Time and Lives

Using Clinical Surveillance to Drive Performance Improvement

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Clinical Surveillance Outcomes

Decrease in mortality/1000 discharge	**15.6%**
Decrease in inpatient cardiac/respiratory arrests	**13%**
Reduction in cardiac/respiratory arrests outside critical care	**22%**
Increase in calls to the rapid response team for critical care support/assessments	**115%**
Reduction in ICU mortality for patients transferred from medical-surgical units with a diagnosis of sepsis	**38%**
Increase in number of Congestive Heart Failure patients receiving CMS bundle measures	**35%**

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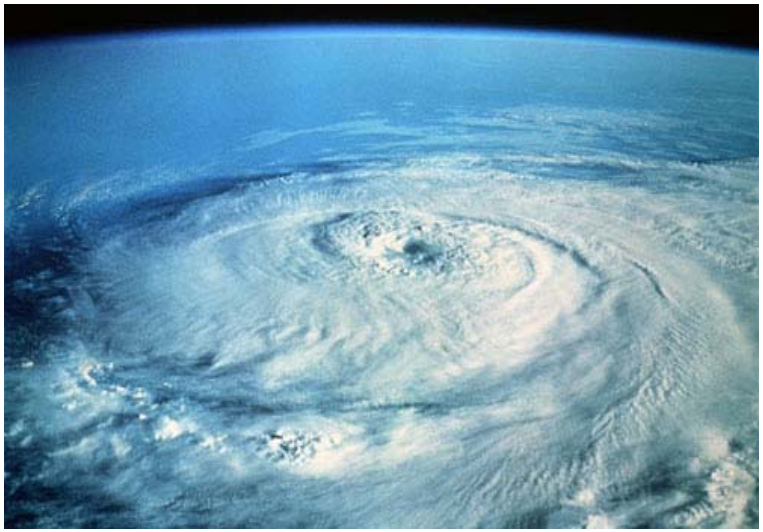
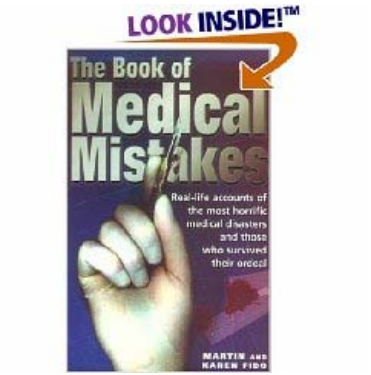
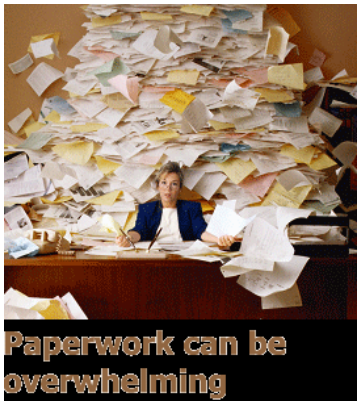
"The Nursing Information Technology Innovation Award", Health Data Management, March 31, 2008

