University HealthSystem Consortium

Examining Patient Safety Indicators in UHC Academic Medical Centers

UHC Benchmarking Projects

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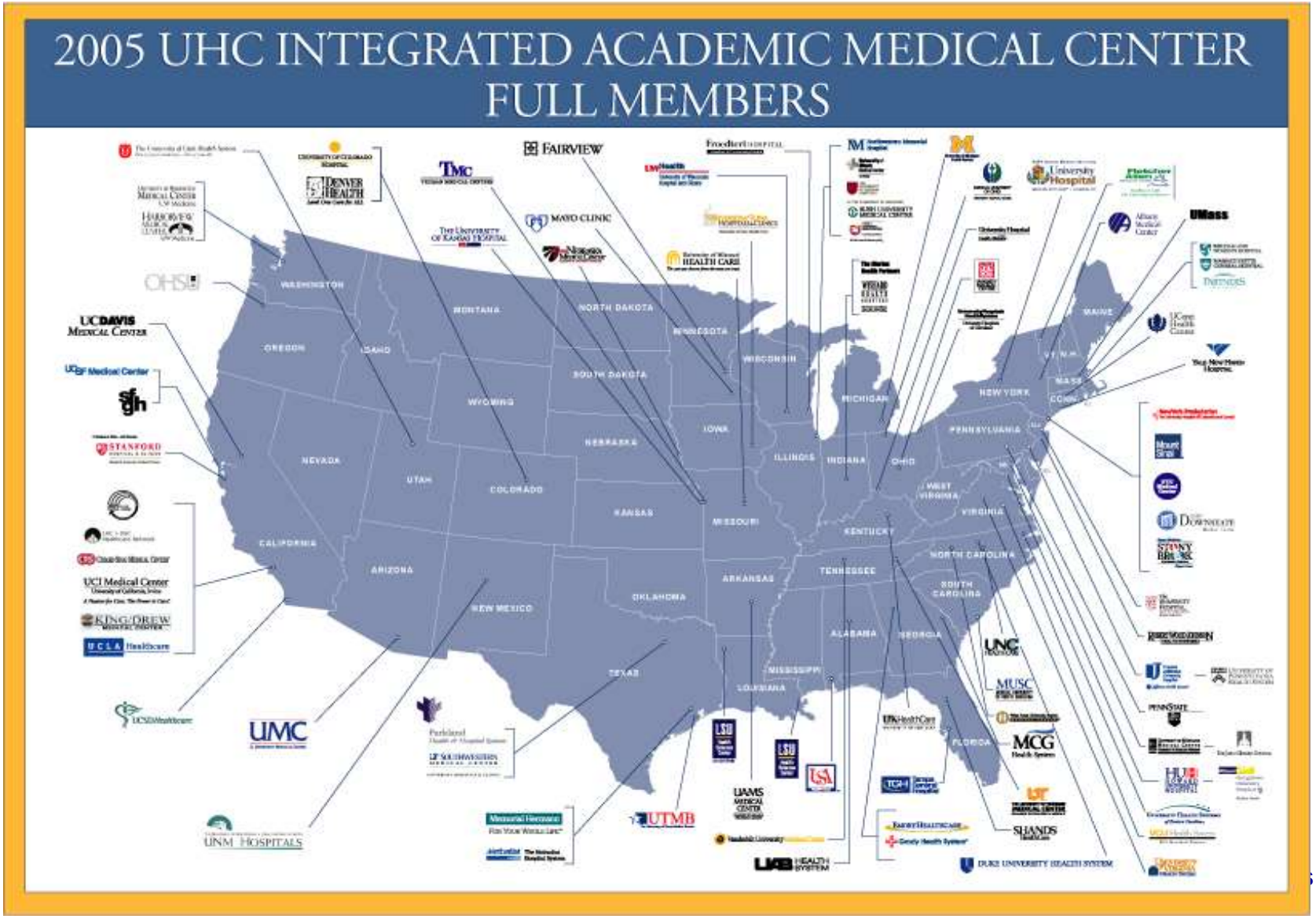
Annual AHRQ Quality Indicators
User Meeting
September 10, 2008

THE POWER OF COLLABORATION

Who is the UHC?



