AHRQ/HRET Web Conference for the Florida Hospital Association

Quality Indicators and Their Use in Improving Quality of Care and Patient Safety

October 21, 2010

Web Conference Presenters

- **Patrick S. Romano, MD, MPH:** Professor of Medicine and Pediatrics, UC Davis Division of General Medicine
- David Schulke, Vice President for Research Programs, Health Research and Educational Trust (HRET)
- **Kim Streit,** Vice President, Healthcare Research and Information, Florida Hospital Association (moderator)

Audio Conference Overview

- Dr. Patrick Romano will discuss a variety of the PSIs and how they can be used to improve quality at the hospital level
- Kim Streit and David Schulke will conclude with next steps regarding the QIs and will open the Q&A session

How the AHRQ Patient Safety Indicators are Used to Drive Quality Improvement at the Hospital Level

Patrick S. Romano, MD MPH
UC Davis Center for Healthcare Policy and Research

AHRQ Quality Indicators

AHRQ Patient Safety Indicators

- Reflect quality of care inside hospitals, focusing on potentially avoidable complications and related iatrogenic events.
  - Can be used to help hospitals identify potential adverse events that might need further study
  - Include 19 indicators for complications occurring in-hospital that may represent safety-related events
  - 6 indicators also have area level analogs designed to detect patient safety events on a regional level
  - 10 were endorsed by National Quality Forum
  - 4 were adopted by CMS for RHQDAPU (plus composite that includes 5 others)

NQF Endorsement of PSIs

PSI	Label	PSI	Label
PSI 2	Death in Low Mortality DRGs	PSI 12	Postoperative Pulmonary Embolism or Deep Vein Thrombosis
PSI 4	**Death among Surgical Inpatients with Treatable Serious Complications**	**PSI 14**	**Postoperative Wound Dehiscence**
PSI 5	Foreign Body Left in during Procedure	**PSI 15**	**Accidental Puncture or Laceration**
PSI 6	**Postoperative Respiratory Failure**	PSI 16	Transfusion Reaction
PSI 11	Iatrogenic Pneumothorax	PSI 17	Birth Trauma – Injury to Neonate

NQF-endorsed composite also includes PSI 3 (Pressure Ulcer), PSI 7 (Central Venous Catheter-Related Bloodstream Infection), PSI 8 (Postoperative Hip Fracture), PSI 12 (see above), and PSI 13 (Postoperative Sepsis).

CMS Preview Report

AHRQ Patient Safety and Inpatient Quality Measures Adopted for RHQDAPU

February 2010

HEARTCARE REGIONAL MEDICAL CENTER
Provider ID: 840002
State

Table 3: Your Hospital's Performance on Individual Measures
HEARTCARE REGIONAL MEDICAL CENTER

Patient Safety Indicators (Rate per 1,000)	x Indicates Measure Will Be Posted on CMS Website	Measure's Weight in Composite[a]	Number of Outcomes (Numerator)[b]	Number of Eligible Discharges (Denominator)[*,c]	Observed Rate per 1,000 Eligible Discharges[d]	Expected Rate per 1,000 Eligible Discharges[e]	Risk-Adjusted Rate[f]	Risk-Adjusted Rate's 95% Confidence Interval[g]	CMS National Rate[*,h]	Smoothed Rate[*,i]	Smoothed Rate's 95% Confidence Interval[*,g]	State Smoothed Rate[j]
Individual Measures That Make Up PSI Composite – Complication/Patient Safety for Selected Indicators												
PSI 03 – Decubitus Ulcer		0.2811	26	980	26.53	35.76	17.26	(9.87, 24.65)	27.46	17.88	(10.73, 25.04)	25.10
PSI 06 – Iatrogenic Pneumothorax	x	0.0440	1	2,643	0.38	0.47	0.46	(0.00, 1.48)	0.67	0.61	(0.08, 1.14)	0.64
PSI 07 – Selected Infections Due to Medical Care		0.1370	2	2,063	0.97	1.94	1.07	(0.00, 3.15)	1.65	1.20	(-0.61, 3.02)	1.39
PSI 08 – Postoperative Hip Fracture		0.0024	0	211	0.00	0.47	0.00	(0.00, 1.72)	0.29	0.20	(-0.76, 1.16)	0.33
PSI 12 – Postoperative Pulmonary Embolism or Deep Vein Thrombosis		0.1604	2	353	5.67	12.47	4.44	(0.00, 13.48)	11.11	7.83	(1.50, 14.17)	10.15
PSI 13 – Postoperative Sepsis		0.0266	1	76	13.16	7.43	19.38	(0.00, 47.64)	16.19	17.33	(0.47, 34.19)	14.78
PSI 14 – Postoperative Wound Dehiscence	x	0.0130	0	43	0	3.00	0.00	(0.00, 11.10)	2.15	2.09	(0.33, 3.86)	2.06
PSI 15 – Accidental Puncture or Laceration	x	0.3356	4	2,685	1.49	0.95	5.67	(1.26, 10.08)	4.33	4.85	(2.11, 7.59)	4.24
Individual Measure Reported Separately – Not Part of PSI Composite												
PSI 04 – Death Among Surgical Inpatients with Serious Treatable Complications	x	N/A	5	28	178.57	137.80	168.66	(52.09, 285.23)	133.61	139.07	(93.05, 185.10)	141.72

FloridaHealthFinder.gov

Complication/Infection Rates
Age Group: Age 18 years and older
Time Period: January 2009 through December 2009

Directions:
View the results below or if you would like to change the "sort-by-column" use the drop-down box, then click "View Results". To learn more about the data, click the column heading. To learn more about the facility, click the facility name. For the Health Encyclopedia References for Complication/Infection Rates **click here**.

- Sort by Column -

(•) Ascending (A-Z, 0-9) ( ) Descending (Z-A, 9-0)

