Using Health Information Technology to Ensure Quality and Safety

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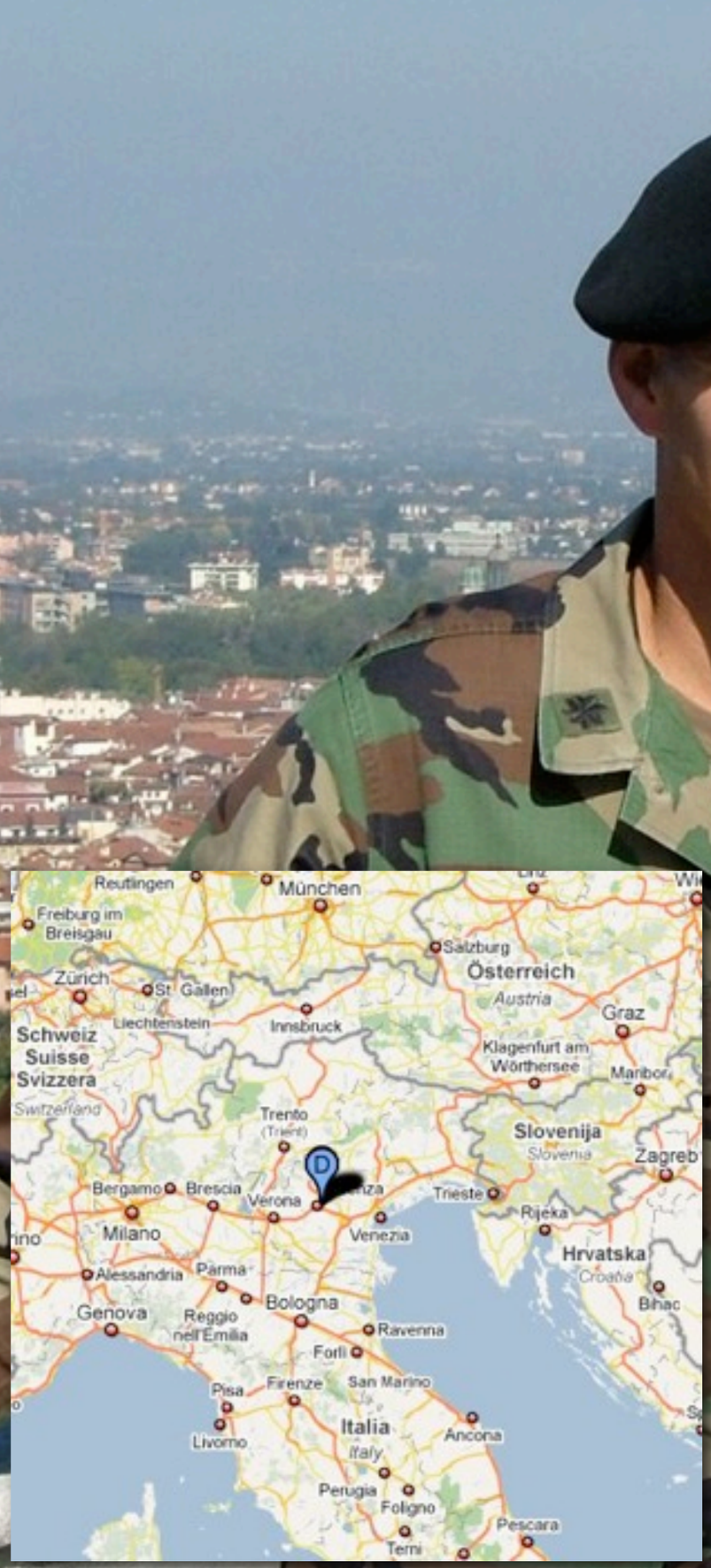
MAMC Grand Rounds, Dec 11, 200


VIRGINIA MASON
EMERGENCY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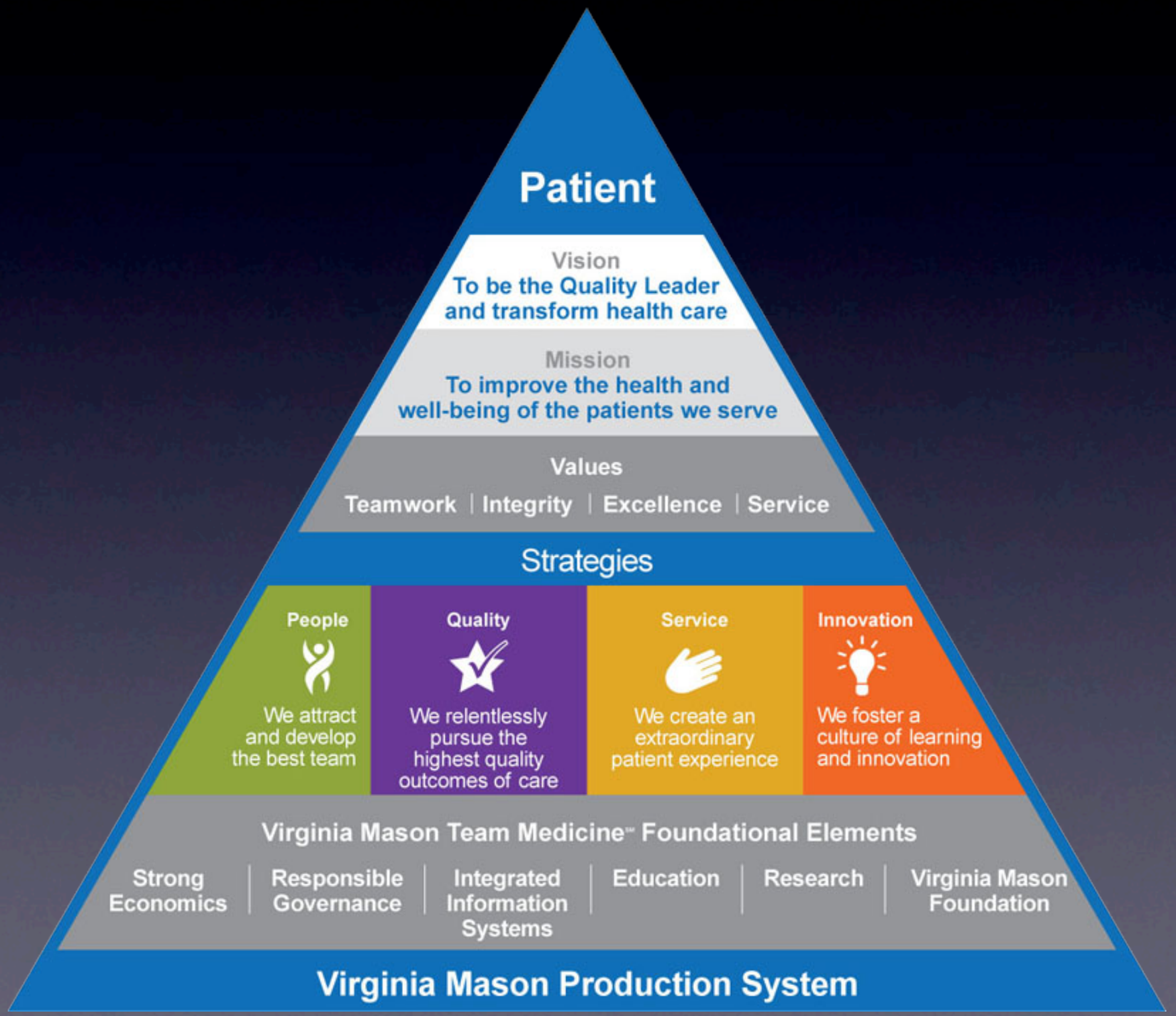
Using Health Information Technology to Ensure Quality and Safety



Patient

Vision

To be the Quality Leader and transform health care

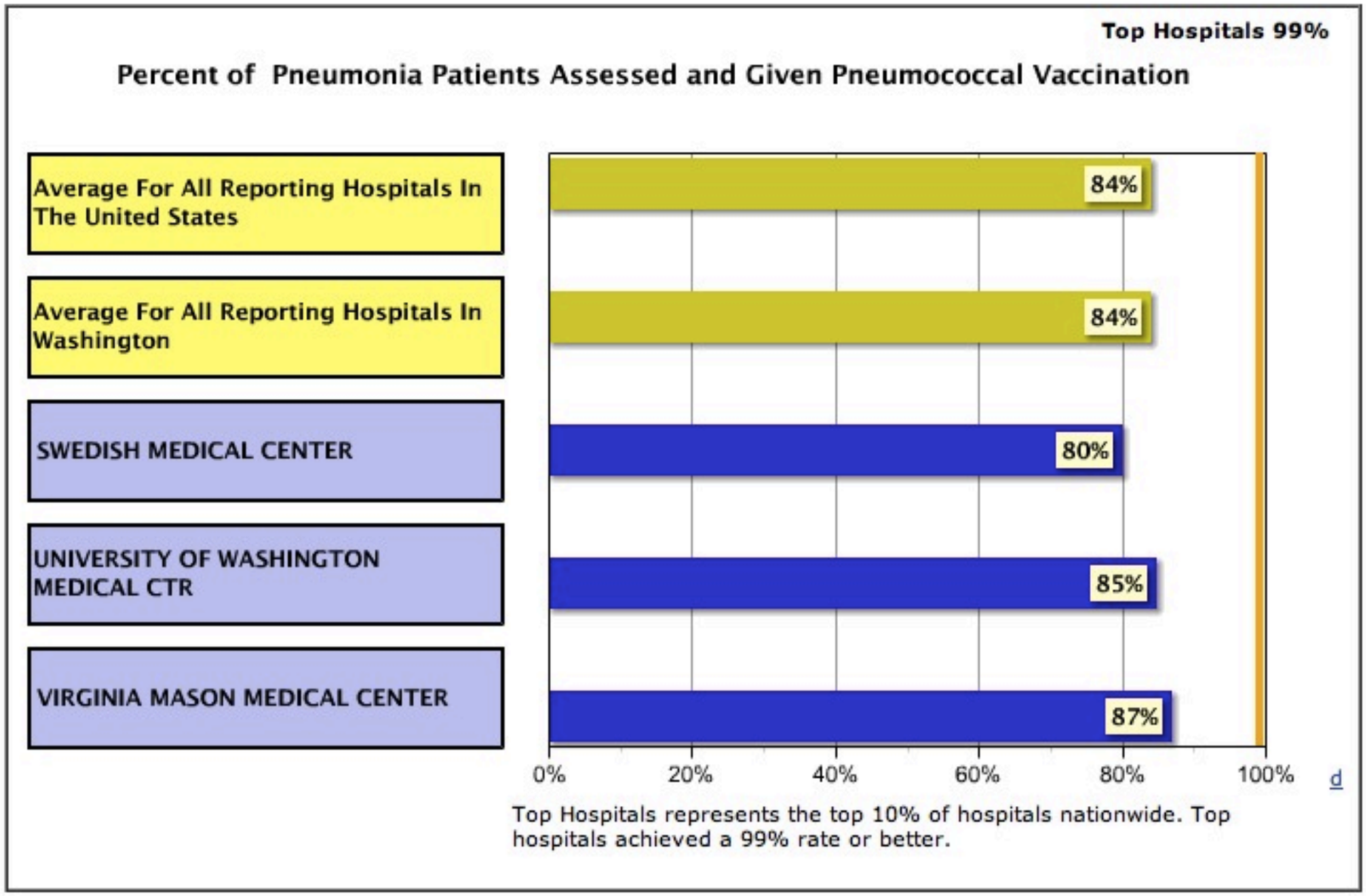
Mission

To improve the health and well-being of the patients we serve

Hospitalcompare.hhs.gov

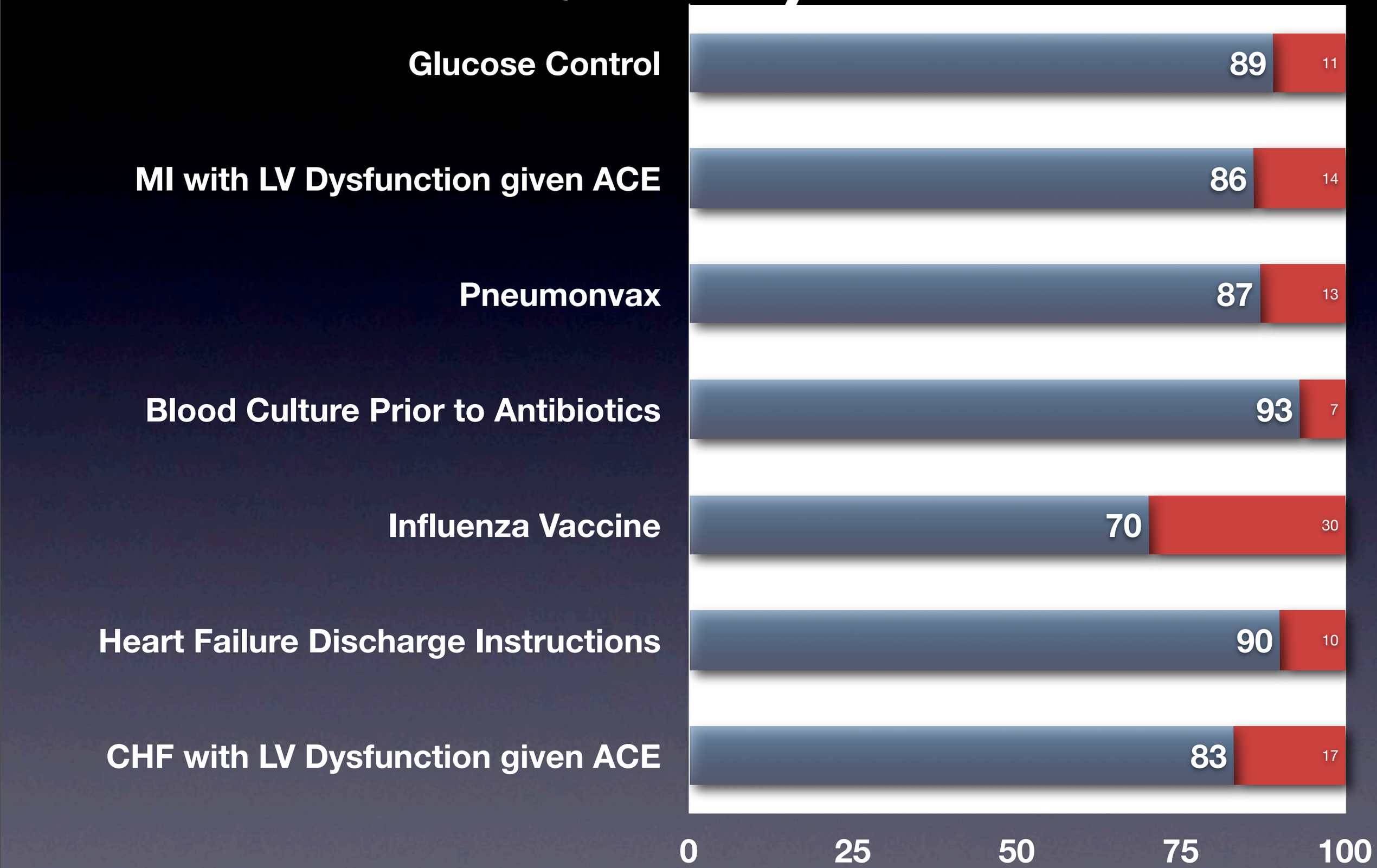
Hide Information **Percent of Pneumonia Patients Assessed and Given Pneumococcal Vaccination**

The rates displayed in this graph are from data reported for discharges January 2008 through December 2008.

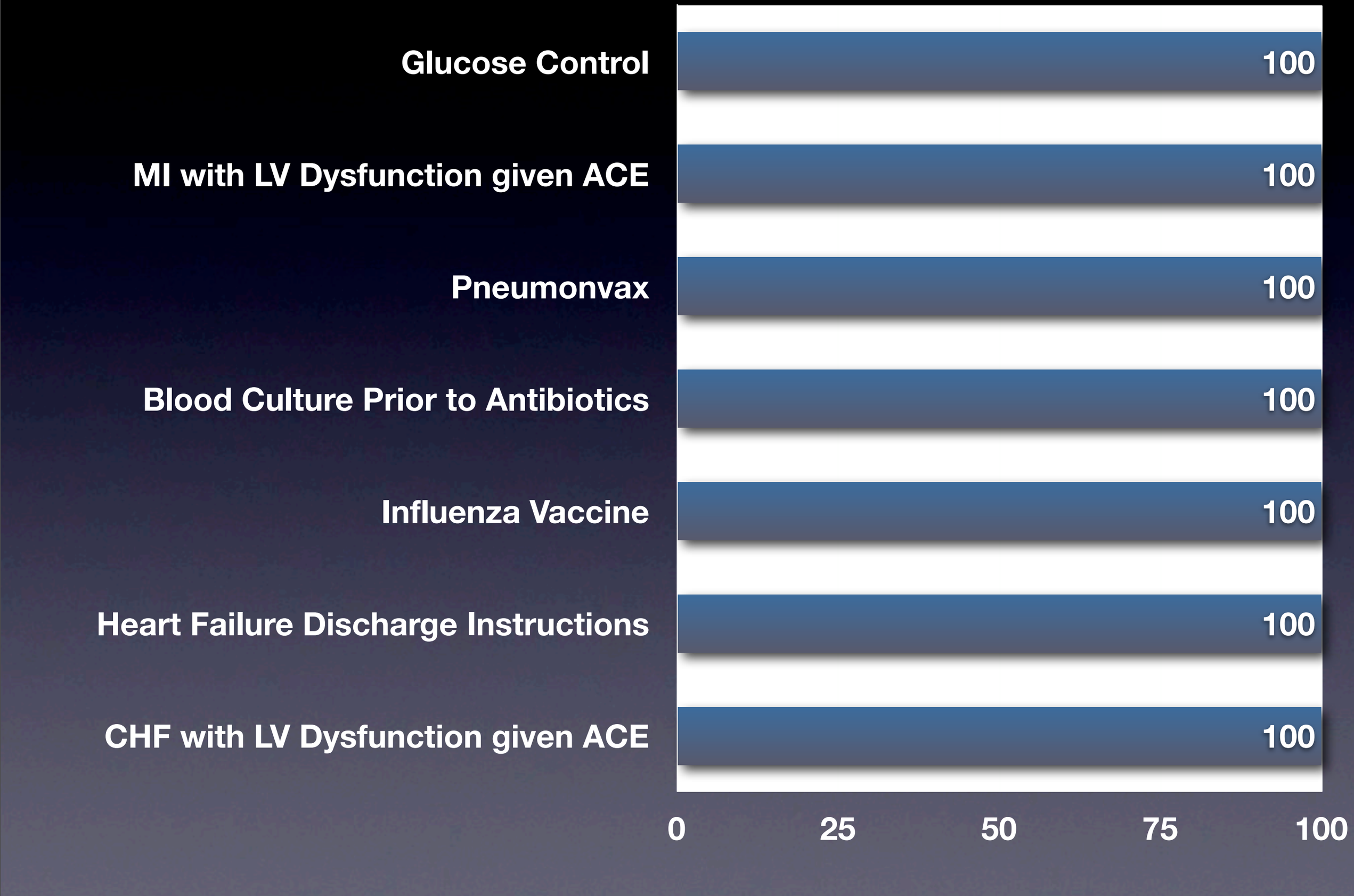


Also see whynotthebest.org

VM Quality Now



Quality Goal



So what's good enough?

Imagine 96% quality at VM…

600 defective surgeries/year

501 defective transfusions/year

40,000 defective medication administrations/year

10,800 wrong meals served/year

68,000 defective bills sent/year

5,000 defective paychecks/year

So what's good enough?

