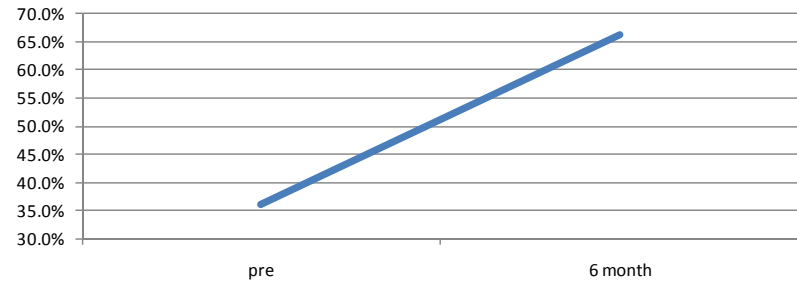
Current System Provides Information to Take Care of My Patients: Percent Favorable



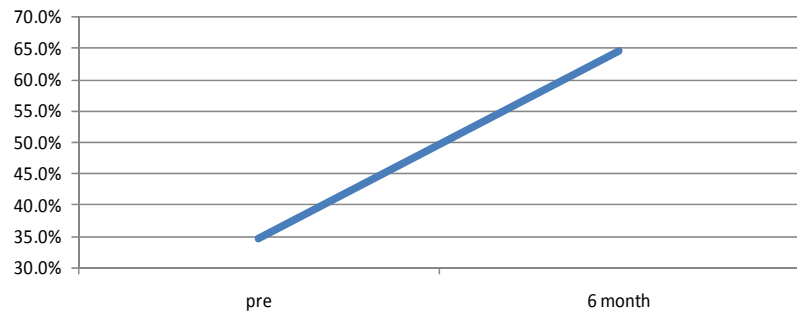
Current System Adequately Informs Me of Potential Errors for ORDERS: Percent Favorable



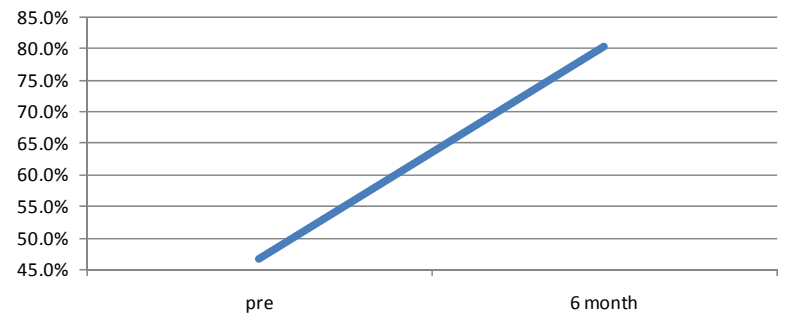
Current System Adequately Informs Me of Potential Errors for Drug Interactions: Percent Favorable



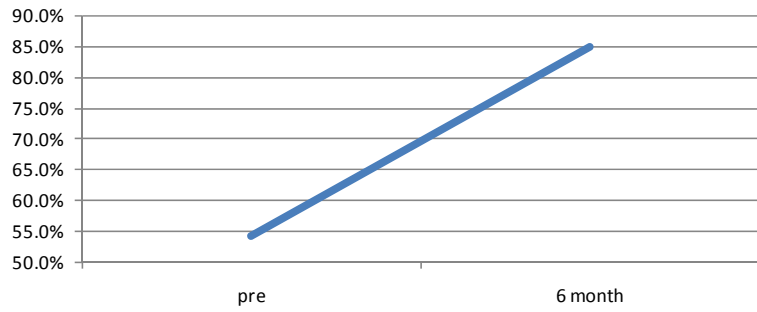
Current System Adequately Informs Me of Potential Errors for MEDS: Percent Favorable



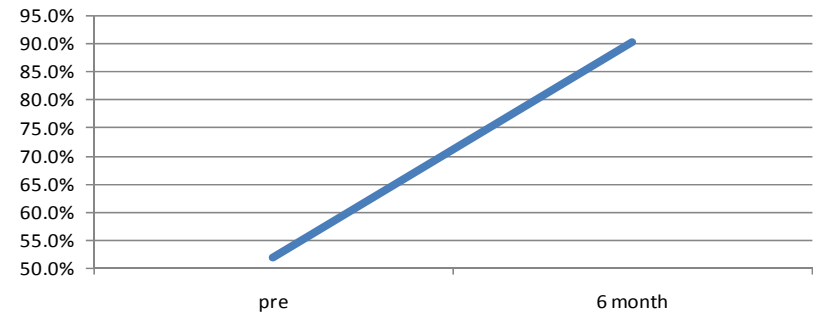
Current System Adequately Informs Me of Potential Errors for Pat ID: Percent Favorable