Mission

To advance knowledge, foster collaboration, and promote change to help members succeed in their respective markets

Vision

To be a catalyst for change, accelerating the achievement of clinical and operational excellence

UHC Explores Patient Safety Indicators

- 2004: Failure to Rescue
- 2007: DVT/PE
- 2008: Postoperative Respiratory Failure
- 2009: Pressure Ulcers (Decubitus)

Failure to Rescue 2004 Project Methods and Enrollment Criteria

Inclusion Criteria:

- Patients discharged prior to 10/1/2003 and after 9/30/2002 identified via the the AHRQ Patient Safety Indicators SAS software documentation, version 2.1, rev. 1, with one or more of the following complications of admission:

DVT/PE	Sepsis
Acute Renal Failure (ARF)	GI Hemorrhage (GIH)/Acute Ulcer
Pneumonia	Shock/Cardiac Arrest (S/CA)

- ≥ 10 years of age
- < 75 years

Exclusion Criteria:

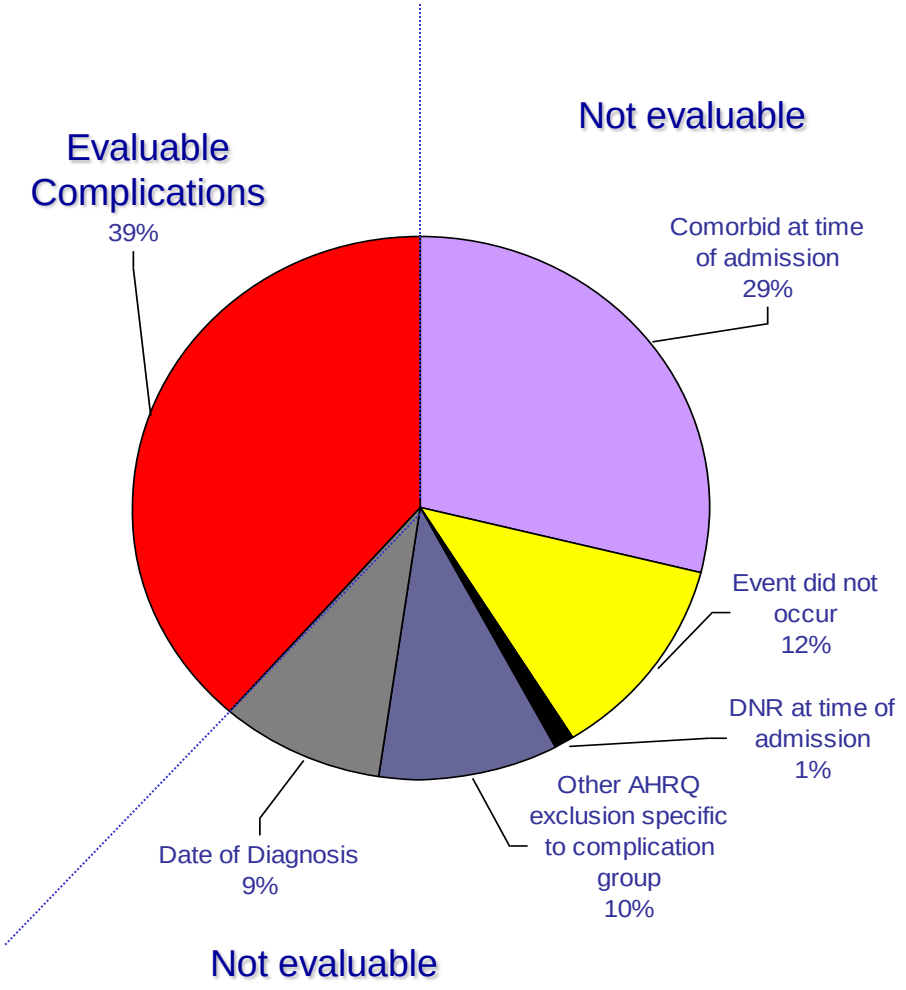
- Transferred from acute care facility
- Discharged/Transferred to acute care facility
- Admitted from long-term facility
- DNR on admission
- Additional exclusions specific to each complication group

NOTE: **41** UHC AMC hospitals submitted patient-level data for **5,376** complications

FTR Distribution of Complications and Exclusions

Of the 5,376 complications identified by AHRQ SAS software:

- 2,074 (38.6%) complications were evaluable for FTR
- 3,302 (61.4%) complications were eliminated for the following reasons:
  - 47.2% (1,560) were comorbid condition
  - 19.7% (651) did not occur
  - 16.4% (540) had complication specific exclusion
  - 15.0% (494) had date of diagnosis too early
  - 1.7% (57) were in cases with DNR at admission