Imagine 99.9% quality at VM…

15 defective surgeries/year

17 defective transfusions/year

1,000 defective medication administrations/year

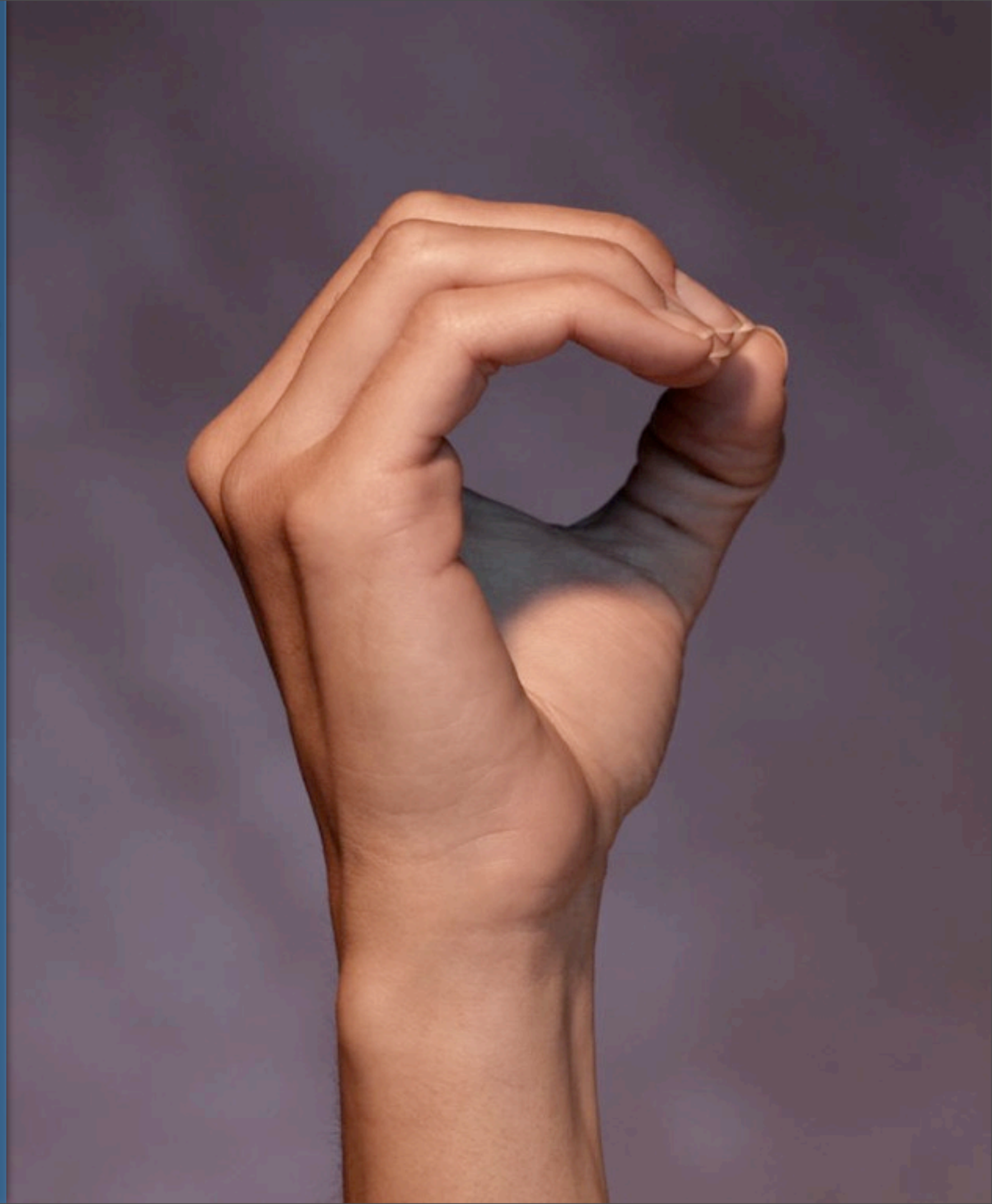
182 wrong meals served/year

17,000 defective bills sent/year

125 defective paychecks/year

Defects are mistakes that go uncorrected

The purpose of VMPS is to ensure zero defects



ORIGINAL INVESTIGATION

Improving Outcomes in Elderly Patients With Community-Acquired Pneumonia by Adhering to National Guidelines

Community-Acquired Pneumonia Organization International Cohort Study Results

Forest W. Arnold, DO; A. Scott LaJoie, PhD; Guy N. Brock, PhD; Paula Peyrani, MD; Jordi Rello, MD; Rosario Menéndez, MD; Gustavo Lopardo, MD; Antoni Torres, MD; Paolo Rossi, MD; Julio A. Ramirez, MD; for the Community-Acquired Pneumonia Organization (CAPO) Investigators

Background: To define whether elderly patients hospitalized with community-acquired pneumonia (CAP) had better outcomes if they were treated with empirical antimicrobial therapy adherent to the 2007 Infectious Diseases Society of America (IDSA)/American Thoracic Society (ATS) guidelines for CAP.

Methods: This was a secondary analysis of the CAPO International Cohort Study database, which contained data from a total of 1725 patients aged 65 years or older who were hospitalized with CAP. Data from June 1, 2001, until January 1, 2007, were analyzed from 43 centers in 12 countries including North America (n=2), South America (n=4), Europe (n=4), Africa (n=1), and Southeast Asia (n=1). Initial empirical therapy for CAP was evaluated for guideline compliance according to the 2007 IDSA/ATS guidelines for CAP. Time to clinical stability, length of stay (LOS), total in-hospital mortality, and CAP-related mortality for each group were calculated. Comparisons between groups were made using cumulative incidence curves and competing risks regression.

Results: Among the 1649 patients with CAP, aged 65 years or older, 975 patients were given antimicrobial regimens adherent to the IDSA/ATS for CAP guidelines, while 660 patients were treated with nonadherent regimens (465 patients were "undertreated"; 195 were "overtreated"). Adherence to guidelines was associated with a statistically significant decreased time to achieve clinical stability compared with nonadherence: the proportion of patients who reached clinical stability by 7 days was 71% (95% confidence interval [CI], 68%-74%) and 57% (95% CI, 53%-61%) ($P<.01$), respectively. Guideline adherence was also associated with shorter LOS (median adherence LOS, 8 days; interquartile range [IQR], 5-15 days; median nonadherence LOS, 10 days; IQR, 6-24 days) ($P<.01$) and decreased overall in-hospital mortality (8%; 95% CI, 7%-10% vs 17%; 95% CI, 14%-20%) ($P<.01$).

Conclusion: Implementation of national guidelines at the local hospital level will improve not only mortality and LOS of elderly patients hospitalized with CAP but also time to clinical stability.

Arch Intern Med. 2009;169(16):1515-1524

Community-Acquired Pneumonia Organization International Cohort Study Results

Table 2. Severity of Disease and Demographics Among Patients Treated With Adherence and Nonadherence to the 2007 IDSA/ATS Guidelines[10] for Community-Acquired Pneumonia[a]

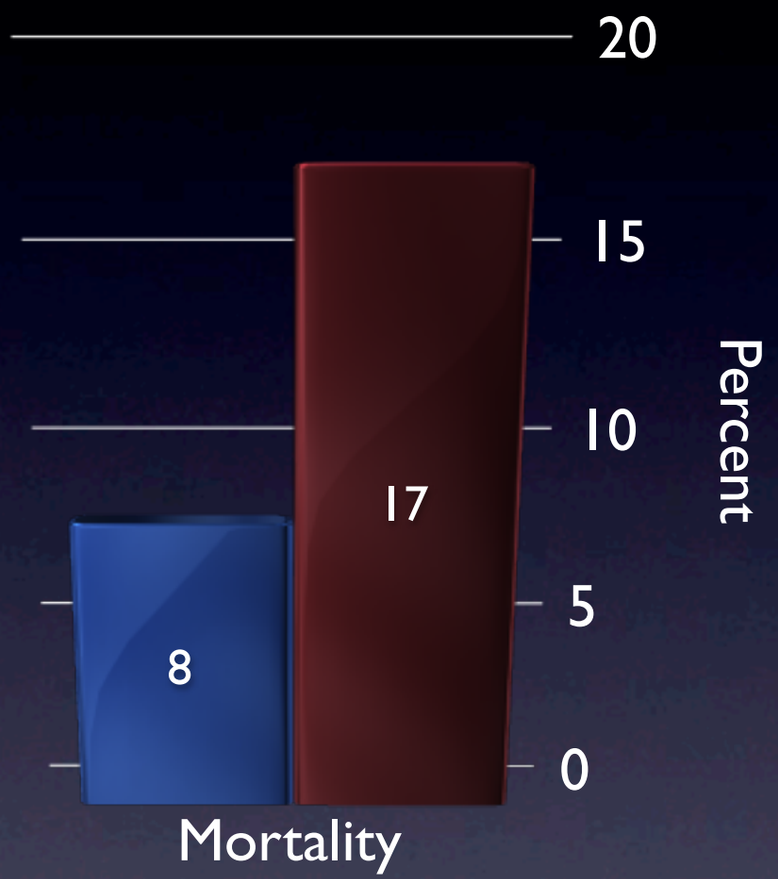
Characteristic	Guideline-Adherent Treatment (n = 975)	Guideline-Nonadherent Treatment		*P* Value
		Undertreatment (n = 465)	Overtreatment (n = 195)	
Male	602 (62)	254 (55)	126 (65)	.01
Age, mean, y	78.8	80.0	78.0	<.01
Nursing home residence	65 (7)	49 (11)	30 (15)	<.01
PSI, median	105	111	117	<.01
Risk class				
I-III	264 (27)	96 (21)	36 (18)	<.01
IV-V	711 (73)	369 (79)	159 (82)	
I	0	1 (<1)	0	NR
II	45 (5)	11 (2)	11 (6)	NR
III	219 (22)	84 (18)	25 (13)	NR
IV	505 (52)	224 (48)	94 (48)	NR
V	206 (21)	145 (31)	65 (33)	NR
Comorbidities				NR
COPD	361 (37)	141 (30)	75 (38)	.03
CHF	276 (28)	139 (30)	51 (26)	.61
Stroke	197 (20)	149 (32)	36 (18)	<.01
Renal disease	139 (14)	65 (14)	30 (15)	.89
Liver disease	28 (3)	12 (3)	6 (3)	.93
Diabetes mellitus	222 (23)	89 (19)	51 (26)	.11
Cancer	94 (10)	67 (14)	28 (14)	.01

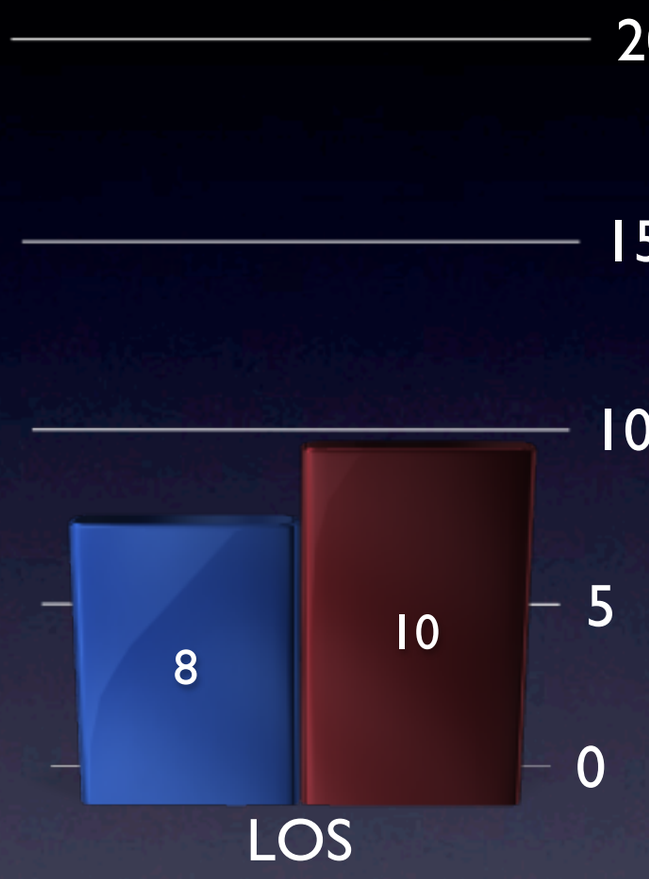
Abbreviations: CHF, congestive heart failure; COPD, chronic obstructive pulmonary disease; IDSA/ATS, Infectious Diseases Society of America/American Thoracic Society; MRSA, methicillin-resistant *Staphylococcus aureus*; NR, not reported; PSI, pneumonia severity index.

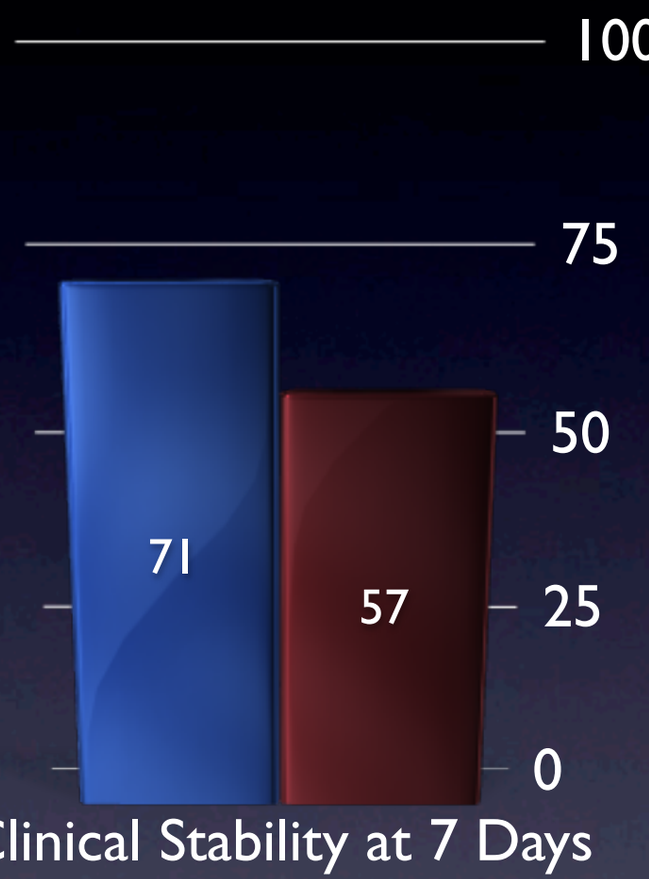
[a] Unless otherwise indicated, data are reported as number (percentage) of patients.

- 43 Centers
- 12 Countries
- IDSA/ATS Guidelines

Guideline Adherence







Compliant

Non-Compliant

"If all hospitals performed at the level of a 5-star rated hospital ... 224,537 Medicare lives could potentially have been saved from 2006 through 2008."

The Twelfth Annual HealthGrades Hospital Quality in America Study

Approximately 56% (127,488) of the potentially preventable deaths were associated with just four diagnoses:

- Sepsis (44,622)
- Pneumonia (29,251)
- Heart Failure (26,374)
- Respiratory Failure (27,241)

October 2009

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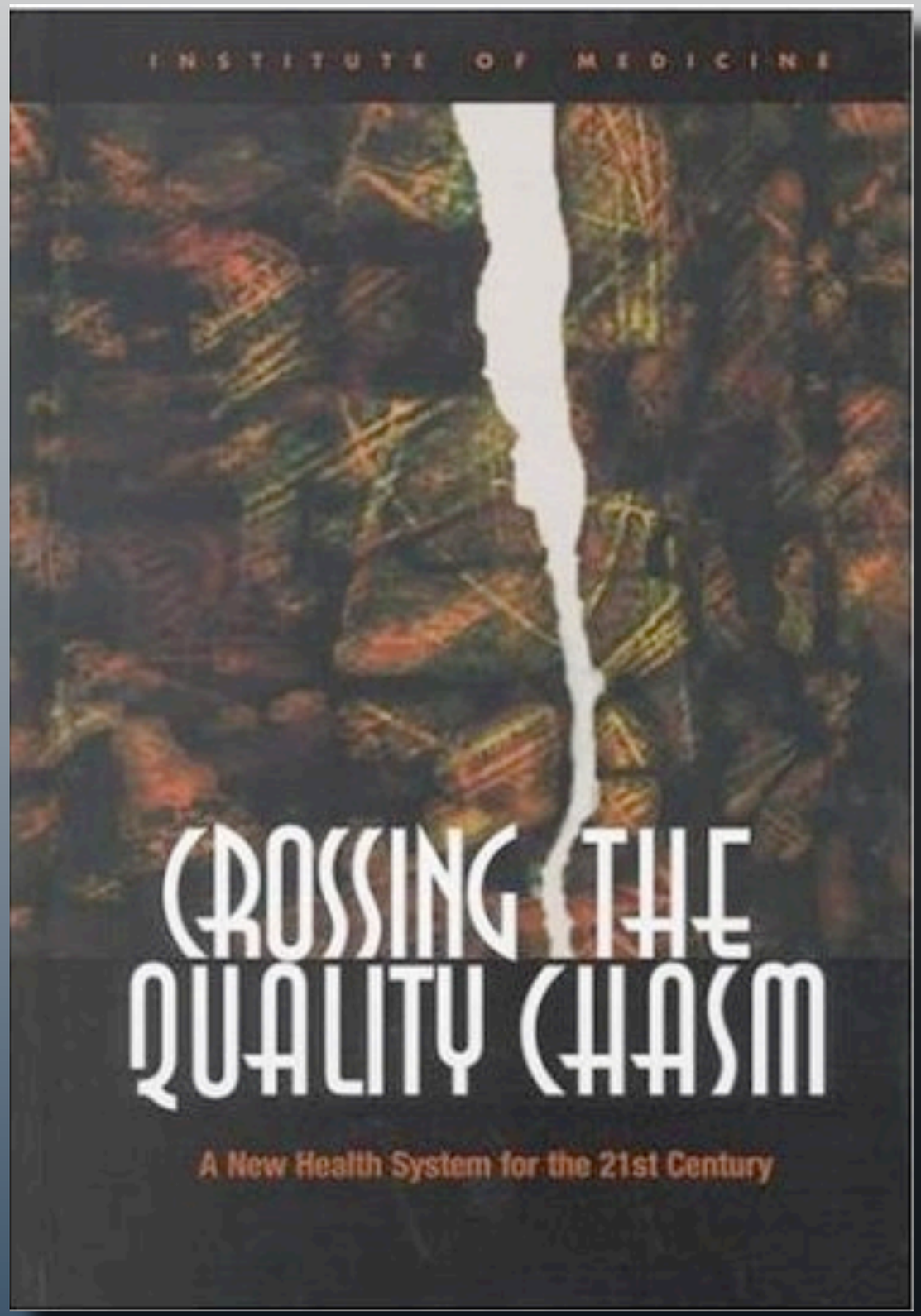


2001

"... information technology must play a central role in the redesign of the health care system if a substantial improvement in quality is to be achieved over the coming decade."

"... national commitment to building an information infrastructure to support health care delivery... should lead to the elimination of most handwritten clinical data by the end of the decade."

ORIGINAL INVESTIGATION

Clinical Information Technologies and Inpatient Outcomes

A Multiple Hospital Study

Ruben Amarasingham, MD, MBA; Laura Plantinga, ScM; Marie Diener-West, PhD; Darrell J. Gaskin, PhD; Neil R. Powe, MD, MPH, MBA

Background: Despite speculation that clinical information technologies will improve clinical and financial outcomes, few studies have examined this relationship in a large number of hospitals.