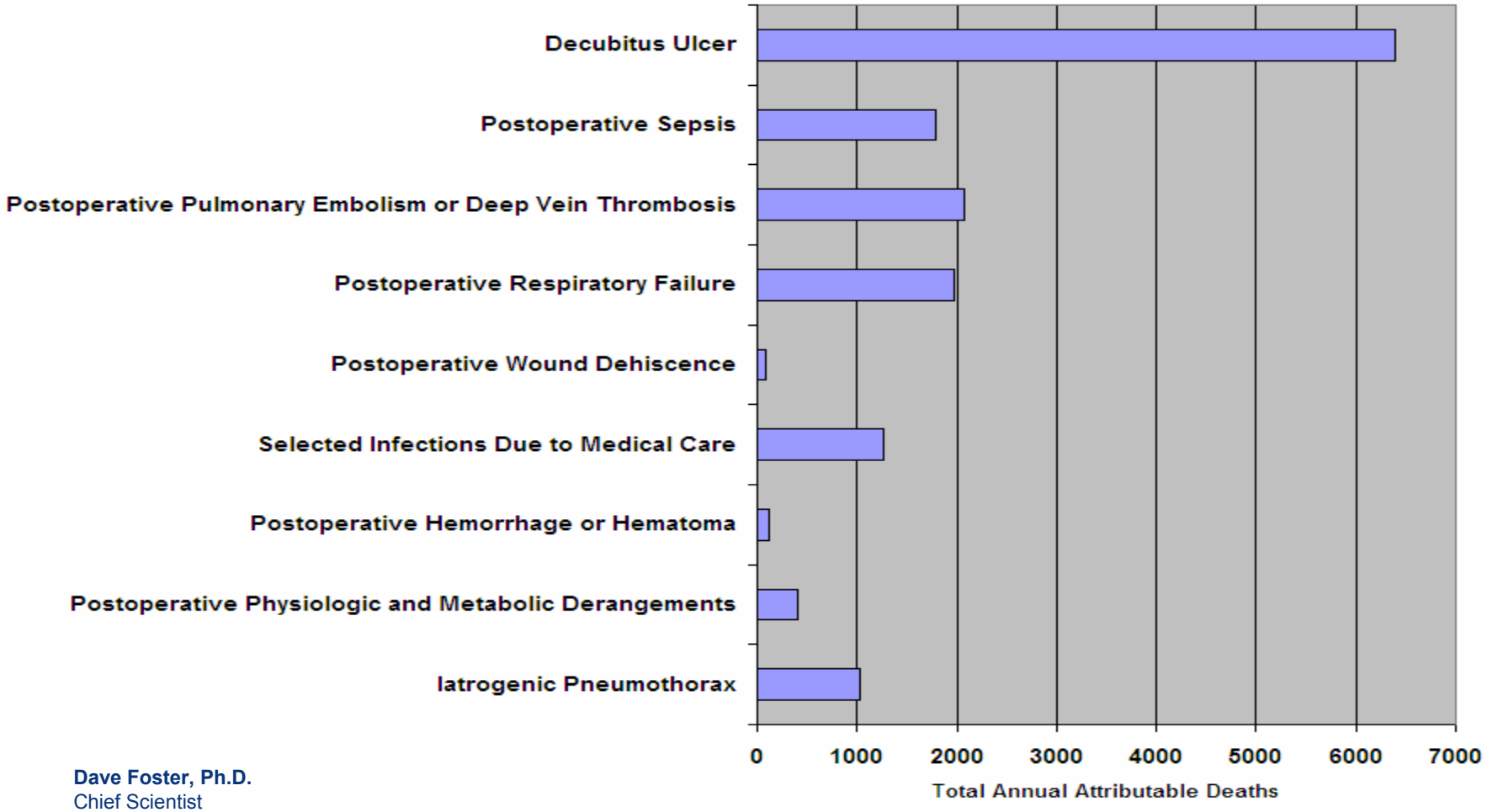
The Perfect Storm







Estimated Annual Attributable Mortality



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Chief Scientist

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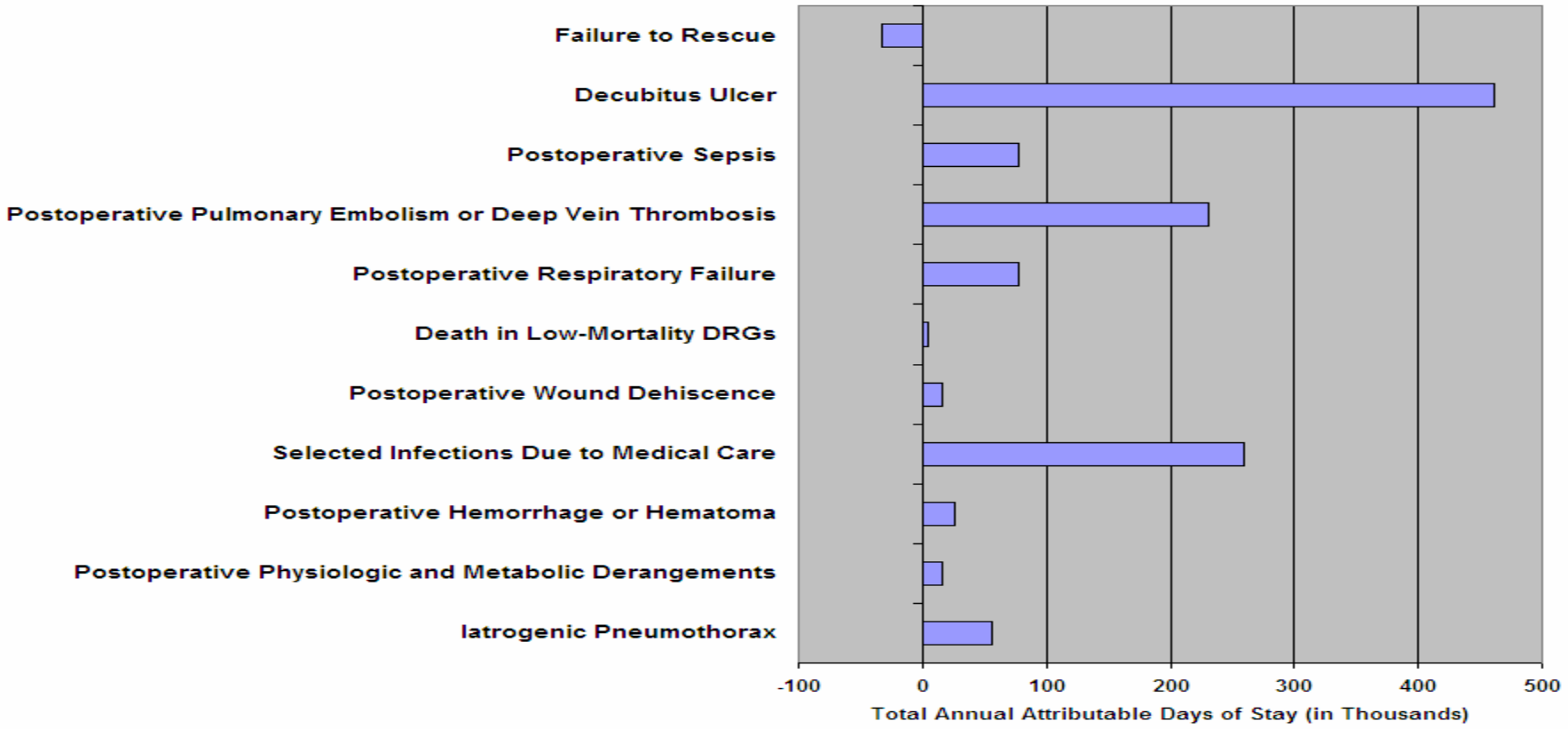
Estimated Annual Attributable LOS



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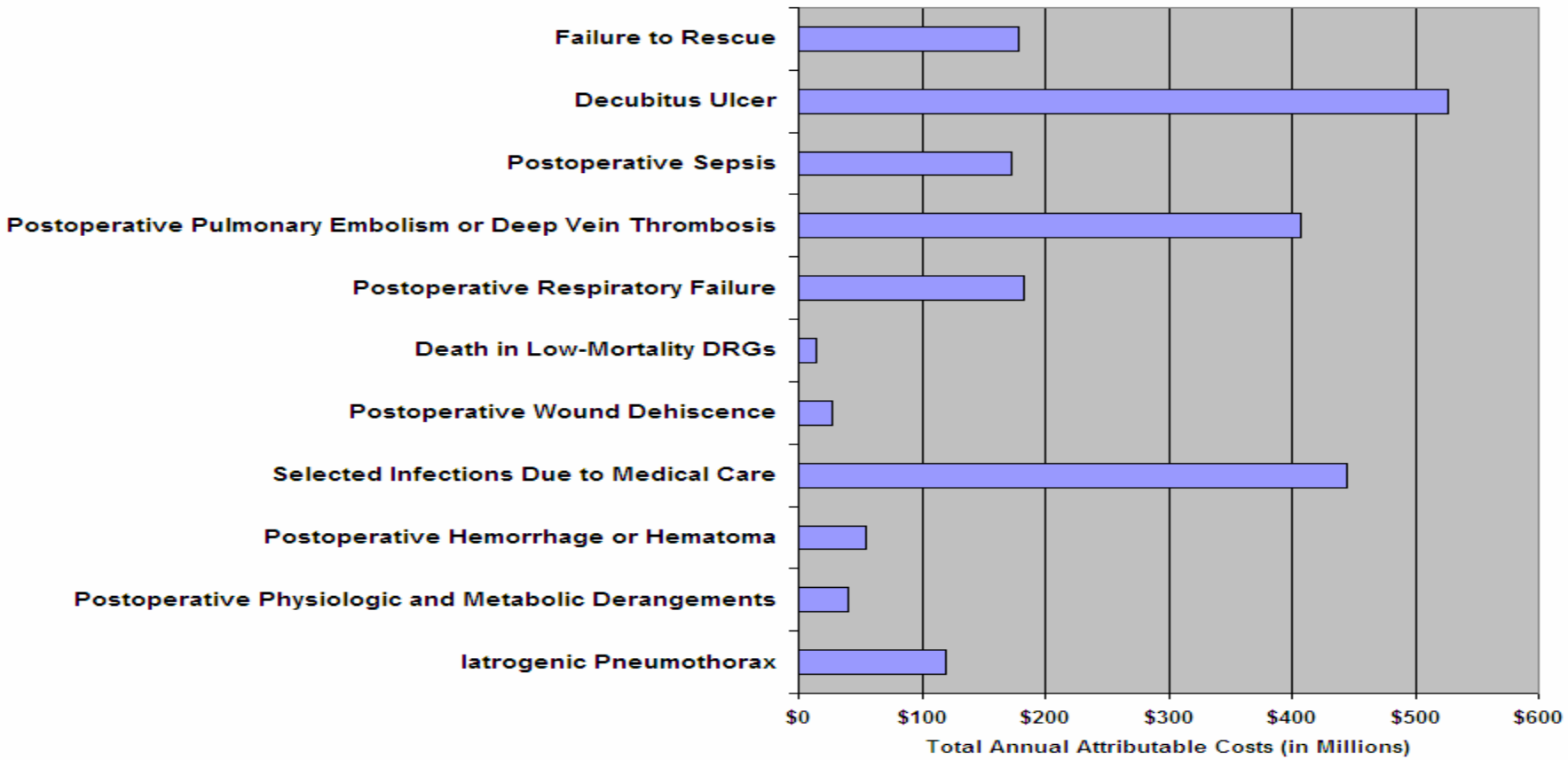
Estimated Annual Attributable Costs



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Complications / Cost (Per Case) Non-Reimbursed

Catheter-Associated Urinary Tract Infections	**$40,347**
Pressure Ulcers	**$40,381**
Serious Preventable Event--Object Left in during Surgery	**$61,962**
Air Embolism	**$66,007**
Blood Incompatibility	**$46,492**
Staphylococcus Aureus Bloodstream Infection/Septicemia	**$82,678**
Ventilator Associated Pneumonia (VAP)	**$88,781**
Clostridium Difficile-Associated Disease (CDAD)	**$52,464**
Methicillin-Resistant Staphylococcus Aureus (MRSA)	**$31,088**

Centers for Medicare & Medicaid Services, 2008

Non-Reimbursed Conditions and PSI's

Falls	Postoperative hip fracture (PSI 8)
Mediastinits	Selected infections due to medical care (PSI 7) Postoperative sepsis (PSI 13)
UTI from improper use of catheters	Selected infections due to medical care (PSI 7) Postoperative sepsis (PSI 13)
Pressure ulcers (Stage III and IV)	Decubitus ulcer (PSI 3)
Vascular infections that result from improper use of catheters	Selected infections due to medical care (PSI 7) Postoperative sepsis (PSI 13)
Objects left in the body during surgery	Foreign body left in during procedure (PSI 5)
Air embolisms	Complications in anesthesia (PSI 1)
Blood incompatibility	Transfusion reaction (PSI 16)