Failure to Rescue Remains a Serious Threat

- Weaknesses in methods of identifying the FTR patient did not mean the FTR rate was lower than estimated
- Improvement efforts are still warranted

The mortality rate in the 2,125 excluded cases was 37.7% (n=801)

The mortality rate in the 1,592 evaluable cases was 57.3% (n=912)

*Mortality data can be used only for comparison among groups as study was designed to capture 50% mortality in each complication group

Commit to *ACT*ion: Rapid Rescue

- ***Best Practice #1:***

  Establish a standardized set of early warning signs

- ***Best Practice #2:***

  Use SBAR communication technique and a standard to speed escalation of communication up the chain of command

- ***Best Practice #3:***

  Implement and deploy a rapid response team

DVT/PE 2007 Project Methods and Enrollment Criteria

Methods/Inclusion Criteria

- Retrospective medical record review of a target of 60 cases meeting enrollment criteria
  - 15 cases meeting the specific inclusion criteria* for each of 4 cohorts:
    - ✓ *Surgical patients with DVT or PE*
    - ✓ *Surgical patients without DVT or PE*
    - ✓ Medical *patients with DVT or PE*
    - ✓ *Medical patients without DVT or PE*
- Patients meeting the inclusion criteria for each cohort were randomly selected from eligible cases discharged during Q1/2006 through Q1/2007

Exclusion Criteria for all patients:

- Patients with ICD-9-CM codes for DVT/PE in the principal diagnosis field
- (MDC 14) A primary diagnosis or reason for admission related to pregnancy, childbirth or puerperium
- Admitted for comfort care only or comfort care only ordered on the first day of admission

* Specific inclusion/exclusion criteria for each cohort defined on the following slides

NOTE: **34** UHC AMC hospitals submitted patient-level data for **2,100** patients

Surgical Cohort Enrollment Criteria

Inclusion Criteria for All Surgical Patients

- Adult patients ≥ 18 years of age
- Surgical patients identified via the AHRQ Patient Safety Indicator SAS software documentation 3.1 (March 12, 2007) (all surgical discharges defined by specific DRGs and ICD-9-CM codes for an elective operating room procedure)

Cohort #1 Surgical patients with DVT or PE – Include only cases with ICD-9-CM codes for DVT or PE in any secondary diagnosis field

Cohort #2 Surgical patients without DVT or PE – Exclude cases with ICD-9-CM codes for DVT or PE in any diagnosis field

Exclusion Criteria for All Surgical Patients

- A procedure for interruption of vena cava is the only operating room procedure
- A procedure for interruption of vena cava occurs before or on the same day as the first operating room procedure

Medical Cohort Enrollment Criteria

Inclusion Criteria for All Medical Patients

- Adult patients ≥ 18 years of age
- Patients in one of the following product lines: Cardiology, Gastroenterology, HIV, Medical Oncology, General Medicine or Neurology
- LOS > 2 Days
- SOI score of moderate, major or extreme

Cohort #3 Medical patients with DVT or PE – Include only cases with ICD-9-CM codes for DVT or PE in any secondary diagnosis field

Cohort #4 Medical patients without DVT or PE – Exclude cases with ICD-9-CM codes for DVT or PE in any diagnosis field

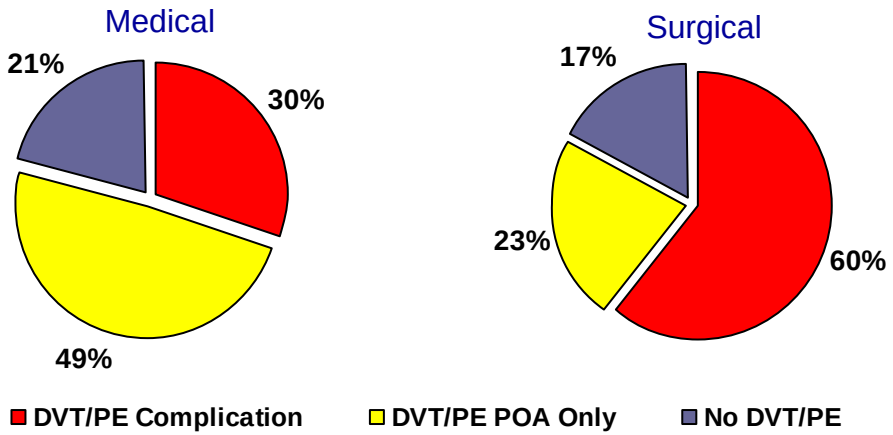
Exclusion Criteria for All Medical Patients