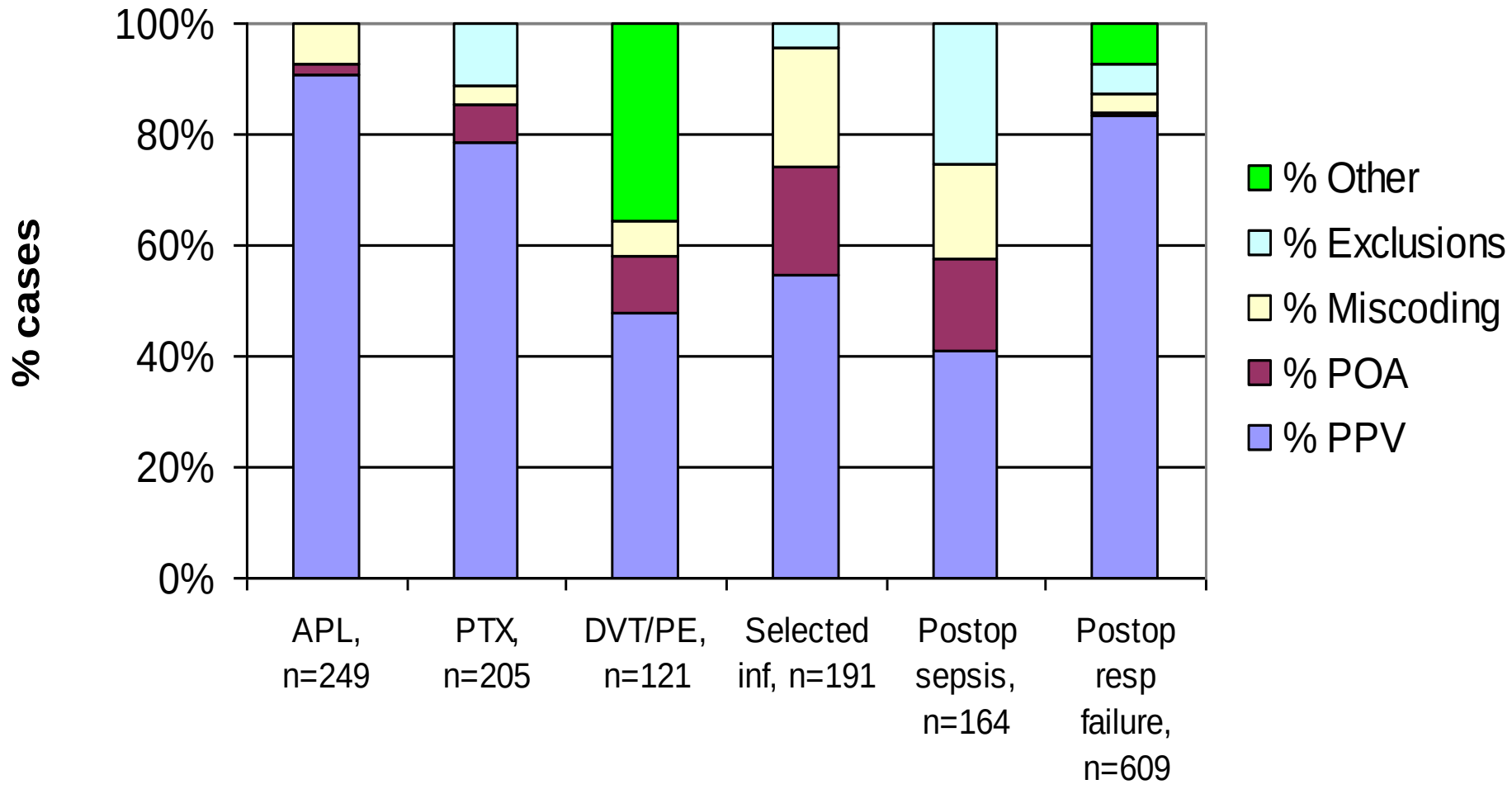
View Results

Facility / City	Decubitus Ulcer	Iatrogenic Pneumothorax	Infections Due to Medical Care	Postoperative Hip Fracture	Postoperative Pulmonary Embolism or Deep Vein Thrombosis	Postoperative Sepsis
BETHESDA MEMORIAL HOSPITAL 100002 Boynton Beach	Lower than Expected	As Expected	As Expected	As Expected	Lower than Expected	As Expected
BOCA RATON COMMUNITY HOSPITAL 100168 Boca Raton	Lower than Expected	As Expected	As Expected	As Expected	Lower than Expected	As Expected
COLUMBIA HOSPITAL 100234 West Palm Beach	As Expected	Lower than Expected	As Expected	As Expected	As Expected	As Expected
DELRAY MEDICAL CENTER 100258 Delray Beach	Lower than Expected	Lower than Expected	As Expected	As Expected	As Expected	As Expected
GOOD SAMARITAN MEDICAL CENTER 110403 West Palm Beach	Higher than Expected	As Expected	As Expected	As Expected	As Expected	As Expected
JFK MEDICAL CENTER 100080 Atlantis	As Expected	As Expected	Higher than Expected	As Expected	Higher than Expected	As Expected

PSI Validation Methods

- Gather evidence on the criterion validity of the PSIs based on medical record review as “gold standard”
- Improve guidance about how to interpret & use the indicators, especially for quality improvement
- Retrospective cross-sectional study design
- Volunteer sample of 47 partners (78% nonprofit, nonreligious) plus parallel study of 28 VA hospitals by Rosen et al.
- Sampling based on administrative data using AHRQ QI software to generate desired sample size locally (30 per hospital) and nationally (240 per PSI) from 2006-7
- Coordinated with UHC on Clinical Benchmarking Projects (involving volunteer AMCs) for Postoperative DVT/PE, Postoperative Respiratory Failure, and Pressure Ulcer.

Summary of PPV estimates from community hospitals



Other evidence regarding PSI criterion validity

- Catheter-associated BSI
  - National Healthcare Safety Network 24 hospitals: sensitivity=9%
- Postoperative DVT/PE
  - Single US teaching hospital: PPV=50%, sensitivity=87%
- Postoperative respiratory failure
  - UHC 18 hospitals: PPV=93%
  - Veterans Affairs 28 hospitals: PPV=80%
- Pressure ulcer
  - UHC 32 hospitals: PPV=60% (after excluding POA) but NPV=85% in high-risk cases not reported as having PU
  - Veterans Affairs 28 hospitals: PPV=29% (not excluding POA)
- Postoperative wound dehiscence
  - Veterans Affairs 28 hospitals: PPV=88%

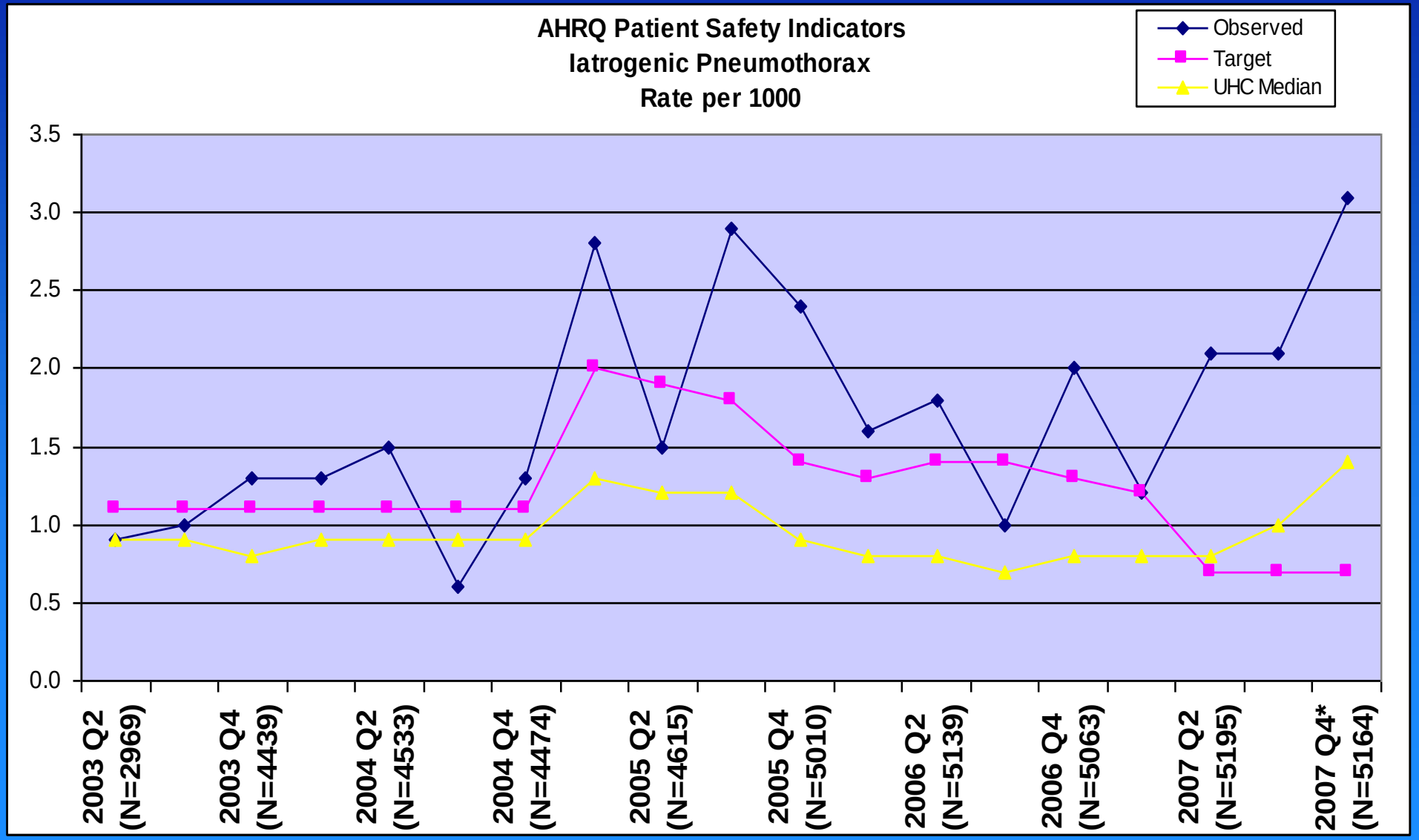
Moore Demonstration Project (MDP)