**I Can Easily Act on Orders:
Percent Favorable**

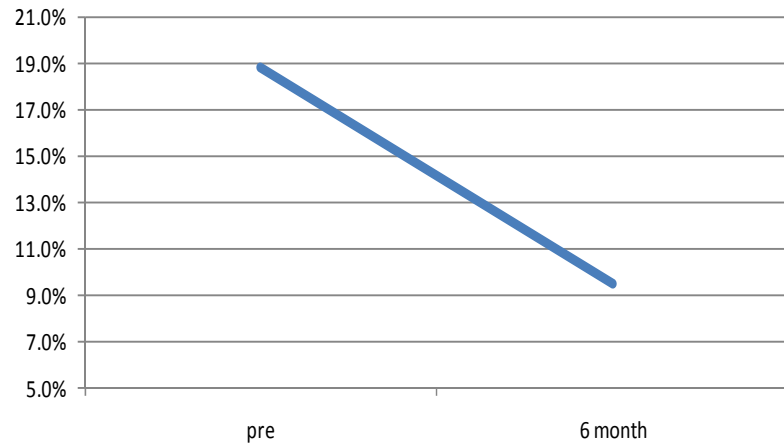


**I Can Easily Act on Lab Data:
Percent Favorable**

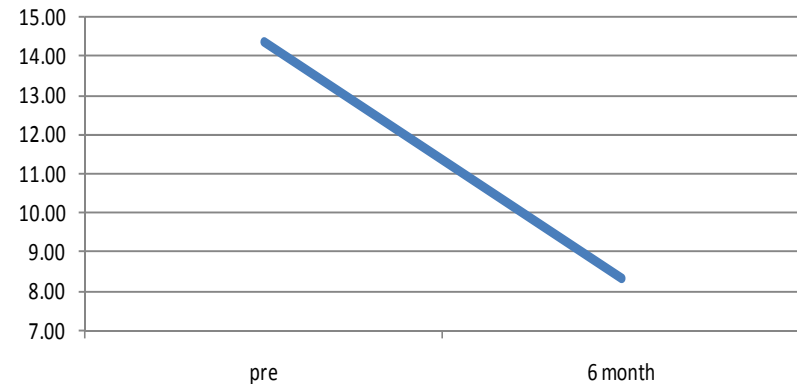


Clinicians Adopt due to Inherent Value

**21 Calls or More: Receive or Make Daily:
Percent Favorable**



**Avg Min per Day Preparing My Patient List
for MDs**



Why is satisfaction UP?

Sepsis Disease of infections and “avoidables”

Statistics:

- The leading cause of death in hospitals globally – 1.7 Million cases a year
- Prolonged LOS in ICU w/ CCs, complex therapies, high costs – est. **£18Bn annually**

Solution:

- SQL query 12-month retrospective chart review
- MEWS: Perpetual, house-wide, imbedded monitoring and surveillance

	3	2	1	0	1	2	3
Systolic BP (mmHg)	< 70	71-80	81-100	101-199		>= 200	
Heart rate (bpm)		< 40	41-50	51-100	101-110	110-129	>= 130
Respiratory rate (bpm)		< 9		9-14	15-20	21-29	>= 30
Temperature (°C)		< 35		35-38.4		>= 38.5	
Age (y)					65-74	75-84	>= 85
BMI (kg/m ²)			< 18.5		25.1-34.9	> 35	

<http://www.nigms.nih.gov/>

1. Angus DC, Linde-Zwirble WT, Lidicker J, Clermont G, Carcillo J, Pinsky MR. Epidemiology of severe sepsis in the United States: analysis of incidence, outcome and associated costs of care. *Critical Care Medicine*. 2001 Jul;29(7):1303-10.
2. Wood KA, Angus DC. Pharmacoeconomic implications of new therapies in sepsis. *Pharmacoeconomics*. 2004;22(14):895-906.
3. Yende S, Angus DC. Long-term outcomes from sepsis. *Current Infectious Disease Reports*. 2007 Sep;9(5):382-6.
4. Kho MD, Abel. "Utility of commonly captured data from an EHR to identify hospitalized patients at risk for clinical deterioration.." AMIA 2007 Symposium Proceedings. (2007): 404-407. Print.