- LOS ≤ 2 days
- SOI score of "minor"

Current Rate of Success in Capturing DVT/PE Complications

DVT/PE Status by CDB N=2041*	Total	DVT/PE Status by Data Abstraction: DVT/PE Complication	DVT/PE POA Only	No DVT/PE
Medical With DVT/PE	513	156 (30.4%)	250 (48.7%)	107 (20.9%)
Medical Without DVT/PE	506	4 (0.8%)	4 (0.8%)	498 (98.4%)
Surgical With DVT/PE	505	306 (60.6%)	114 (22.6%)	85 (16.8%)
Surgical Without DVT/PE	517	1 (0.2%)	2 (0.4%)	514 (99.4%)

Final Distribution of CDB identified "with DVT/PE" Medical/Surgical Cases after Chart Review



DVT/PE False Positives	Medical N=107 n (%)	Surgical N=85 n (%)
Did not occur	31 (29%)	41 (48%)
History only	76 (71%)	44 (52%)

* The 59 study patients enrolled from the one hospital that does not participate in CDB were not included in this analysis (2,041 + 59 = 2,100).

Learnings Related to DVT/PE Patient Identification

- Identifying patients with complications of admission through administrative data remains problematic.

  Current accuracy rate:

  - Surgical cases: **60%**
  - Medical cases: **30%**

- The good news!
  - Appropriate use of the "present on admission" **(POA) flag** in coding will significantly improve accuracy rate:
  - Surgical cases actually POA: 23% [60% + 23% = **83%** accuracy]
  - Medical cases actually POA: 49% [30% + 49% = **79%** accuracy]
- The not so good news!
  - Still work to be done related to coding to improve accuracy. Rate of **"did not occur" or "history only"** reflected as DVT/PE in coding:
  - Surgical cases: **17%**
  - Medical cases: **21%**

Key Performance Measure

Guideline-Directed DVT/PE Prophylaxis

54.4% (1072/1971) of eligible cases* received appropriate DVT/PE prophylaxis according to ACCP guidelines, initiated:

- Surgical cases: prior to or on day of surgery
- Medical cases: by the 3rd day of admission

Hospital Performance:

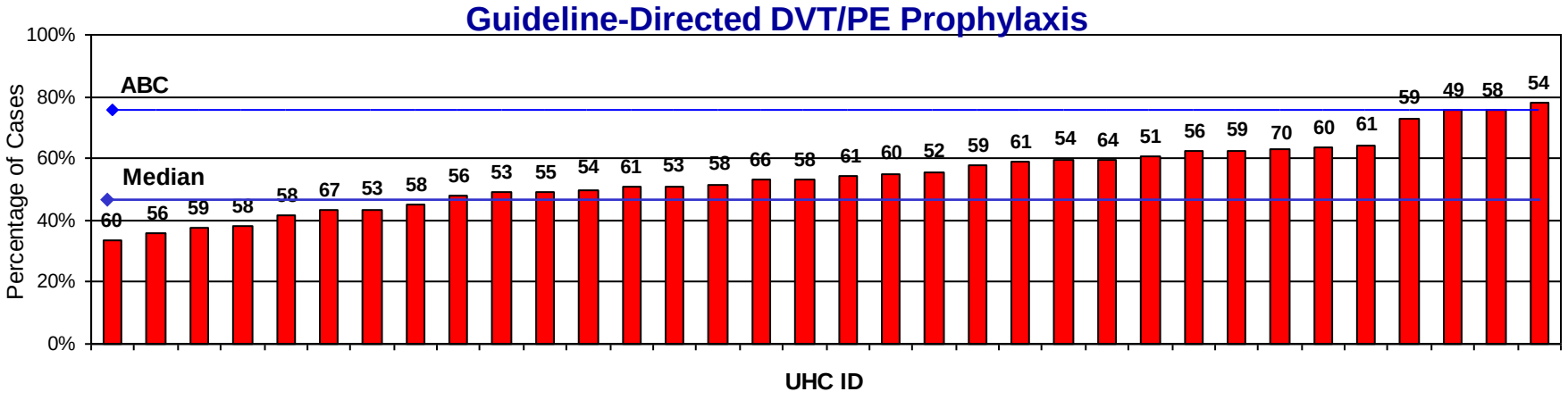
Mean: 54.5% SD: 11.4%

Median: 53.8% Range: 33.3% - 77.8%

Achievable Benchmark of Care™: 75.5%

"One of six cases of all VTE and two of three cases of VTE, for which thromboprophylaxis had been indicated could potentially have been prevented had physicians followed the recommended ACCP guidelines. Inadequacy of prophylaxis was most often caused by omission of prophylaxis."