CMS Non-Reimbursed Events

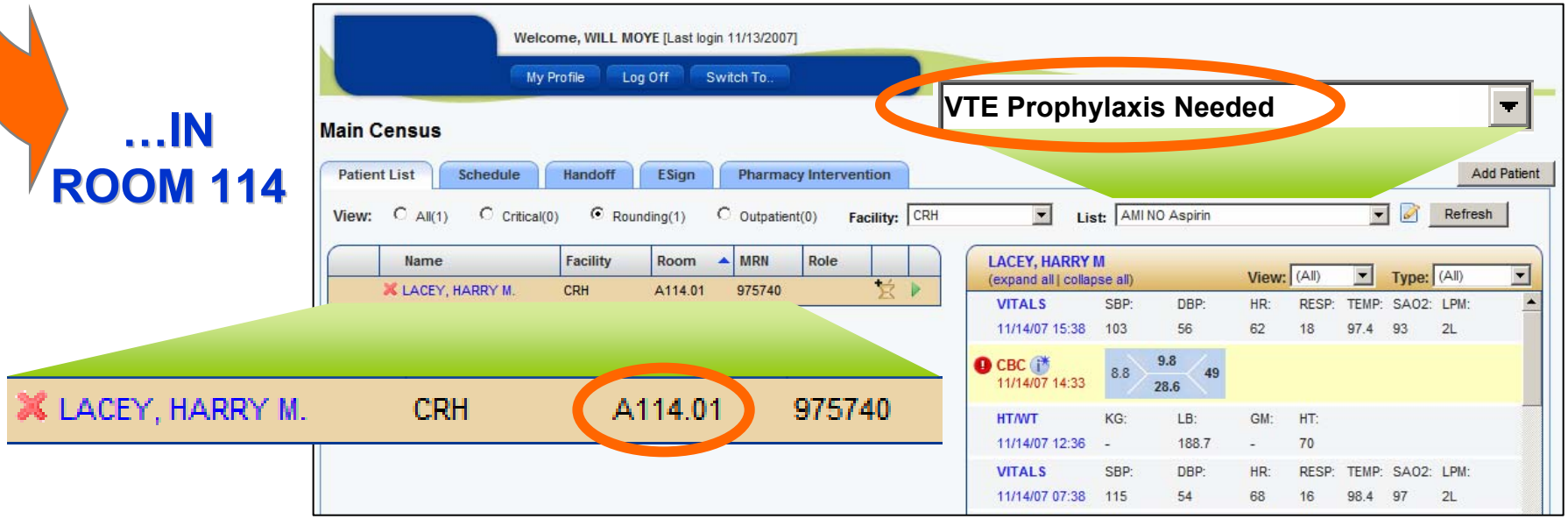
- Healthcare-associated infections
  - Catheter-associated urinary tract infections
  - Vascular catheter-associated blood stream infection
  - Surgical site infection
- Other Hospital-acquired conditions
  - Object left in surgery
  - Air embolism
  - Blood incompatibility
  - Pressure ulcers
  - Falls
  - VTE after hip and knee replacement
  - Poor glycemic control

Right Now, an Opportunity For Improvement Exists…

The data below are based on complications observed for your facility.

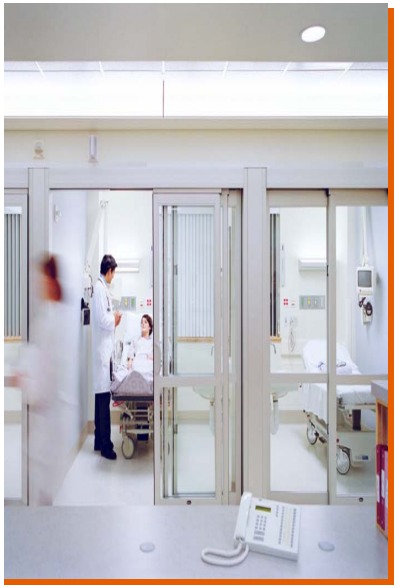
Complication	% total observed comp	Qual comp disch	Obs comp cases	Obs comp rate
Hemorrhage, hematoma or seroma complicating a procedure (BOTH MEDICAL and SURGICAL Risk Groups)	16.43%	18,607	194	0.01
Venous thrombosis (BOTH MEDICAL and SURGICAL Risk Groups)	11.18%	18,369	132	0.01

…IN ROOM 114



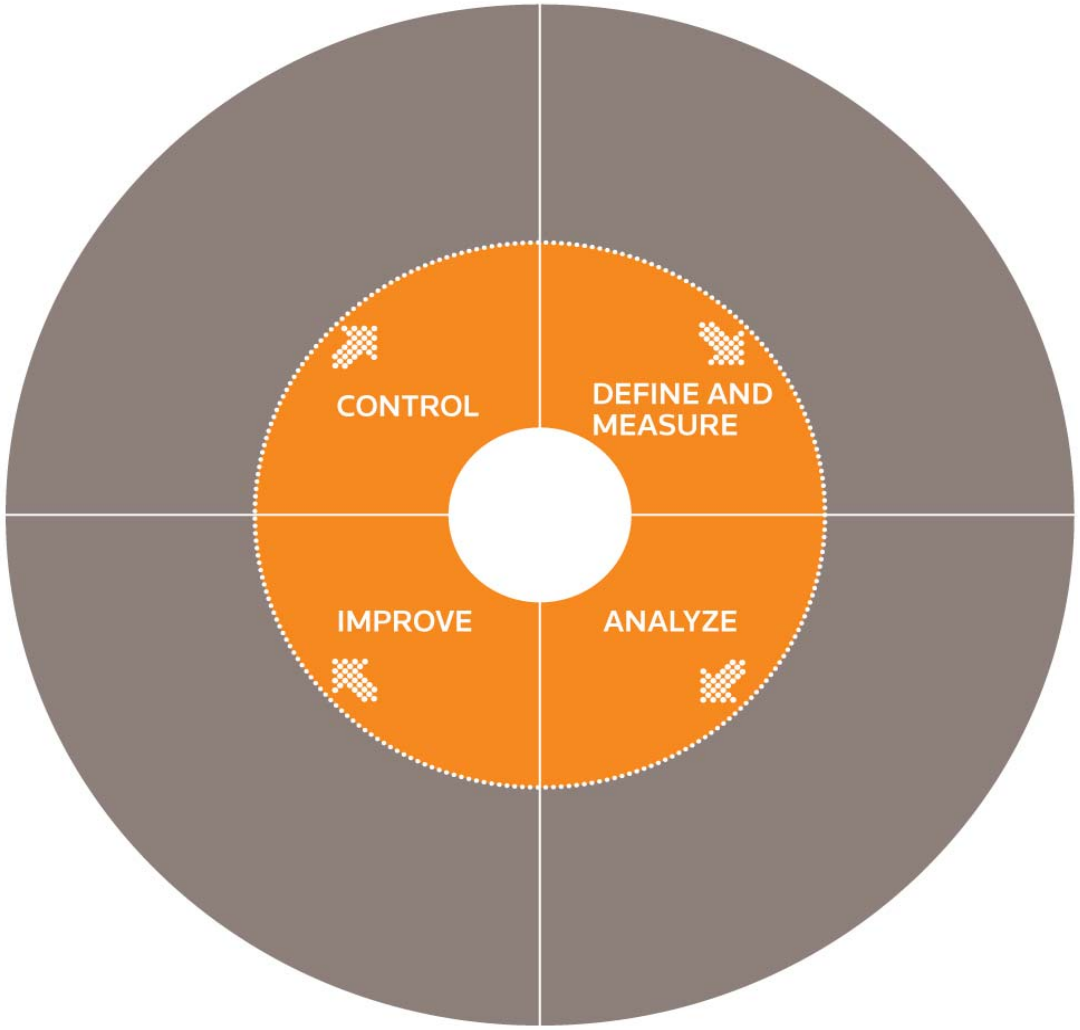
So How Does One Connect the Opportunity……..With Real-Time Surveillance

Indicator	Qualified discharges	Observed	Compare group	Observed/ compare group index	Observed PSI rate(%)	Compare group PSI rate(%)	Stat sig	Opportunity
Decubitus Ulcer - 2.1	6,089	186	93.93	1.98	3.05%	1.54%		92.07
Postoperative Pulmonary Embolism or Deep Vein Thrombosis - 2.1	8,255	66	30.12	2.19	0.80%	0.36%		35.88
Accidental Puncture or Laceration - 2.1	18,531	57	21.35	2.67	0.31%	0.12%		35.65
Failure to Rescue - 2.1	1,201	120	95.81	1.25	9.99%	7.98%		24.19
Postoperative Sepsis - 2.1	1,401	23	2.74	8.40	1.64%	0.20%		20.26