Shaha SH (2014) *The EMR as an Effective Tool for Boosting Medication Adherence*. Invited Presentation: 2nd Annual World Congress Summit to Improve Adherence and Patient Engagement, March 10-11, 2014, Philadelphia.
 Shaha SH, Hutchinson M (2014). *EPR Impacts: The Real ROI*. HC 2014: The National Health IT Conf & Exh, Manchester, England, March 20, 2014.
 Shaha SH, et al. (2014). *CPOE's Predictive Impact on LOS: Three Case Studies Illustrate the Impact of High Capability EMRs*. HIC 2014 Health Informatics Society of Australia, Melbourne.

The Process: Identification and Remediation



Summary Impacts:

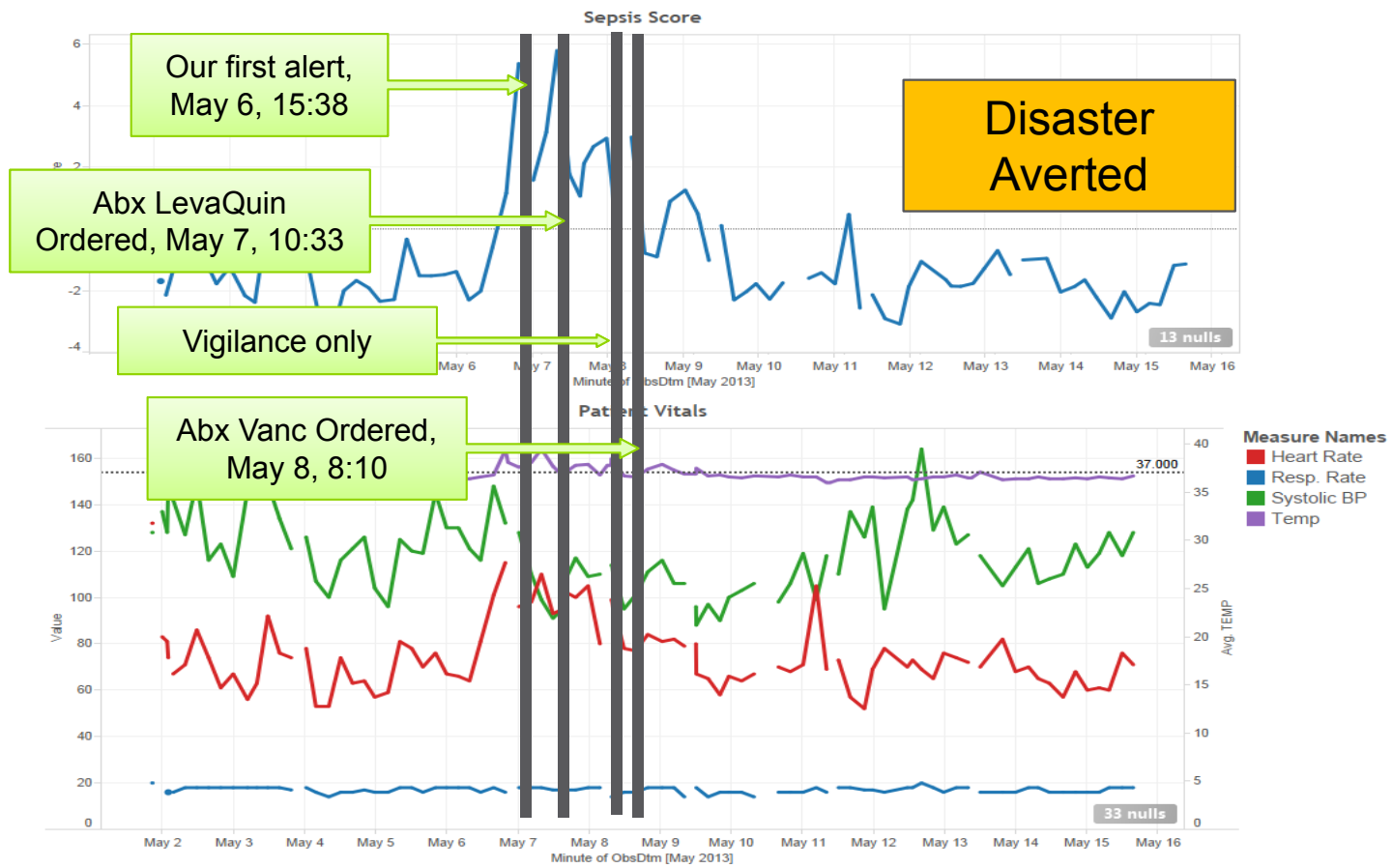
Measure	Pre	Post
Timeliness of Recognition ¹	571.2 minutes	93.7 minutes
Cardiopulmonary Arrest Rate Outside ICU ²	5.54%	3.86%
ICU Length of Stay ³	3.8 days	3.3 days