Missed Opportunities for Prevention of Venous Thromboembolism; An Evaluation of the use of Thromboprophylaxis guidelines. CHEST 2001; 120: 1964-1971.



Numbers above bars represent the number of cases in the denominator for each institution.

Guideline-Directed DVT/PE Prophylaxis for Surgical Cases Only

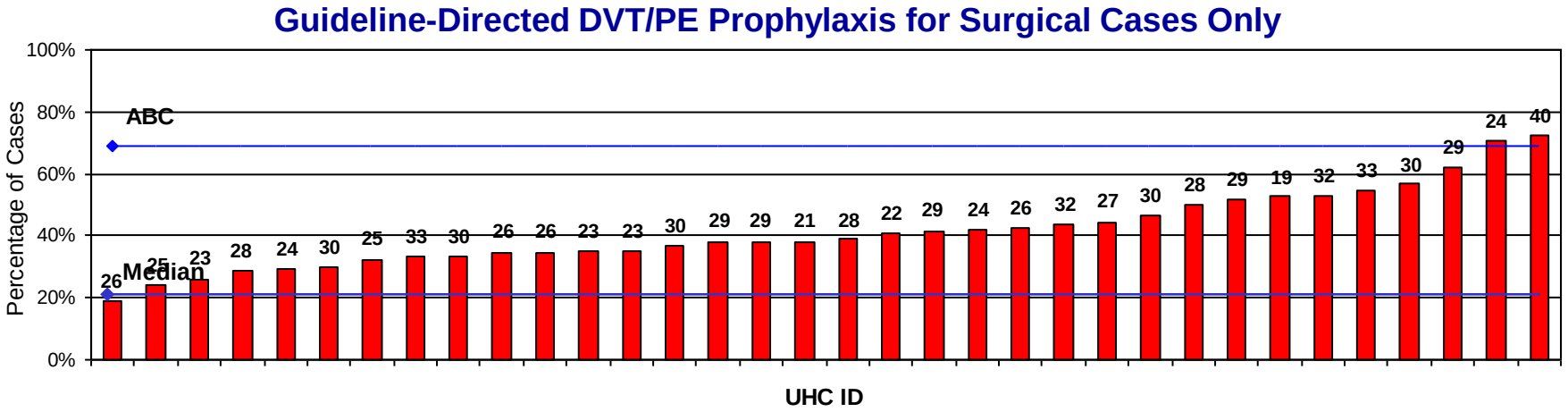
42.1% (393/933) of eligible **surgical** cases* received appropriate DVT/PE prophylaxis according to ACCP guidelines, initiated prior to or on day of surgery

Hospital Performance:

Mean: 41.5% SD: 12.4%

Median: 38.7% Range: 19.2% - 72.5%

Achievable Benchmark of Care™: 68.8%



Numbers above bars represent the number of cases in the denominator for each institution.