- Goal 1: To develop a collaboration with 3 northern CA hospitals to collaboratively review cases flagged by PSIs
- Goal 2: To provide information useful for improving coding and quality of care in the future
- Retrospective cross-sectional design
- Consecutive sampling using AHRQ QI software to identify up to 100 cases of ≥4 PSIs at each hospital (10/07-2/09)
- "Present on admission" (POA) logic was used in V3.2, March 2008 software to reduce false positives
- Each hospital identified RN or MD abstractors, who were trained to use "root cause" PSI tools and guidelines
- UC Davis entered data, identified discrepancies, and performed descriptive analysis of opportunities for QI

PSI 6: Iatrogenic pneumothorax MDP opportunities for improvement

- Watch for inadequate documentation, such as “rule out” pneumothorax without alternative diagnosis established after study (CXR or CT)
- Increase use of “bedside” ultrasound guidance during placement of central venous catheters, especially in the OR, ICU, and ED (proven to reduce iatrogenic injury during IJ placement)

Case study: Iatrogenic pneumothorax

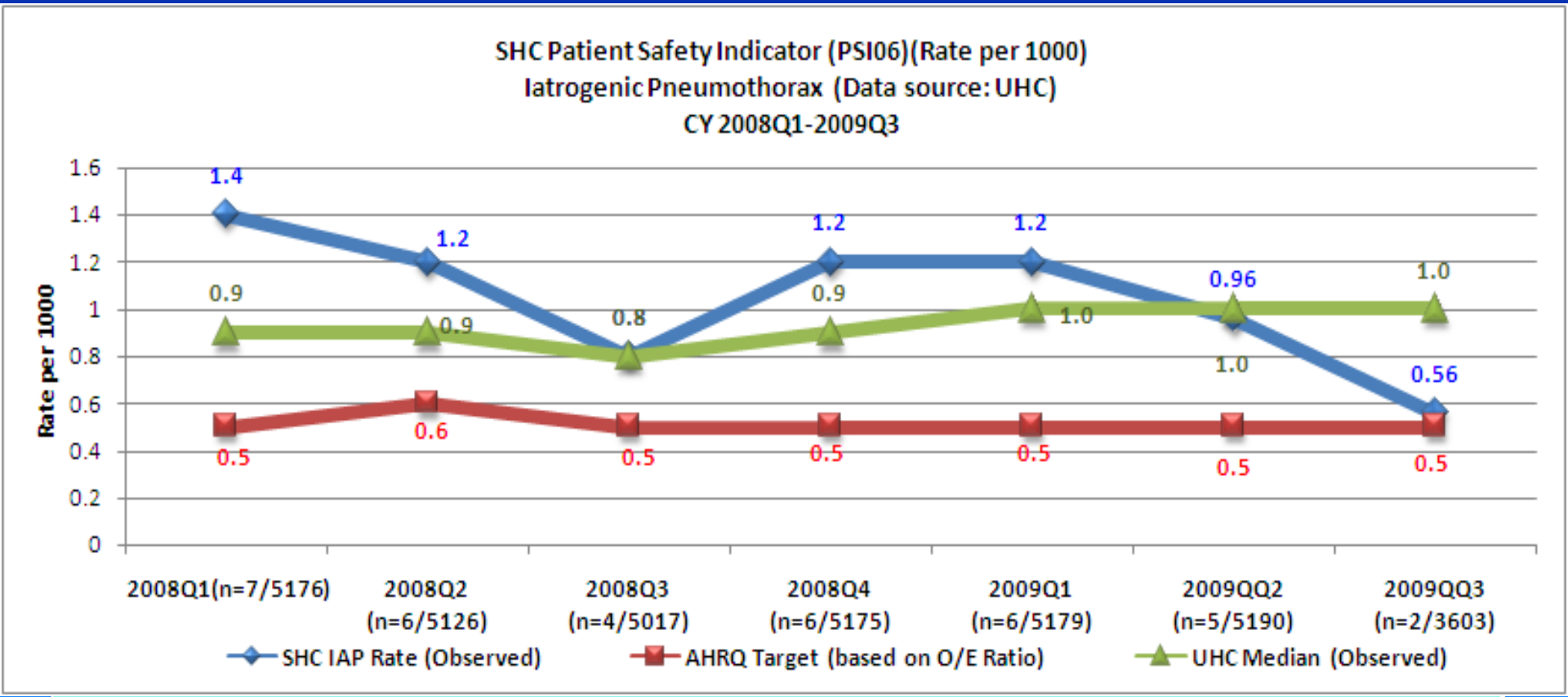


Action Plan for Iatrogenic Pneumothorax

GOAL: Reduce the rate of iatrogenic pneumothorax (IAP) from central venous catheterization (CVC) by 50% by 6 months.

Action	Agent	Timeline
Promote ultrasound-guided internal jugular (IJ) catheterization as the method of choice for CVC Limit use of subclavian approach (with faculty supervision) to: • access to the neck is limited (e.g., trauma/code resuscitations) • patients with suspected neck injuries • lack of other available sites Ensure availability of ultrasound equipment	• L. Shieh to revise CVC Website Curriculum & Simulation Program to further promote IJ approach • Drs. Maggio, Williams, Mihm & Lee to educate ED, OR & General Surgery. Drs. Mihm, Riskin and Daniels to educate ICU. Dr. Shieh to educate B2 & D1. • I. Tokareva to develop & distribute educational materials to reinforce	Start Jan 22 & ongoing
Require all medical & surgical interns to complete CVC Website Curriculum & Simulation Program during orientation ("Bootcamp" for surgical interns)	• Drs. Shieh, Maggio, Williams, Mihm & Lee • Monitor quarterly IAP rates for impact	June 30