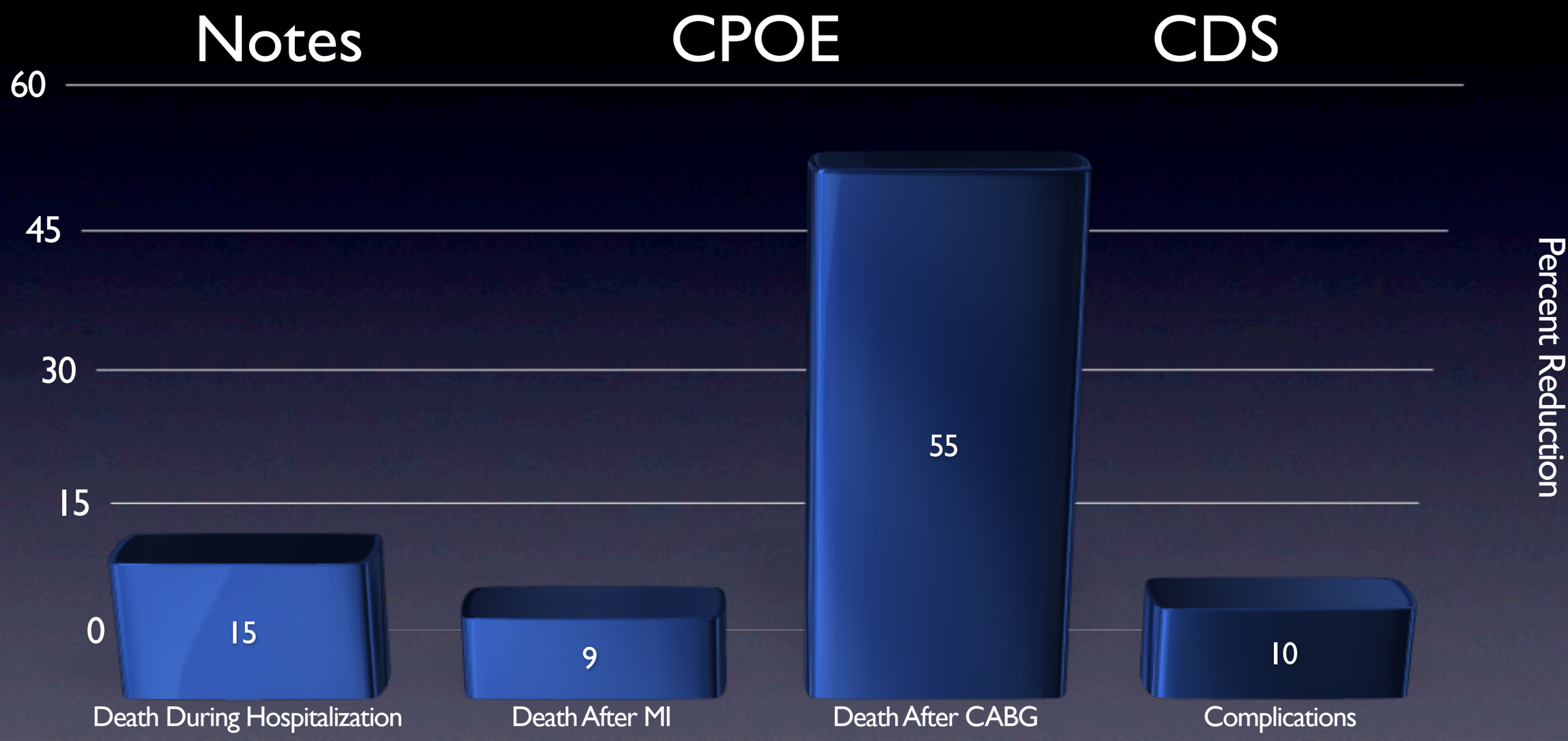
Methods: We conducted a cross-sectional study of urban hospitals in Texas using the Clinical Information Technology Assessment Tool, which measures a hospital's level of automation based on physician interactions with the information system. After adjustment for potential confounders, we examined whether greater automation of hospital information was associated with reduced rates of inpatient mortality, complications, costs, and length of stay for 167 233 patients older than 50 years admitted to responding hospitals between December 1, 2005, and May 30, 2006.

Results: We received a sufficient number of responses from 41 of 72 hospitals (58%). For all medical conditions studied, a 10-point increase in the automation of notes and records was associated with a 15% decrease in the adjusted odds of fatal hospitalizations (0.85; 95% confidence interval, 0.74-0.97). Higher scores in order entry were associated with 9% and 55% decreases in the adjusted odds of death for myocardial infarction and coronary artery bypass graft procedures, respectively. For all causes of hospitalization, higher scores in decision support were associated with a 16% decrease in the adjusted odds of complications (0.84; 95% confidence interval, 0.79-0.90). Higher scores on test results, order entry, and decision support were associated with lower costs for all hospital admissions (–$110, –$132, and –$538, respectively; $P < .05$).

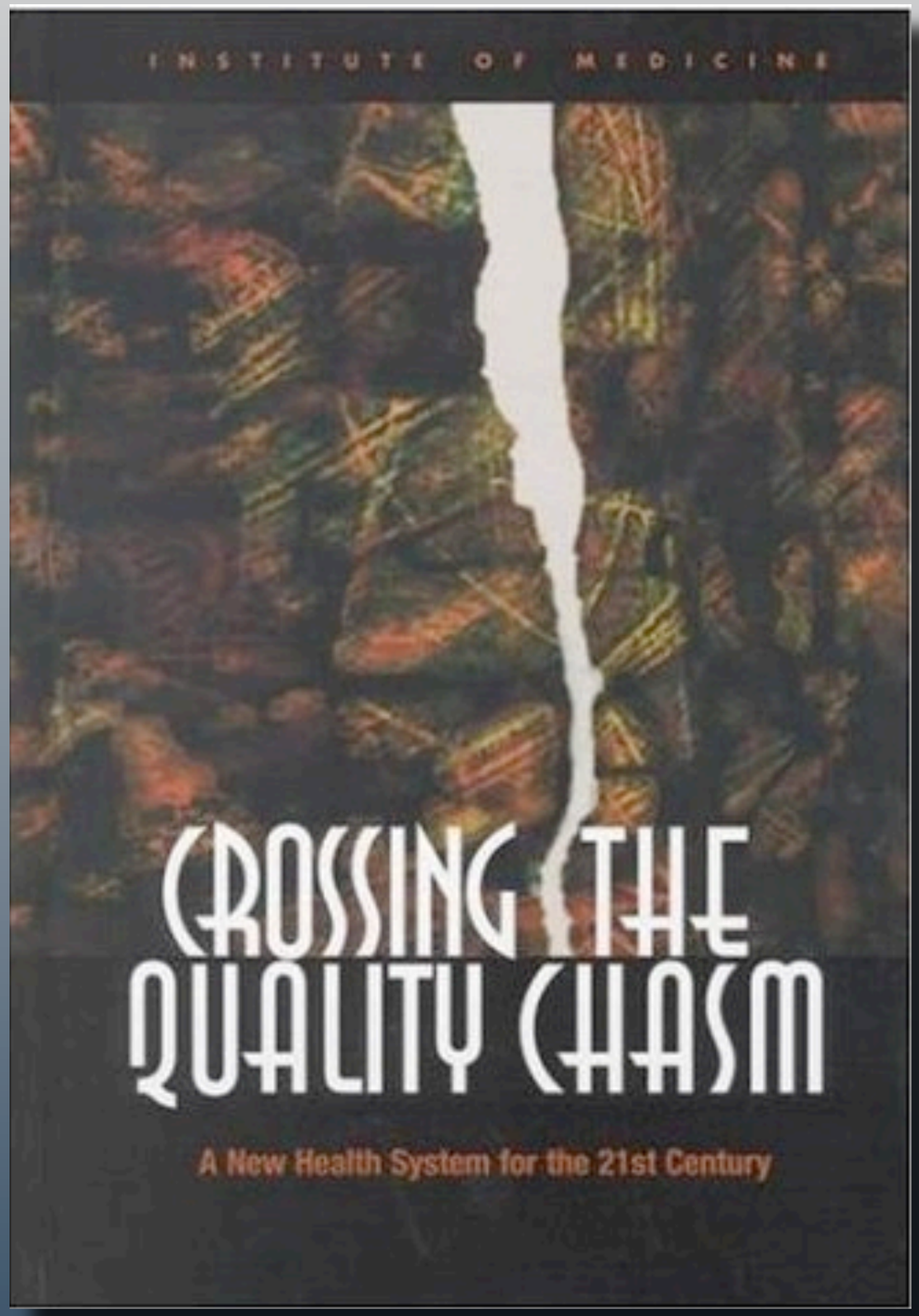
Conclusion: Hospitals with automated notes and records, order entry, and clinical decision support had fewer complications, lower mortality rates, and lower costs.

Arch Intern Med. 2009;169(2):108-114

IT and Inpatient Outcomes



Survey of 41 Hospitals in Texas



2001

"... national commitment to building an information infrastructure to support health care delivery... should lead to the elimination of most handwritten clinical data by the end of the decade."

Eight Months Until the End of the Decade

The NEW ENGLAND JOURNAL of MEDICINE
April 16, 2009

SPECIAL ARTICLE

Use of Electronic Health Records in U.S. Hospitals

Ashish K. Jha, M.D., M.P.H., Catherine M. DesRoches, Dr.Ph.,
Eric G. Campbell, Ph.D., Karen Donelan, Sc.D., Sowmya R. Rao, Ph.D.,
Timothy G. Ferris, M.D., M.P.H., Alexandra Shields, Ph.D., Sara Rosenbaum, J.D.,
and David Blumenthal, M.D., M.P.P.

The Office of the National Coordinator for Health Information Technology (ONC)

The Office of the National Coordinator for Health Information Technology (ONC) is at the forefront of the Administration's Health IT efforts, and a resource to the entire health system to support the adoption of health information technology and the promotion of nationwide health information exchange to improve health care. ONC is organizationally located within the Office of the Secretary for the U.S. Department of Health and Human Services (HHS).

ONC is the principal Federal entity charged with coordination of nationwide efforts to implement and use the most advanced health information technology and the electronic exchange of health information. The position of National Coordinator was created in 2004, through an Executive Order, and legislatively mandated in the Health Information Technology for Economic and Clinical Health Act [HITECH Act] of 2009.

ONC's mission includes:

- Promoting development of a nationwide HIT infrastructure that allows for electronic use and exchange of information that:
  - Ensures secure and protected patient health information
  - Improves health care quality
  - Reduces health care costs
  - Informs medical decisions at the time/place of care
  - Includes meaningful public input in infrastructure development
  - Improves coordination of care and information among hospitals, labs, physicians, etc.
  - Improves public health activities and facilitates early identification/rapid response to public health emergencies
  - Facilitates health and clinical research
  - Promotes early detection, prevention, and management of chronic diseases
  - Promotes a more effective marketplace
  - Improves efforts to reduce health disparities
- Providing leadership in the development, recognition, and implementation of standards and the certification of HIT products;
- Health IT policy coordination;
- Strategic planning for HIT adoption and health information exchange; and
- Establishing governance for the Nationwide Health Information Network.

SPOTLIGHT

- HITECH Funding Opportunities
- Meaningful Use
- HIT Policy Committee
- HIT Standards Committee

Table 3. Electronic Requirements for Classification of Hospitals as Having a Comprehensive or Basic Electronic-Records System.*

Requirement	Comprehensive EHR System	Basic EHR System with Clinician Notes	Basic EHR System without Clinician Notes
Clinical documentation			
Demographic characteristics of patients	√	√	√
Physicians' notes	√	√	
Nursing assessments	√	√	
Problem lists	√	√	√
Medication lists	√	√	√
Discharge summaries	√	√	√
Advanced directives	√		
Test and imaging results			
Laboratory reports	√	√	√
Radiologic reports	√	√	√
Radiologic images	√		
Diagnostic-test results	√	√	√
Diagnostic-test images	√		
Consultant reports	√		
Computerized provider-order entry			
Laboratory tests	√		
Radiologic tests	√		
Medications	√	√	√
Consultation requests	√		
Nursing orders	√		
Decision support			
Clinical guidelines	√		
Clinical reminders	√		
Drug-allergy alerts	√		
Drug–drug interaction alerts	√		
Drug–laboratory interaction alerts (e.g., digox-	√		
Adoption level — % of hospitals (95% CI)	1.5 (1.1–2.0)	7.6 (6.8–8.1)	10.9 (9.7–12.0)

* A comprehensive electronic-health-records (EHR) system was defined as a system with electronic functionalities in all clinical units. A basic electronic-records system was defined as a system with electronic functionalities in at least one clinical unit.

By Robert M. Wachter

Patient Safety At Ten: Unmistakable Progress, Troubling Gaps

doi: 10.1377/hlthaff.2009.0785
HEALTH AFFAIRS 29,
NO. 1 (2010):

ABSTRACT **December 1, 2009, marks the tenth anniversary of the Institute of Medicine report on medical errors, *To Err Is Human*, which arguably launched the modern patient-safety movement. Over the past decade, a variety of pressures (such as more robust accreditation standards and increasing error-reporting requirements) have created a stronger business case for hospitals to focus on patient safety. Relatively few health care systems have fully implemented information technology, and we are finally grappling with balancing "no blame" and accountability. The research pipeline is maturing, but funding remains inadequate. Our limited ability to measure progress in safety is a substantial impediment. Overall, I give our safety efforts a grade of B−, a modest improvement since 2004.**

Robert M. Wachter
(bobw@medicine.ucsf.edu) is
professor and associate chair
of the Department of
Medicine at the University of
California, San Francisco.

EXHIBIT 1

An Assessment Of Our Progress In Ten Key Patient-Safety Domains, 1999–2004 And 2004–2009

Safety category	2004 grade	2009 grade	Comments
Regulation/accreditation	A–	B+	An important early driver, but much of the low-hanging fruit has now been picked
Reporting systems	C	B+	Key intervention was the adoption of the NQF list to support error reporting; some improvement in analytical abilities at provider organization and state/national levels
Health information technology	B–	C+	Surprisingly low uptake over past 5 years; increasing evidence of health IT–related safety hazards and implementation challenges; new infusion of federal dollars should promote health IT adoption
Malpractice system and accountability	D+	C+	Increased pressure for accountability has led to more emphasis on "Just Culture"; more accountability at leadership level as well; practical approaches for balancing "no blame" and accountability still lagging
Workforce and training issues	B	B–	Limited but increased engagement by providers; evidence regarding impact of residency duty-hour limits mixed; nurse shortage eased but primary care shortage worse; few organizations adopting robust teamwork, culture change, or simulation programs
Research	–[a]	B–	Stronger methods are emerging; moderate, but insufficient, increase in funding; still limited data on what works; field still debating fundamental questions regarding evidence standards for safety studies
Patient engagement and involvement	–[a]	C+	Patient advocacy movements small; impact of "how can patients protect themselves?" efforts uncertain; significant progress on disclosure policies and practices
Provider organization leadership engagement	–[a]	B	Stronger focus on safety by boards, "C-suite," as business case becomes more robust; uptake of strong leadership interventions (root-cause analyses, Executive Walk Rounds) improved but spotty
National and international organizational interventions	–[a]	A–	Much stronger engagement by AHRQ, NQF, Joint Commission, ACGME, WHO, IHI, and others; better dissemination of tools, training, and requirements; some wide-scale change efforts (IHI campaigns, Michigan and WHO checklist studies) have illustrated capacity for broad engagement and measurable progress
Payment system interventions	–[a]	C+	Impact of P4P in quality uncertain; P4P not yet applied to safety because of measurement challenges; Medicare's "no pay for errors" is a provocative initiative; no evidence yet about impact and concerns regarding unintended consequences
Overall grade for progress in patient safety	**C+**	**B–**	**Most striking improvements in reporting and leadership; gaps in IT and accountability are most concerning, but both areas should see significant progress, driven by new funding (IT) and emerging consensus (accountability)**

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- OR -

Enter Restaurant Name

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8. Tavolata
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SEEDIE, the Society for Exorbitantly Expensive and Difficult to Implement EHR's, is a healthcare IT standards organization that is completely funded and operated by a select group of proprietary electronic health record vendors.

Unlike independent, objective, professional organizations created to help medical professionals select and implement interoperable EHR solutions, SEEDIE promotes healthcare IT systems that play well in the sandbox if, and only if, it is in the best interests of a particular vendor.

While the other groups argue endlessly about which standards are most appropriate in pursuit of "plug and play" solutions, SEEDIE recognizes that data exchange should only occur after a lengthy and expensive custom integration process. Further, that integration should require ongoing technical support from multiple vendors.

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Barriers to Implementation

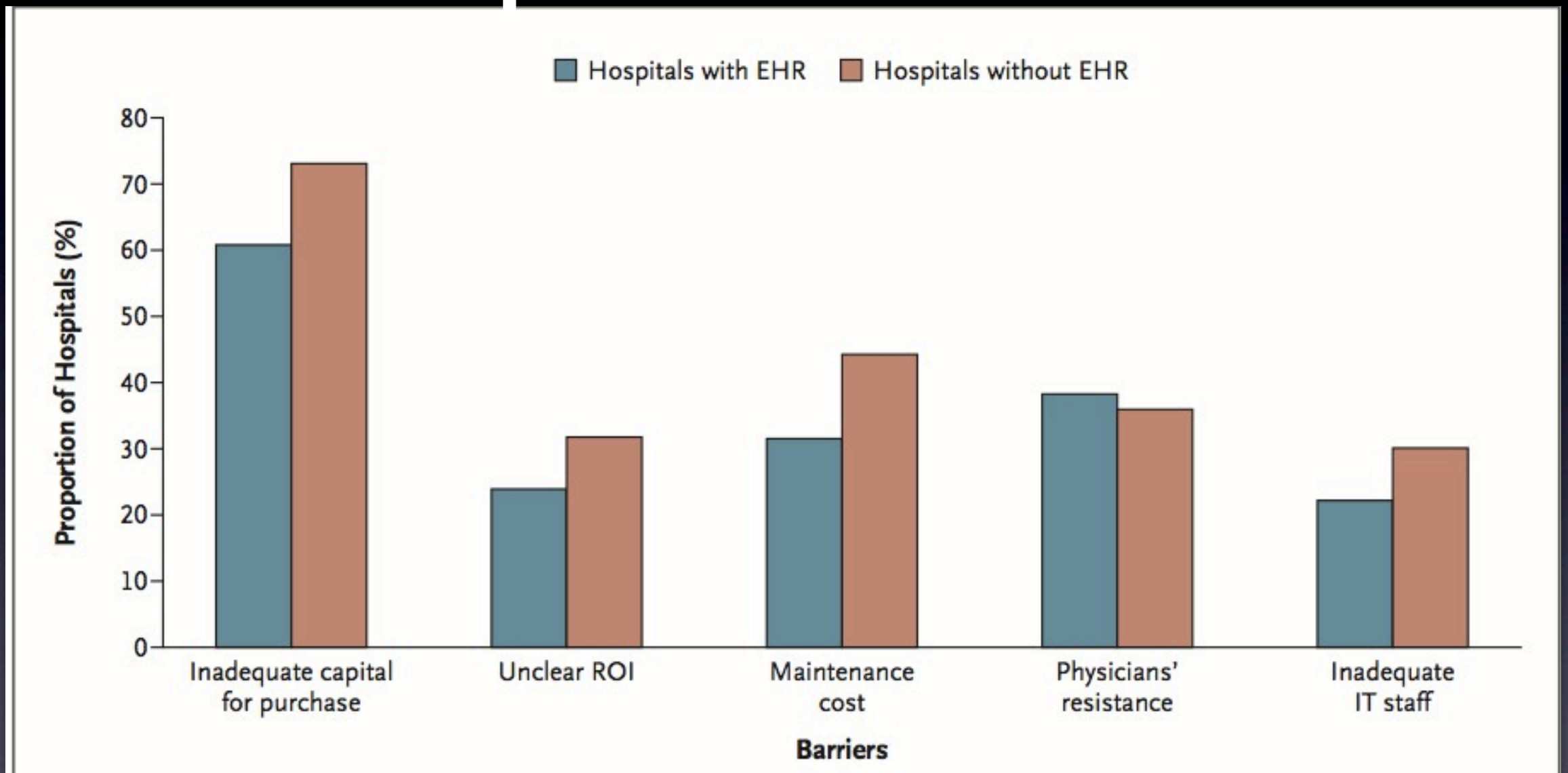

Figure 1. Major Perceived Barriers to Adoption of Electronic Health Records (EHRs) among Hospitals with Electronic-Records Systems as Compared with Hospitals without Systems.