- ✓ Save Lives
- ✓ Improve Patient Safety & Clinical Outcomes
- ✓ Address the National Quality Agenda

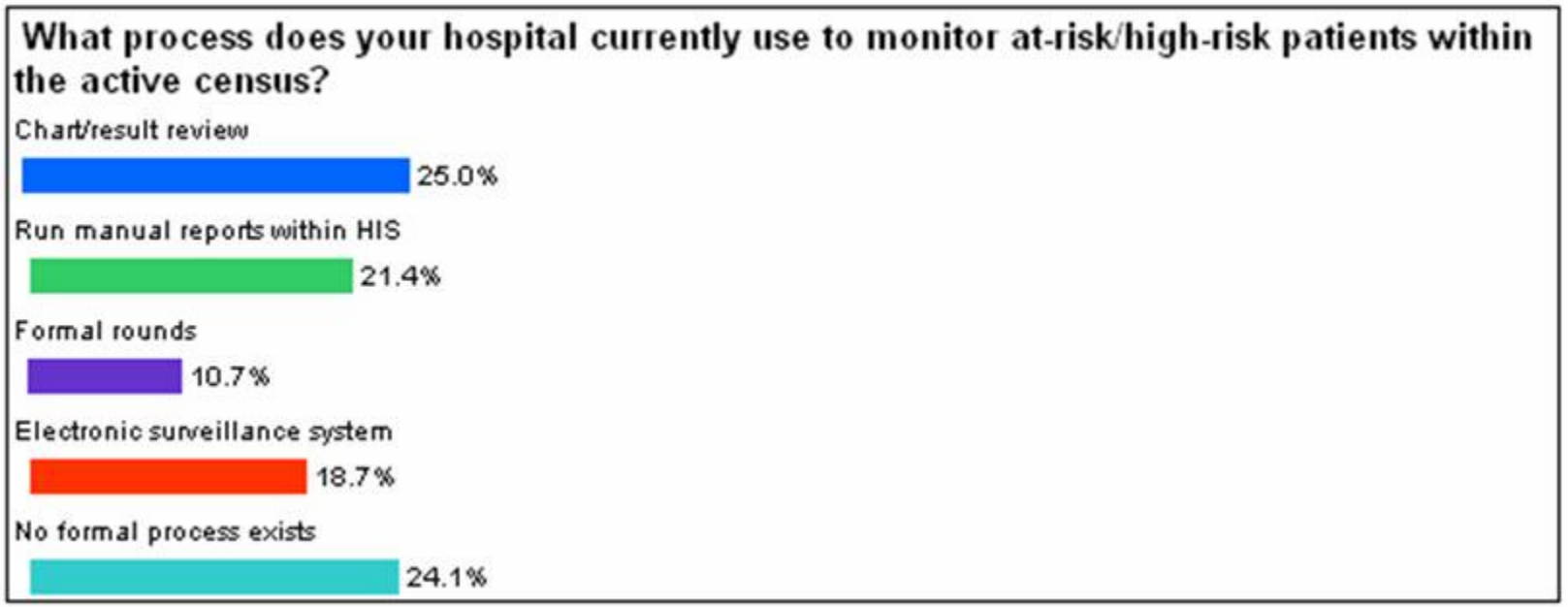
The Continuous Cycle of Performance Improvement



The Goal

True Performance Improvement occurs when…

It All Begins with a Step…

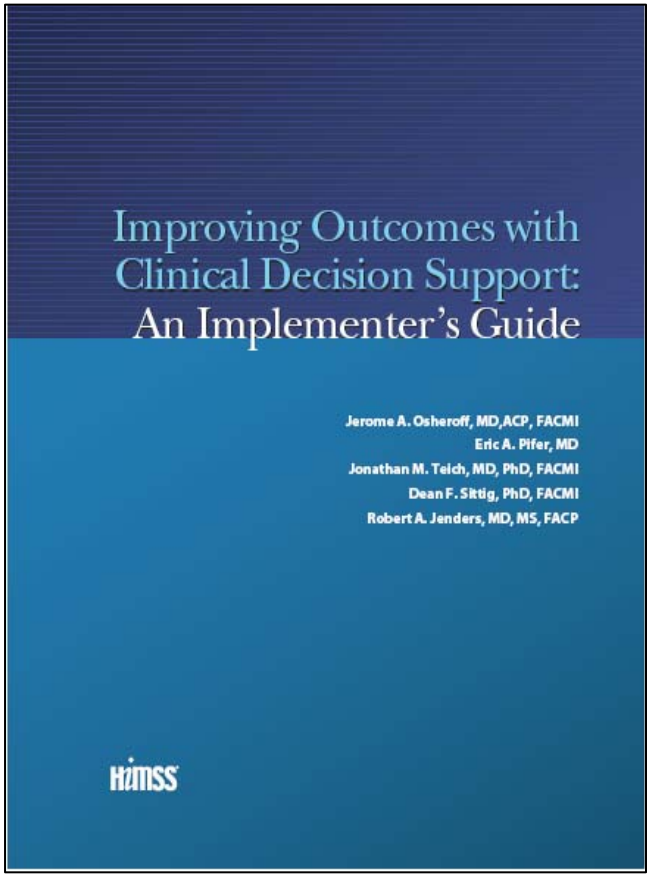


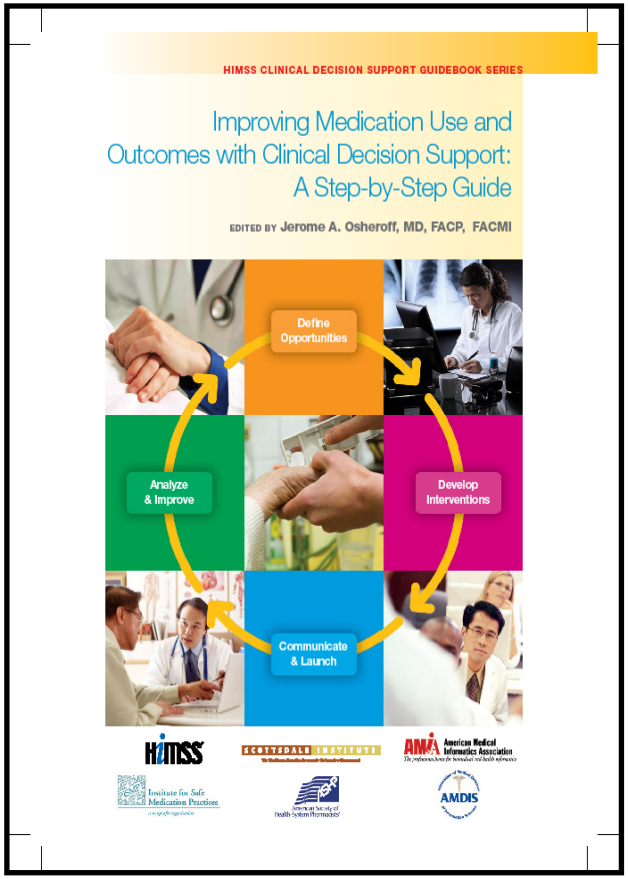
Healthcare IT News; On-Demand Web Seminar: Time and Lives - Using Clinical IT to Identify High-Risk Patients; 9/18/08

Quality Improvement begins by…

- Connecting the dots
- Developing a protocol
  - Leverage evidence-based medicine
  - Construct an identification algorithm
  - Deploy a surveillance system
  - Maintain a tracking mechanism
- Standardize optimal care

How Can Healthcare Organizations Improve the Care Process and Clinical Outcomes with CDS?