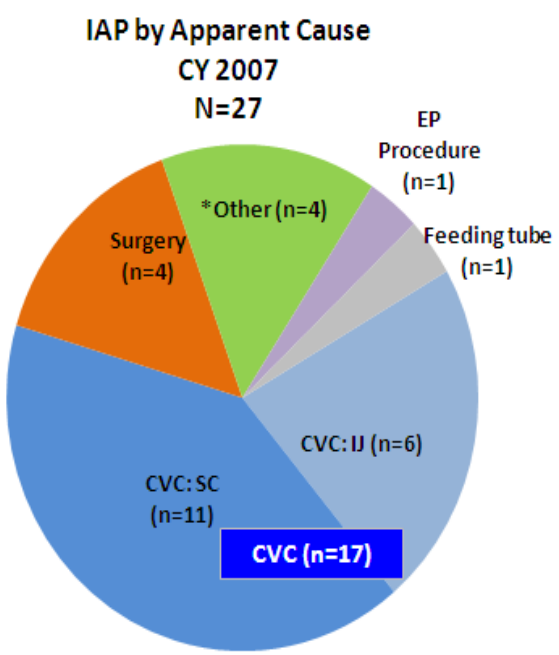
Iatrogenic Pneumothorax (IAP) Data

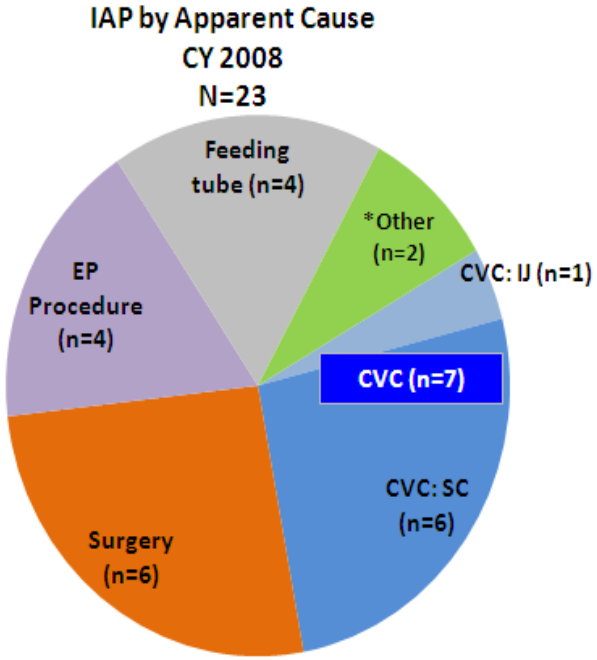


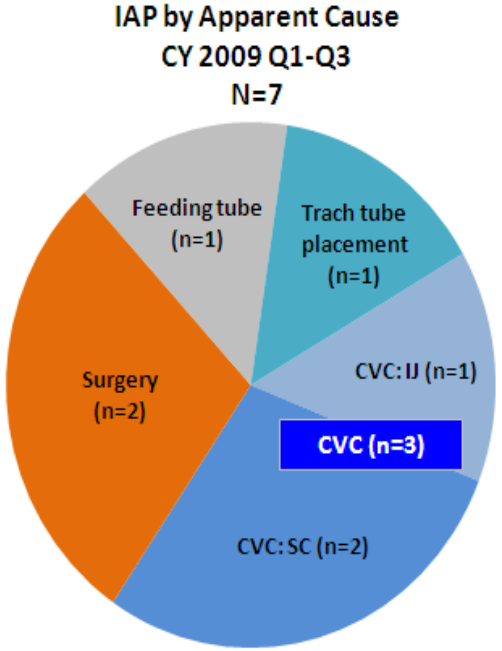
Findings

- Overall SHC IAP rate per 1000 discharges is trending down
- The best performance occurred in 2009Q3 with SHC IAP rate of 0.56 per 1000 inpatient discharges, but this remains slightly above target. Please note that if 2 cases in 2009Q3 are recoded and removed, SHC IAP rate would be at zero.

Iatrogenic Pneumothorax (IAP) Data







Findings

- Overall IAP CY 2007-2009 rate is trending down
- 70% of CVC cases were due to SC (19/27)

* Other – infrequent causes of IAP (occurred 1 time per service per cause)

From one AMC to the nation

- About 14 pneumothoraxes were prevented at one AMC in CY 2009
- Extrapolating from RCT findings and 2004 HCUP data, at least 1725 of the 14729 reported pneumothoraxes among hospitalized adults in nonfederal hospitals and at least 431 of 3682 additional outpatient-acquired, hospital-treated pneumothoraxes could have been prevented through universal use of ultrasound during IJ cannulation (given no change in insertion site distribution).
- Each pneumothorax adds (on average) 4.4 inpatient days and $17,312 in hospital charges (3.9 days in VA, >5 days in Medicare)
- Sadeghi B, et al. Cases of iatrogenic pneumothorax can be identified from ICD-9-CM coded data. Am J Med Qual 2010; 25(3);211-7.
- Zhan C, Miller M. Excess length of stay, charges, and mortality attributable to medical injuries during hospitalization. JAMA 2003; 290(14):1868-74.

PSI 7: CVC-related bloodstream infection MDP opportunities for improvement

- Identify tunneled catheters that are infected at admission and code as POA
- Minimize use of femoral venous catheters, which are associated with higher rates of infection
- Remove catheters at earliest opportunity consistent with patient safety

Case study: CVC-related bloodstream infection

ORIGINAL INVESTIGATION

Use of Simulation-Based Education to Reduce Catheter-Related Bloodstream Infections

Jeffrey H. Barsuk, MD; Elaine R. Cohen, BA; Joe Feinglass, PhD; William C. McGaghie, PhD; Diane B. Wayne, MD

Background: Simulation-based education improves procedural competence in central venous catheter (CVC) insertion. The effect of simulation-based education in CVC insertion on the incidence of catheter-related bloodstream infection (CRBSI) is unknown. The aim of this study was to determine if simulation-based training in CVC insertion reduces CRBSI.

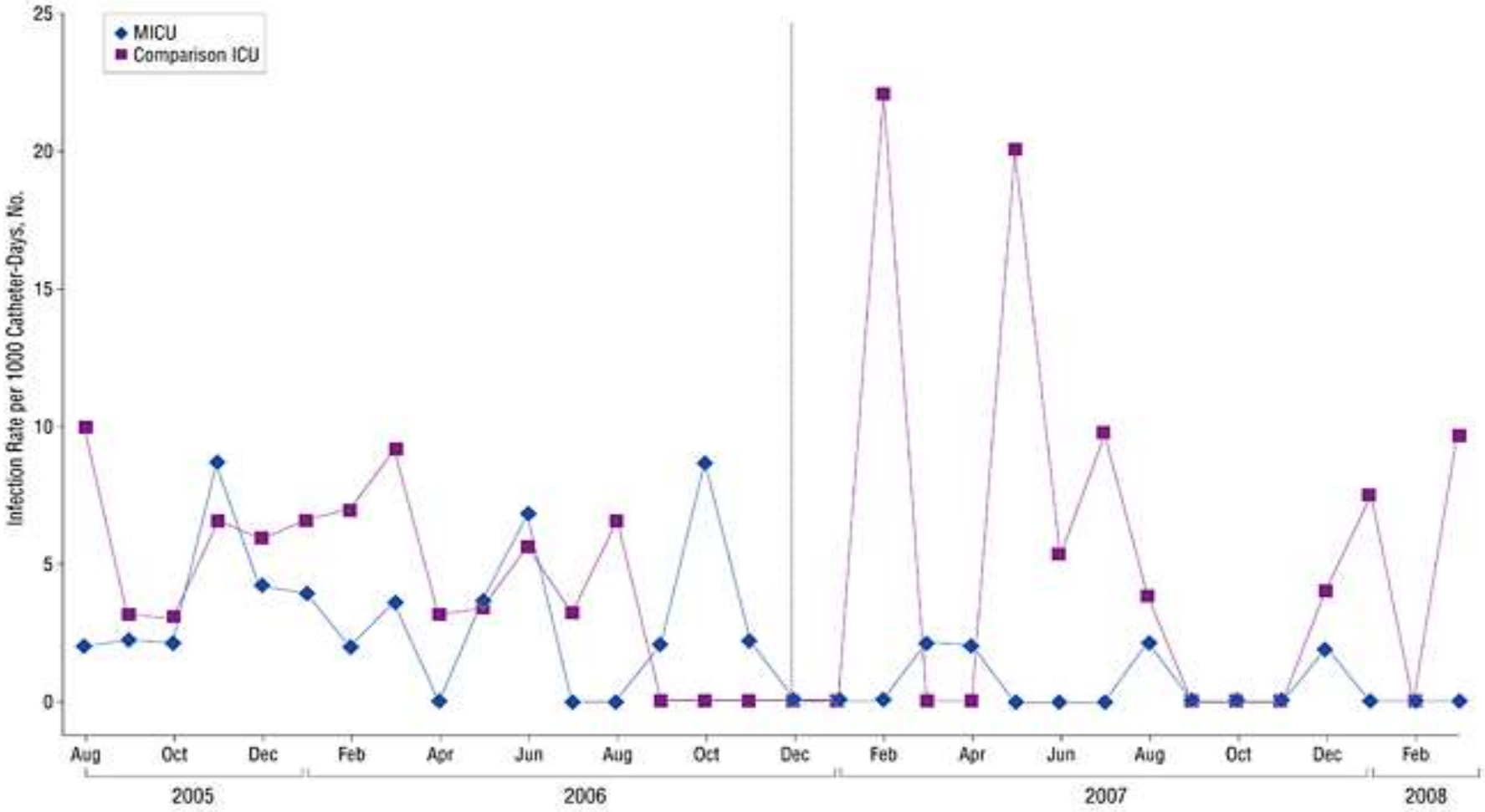
Methods: This was an observational education cohort study set in an adult intensive care unit (ICU) in an urban teaching hospital. Ninety-two internal medicine and emergency medicine residents completed a simulation-based mastery learning program in CVC insertion skills. Rates of CRBSI from CVCs inserted by residents in the ICU before and after the simulation-based educational intervention were compared over a 32-month period.