Guideline-Directed DVT/PE Prophylaxis for Medical Cases Only

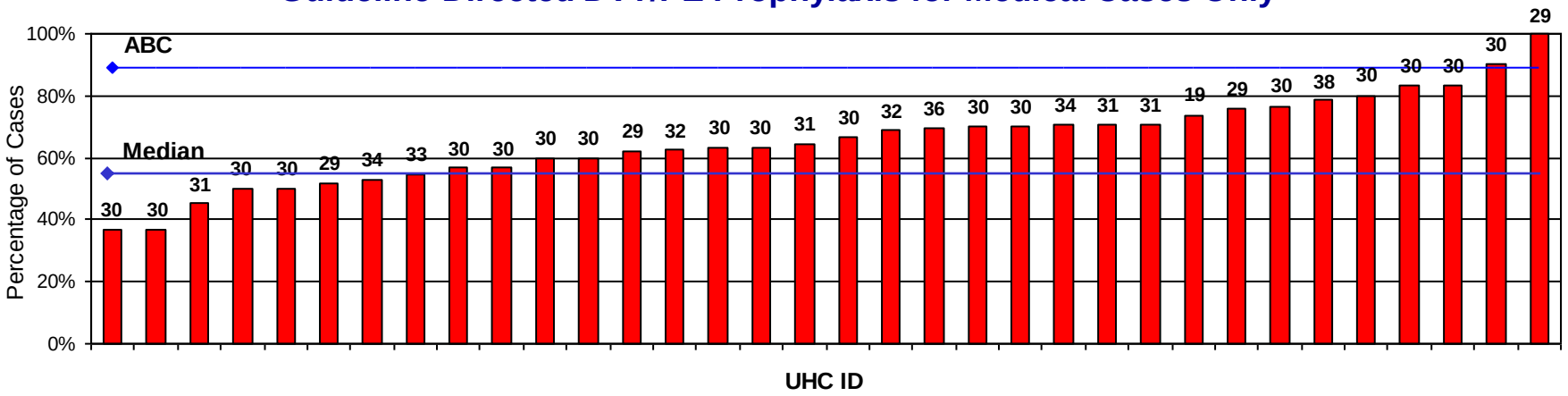
65.4% (679/1,038) of eligible **medical** cases received appropriate DVT/PE prophylaxis according to ACCP guidelines, initiated by the 3rd day of admission

Hospital Performance:

Mean: 65.5% SD: 14.1%

Median: 65.6% Range: 36.7% - 100.0%

Achievable Benchmark of Care™: 89.1%



Numbers above bars represent the number of cases in the denominator for each institution.

When is a DVT actually a DVT?

Specific segments where DVT occurred	N = 567 n (%)
Lower Limb only (N = 283)	**283 (49.9%)***
Femoral veins (common or superficial)	153 (54.1%)
Popliteal vein	98 (34.6%)
Deep lower extremity veins distal to the popliteal	76 (26.9%)
Superficial lower extremity veins	43 (15.2%)
Upper Limb only (N = 209)	**209 (36.9%)***
Subclavian axillary vein	81 (38.8%)
Internal jugular vein	67 (32.1%)
Superficial upper extremity	57 (27.3%)
Brachiocephalic (innominate) veins	43 (20.6%)
Deep upper extremity veins distal to the axillary	32 (15.3%)
Superficial neck veins	2 (1.0%)
Central only (N = 27)	**27 (4.8%)***
Iliac veins	13 (48.1%)
Inferior vena cava	11 (40.7%)
Superior vena cava	4 (14.8%)
Combination	**24 (4.2%)***
Location not documented	**24 (4.2%)***

Reported Age of DVT

Of the 567 cases diagnosed with DVT during admission, the reported age of the DVT was:

- 213 (37.6%) were “acute”
- 168 (29.6%) were “unspecified age”
- 65 (11.5%) were “chronic”
- 34 (6.0%) were “sub acute”
- 87 (15.3%) cases did not have a test or the report lacked DVT age information

*Note: Segments are not mutually exclusive, i.e. cases could have more than one DVT diagnosed

DVT/PE Project Summary of Key Findings

- Only **54.4%** of all cases received **ACCP guideline-direct DVT/PE prophylaxis**. Hospital performance ranged from **33.3% - 77.8%.**
- The **rate of early recognition and rapid intervention for DVT/PE has improved** since the 2004 Failure to Rescue study
- **23.2%** of all surviving study patients with active DVT/PE during the admission received **no pharmacologic DVT/PE prophylaxis** at discharge
- Patients **with active DVT or PE** during the target admission were:
  - **discharged to home** on self care at **nearly 1/2 the rate** of patients without DVT/PE
  - discharged to **rehab or SNF** facilities at **> 2 times the rate** of patients without DVT/PE
- Patients with **PE** had a **mortality rate** nearly **2 times that of patients with DVT** alone and nearly **4 times that of patient without either** of these conditions

Post Op Respiratory Failure 2008 Project Methodology

Methods

- Retrospective review and documentation of 40 eligible cases
- Discharged on or prior to June 30, 2007
- Enrolled in reverse chronological order by discharge date, proceeding back in time until the target number of cases were identified.
- To avoid selection bias, cases could not be skipped or excluded unless a specific exclusion criterion was identified