For more info, see: www.himss.org/cdsguide

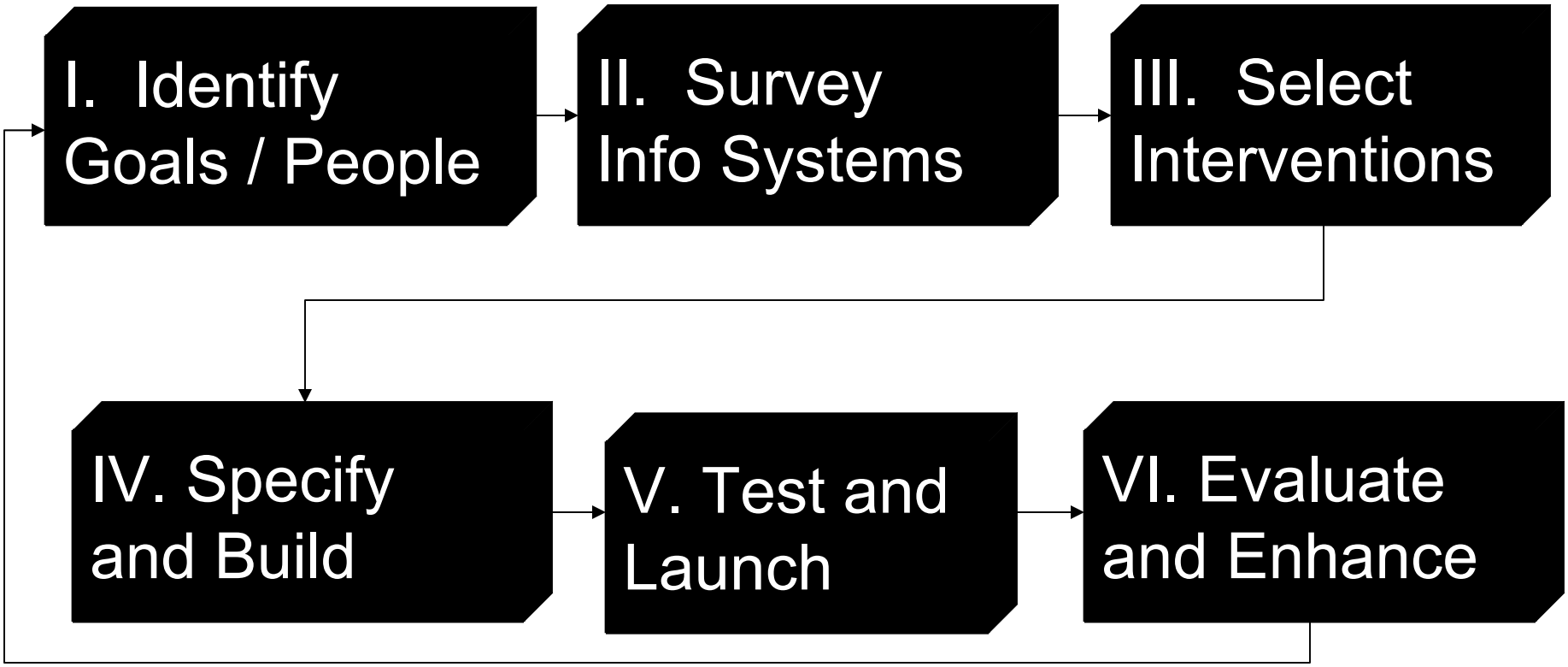
PI and the Five "Rights" of CDS

CDS, ***well developed and deployed***, provides

- the right information (evidence-based, guides action…),
- to the right person (clinicians ***and*** patients…),
- in the right intervention format (alert, order set, answer…),
- through the right channel (CIS, internet, mobile…),
- at the right point in workflow (decision/action…)

to improve health care decisions and outcomes.

How Can We Improve the Care Process/Outcomes with CDS?



I. Identify Goals / People

Goals

- Improving Patient Safety
- Preventing “Never Events”
- Preventing ADEs
- Preventing Hospital Acquired Infections
- Improving Core Measures
- Improving Clinical Outcomes
- Improving Efficiency
- Maximizing Resources

Clinical Surveillance Addresses Risk Management and Quality Improvement Issues

- Risk Management
  - Falls
  - Medication Management
  - Anticoagulation Management/Intervention
  - Antibiotic Protocols/Intervention
- Quality Improvement
  - Early Warning System (Failure-to-Rescue)
  - Quality Initiatives (Core Measures, Performance Improvement)
  - Chronic Disease Management (Diabetes, Heart Failure)
  - Special Populations (Elderly, HIV, Ventilator)
  - Patient Safety Initiatives

Clinical Surveillance Addresses Infection Control and Case Management Opportunities

- Infection Control
  - Identification of Pathogens
  - Optimal Utilization of Resources
  - Global Reporting
  - Infectious Disease/Epidemiology (MRSA, C.Diff, VRE, Pneumonia)
- Case Management
  - Length of Stay
  - 23-hour Observation

Clinical Surveillance Addresses CMS Non-Reimbursed Events

- Healthcare-associated infections
  - Catheter-associated urinary tract infections
  - Vascular catheter-associated blood stream infection
  - Surgical site infection
- Other Hospital-acquired conditions
  - Blood incompatibility
  - Pressure ulcers
  - Falls
  - VTE after hip and knee replacement
  - Poor glycemic control

Who Benefits?

- Quality
- Risk Management
- Nursing
- Pharmacy
- Infection Control
- Care/Case Management
- Physicians
- Respiratory Therapy
- Nutrition Services
- Patients

II. Survey Info Systems

Survey Information Systems (Access to Data and Throughput)

Clinical Applications

- Demographics
- Labs
- Radiology
- Pathology
- Other Transcribed Reports
- Vitas; I/Os
- Medications (Orders / MAR)
- More…..

Aggregate

Database
EMR
CDR

Filter

- Clinical Logic
- Patient Data

Analyze

Distribute

Document Interventions

Point-of-Care

Paper Reports

Smartphone / PDA

PC / Laptop / Tablet PC

III. Select Interventions

Leverage EBM to Define Surveillance Measures

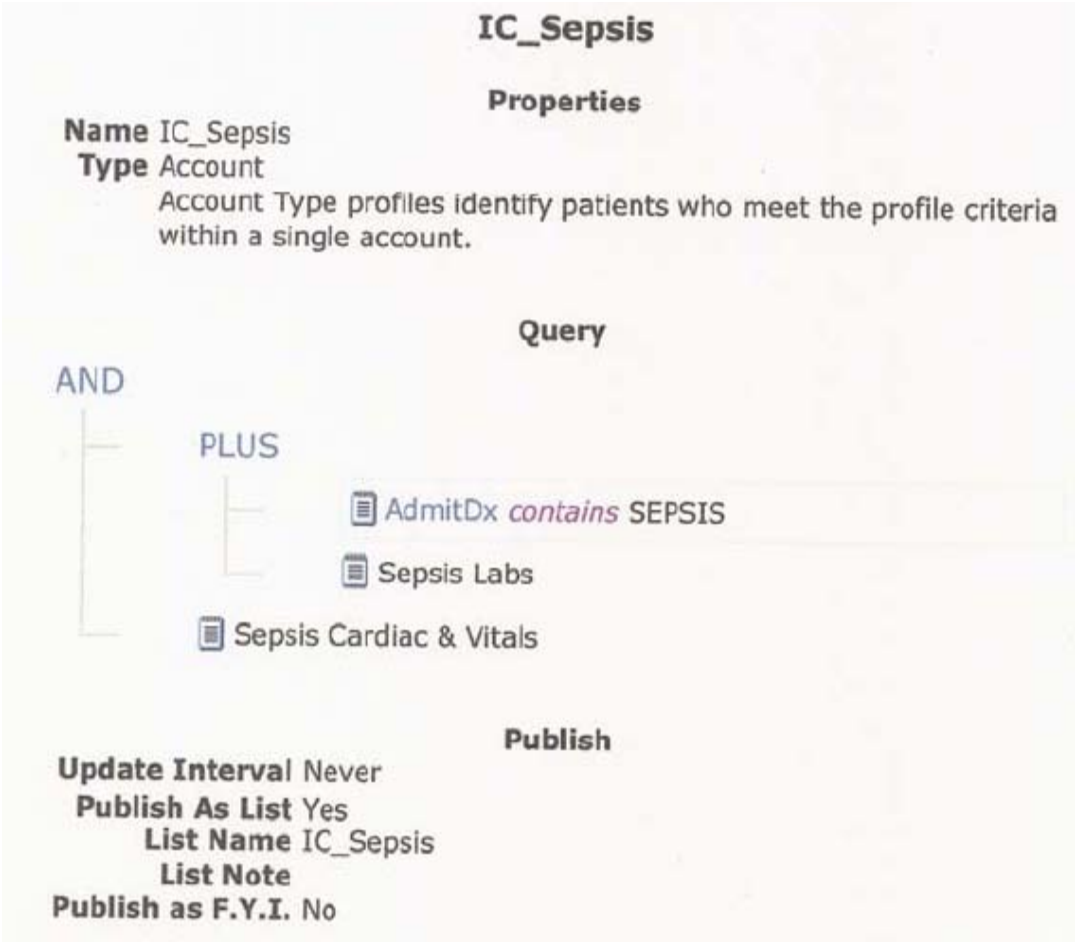
- **Sepsis:** (The documented or suspected infection or invasion of sterile tissue and two of more of the following clinical markers):
  - Fever > 100.4 or < 96.8
  - Heart rate > 90 beats per minute
  - Respiratory rate > 20 breaths per minute or PaCO2 < 32
  - Altered mental status
  - WBC > 12,000/mm or < 4,000/mm or a differential count > 10% immature neutrophils
  - Blood glucose >120mg/dL (in absence of diabetes)