Results: There were fewer CRBSIs after the simulator-trained residents entered the intervention ICU (0.50 infections per 1000 catheter-days) compared with both the same unit prior to the intervention (3.20 per 1000 catheter-days) ($P = .001$) and with another ICU in the same hospital throughout the study period (5.03 per 1000 catheter-days) ($P = .001$).

Conclusions: An educational intervention in CVC insertion significantly improved patient outcomes. Simulation-based education is a valuable adjunct in residency education.

Arch Intern Med. 2009;169(15):1420-1423

Case study: CVC-related bloodstream infection



Barsuk, J. H. et al. Arch Intern Med 2009;169:1420-1423.

PSI 9: Postoperative hemorrhage/hematoma MDP opportunities for improvement

- Logic of indicator may capture both intraoperative and postoperative hemorrhage (especially if bleeding persists after surgery)
- Impact of true positive cases was significant (i.e., most returned to OR), but opportunities for improvement are unclear
- Most cases not related to anticoagulants or antiplatelet agents

Case study from one AMC

AHRQ PSI	Coding problem	Definition problem	Potential Clinical Issue
Pneumothorax	5 (12%)	0 (%)	38 (88%)
Postoperative Hemorrhage or Hematoma	3 (8%)	10 (26%)	26 (67%)
Postoperative PE / DVT	12 (30%)	0 (0%)	28 (70%)

PSI 10: Postoperative physiologic/metabolic MDP opportunities for improvement

Postoperative renal failure requiring dialysis

- Earlier recognition of renal failure may be beneficial
- Evaluate use of nephrotoxic medications, especially NSAIDs in postoperative setting
- Review ionic contrast documentation & use

Postoperative diabetic complications

- Tighter blood sugar control and monitoring in type I DM post-operatively
- Consider insulin drips instead of implanted pumps and/or SQ in the immediate postoperative period

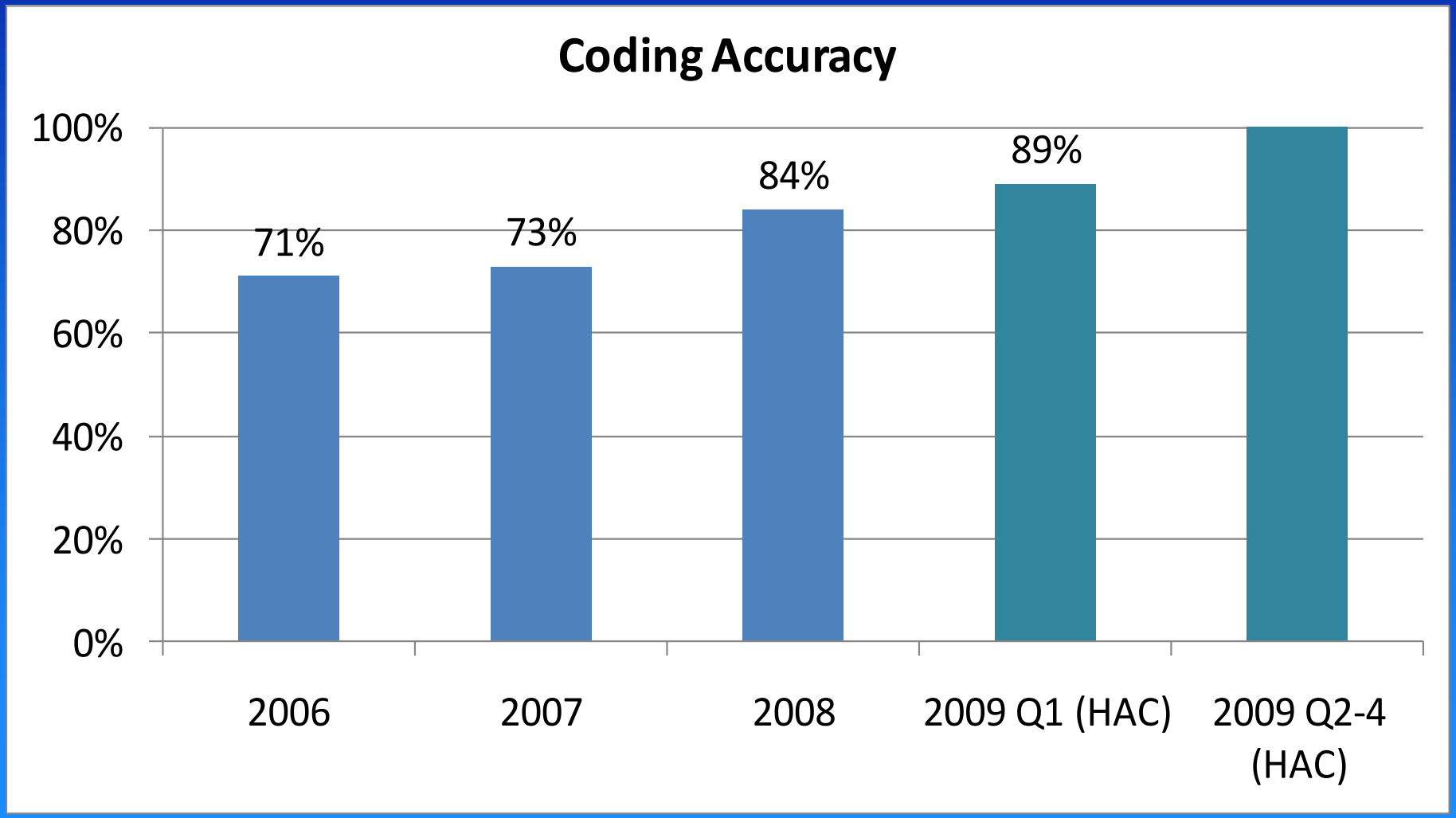
PSI 11: Postoperative respiratory failure MDP opportunities for improvement

- Coding
  - Avoid using 96.04 code when intubation is an expected part of a subsequent procedure
  - Short term intubation, such as overnight, should not be coded as respiratory failure unless clinical criteria are satisfied
- Clinical
  - Evaluate causation- oversedation in one hospital was a leading cause of respiratory complications
  - Improve documentation of reasons for re-intubation or prolonged ventilation (on an ongoing basis)
  - Some patients probably could have been extubated earlier (and would then not have counted as respiratory failure)
  - Significant underuse (or underdocumentation) of lung expansion modalities, such as incentive spirometry