p<0.001

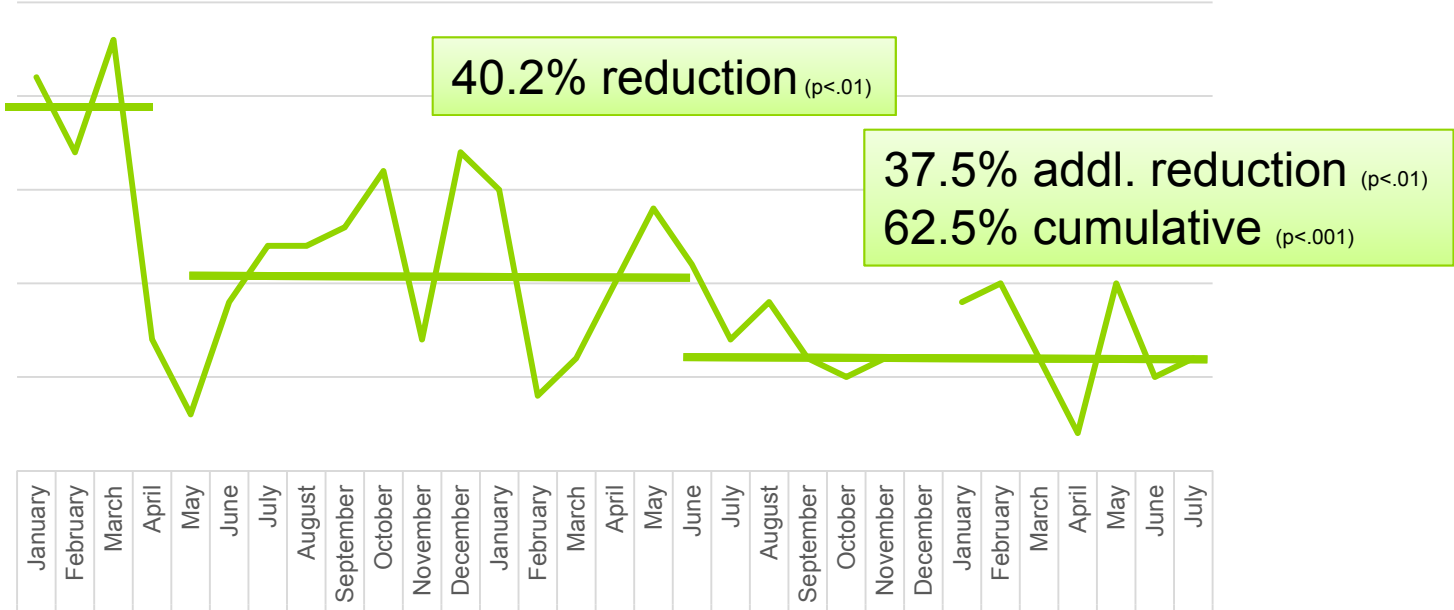
p<0.001

p<0.01

1. T Test procedure, statistically significant (p <.0001)
 2. Chi square procedure, statistically significant (p 0.046)
 3. Not statistically significant (t=1.74/p=.08) but *clinically significant?*



Sepsis Outside of the ICU



\$14.2 Million est. Cost Reduction

Why is satisfaction UP?

What bedside caregivers DO matters.

What they DOCUMENT matters.



What EPRs should DO ...



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