- **Severe Sepsis:** (Sepsis + one organ dysfunction, hypoperfusion or hypotension):
  - PaO2/FIO2 ratio < 300
  - Urine output < 0.5 ml/kg/hr despite adequate fluid resuscitation for 2 hours
  - Creatinine increase > 0.5 mg/dL
  - INR > 1.5 or aPTT > 60 seconds
  - Platelet counts < 100,000
  - Plasma total bilirubin > 4 mg/dL
  - Serum lactate level $\geq$ 4 mmol/L
  - MAP < 65 mg despite adequate fluid resuscitation for 2 hours
  - SvO2 $\leq$ 70%
  - Cardiac index < 3.0
  - Lactate >2mMol/L

IV. Specify and Build

Develop a Surveillance Protocol…

Develop a Surveillance Protocol



III. Select Interventions

Early Warning Surveillance and EBM

- Early Warning Scoring System (EWS)
  - UK, 2002
  - Proved reduction in incidence of and reduced mortality from cardiac arrest*
  - 39% of all patients admitted to adult critical care were admitted “late” in their clinical course*
  - Based on methodology in combination with clinical observations to predict risk for deterioration
  - Assigns points for each:
    - LOC, Temperature, Systolic BP, Heart Rate, Respiratory rate, and urine output
  - Determines risk based on total score

*Sharpley J, Holden J. Introducing and early warning system. Nursing in Critical Care. May 2004.

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Early Warning System Parameters

- Not restricted by diagnosis
- Criteria for evaluation:
  - Two abnormalities must be present to be included on the list:
    - ✓ WBC
    - ✓ Hematocrit
    - ✓ Sodium
    - ✓ Platelets
    - ✓ Potassium
    - ✓ INR
    - ✓ Oxygen >50% (administered)
    - ✓ SaO2 <88%
    - ✓ Respiratory Rate
    - ✓ Heart Rate
    - ✓ MAP

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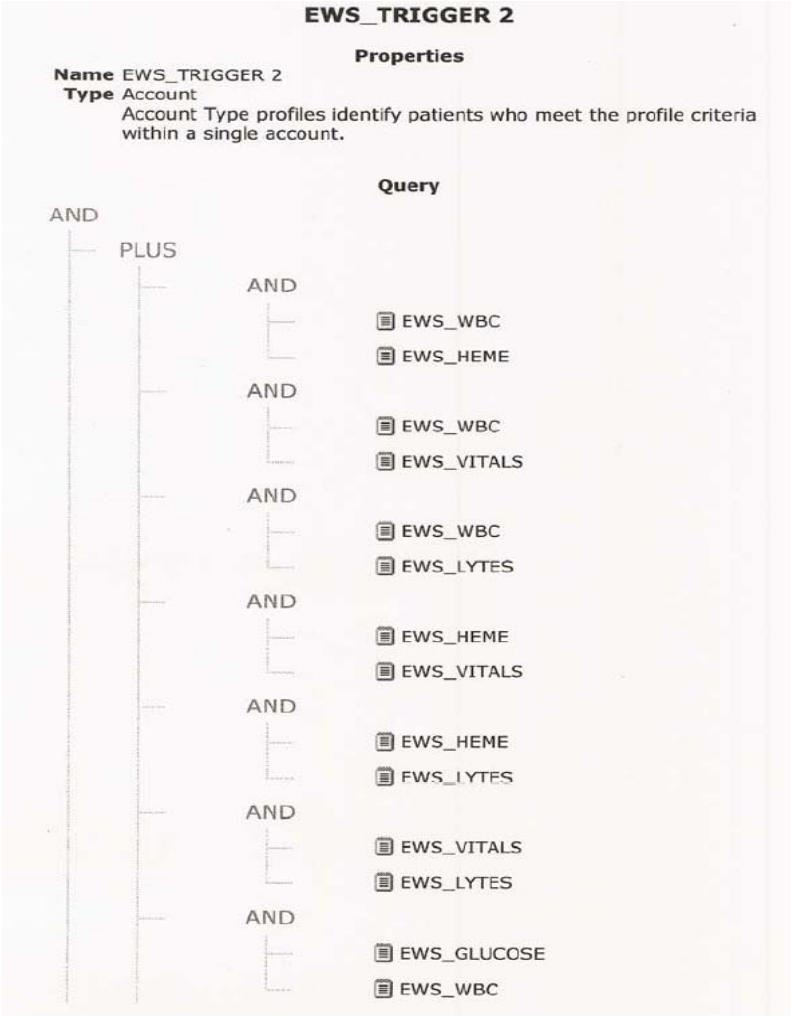
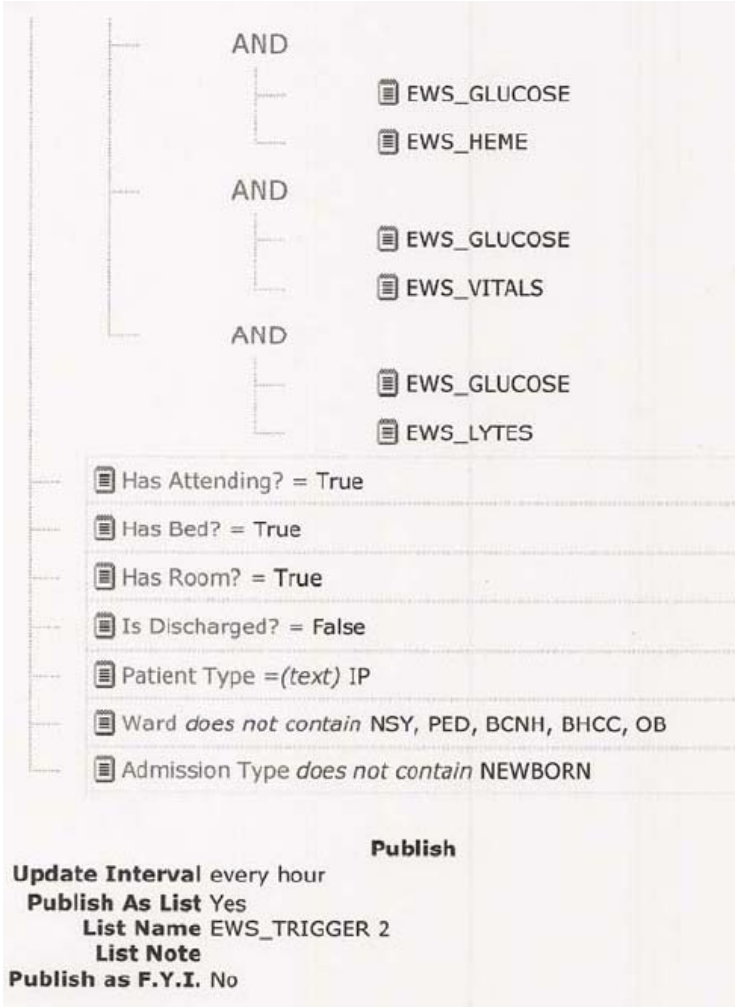
IV. Specify and Build

Develop a Surveillance Protocol…

Early Warning System (EWS) Trigger – "Failure-to-Rescue"





Additional Surveillance Examples (DVT, Decubitus Ulcer, AMI Core Measures, IV to PO Antibiotics)

HIMSS Central & Southern Ohio Chapter — transforming healthcare through IT

DVT PREVENTIVE SURVEILLANCE

Properties

Name DVT PREVENTIVE SURVEILLANCE
Type Patient
Patient Type profiles identify patients who meet the profile criteria regardless of which account they occur in.