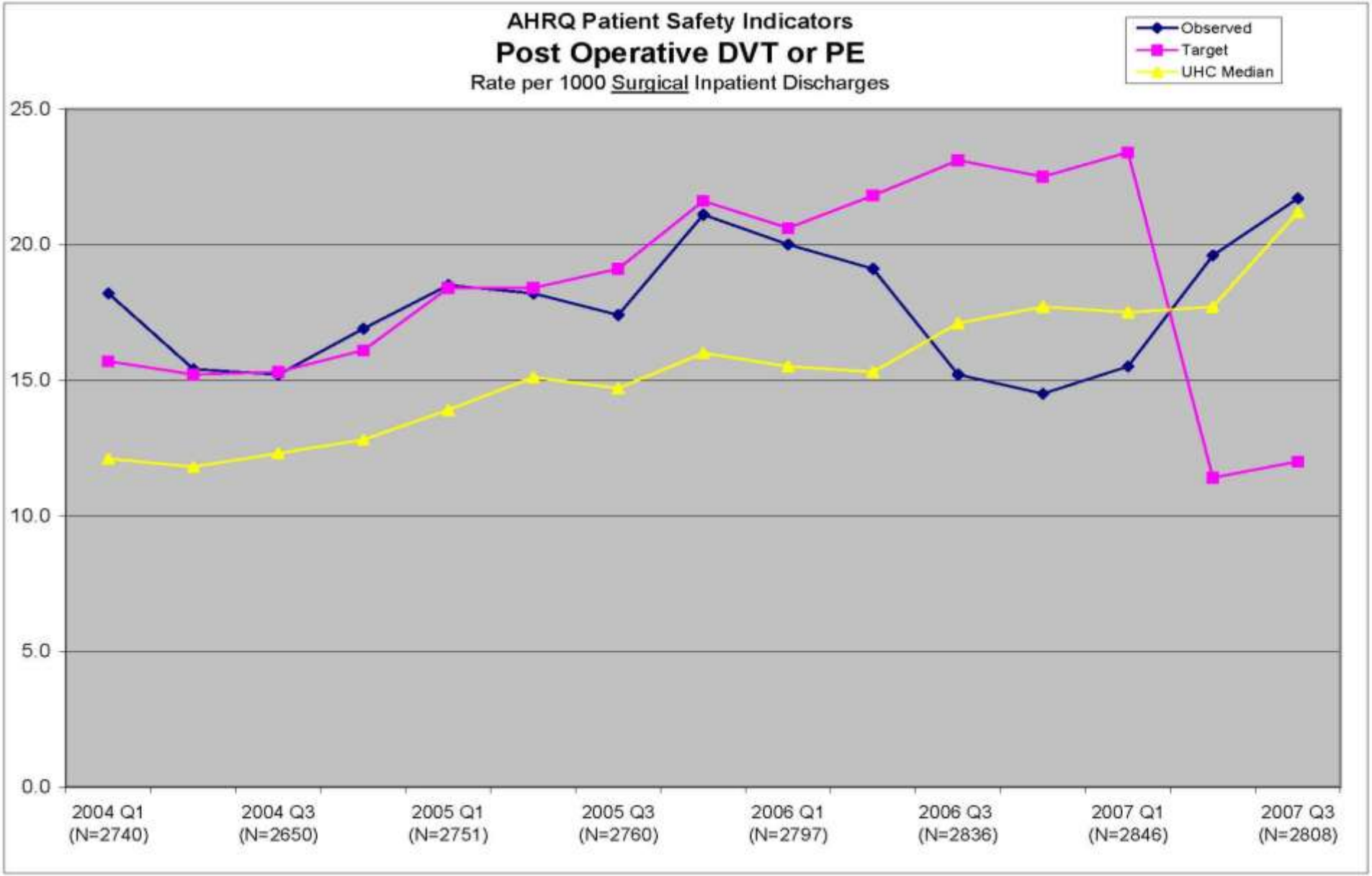
PSI 12: Postoperative DVT/PE MDP opportunities for improvement

- Watch for inadequate documentation, such as “rule out” DVT or PE without alternative diagnosis established after study
- Use new ICD-9-CM codes to capture chronic VTE
- More timely (day 0) use of pharmacologic prophylaxis may be beneficial, especially for perioperative patients at intermediate risk and without contraindications (consider adequacy of mechanical prophylaxis alone)

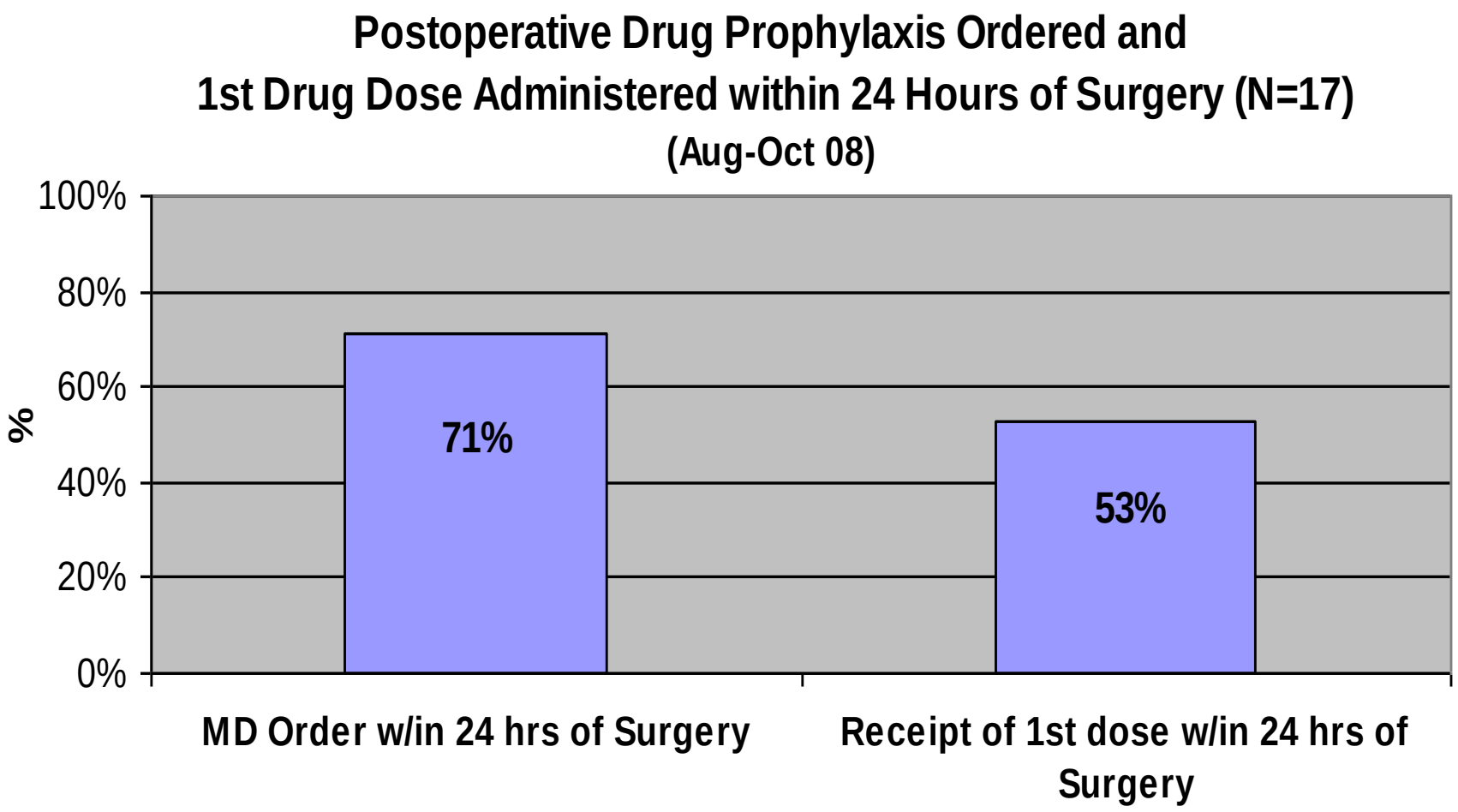
Case study: Postoperative DVT/PE Coding Accuracy



Case study: Postoperative DVT/PE



Retrospective Surgical Audit
Confirmed cases



Action Plan for Postoperative DVT/PE

Goal: Reduce the rate of DVT & PE by 25% by Dec 2008.