Facilitators of Adoption

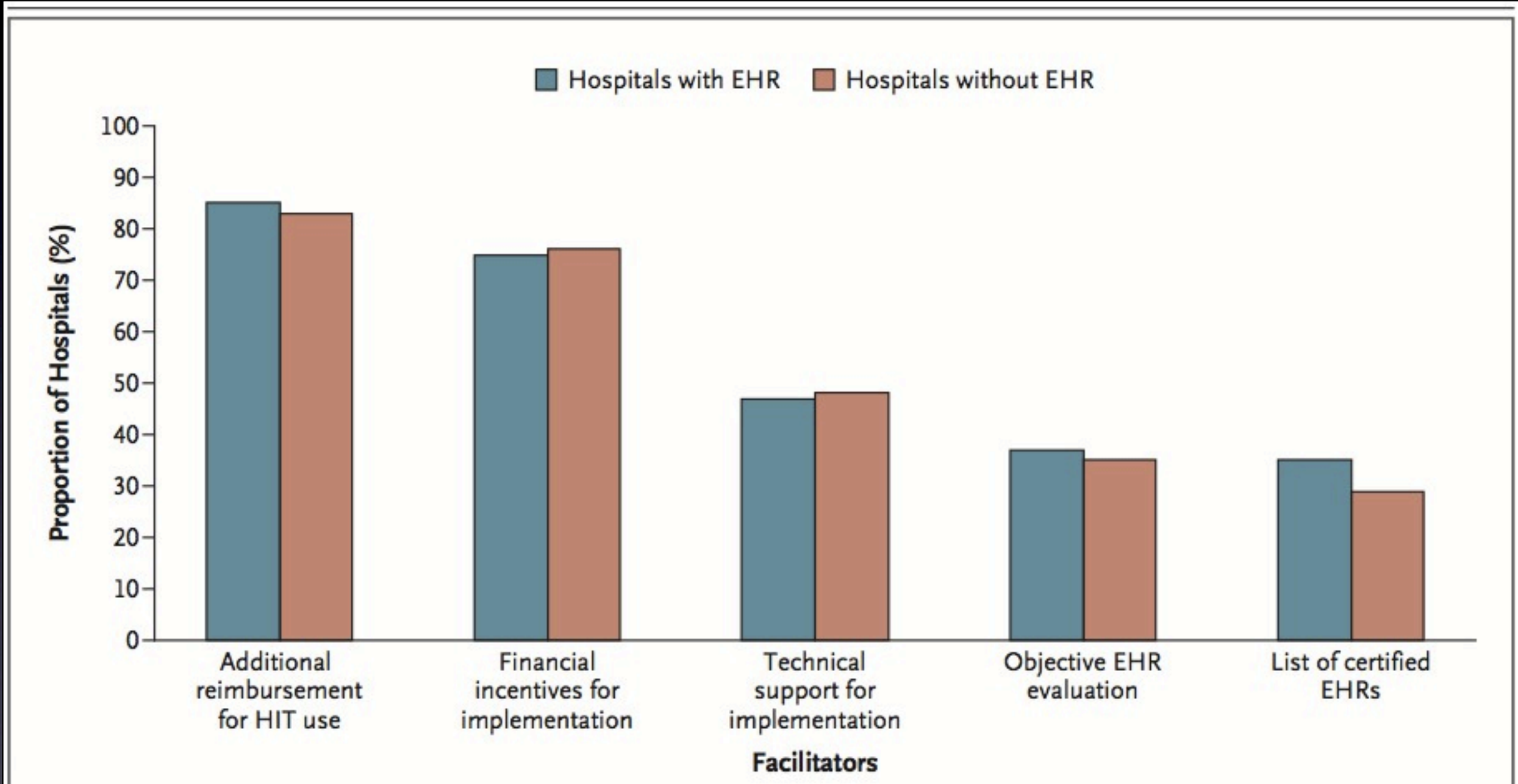

Figure 2. Perceived Facilitators of Adoption of Electronic-Records Systems among Hospitals with Systems as Compared with Hospitals without Systems.

Federal Funding

HITECH Act

- ARRA- American Recovery and Reinvestment Act
- Health Information Technology for Economic and Clinical Health
- $19 Billion for EHRs
  - $2 Million/Hospital/Year
- Meaningful Use Criteria

Meaningful Use Criteria

Health Outcomes Policy Priority	Care Goals	2011[1] Objectives *Goal is to electronically capture in coded format and to report health information and to use that information to track key clinical conditions*		2011[1] Measures	2013 Objectives *Goal is to electronically capture in coded format and to report health information and to use that information to track key clinical conditions*		2013 Measures	2015 Objectives Goal is to achieve and improve performance and support care processes and on key health system outcomes	2015 Measures
		Eligible Providers	**Hospitals**		**Eligible Providers**	**Hospitals**			
Improve care coordination	• Exchange meaningful clinical information among professional health care team	• Capability to exchange key clinical information (e.g., problem list, medication list, allergies, test results) among providers of care and patient authorized entities electronically [5] • Perform medication reconciliation at relevant encounters and each transition of care[6]	• Capability to exchange key clinical information (e.g., discharge summary, procedures, problem list, medication list, allergies, test results) among providers of care and patient authorized entities electronically[5] • Perform medication reconciliation at relevant encounters and each transition of care[6]	• Report 30-day readmission rate [IP] • % of encounters where med reconciliation was performed [EP, IP] • Implemented ability to exchange health information with external clinical entity (specifically labs, care summary and medication lists) [EP, IP] • % of transitions in care for which summary care record is shared (e.g., electronic, paper, e-Fax) [EP, IP]	• Retrieve and act on electronic prescription fill data • Produce and share an electronic summary care record for every transition in care (place of service, consults, discharge) • Perform medication reconciliation at each transition of care from one health care setting to another	• Retrieve and act on electronic prescription fill data • Produce and share an electronic summary care record for every transition in care (place of service, consults, discharge) • Perform medication reconciliation at each transition of care from one health care setting to another	• Access to comprehensive patient data from all available sources • 10 % reduction in 30-day readmission rates for 2013 compared to 2012 • Improvement in NQF-endorsed measures of care coordination.	• Access comprehensive patient data from all available sources	• Aggregate clinical summaries from multiple sources available to authorized users [OP, IP] • NQF-endorsed Care Coordination Measures (TBD)

Meaningful Use Criteria

Health Outcomes Policy Priority	Care Goals	2011[1] Objectives *Goal is to electronically capture in coded format and to report health information and to use that information to track key clinical conditions*		2011[1] Measures	*Goal is to el format and t use that info conditions*
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ed ation ormed nted e health	• Produce and share an electronic summary care record for every transition in care (place of service, consults,	an electronic summary care record for every transition in care (place of service, consults, discharge) • Perform medication	sources • 10 % reduction in 30-day readmission rates for 2013 compared to 2012	sources	sources available to authorized users [OP, IP] • NQF-

Meaningful Use Criteria

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Critical HIT Components Needed to Ensure Quality

- Computer System
- Discrete Data
- Realtime Provider Feedback
- Group (Team) Situational Awareness

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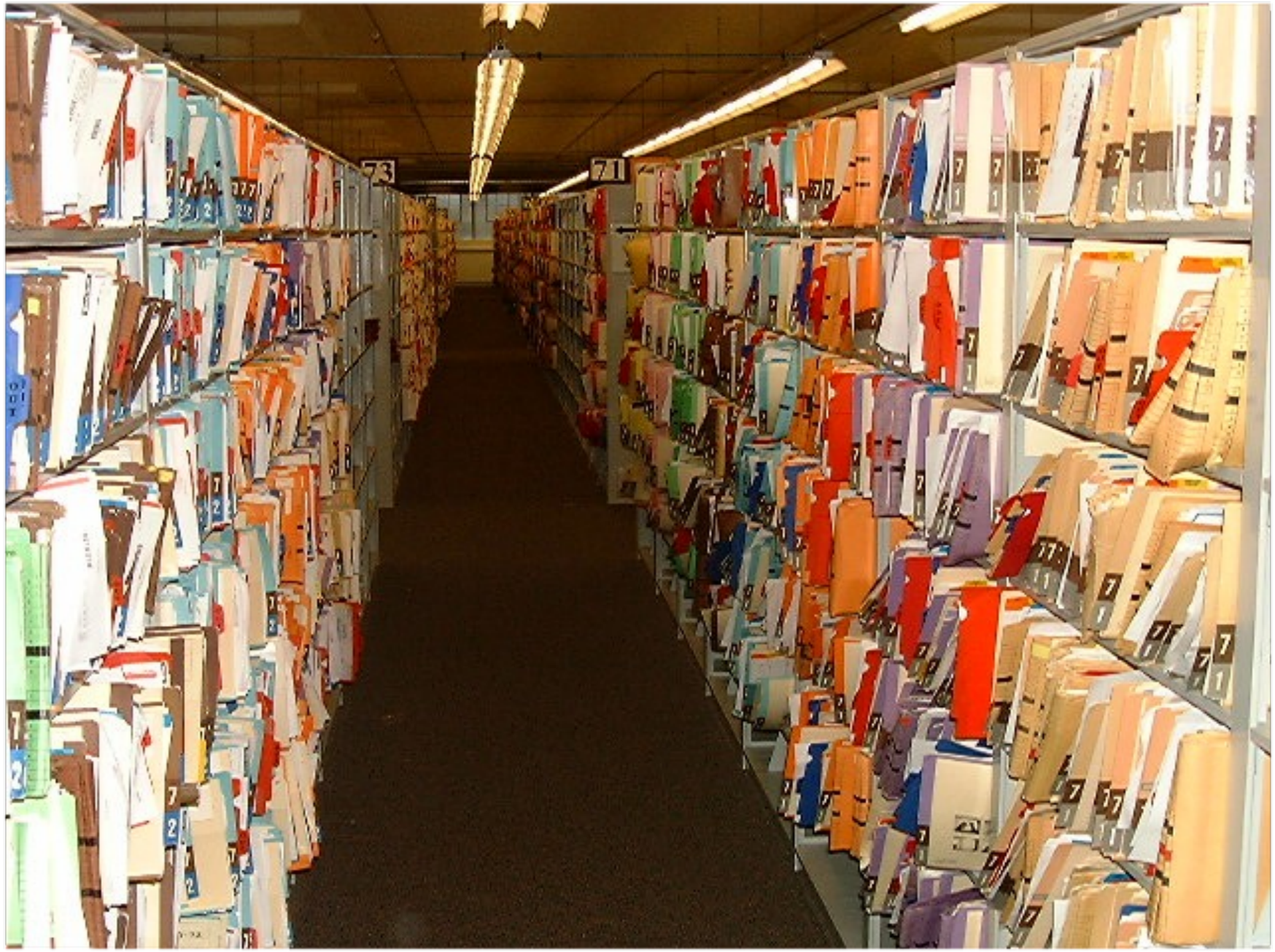
- Computer System
- Discrete Data
- Realtime Provider Feedback
- Group Situational Awareness

VM Record Storage in Georgetown

UW Record Storage Sand Point Naval Hanger



Server Cabinet

Michael Cuzzetto & $40M of Computer Equipment

30 Terabytes of Disk

7,500,000 Songs or 60 Years of Listening!

240K BTU Air Conditioner

- 4K Sq Ft Room
- 10x Residential Requirement

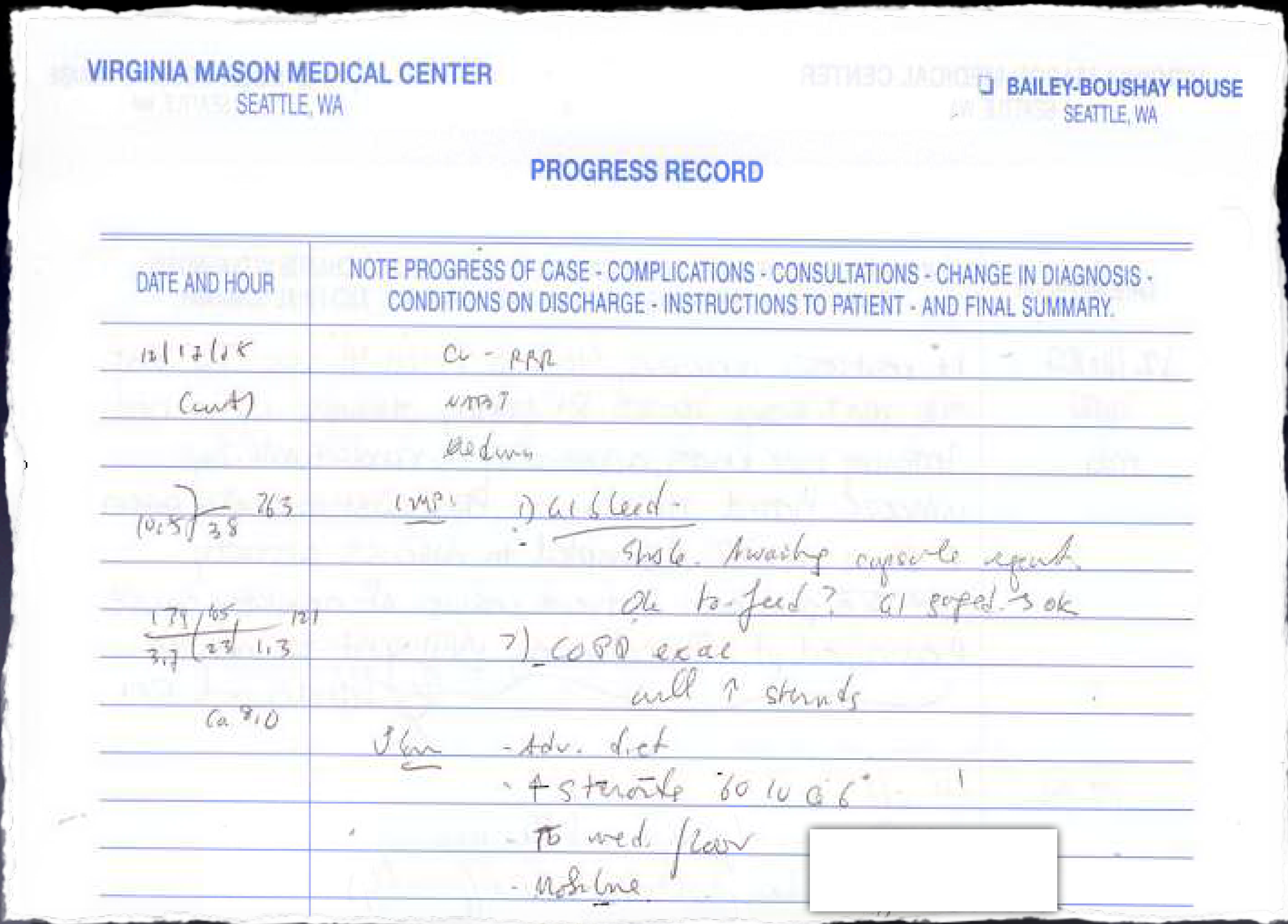
Tape Backup

Critical HIT Components Needed to Ensure

✓ Computer System

- Discrete Data
- Realtime Provider Feedback
- Group Situational Awareness

Handwritten Note



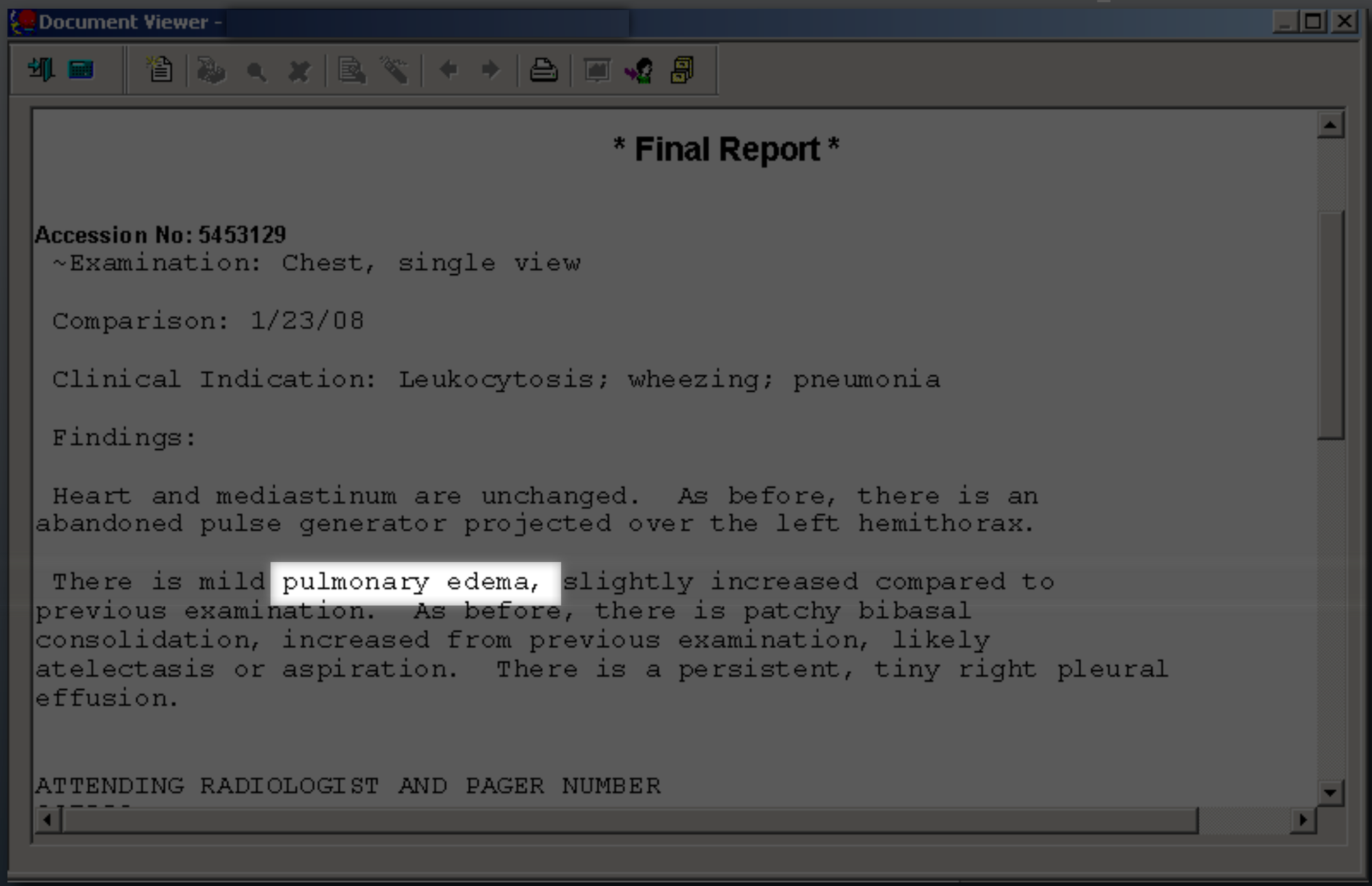
VIRGINIA MASON MEDICAL CENTER
SEATTLE, WA

☐ BAILEY-BOUSHAY HOUSE
SEATTLE, WA

PROGRESS RECORD

DATE AND HOUR	NOTE PROGRESS OF CASE - COMPLICATIONS - CONSULTATIONS - CHANGE IN DIAGNOSIS - CONDITIONS ON DISCHARGE - INSTRUCTIONS TO PATIENT - AND FINAL SUMMARY.
12/17/05	CV - RRR
(cont)	[illegible]
	[illegible]
10.5 / 38 263	IMP: 1) GI bleed -
	Stable. Awaiting capsule [illegible].
	OK to feed? GI [illegible] → ok
179 / 105 / 121 3.7 / 28 / 1.3	2) COPD exac
	will ↑ steroids
Ca 8.0	Plan - Adv. diet
	· ↓ steroids 60 to [illegible]
	- to med floor
	- [illegible]