Case Selection Criteria

- UHC identified postoperative respiratory failure (PSI 11) cases from the clinical database for participating hospitals, using the AHRQ PSI SAS software and documentation version 3.1
- Only those cases that did not have a qualifying surgical procedure during the admission were excluded

NOTE: **18** UHC AMC hospitals submitted patient-level data for **692** cases

PSI-11 Denominator Cases

Inclusion Criteria

- Adults ≥ 18 years of age
- Elective admission type
- Surgical discharge as defined by specific DRGs (includes all surgical DRGs)
- ICD-9-CM code for a specific major therapeutic, non-diagnostic, operating room (OR) procedure

Exclusion Criteria

- Pre-existing acute respiratory failure
  - Principal diagnosis
  - Secondary diagnosis present on admission (POA), if known
- ICD-9-CM diagnosis code of specific neuromuscular disorders (NMD)
- Tracheostomy
  - As the only OR procedure
  - Occurs before the first OR procedure
- DRG falls into MDC 4 (respiratory), MDC 5 (circulatory), or MDC 14 (pregnancy)

PSI-11 Numerator Cases

- Respiratory failure ICD-9-CM secondary diagnosis code
  - **518.81:** diagnosis of acute respiratory failure
  - **518.84:** diagnosis of acute and chronic respiratory failure

or

- Intubation or ventilation ICD-9-CM procedure code with appropriate timing after a qualifying surgical procedure
  - **96.04:** (endotracheal tube insertion) procedure takes place **1 or more days after** a major OR procedure – i.e. reintubation
  - **96.70:** (continuous ventilation, unspecified duration) **or**

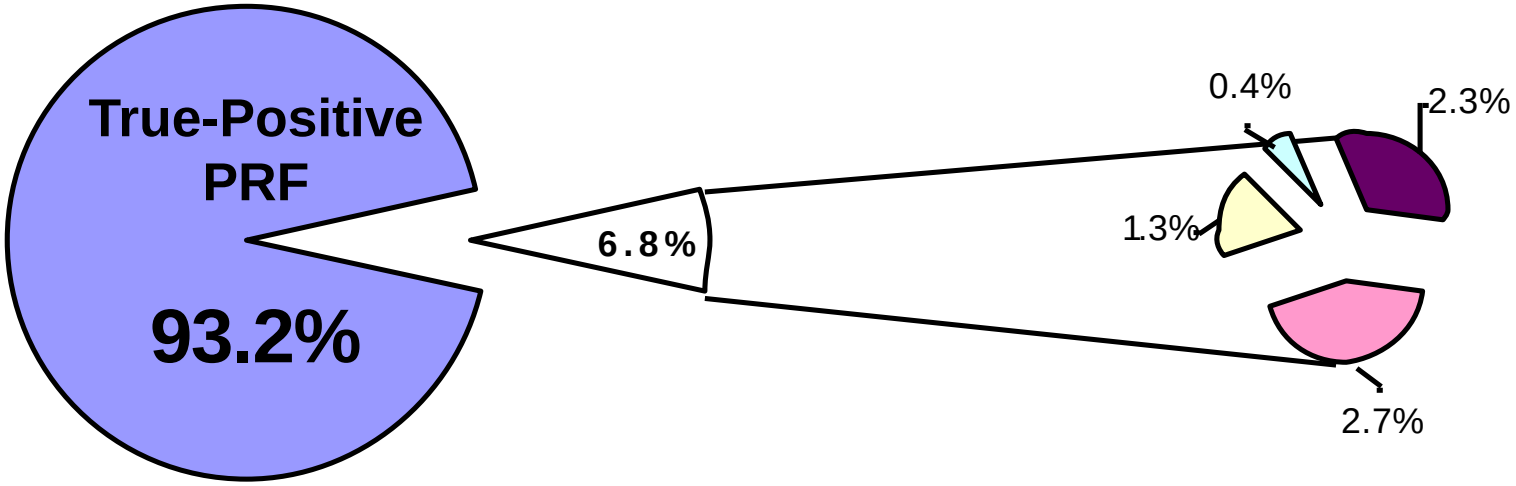
    96.71: (continuous ventilation, less than 96 hours)

    identified **2 or more days after** a major OR procedure
  - **96.72** (continuous ventilation, for 96 hours or more) identified **on or any time after** the day of a major OR procedure

Code Type	Diagnosis Code only	Re-intubation or Ventilation Code only	Both Code Types
	Group 1	Group 2	Group 1 + 2
All Cases (N=692)	17.5% (121)	44.5% (308)	38.0% (263)