Action	Agents	Timeline
Monitor concurrent MD ordering practices of DVT prophylaxis & educate/reinforce Epic order sets.	Quality Specialist to audit 10 charts/wk of General & Ortho Surgery pts & educate MDs.	Begin Feb 1
Review concurrent DVT/PE cases for adherence to DVT prophylaxis guidelines monthly.	Quality Specialist to perform audit based on monthly report of + radiology tests.	Feb 18
Examine & present results from concurrent monitoring & audit & NSQIP data to providers.	P. Pilotin & K. Bashaw to discuss results with Chairs of General & Orthopedic Surgery.	Feb 25
Educate physicians to DVT guidelines and order sets.	P. Pilotin to develop/distribute materials of DVT guidelines & screen shots of Epic DVT order set.	Feb 15
Establish rules & rates for DVT/PE cases for individual MD profiles.	Quality Dept to establish rules & rates in Midas.	March 31
Refine DVT prophylaxis guidelines for medical patients.	K. Posley to review/revise guidelines.	Feb 1

Concurrent Surgical Audit

- Concurrent audit started in Feb 08; conducted by Quality Specialist 24 hours after surgery on orthopedic surgery and general surgery patients
- "Risk level" of patient is assessed by Quality Specialist & compliance determined based on current order
- Surgical DVT Prophylaxis must be ordered and 1st drug dose given within 24 hours after surgery
- If no order or inadequate order, a "fix-it" ticket is placed in medical record so MD can order or revise prophylaxis

DVT

DVT Prophylaxis "Fix it Ticket"

Today's Date: _____
Patient Name: _____
MRN: _____
Unit: _____
Attending MD: _____
Resident: _____

Dear Physician:

As soon as possible, please either:

- Order DVT Prophylaxis:
  - Pharmacologic agent
  - Mechanical compression

OR,

- Document a contraindication to DVT Prophylaxis.

Thank you for providing quality care to your patient!

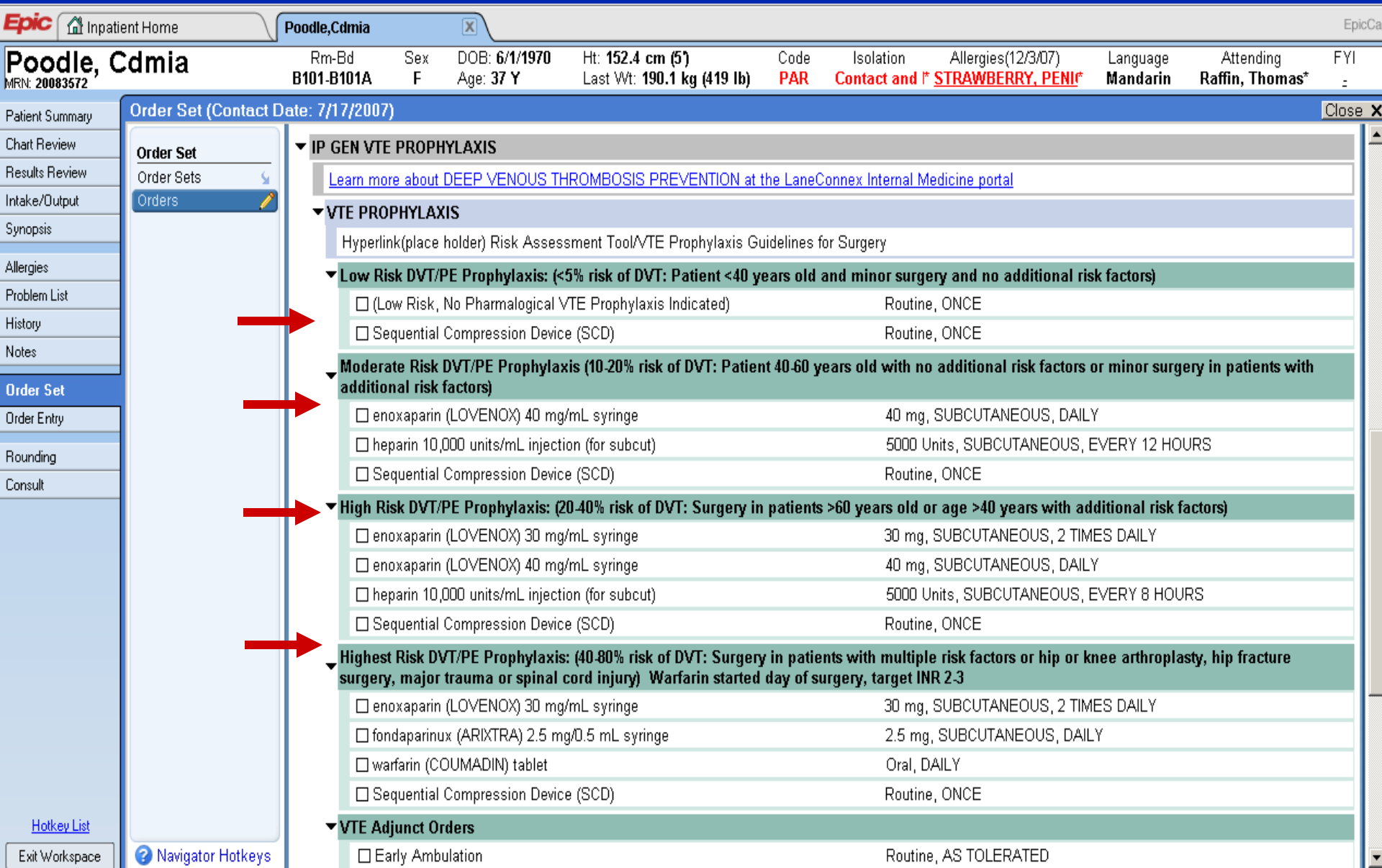
Any questions?

Please call our DVT Prophylaxis Specialist:

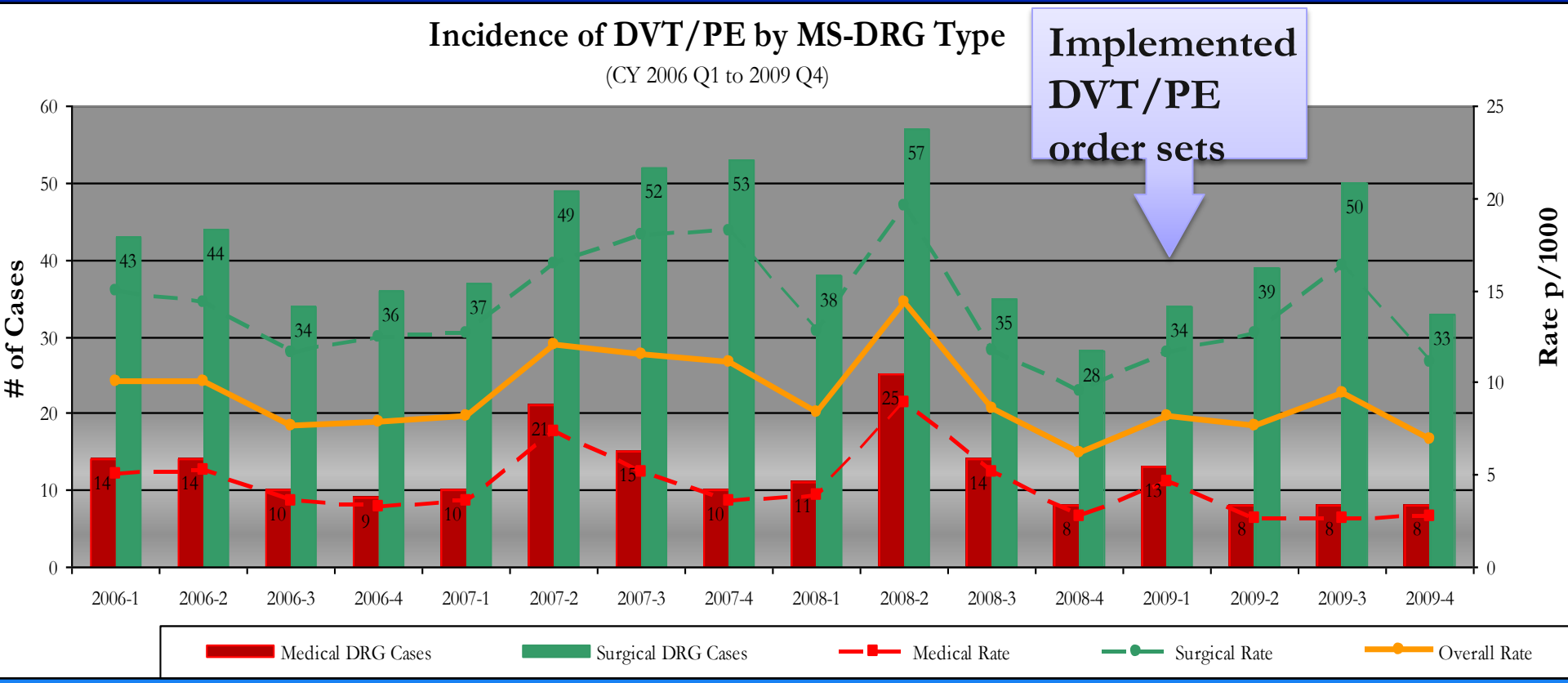
Julie Wahlig, RN MA at Ext. 1-6180 or Pager 16621