Free Text Rads Report



Clinical Notes, Pathology Reports

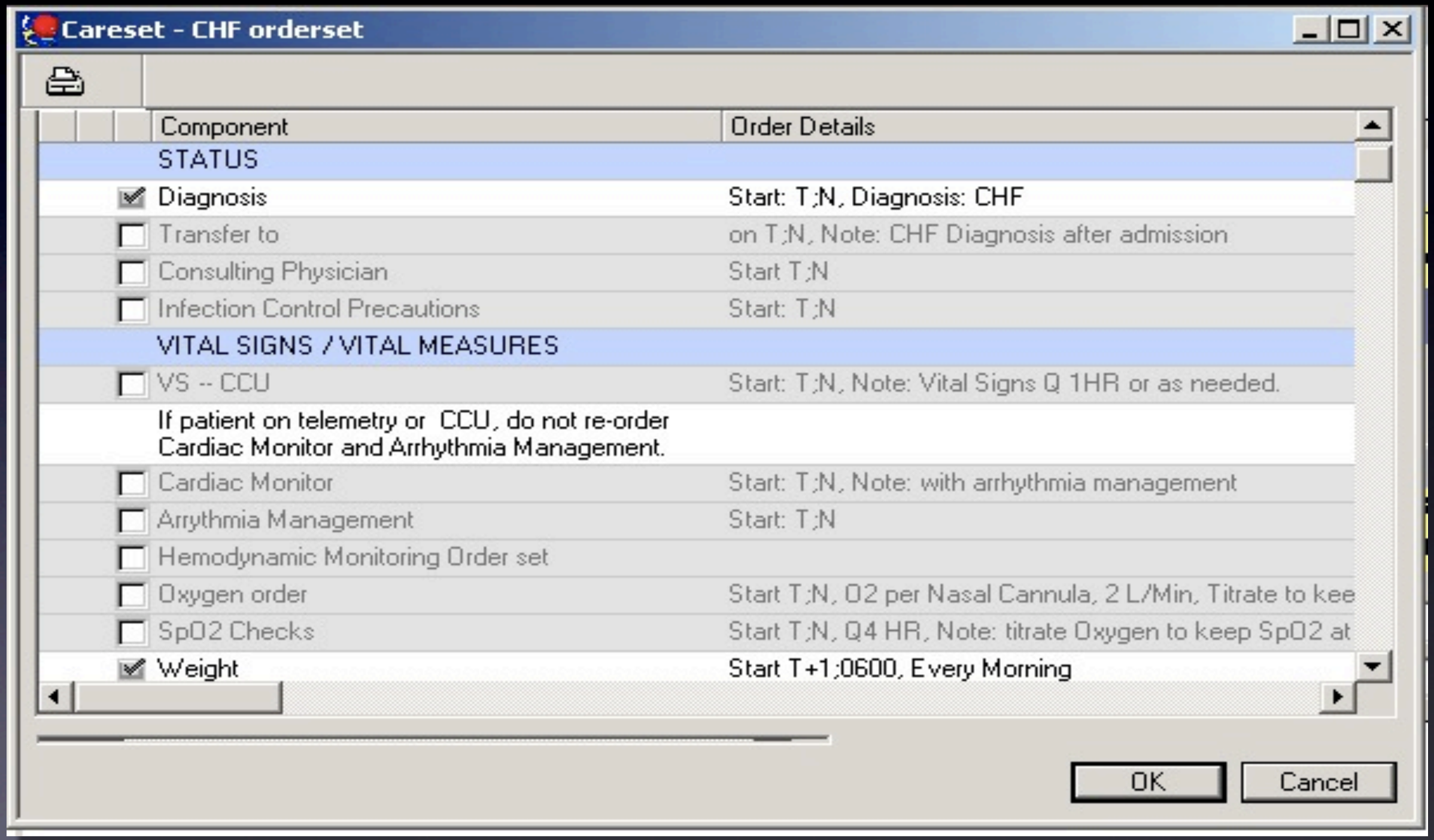
Discrete Data- Meds

MAR Summary 48H

09 August 2009 0700 - 13 August 2009 0659

Time View	08/09/2009 0700 - 0659	08/10/2009 0700 - 0659	08/11/2009 0700 - 0659	08/12/2009 0700 - 0659
Scheduled				
aspirin 325 mg, ec tablet, PO, Daily, NOW, Start: 08/10/09 15:18:00		Not Given: dcd per MD order @1626		
aspirin 325 mg, tab, PO, Daily With Breakfast, NOW, Start: 08/10/09 20:26:00		325 mg @1807 325 mg @2030 Pain Intensity: 8 Pain Location: Head Frontal	325 mg @0800	@0800
docusate 200 mg, cap, PO, Daily, Routine, Start: 08/10/09 14:41:00		200 mg @2100	200 mg @0900	@0900
docusate 100 mg, cap, PO, Q12 HR, Routine, Start: 08/10/09 21:00:00				
lisinopril 10 mg, tab, PO, Daily, NOW, Start: 08/11/09 9:55:00			10 mg @0955	@0900
metoprolol (metoprolol oral tablet) 25 mg, tab, PO, Q12 HR, Routine, Start: 08/10/09 21:00:00		25 mg @1807 25 mg @2100 Systolic Blood Pressure: 143 mmHg Heart Rate: 60 bpm	25 mg @0900 Systolic Blood Pressure: 152 mmHg Heart Rate: 66 bpm 25 mg @2107	@0900 @2100
sodium chloride (saline lock flush-peripheral line) 2 mL, inj, IV, Q12 HR, Routine, Start 08/10/09 9:46:00, for 4 hr, Stop 08/10/09 9:46:00, Note: Flush every 12 hours ...		2 mL @0946		
sodium chloride (saline lock flush-peripheral line) 2 mL, inj, IV, Q12 HR, Routine, Start 08/10/09 9:49:00,		2 mL @0949	Not Given: Not Appropriate at this Time @0900	@0900

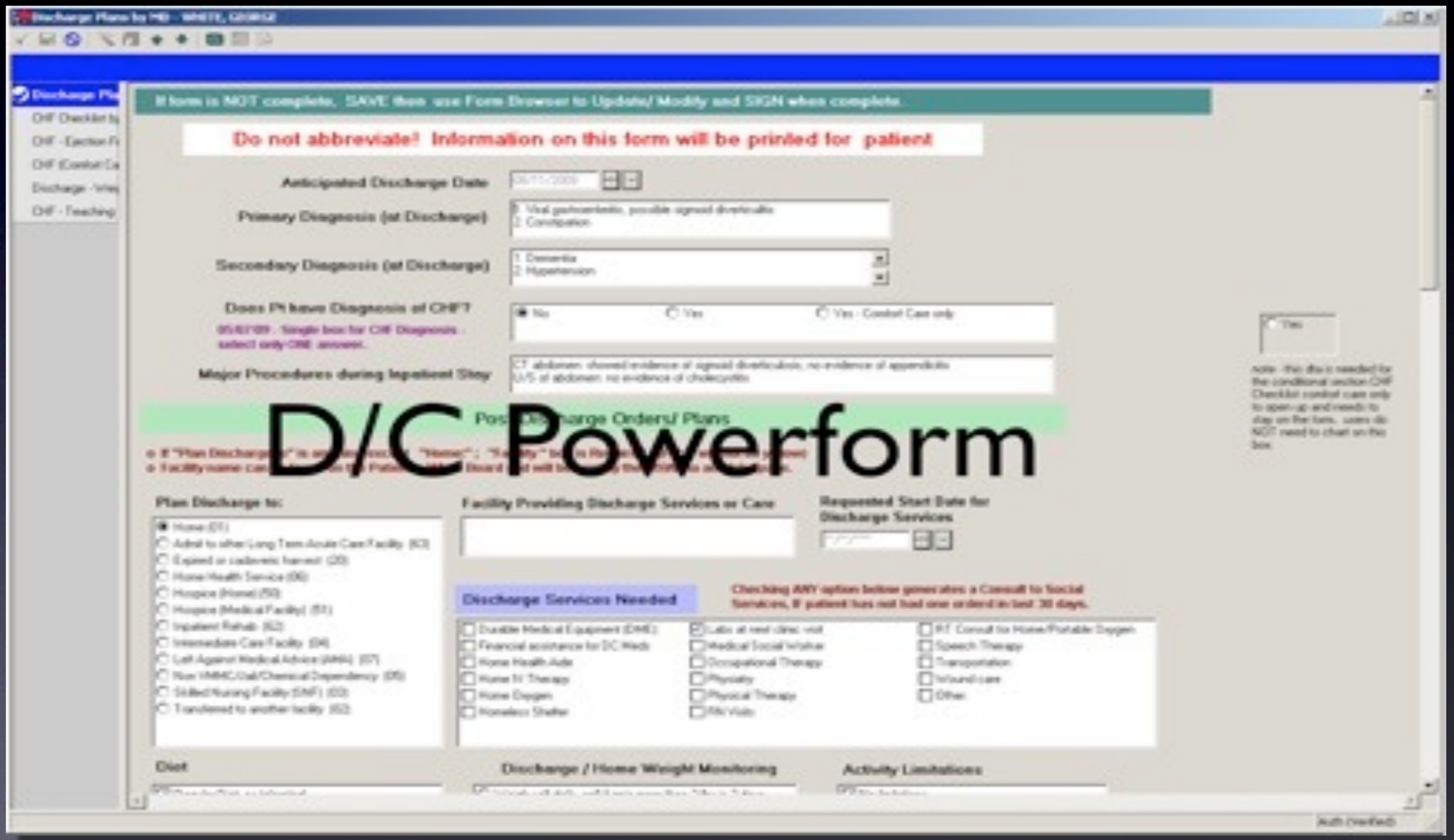
Discrete Data- Orders



Discrete Data- Labs

Lab and Rad Results	10/20/2009 6:10	10/19/2009 9:30	10/19/2009 8:50	10/19/2009 5:05	10/19/2009 5:00	10/18/2009 21:22	10/18/2009 10:00	10/18/2009 6:55	10/18/2009 5:01	10/18/200 4:55
Hemogram										
White Blood Cell Count	6.9 K/cmm				7.7 K/cmm					9.1 K/cmm
Red Blood Cell Count	L 3.52 M/cmm				L 3.32 M/cmm					L 3.08 M/cr
Hemoglobin	L 8.6 g/dL				L 8.0 g/dL					L 7.5 g/dL
Hematocrit	L 27 %				L 25 %		L 23 %			L 23 %
Mean Corpuscular Volume	L 76 fL				L 75 fL					L 76 fL
Mean Corpuscular HGB	L 24 pg				L 24 pg					L 24 pg
Mean Corpuscular HGB Concentrn	L 32 g/dL				L 32 g/dL					L 32 g/dL
RBC Distribution Width	H 19.5 %				H 18.5 %					H 19.0 %
Platelet Count	371 K/cmm				251 K/cmm					162 K/cmm
Reticulocyte Count										
Differential: Percent (Automated)										
Lymphocytes, Percent	26.4 %				19.7 %					
Monocytes, Percent	8.7 %				8.2 %					
Granulocytes, Percent	60.8 %				70.5 %					
Eosinophils, Percent	3.4 %				1.3 %					
Basophils, Percent	0.7 %				0.3 %					
Differential: Absolute Count (Automated)										
Lymphocytes, Absolute Count	1.8 K/cmm				1.5 K/cmm					
Moncytes, Absolute Count	0.6 K/cmm				0.6 K/cmm					
Granulocytes, Absolute Count	4.2 K/cmm				5.4 K/cmm					
Eosinophils, Absolute Count	0.2 K/cmm				0.1 K/cmm					
Basophils, Absolute Count	0.1 K/cmm				0.0 K/cmm					
Differential: Percent (Manual)										
Lymphocytes Percent										L 11 %
Monocytes Percent										L 1 %
Polymorphonuclear Leukocytes Percent										74 %
Bands Percent										H 12 %

Discrete Data- Forms



Discrete Data- Note

PowerNotes

Print 0 minutes ago

Add Forward Dictate Find Term Required

Progress Note | List

- Basic Information
- Subjective
- ✓ Review of Systems
- Health Status
- Objective
- Review / Management
- Impression and Plan

Author: Aaronson MD, Barry A

Basic Information <Hide Structure>

Admit information	Admission Day === / Today's information === / OTHER

Subjective <Show Structure>

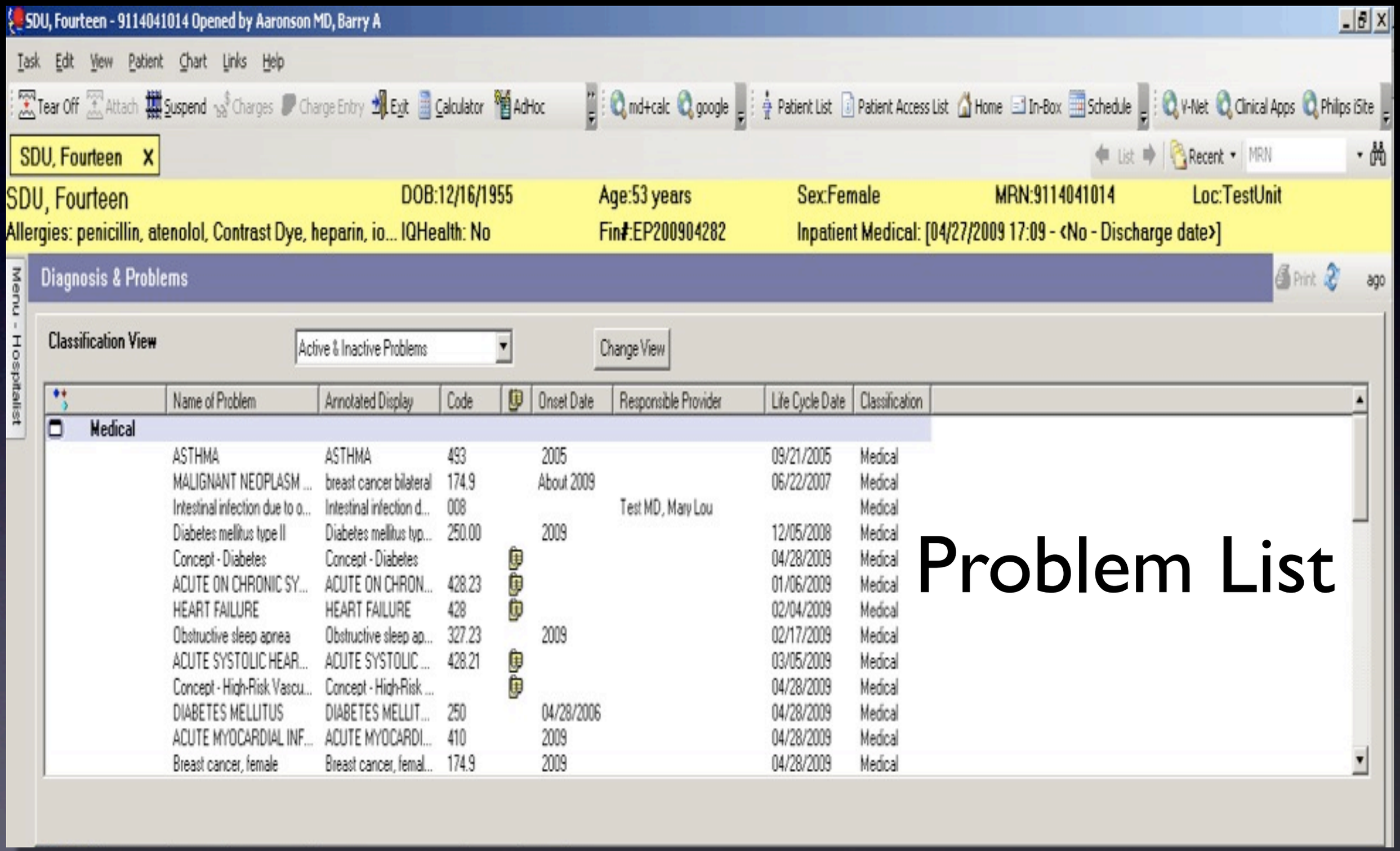
Review of Systems <Hide Structure>

Constitutional >>	Negative / Fever / Chills / Sweats / Weakness / Fatigue / Decreased activity / OTHER
Eye >>	Negative / Recent visual problem / Icterus / Discharge+ / Blurring / Double vision / Visual disturbances / OTHER
ENMT >>	Negativ ar pain+ / Nasal congestion / Sore throat / OTHER
Respiratory >>	Negativ / SOB / Cough / Sp m production / Hemoptysis / Wheezing / Cyanosis / Apnea / OTHER
Cardiovascular >>	Negativ / Chest pain+ / Palpita ns / Bradycardia / Tachycardia / Peripheral edema / Syncope / OTHER
Breast	Negative / Left / Right / Both / Lump/ mass / Nipple discharge / Engorgement / Pain+ / Redness / OTHER
Gastrointestinal >>	Negative / Nausea / Vomiting / Diarrhea / Constipation / Heartburn / Abdominal pain+ / Hematemesis / OTHER
Genitourinary >>	Negative / Dysuria / Hematuria / Change in urine stream / Urethral discharge / Lesions / OTHER
Gynecologic >>	Negative / Menstrual cycle+ / LMP === / Age at menarche === years / Dysmenorrhea / Hot flashes / Intermenstrual bleeding / OTHER
Hema/Lymph >>	Negative / Bruising tendency / Bleeding tendency / Swollen lymph glands / OTHER
Endocrine >>	Negative / Excessive thirst / Polyuria / Cold intolerance / Heat intolerance / Excessive hunger / OTHER
Immunologic >>	Negative / Immunocompromised / Recurrent fevers / Recurrent infections / Malaise / OTHER
Musculoskeletal >>	Negative / Back pain+ / Neck pain / Joint pain / Muscle pain / Claudication / Decreased ROM / Trauma / OTHER
Integumentary >>	Negative / Rash / Pruritus / Abrasions / Breakdown / Burns / Dryness / Petechiae / Skin lesion / OTHER