Query

MINUS
- AND
  - PLUS
    - Age > 60
    - Ward =(text) ICU
  - Has Attending? = True
  - Has Bed? = True
  - Has Room? = True
  - Is Discharged? = False
  - Patient Type =(text) IP
  - Ward *does not contain* NSY, PED, BCNH, BHCC, OB
  - Admission Type *does not contain* NEWBORN
- Name Summary *contains* WARFARIN, COUMADIN, FRAGMIN, DALTEPARIN, HEPARIN, LOVENOX, ENOXAPARIN
  AND restrict to *Active Meds*

Publish

Update Interval every hour
Publish As List Yes
List Name DVT PREVENTIVE SURVEILLANCE
List Note
Publish as F.Y.I. No

AMI No Aspirin and Beta Blocker

Properties

Name AMI No Aspirin and Beta Blocker
Type Account
Account Type profiles identify patients who meet the profile criteria within a single account.

Query

MINUS
- PLUS
  - AdmitDx *contains* AMI, MI, MYOCARDIAL INFARCTION, HEART ATTACK
  - Result Key =(text) CK-MB
    AND Result > 8.8
  - Result Key =(text) TROPONIN-I
    AND Result > 0.4
- AND
  - Name Summary =(text) ASPIRIN, ASPIRIN EC
    AND restrict to *Active Meds*
  - Name Summary =(text) ATENOLOL, METOPROLOL, LEVATOL, BISOPROLOL, ACEBUTOLOL, BETAXOLOL, APENDOLOL, INDERAL, LOPRESSOR, VISKEN, TENORMIN, BLOCADREN, LOPRESSOR, TENORMIN, LABETOLOL, TOPROL XL, ZEBETA, CORGARD, BREVIBLOC
    AND restrict to *Active Meds*

Publish

Update Interval every 30 minutes
Publish As List Yes
List Name AMI No Aspirin and Beta Blocker
List Note
Publish as F.Y.I. No

DU PREVENTIVE SURVEILLANCE

Properties

Name DU PREVENTIVE SURVEILLANCE
Type Patient
Patient Type profiles identify patients who meet the profile criteria regardless of which account they occur in.

Query

AND
- PLUS
  - Age > 65
  - AdmitDx *contains* DIABETES MELLITUS, DM, HUMAN IMMUNODEFICIENCY SYNDROME, HIV
  - AdmitDx *contains* HIP FRACTURE, TRAUMA
  - Result Key =(text) Norton Scale
    AND Result < 14
    AND Days since test performed < 1
- Hospital Days > 4
- Has Attending? = True
- Has Bed? = True
- Has Room? = True
- Is Discharged? = False
- Patient Type =(text) IP

IV to PO ABX Surveillance

Properties

Name IV to PO ABX Surveillance
Type Account
Account Type profiles identify patients who meet the profile criteria within a single account.

Query

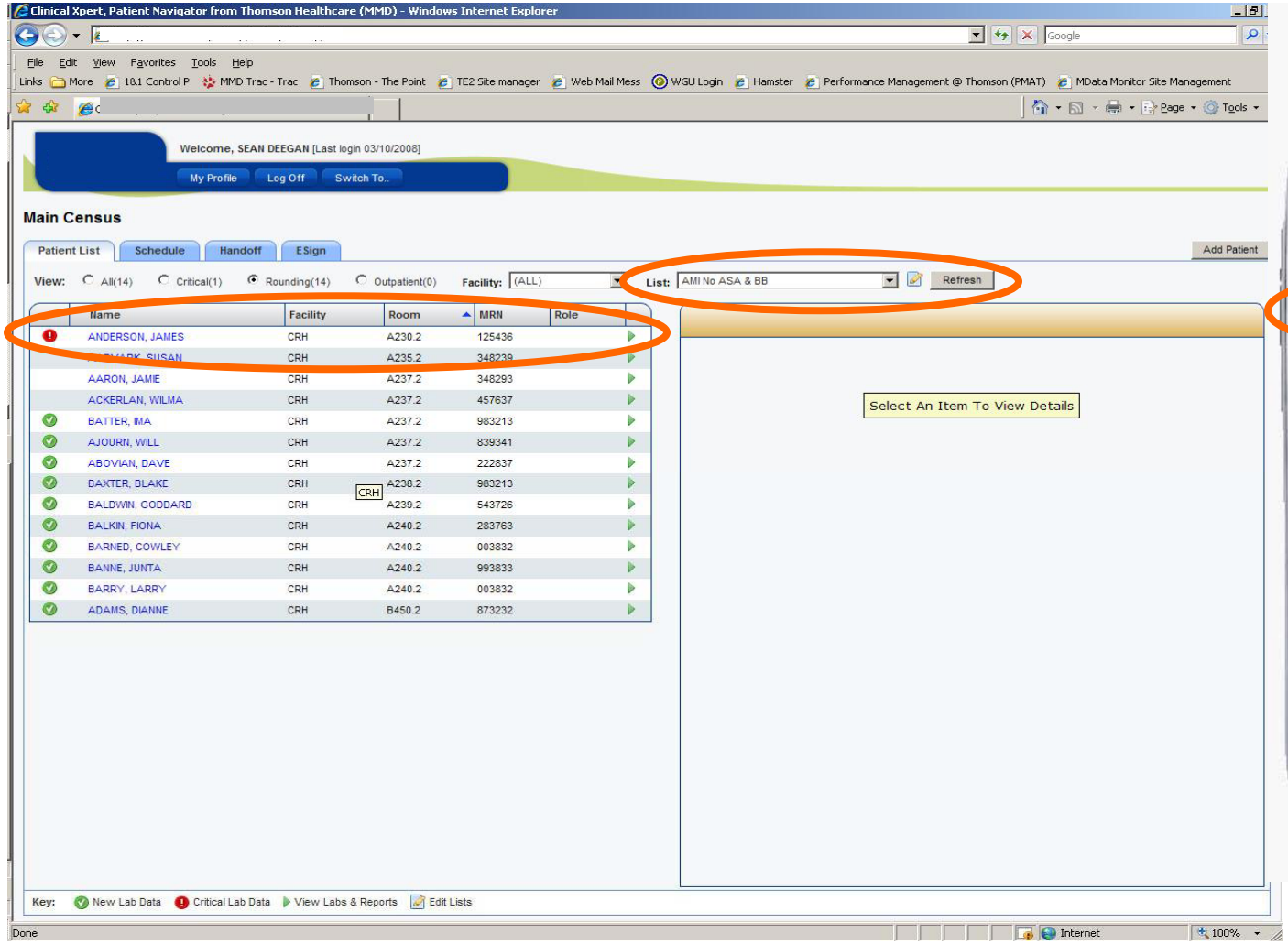
Medication Key =(text) Vancomycin, Vancocin, Cipro, Ciprofloxacin, Levaquin, Levofloxacin, Avelox, Moxifloxacin, Metronidazole, Flagyl
AND for > 2 days

Publish

Update Interval every 30 minutes
Publish As List Yes
List Name IV to PO ABX Surveillance
List Note
Publish as F.Y.I. No