STANFORD HOSPITAL & CLINICS

DVT/PE Risk Assessment in Epic



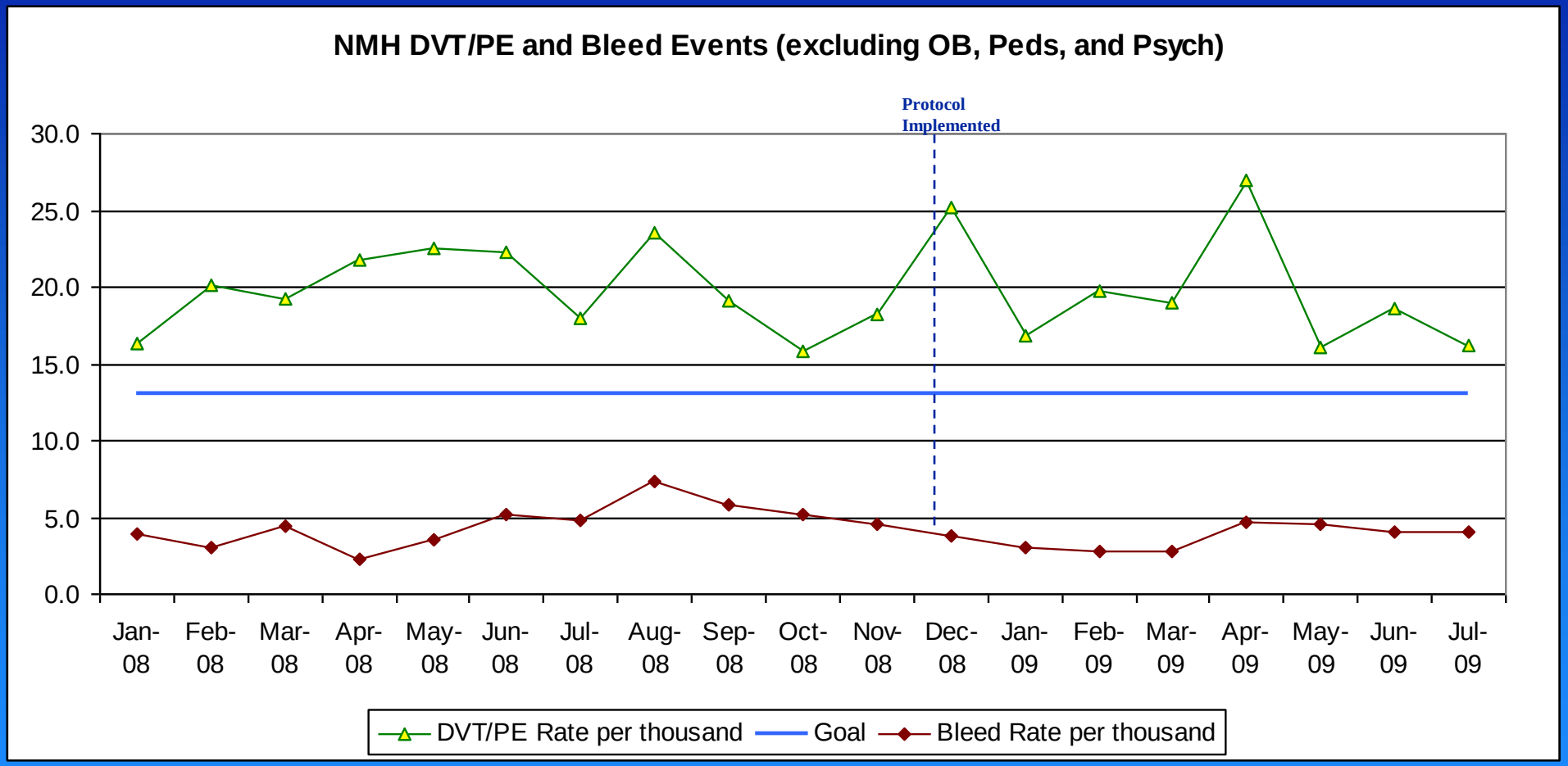
Case study: Too soon to declare victory



Findings/Actions

- Overall incidence of hospital-acquired DVT/PE reflects a downward trend
- Review process for fall-out cases expanded to identify improvement opportunities
- Leverage Epic reports to provide real time data
- Monitor compliance with order set and address non compliance

Case study from another AMC



Source: EPSI Coded Diagnosis Data
Excludes patients with DVT/PE Present on Admission
Bleeding Data represents patients that had a bleeding complication due to an anticoagulant

PSI 15: Accidental puncture or laceration MDP opportunities for improvement

- Occasional overcoding of intraoperative bleeding or other routine events as APL
- Most true positive cases had extenuating circumstances, although some were probably preventable with earlier conversion of laparoscopic to open abdominopelvic surgery, or use of Doppler ultrasound to identify key structures
- Hospitals with inexperienced operators performing technically difficult procedures may experience patterns of similar events

Acknowledgments and references

- AHRQ Quality Indicators project team: Mamatha Pancholi, John Bott
- Gordon and Betty Moore Foundation: Amy Mushlin
- MDP partners: Stanford University Medical Center, San Francisco General Hospital, Sutter Roseville Medical Center
- University HealthSystem Consortium: Joanne Cuny, Julie Cerese, and team

- Utter GH, et al. Positive predictive value of the AHRQ Accidental Puncture or Laceration Patient Safety Indicator. Ann Surg 2009; 250(6):1041-5.
- Sadeghi B, et al. Cases of iatrogenic pneumothorax can be identified from ICD-9-CM coded data. Am J Med Qual 2010; 25(3);211-7.
- White RH, et al. How valid is the ICD-9-CM based AHRQ Patient Safety Indicator for postoperative venous thromboembolism? Med Care 2009; 47(12):1237-43.
- White RH, et al. Evaluation of the predictive value of ICD-9-CM coded administrative data for venous thromboembolism in the United States. Thromb Res 2010; 126(1):61-7.
- Zrelak PA, et al. Positive predictive value of the AHRQ Patient Safety Indicator for Central Line Associated-Bloodstream Infection. J Healthcare Qual; in press.
- Utter GH, et al. Detection of Postoperative Respiratory Failure: How predictive Is the AHRQ Patient Safety Indicator? J Am Coll Surg 2010; 211(3):347-354.
- Cevasco M, et al. Positive predictive value of the AHRQ Patient Safety Indicator Postoperative Sepsis: Implications for Practice and Policy. J Am Coll Surg; in press.

NEXT STEPS

Technical Assistance support via Teleconference—

- Support for integrating AHRQ QI software to calculate rates from your administrative data
- Support implementing AHRQ quality & safety resources relevant to specific QI's
- Other forms of tailored support in response to high priority needs

Case study of your efforts—HRET and FHA will follow up with you.

Questions?