Note Details: Aaronson MD, Barry A, 10/20/2009 17:46, Progress Note

Sign | Save | Save & Close | Cancel

Discrete Data



Problem List

Critical HIT Components Needed to Ensure Quality

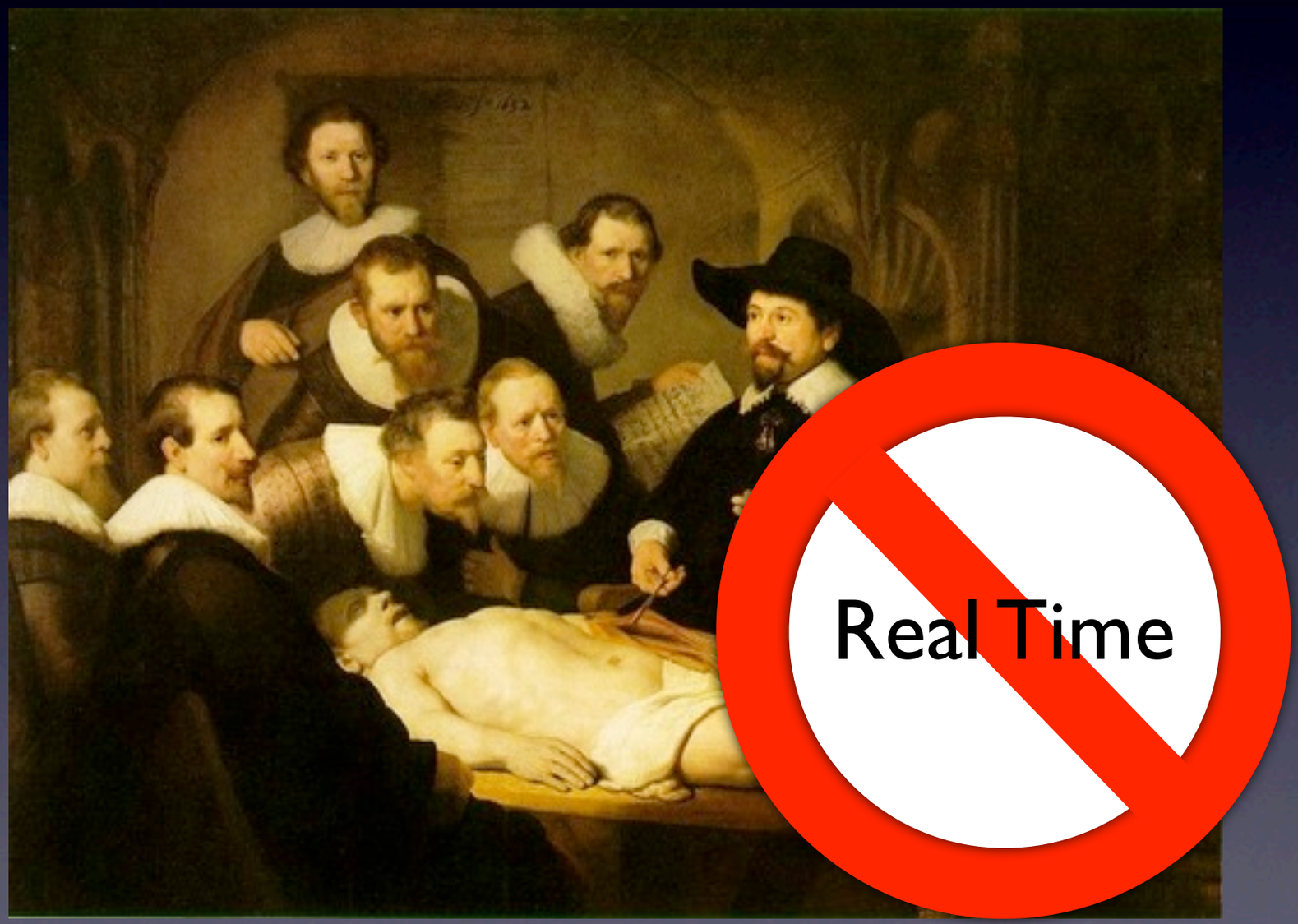
✓ Computer System

✓ Discrete Data

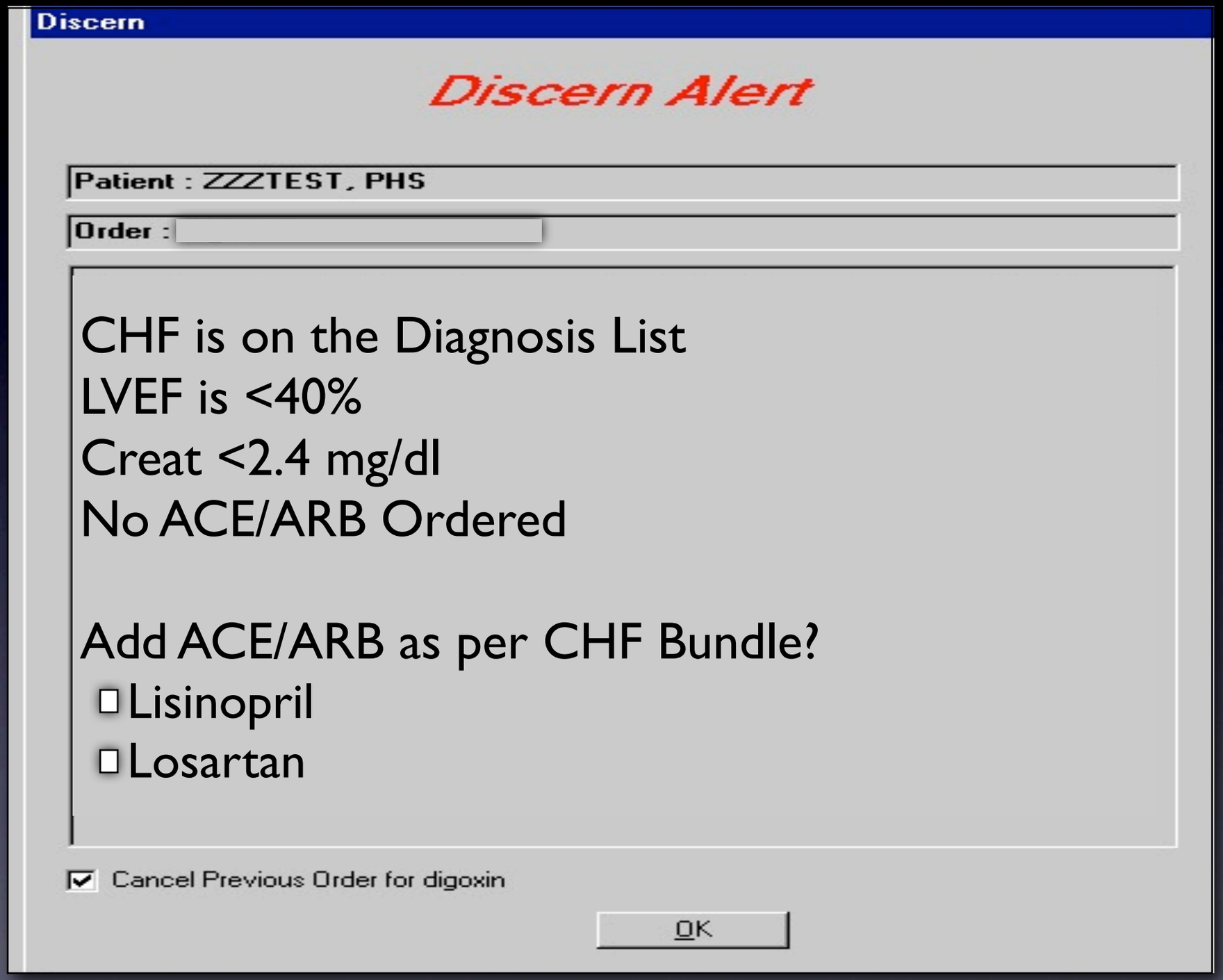
- Realtime Provider Feedback aka Clinical Decision Support
- Group Situational Awareness

Retrospective Improvement Efforts

- Conferences
- Journal Clubs
- Section Meetings
- Housestaff Orientations
- M&M



Clinical Decision Support



Synchronous Alert

Quality Safety Dashboard

Quality Safety Dashboard

150%

Data Last Updated:09/18/09 10:46:00

ICU Dashboard | RRT Dashboard | User Options

Patient Filter: UNIT - U-5E Excluding ICU Patients

UWMC go | U-5E go | --Select a List-- go

All | Non-ICU | Only ICU

Refreshes q5min

Maximize Table

Patient Info	Encounter Info	Patient Status	DVT Prophy	GI Prophy	Glucose	Oral Care	HOB	Sedation	SBT
	U-5E 5N504-1 09/15/2009 13:45 Glenny, MD, Robb William	-	heparin R	ranitidine	101/140 Yes	4/1/2	Normal	OK	Missed
	U-5E 5N512-1 09/14/2009 05:16 Glenny, MD, Robb William	-	heparin R	No Vent	93/178 Yes	No Vent	No Vent	Low	No Vent
	U-5E 5N516-1 09/17/2009 06:10 Flum, MD, David Reed	-	heparin R	No GI Prophy	95/153 No	4/1/0 R	Normal	OK	Missed
	U-5E 5N518-1 09/17/2009 03:54 Merel, MD, Susan Eva	-	heparin R	No Vent	108/111 No	No Vent	No Vent	No Assessment	No Vent
	U-5E 5N518-2 09/16/2009 04:06 Merel, MD, Susan Eva	-	heparin R	No Vent	111/127 No	No Vent	No Vent	OK	No Vent
	U-5E 5N520-2 09/17/2009 07:02 Tonelli, MD, Mark Raymond	-	No DVT Prophy R	No Vent	102/102 No	No Vent	No Vent	No Assessment	No Vent
	U-5E EE502-1 09/08/2009 20:48 Mulligan, MD, Michael S	-	heparin R	lansoprazole	136/165 No	4/4/3	Normal	OK	Done
	U-5E EE503-1 09/14/2009 12:32 Greer, MD, Benjamin E	-	No DVT Prophy R	No Vent	75/235 Yes	No Vent	No Vent	No Assessment	No Vent
	U-5E EE505-1 09/17/2009 18:11 Tonelli, MD, Mark Raymond	-	Mech Only	pantoprazole	125/152 No	4/2/0	Normal	OK	Missed
	U-5E EE510-1 09/06/2009 16:39 Tonelli, MD, Mark Raymond	-	No DVT Prophy R	lansoprazole	163/199 Yes	2/2/1 R	Normal	OK	Missed
	U-5E EE515-1 09/16/2009 04:27 Glenny, MD, Robb William	-	Mech Only	No Vent	158/158 No	No Vent	No Vent	OK	No Vent
	U-5E EE516-1 08/27/2009 14:33 Glenny, MD, Robb William	-	heparin R	No Vent	110/139 No	No Vent	No Vent	OK	No Vent
	U-5E EE516-2 09/15/2009 17:27 Tonelli, MD, Mark Raymond	-	No DVT Prophy R	No Vent	128/135 No	No Vent	No Vent	OK	No Vent
	U-5E EE521-1 09/15/2009 14:41 Glenny, MD, Robb William	-	heparin R	No Vent	98/193 Yes	No Vent	No Vent	OK	No Vent
	U-5E EE521-2 09/17/2009 05:32 Neligan, MBBCH, Peter Camillus	-	enoxaparin	No Vent	107/161 Yes	No Vent	No Vent	No Assessment	No Vent
	U-5E EE522-1 03/21/2009 10:10 Tonelli, MD, Mark Raymond	-	No DVT Prophy R	lansoprazole	No Glucose No	0/0/0 R	No Bed Pos	OK	Missed
	U-5E EE528-1 07/26/2009 19:01 Tonelli, MD, Mark Raymond	-	heparin R	pantoprazole	123/190 No	2/1/2 R	Normal	OK	Missed
	U-5E EE529-1 07/25/2009 15:53 Glenny, MD, Robb William	-	heparin R	lansoprazole	97/123 Yes	2/2/2 R	Normal	OK	Missed
	U-5E EE530-1 09/17/2009 08:50 Flum, MD, David Reed	-	heparin R	No Vent	105/144 No	No Vent	No Vent	No Assessment	No Vent
	U-5E EE533-1 09/12/2009 20:57								

QSDIndicatorDVT.pdf

Save a Copy | Select | 80%

Pages | Attachments | Comments

Quality and Safety Dashboard

Deep Vein Thrombosis (DVT) Prophylaxis Indicator

Data that can be entered through Quality and Safety Dashboard

1 of 1

Clinical Algorithm

Quality Safety Dashboard

Quality Safety Dashboard

Data Last Updated:09/18/09 10:46:00

ICU Dashboard | RRT Dashboard | User Options

Patient Filter: UNIT - U-5E Excluding ICU Patients

UWMC go | U-5E go | --Select a Patient List-- go

○ All ◉ Non-ICU ○ Only ICU

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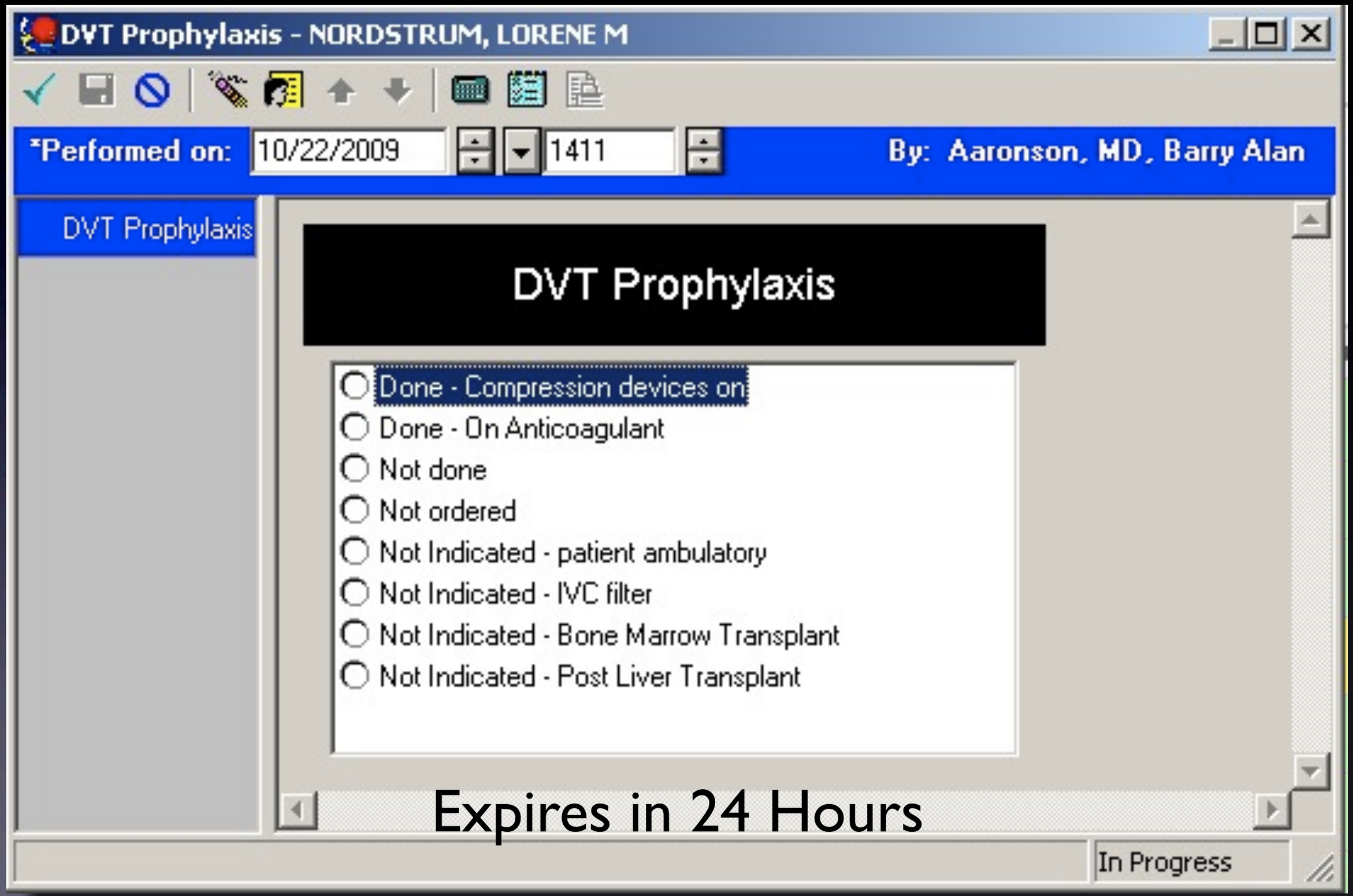
Document



Expires in 24 Hours

Quality Safety Dashboard

Quality Safety Dashboard

150%

Data Last Updated:09/18/09 10:46:00

ICU Dashboard | RRT Dashboard | User Options

Patient Filter: UNIT - U-5E Excluding ICU Patients

UWMC go | U-5E go | --Select a Patient List-- go

All | Non-ICU | Only ICU

Maximize Table

Patient Info	Encounter Info	Patient Status	DVT Prophy	GI Prophy	Glucose	Oral Care	HOB	Sedation	SBT
[redacted]	U-5E 5N504-1 09/15/2009 13:45 Glenny, MD, Robb William	-	heparin R	ranitidine	101/140 Yes	4/1/2	Normal	OK	Missed
	U-5E 5N512-1 09/14/2009 05:16 Glenny, MD, Robb William	-	heparin R	No Vent	93/178 Yes	No Vent	No Vent	Low	No Vent
	U-5E 5N516-1 09/17/2009 06:10 Flum, MD, David Reed	-	heparin R	No GI Prophy	95/153 No	4/1/0 R	Normal	OK	Missed
	U-5E 5N518-1 09/17/2009 03:54 Merel, MD, Susan Eva	-	heparin R	No Vent	108/111 No	No Vent	No Vent	No Assessment	No Vent
	U-5E 5N518-2 09/16/2009 04:06 Merel, MD, Susan Eva	-	heparin R	[illegible]	111/127 No	No Vent	No Vent	OK	No Vent
	U-5E 5N520-2 09/17/2009 07:02 Tonelli, MD, Mark Raymond	-	No DVT Prophy R	No Vent	102/102 No	No Vent	No Vent	No Assessment	No Vent
	U-5E EE502-1 09/08/2009 20:48 Mulligan, MD, Michael S	-	heparin R	lansoprazole	136/165 No	4/4/3	Normal	OK	Done
	U-5E EE503-1 09/14/2009 12:32 Greer, MD, Benjamin E	-	No DVT Prophy R	No Vent	75/235 Yes	No Vent	No Vent	No Assessment	No Vent
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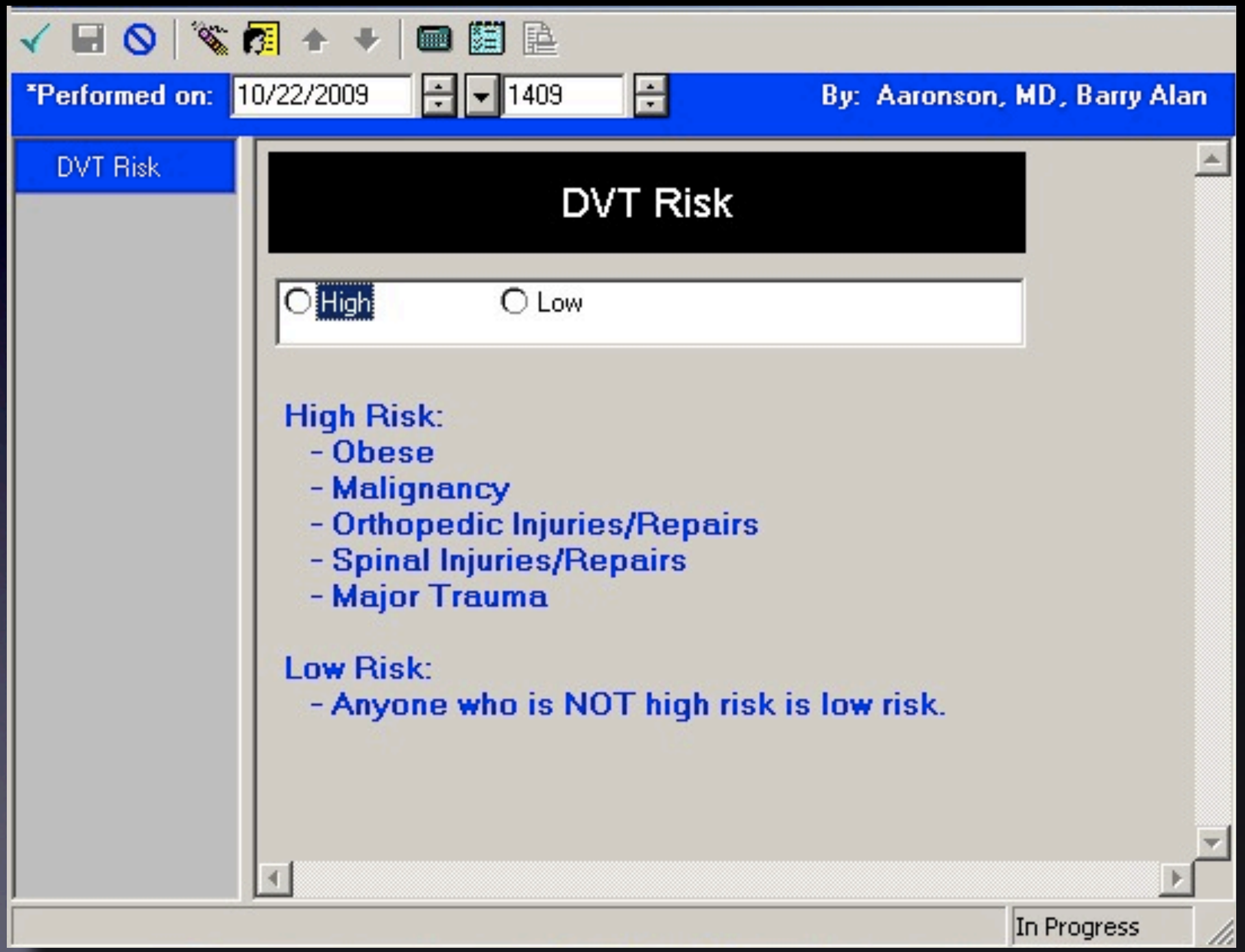
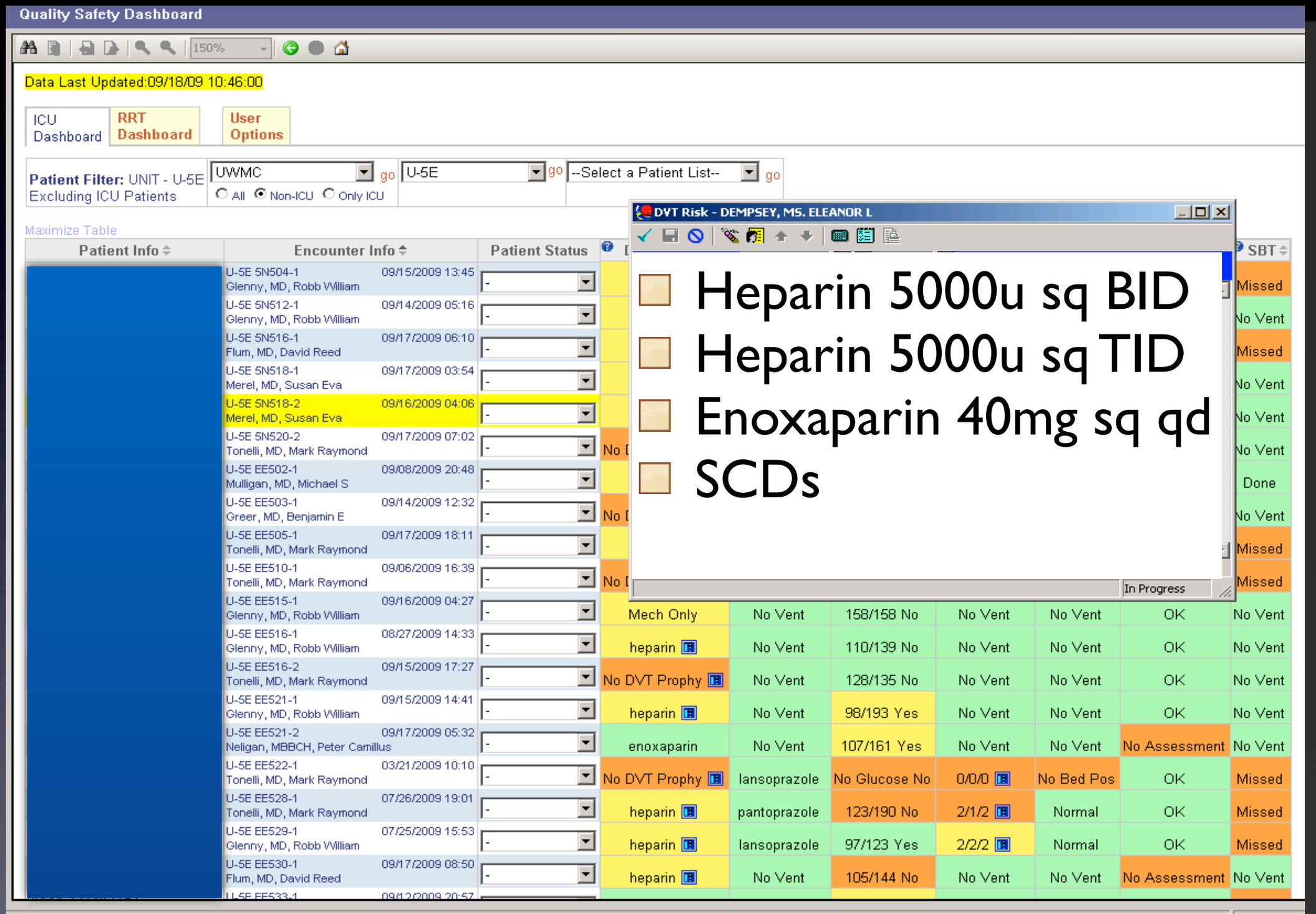
	U-5E EE533-1 09/12/2009 20:57								