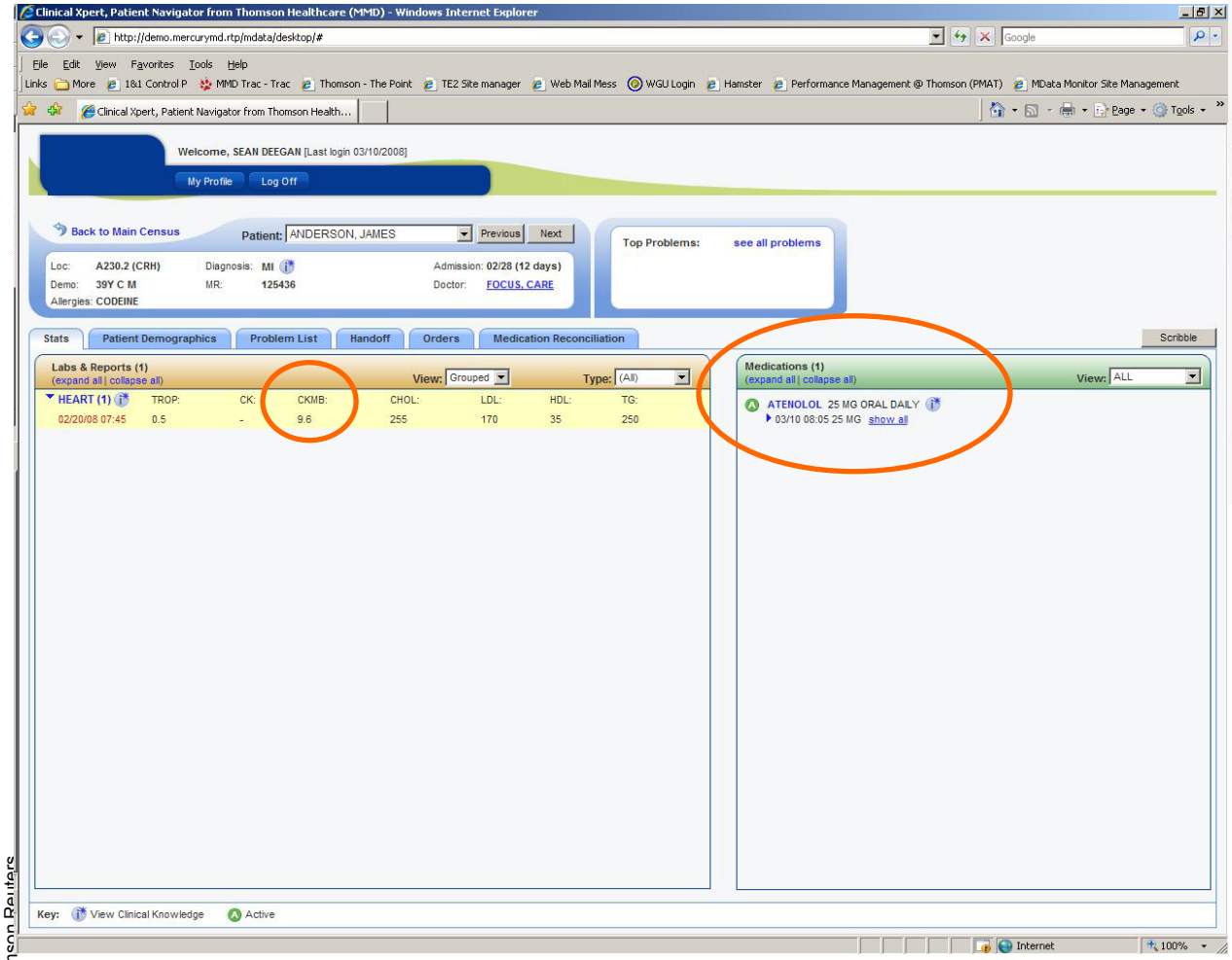
V. Test and Launch

Patient Identification



DESKTOP

Patient Detail Across Platforms

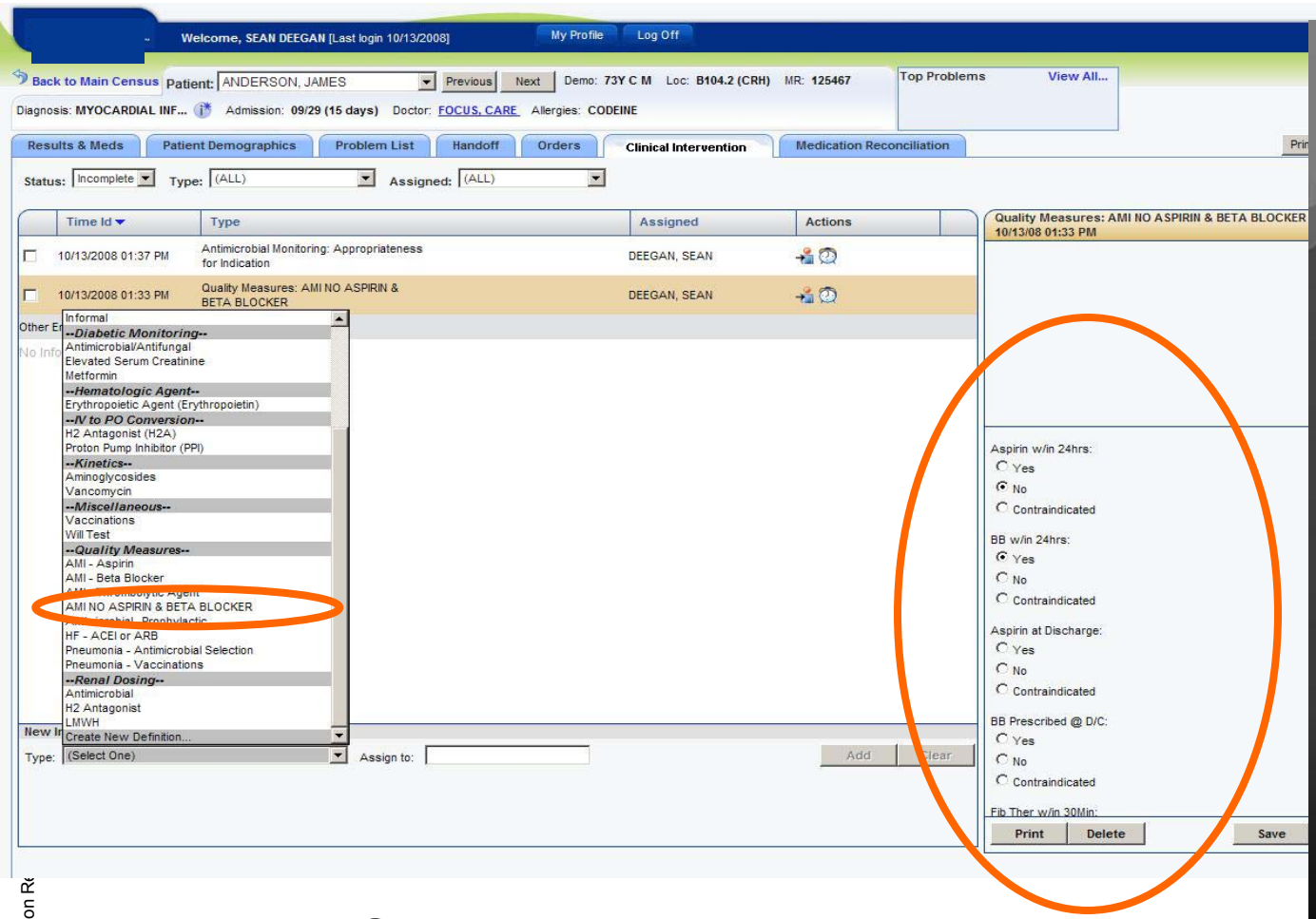


DESKTOP

MOBILE

VI. Evaluate and Enhance

Facilitate Analysis, Tracking, and Reporting of Interventions



Measure Outcomes…

Quality Improvement Through Clinical Surveillance

- Identify Opportunities
- Assess Access to Data for Profiling High-Risk Patient Populations
- Develop Protocols by Leveraging EBM
- Address the Five “Rights” of CDS
  - Deliver the Right Information, to the Right Person, in the Right Intervention Format, Through the Right Channel, at the Right Point in Workflow (preferably real-time)
- Provide “Preventive” Care
- Deliver the Highest Quality Care and Reduce Costs

The Proven Value and Power of Clinical Surveillance

- Decreased time spent searching through charts
- Eliminated piecing together reports from multiple HIS systems
- Increased time spent on patient care
- Improved workflow efficiency and use of resources
- Improved clinical outcomes
- Decreased mortality, complications, LOS, “never events” and costs
- Improved Core Measures compliance
- Improved patient safety

QUESTIONS

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