Specify Risk



Write Orders



Critical HIT Components Needed to Ensure Quality

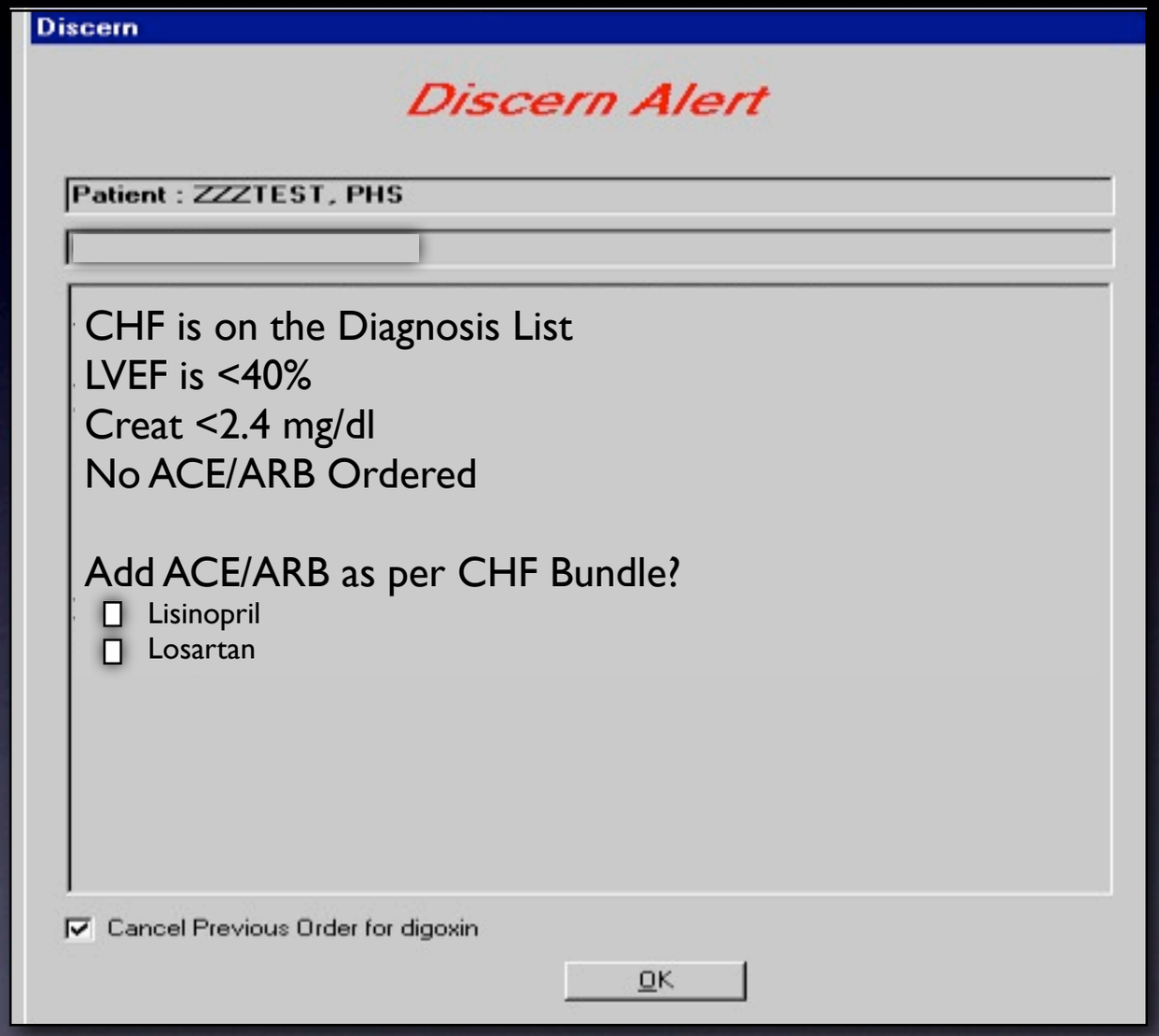
✓ Computer System

✓ Discrete Data

✓ Realtime Provider Feedback aka Clinical Decision Support

- Group (Team) Situational Awareness

Alert Fatigue



JAMA®

Online article and related content current as of November 19, 2008.

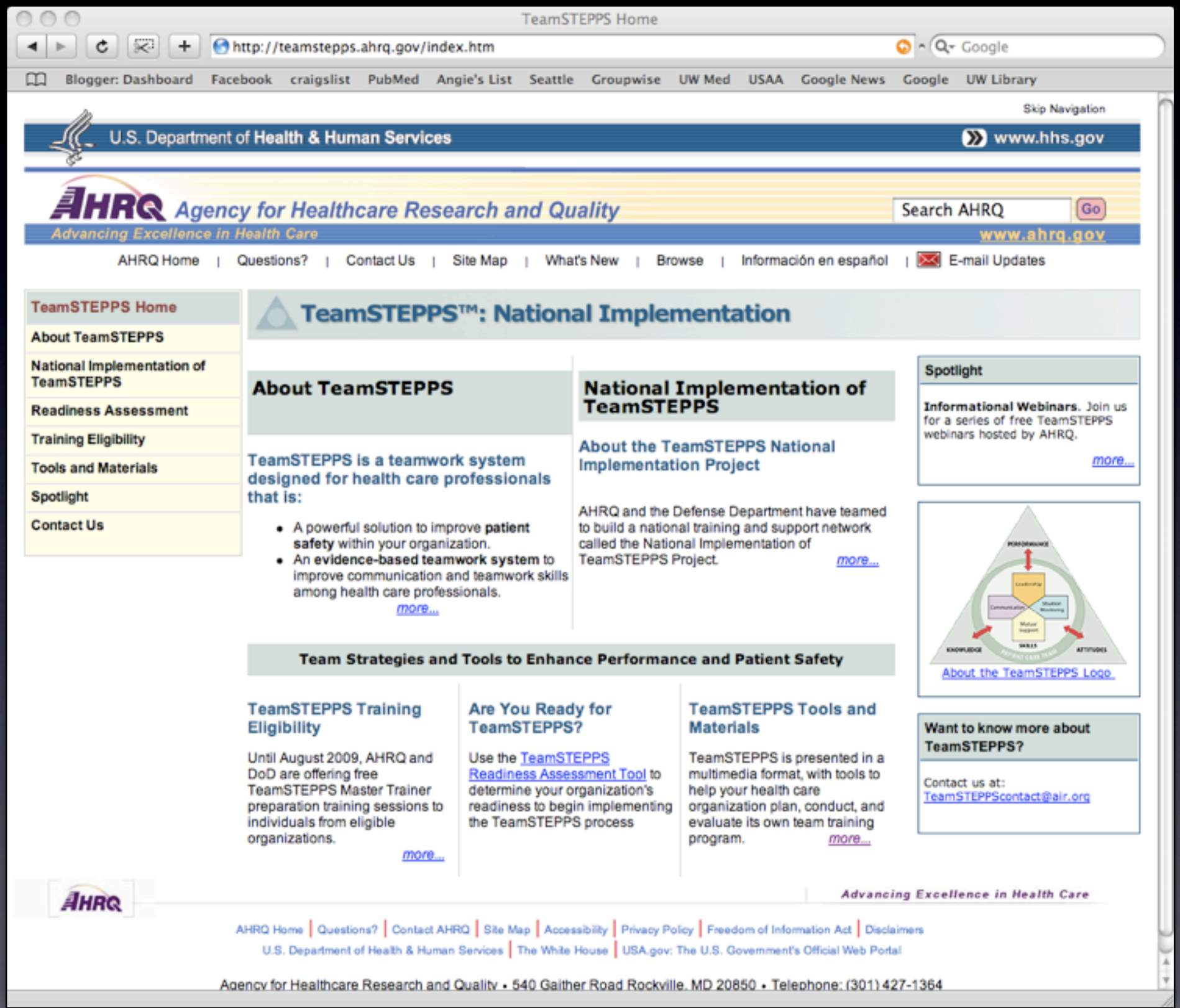
Patient Care, Square-Rigger Sailing, and Safety

Steven J. Henkind; J. Christopher Sinnett

JAMA. 2008;300(14):1691-1693 (doi:10.1001/jama.300.14.1691)

http://jama.ama-assn.org/cgi/content/full/300/14/1691

TeamStepps


TeamSTEPPS Home
http://teamstepps.ahrq.gov/index.htm
Google
Blogger: Dashboard
Facebook
craigslist
PubMed
Angie's List
Seattle
Groupwise
UW Med
USAA
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An evidence-based teamwork system to improve communication and teamwork skills among health care professionals.
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National Implementation of TeamSTEPPS
About the TeamSTEPPS National Implementation Project
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Informational Webinars. Join us for a series of free TeamSTEPPS webinars hosted by AHRQ.
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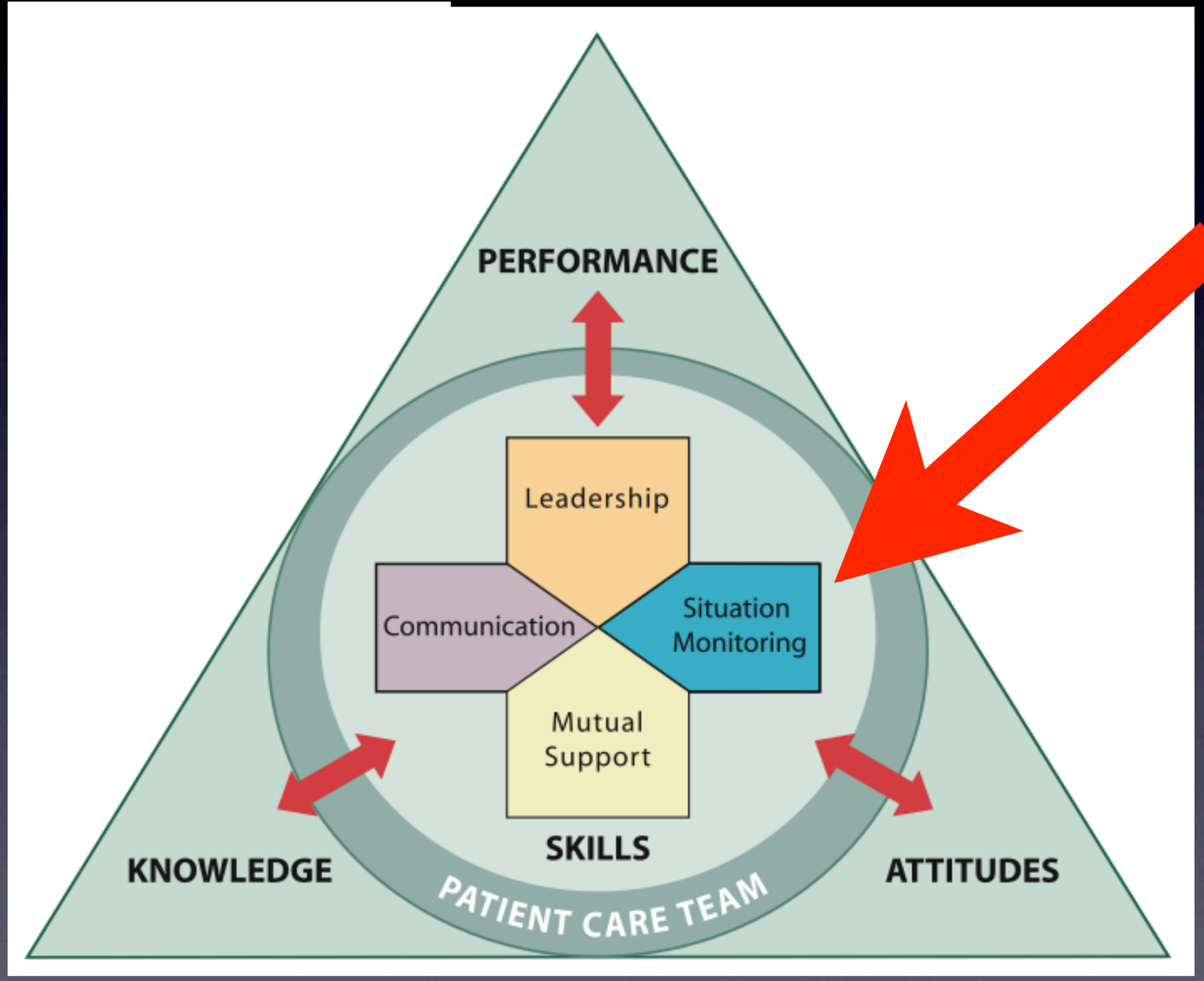
Group Situational Awareness



SITUATIONAL AWARENESS

OR Dashboard

Bed Control

Hospital Dispatch

Harborview Cafe

White Board


ROOM
PATIENT
INC
ON DUTY
DAY RN
NOC RN
PCT
755-1
755-2
756
757-1
757-2
758
759
759
763
764
766
768
ANM/CA
PFC/MH
TELE
IMC
TELE
IMC
TELE
NON-TELE
NON-TELE
IMC
Susan/ Courtney
Shannon
Shannon
Laura
Shannon
Laura
Susan & Courtney
Susan & Courtney
Laura
Alison
Alison
Alison
Alison
Alison
BJ
Alison
Alison
BJ

Quality Safety Dashboard

Quality Safety Dashboard

150%

Data Last Updated:09/18/09 10:46:00

ICU Dashboard | RRT Dashboard | User Options

Patient Filter: UNIT - U-5E Excluding ICU Patients

UWMC go | U-5E go | --Select a Patient List-- go

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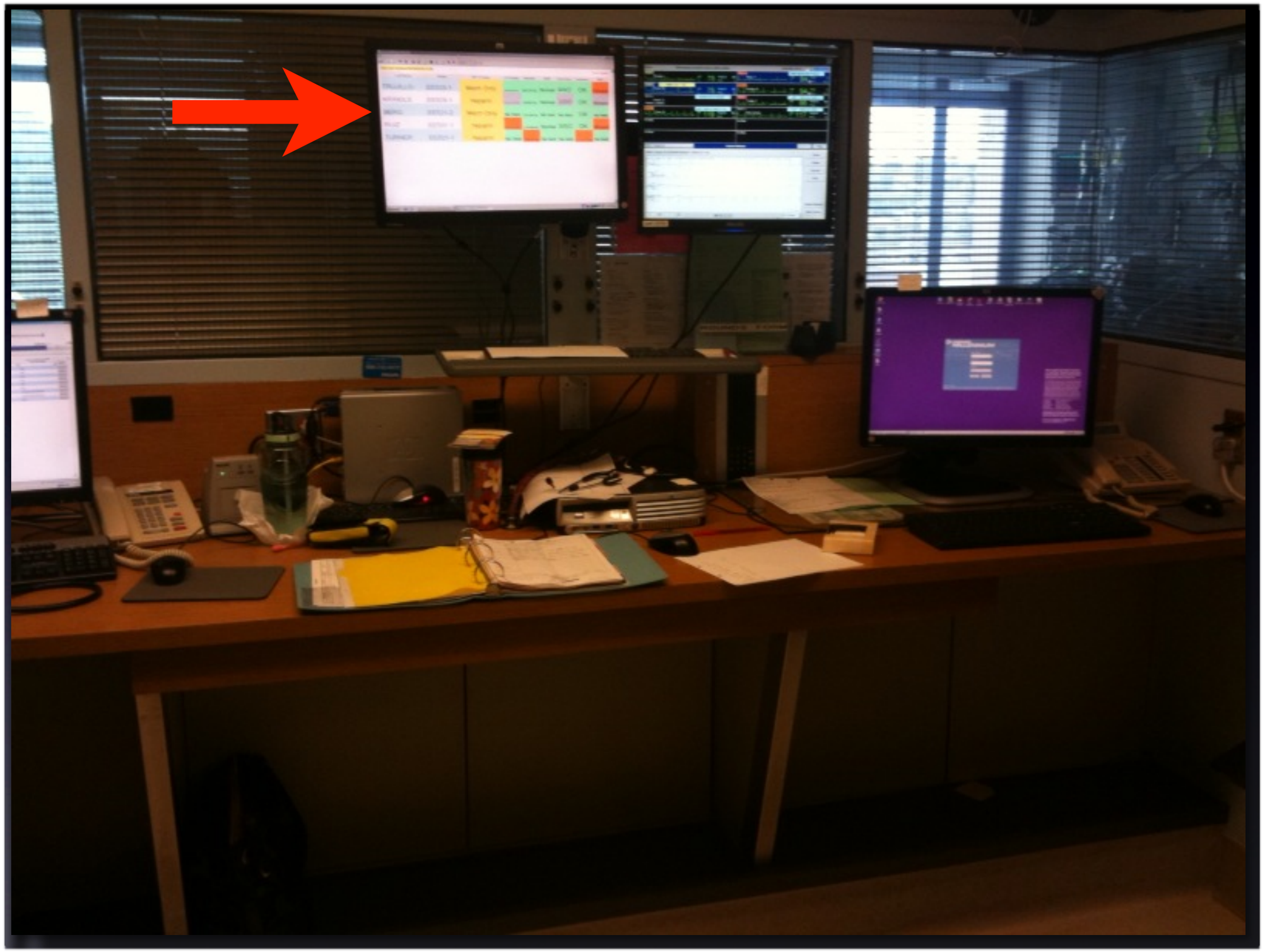
UW ICU



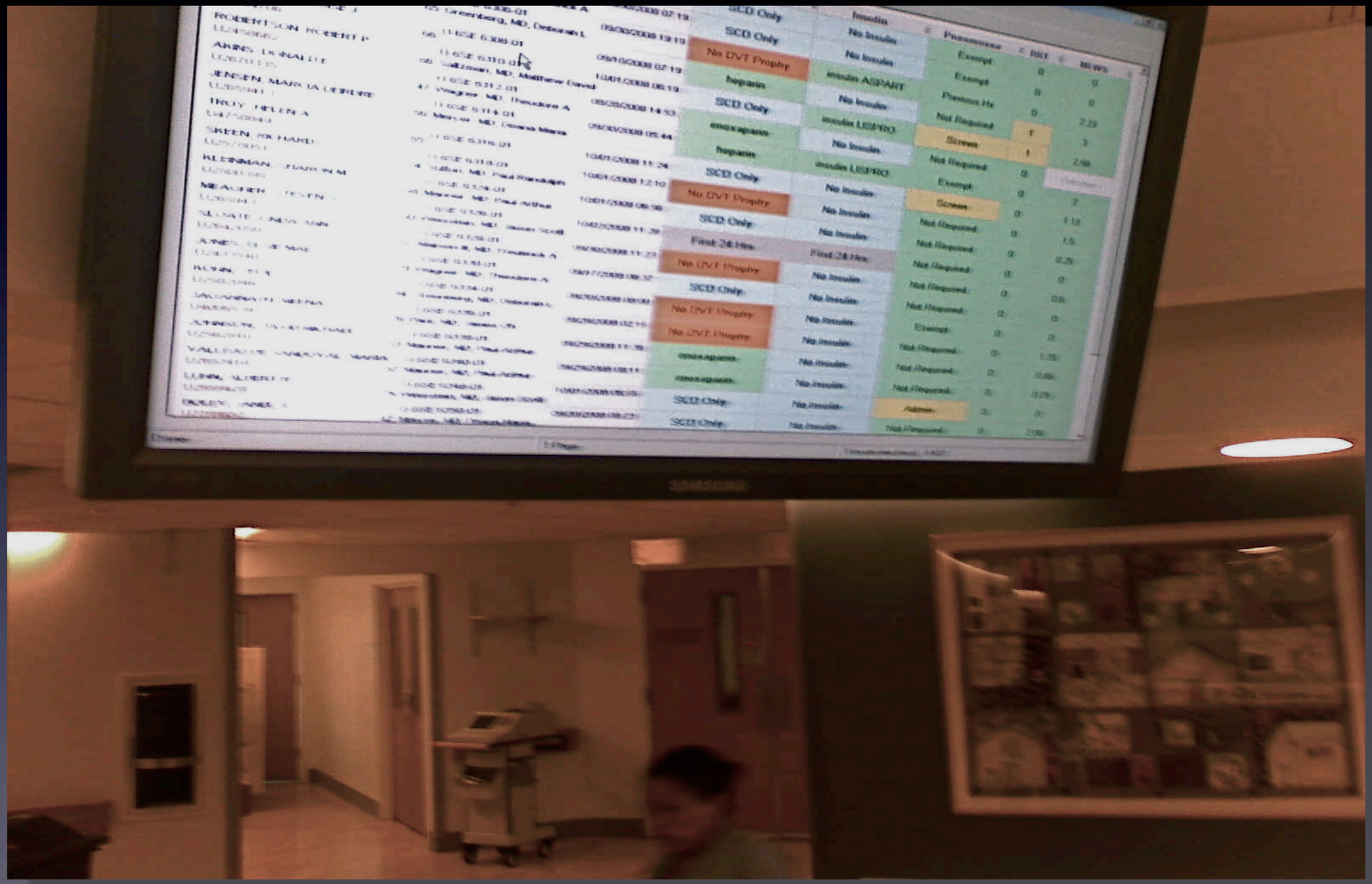
Harborview ICU

Dashboard Study Design

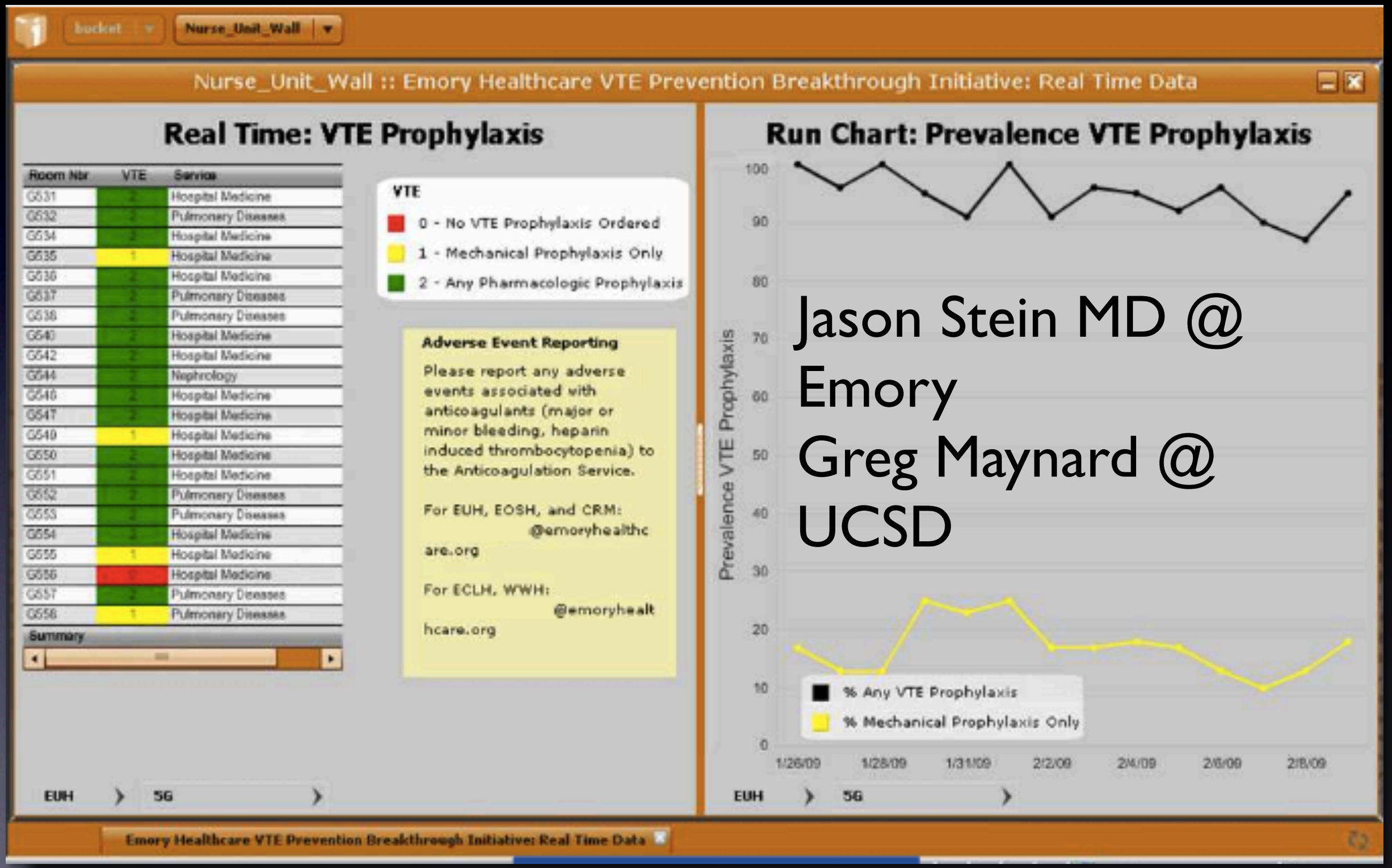
Measure of Compliance with Quality Parameter

	6 Week Control Period	6 Week Intervention Period
Control Unit	No Dashboard	No Dashboard
Intervention Unit	No Dashboard	Dashboard

Med-Surg Dashboard



Measurevention



Jason Stein MD @ Emory

Greg Maynard @ UCSD

Critical HIT Components Needed to Ensure Quality

- ✓ Computer System
- ✓ Discrete Data
- ✓ Realtime Provider Feedback aka Clinical Decision Support
- ✓ Group Situational Awareness

Quality

Safety

Preventing Potentially Avoidable Deaths

Institute of Medicine 1999

Reason for Failure?

There are 2 teams of players, one wearing white shirts and one wearing black shirts. Try to count the number of times the team wearing white passes the ball.

Reason for Failure?

There are 2 teams of players, one wearing white shirts and one wearing black shirts. Try to count the number of times the team wearing white passes the ball.

Rapid Response Team

- SBP<90
- HR>130
- RR>24
- SaO2<90%

3,000 Hospitals

Fire Station Model

Air Traffic Control Surveillance Model

Early Warning System

PowerChart Organizer for Aaronson, MD, Barry Alan

Task Edit View Patient Chart Links Navigation Help

In-Box | Patient List | View Scheduling | Surgery Schedule | Quality Safety Dashboard | Links and Reports | New Sticky Note | View Sticky Notes | Tear Off | Attach | Change | Su

UWMC Radiology Images | HMC Radiology Images

| Quality Safety Dashboard

150%

ICU Dashboard | ICU Dashboard | ICU Dashboard | RRT Dashboard | User Options

Patient Filter: FACILITY - UWMC Excluding ICU Patients | UWMC go | --- Select a Unit --- go | --Select a Patient List-- go

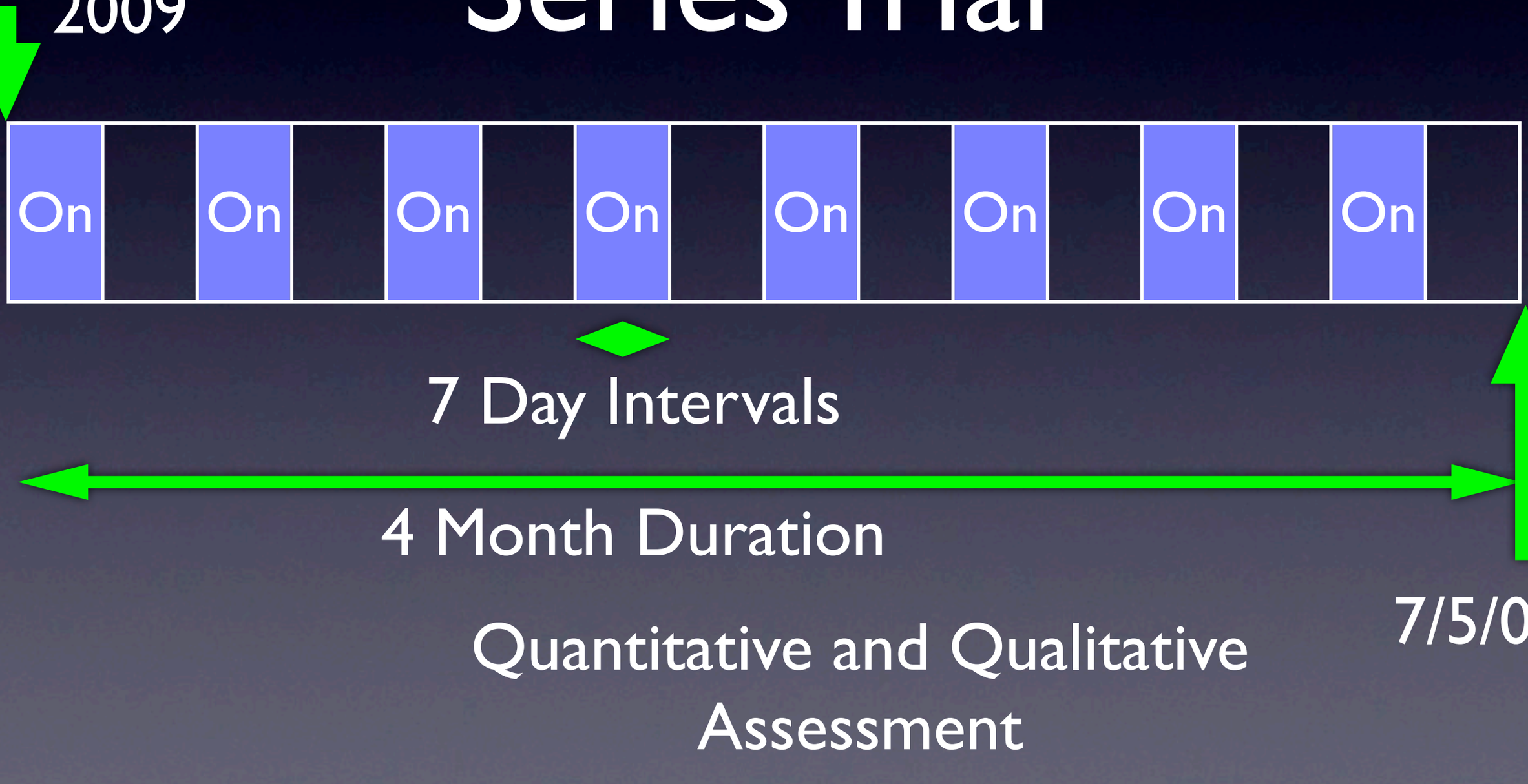
○ All ◉ Non-ICU ○ Only ICU

Filters: ☑ Hide Comfort Care ☑ Hide Snooze

RRT	MEWS	Patient Info	Encounter Info		Comfort Care	Snooze	Notes
2	5.81	[redacted]	U-7SE 7308-01	02/02/2009 09:47	☐	set	edit HR 132
1		SBP of 86 is outside of range (90 - 200) Heart Rate of 150 is outside of range (40 - 120)	-7NE 7204-01 yurkocza, MD, Boglarka	02/03/2009 17:29	☐	set	+ Add Note
1	2.94	MITCHELL, VIOLET G	U-PAV SPAV-10 Wright, MD, Jonathan Lawrence	02/04/2009 09:47	☐	set	+ Add Note
1	3.27		U-6NE 6240-01 Powell, MD, Heidi S	12/18/2008 18:57	☐	set	more | edit Watch list, RLL cellulitis --> weeping open bliste
1	3.02		U-5NE 5254-01	02/03/2009 08:14	☐	set	edit fresh move from ICU
1	3		U-5NE 5264-01 Stempien-Otero, MD, April S	02/03/2009 16:00	☐	set	more | edit CM--EF 19%; infected AICD lead removed12/10 b/p lo
1	3.72		U-6NE 6212-01	12/30/2008 23:15	☐	set	more | edit 1/17 SBP 84, Remodulin, diuresing, fluid restrict,
1	3.3		U-5NE 5224-01 Fishbein, MD, Daniel P	01/27/2009 11:49	☐	set	edit BP better now 99/
1	4.2		U-8NE 8218-01 Nash, MD, Richard A	02/02/2009 09:25	☐	set	+ Add Note
1	3.06		U-5NE 5210-01	10/28/2008 21:36	☐	set	+ Add Note
1	7.61		U-7NE 7246-01 Turtle, MBBS, Cameron John	01/19/2009 08:00	☐	set	edit AML, hr up on postural b/p,
1	5.33		U-6SE 6340-01 Matsen III, MD, Frederick A	02/03/2009 05:33	☐	set	edit HR 124
			U-6SE 6318-01	02/04/2009 10:04			

Single Blind Randomized Controlled Interrupted Time Series Trial

Feb 9, 2009

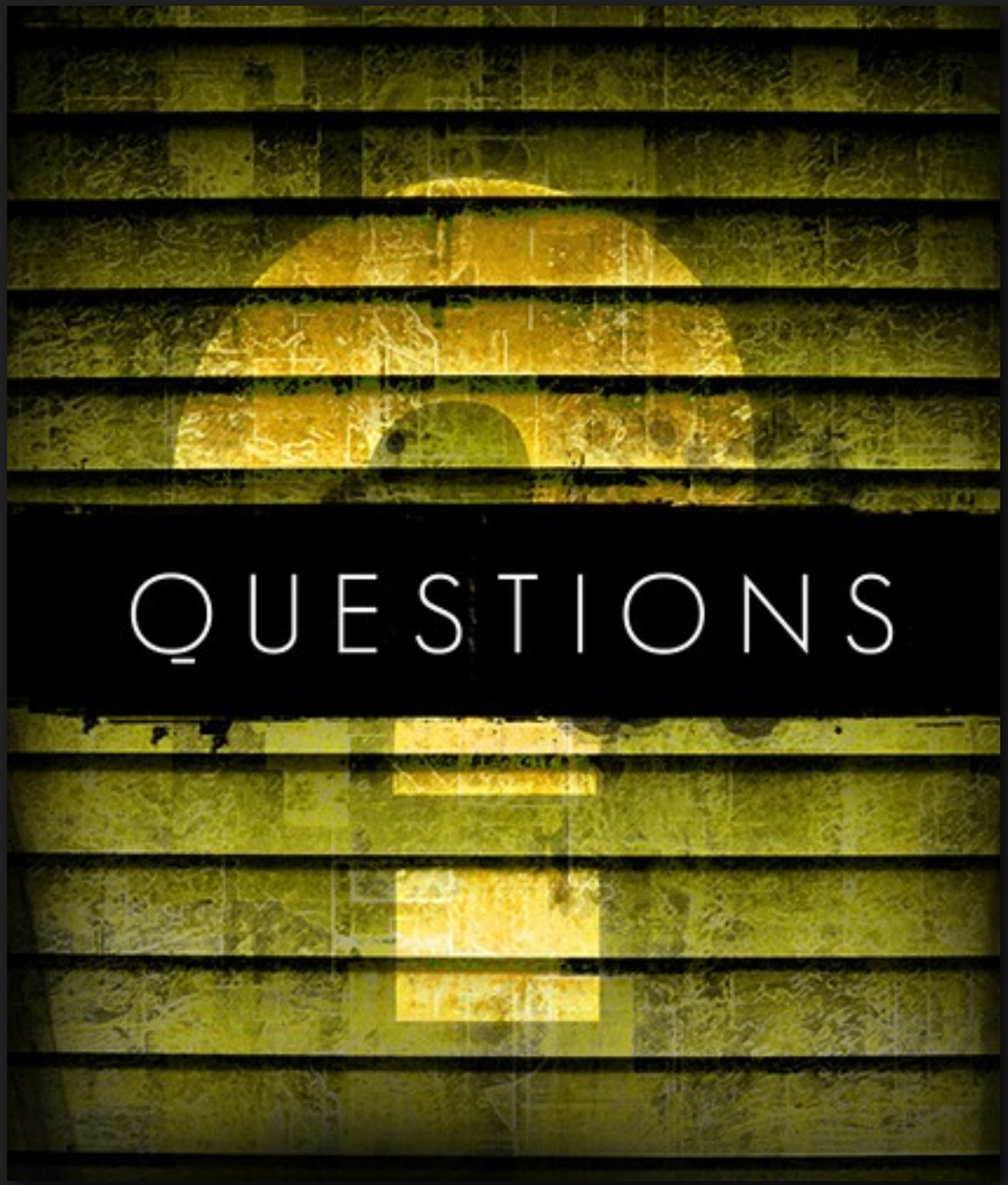


Clinical Outcomes

- Potentially avoidable death rate
- Cardiopulmonary arrest rate outside ICU
- Unexpected transfer to ICU rate
- RRT Activation Rate

iPhone


AT&T
1:25 PM
ORCA
RRT
MEWS
Encounter Info
Notes
2 9 H-2EA EA206-1 03/24/2009 20:05 Luks, MD, Andrew Mark + Add
2 6.53 H-9MB MB940-1 03/04/2009 16:30 Treggiari, MD, Miriam Monica + Add
1 5.34 H-2EA EA204-1 03/23/2009 17:52 Gil Jr, MD, Edward Allen + Add
1 6.03 H-2WA WA254-1 03/23/2009 11:00 Souter, MD, Michael James + Add
1 7.29 H-2WA WA258-1 03/20/2009 19:32 + Add
1 8.91 H-9EA EA905-1 03/20/2009 05:17 Jurkovich, MD, Gregory J + Add
1 6.68 H-9EA EA901-1 03/19/2009 12:40 King, MD, Mary Alice + Add
1 4.58 H-9EA EA907-1 03/16/2009 02:15 Rose-Innes, MB, ChB, Andrew Peter + Add
1 6.3 H-9EB EB913-1 03/14/2009 18:22 McGuire, MD, John Kennedy + Add
1 6.6 H-9EA EA906-1 02/23/2009 23:00 McGuire, MD, John Kennedy + Add
1 2.82 H-2WC WC274-1 03/19/2009 10:10 Souter, MD, Michael James + Add
H-9MB MB938-1 02/22/2009 05:36


QUESTIONS