Postoperative Respiratory Failure: PSI with High Positive Predictive Value

The project's retrospective chart review revealed that 93.2% (645/692) of cases were accurately flagged by the AHRQ software as having postoperative respiratory failure

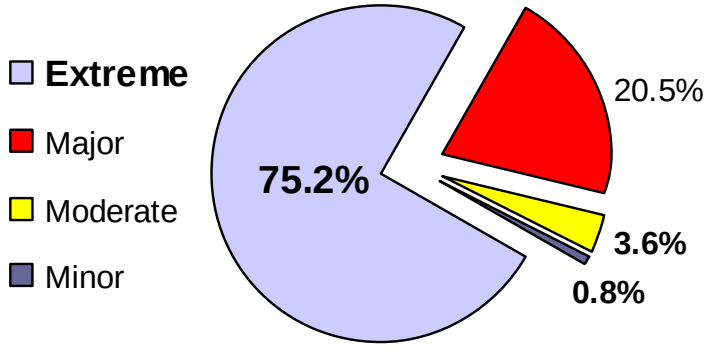


Potentially Useful PRF Predictors

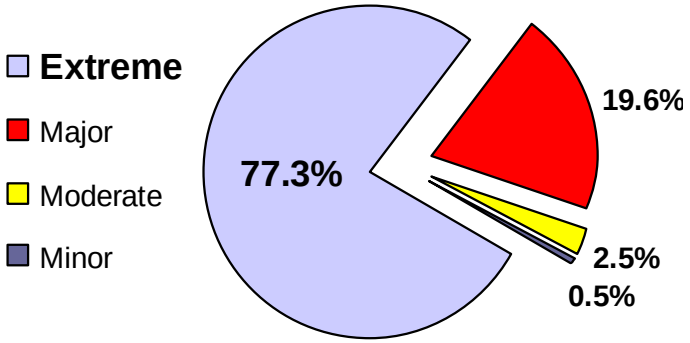
- Type of surgery: AAA, thoracic, neuro, upper abdominal, peripheral vascular, neck
- Emergency surgery
- Albumin <30 g/L
- Blood urea nitrogen >30 mg/dL
- Partially or fully dependent functional status
- History of chronic obstructive pulmonary disease
- Age $\geq$ 60
- Estimated blood loss > 600 mL
- Lowest mean arterial pressure during surgery of > 55 mmHg
- Lowest heart rate during surgery > 75 beats per minute

PRF Severity of Illness

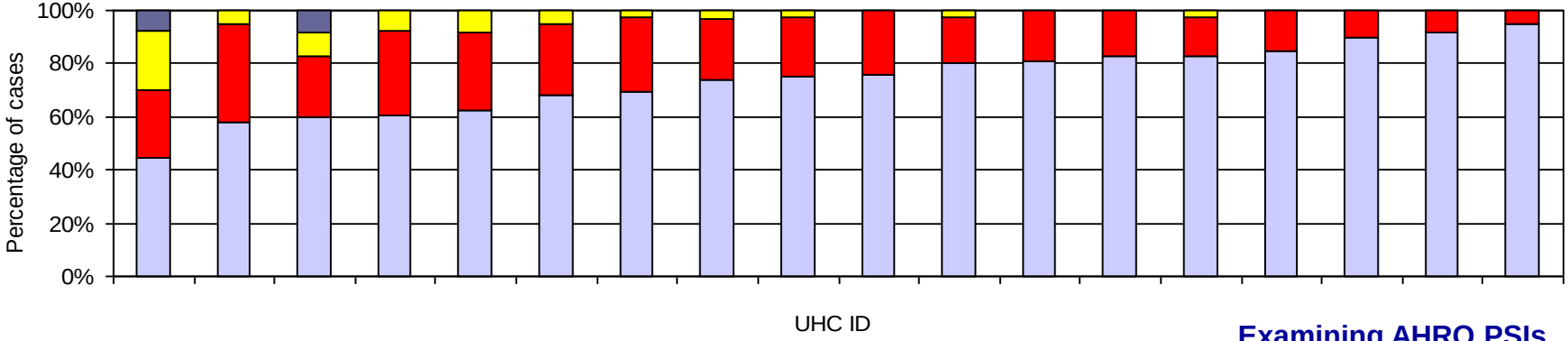
Severity of Illness Distribution
Study Population
(N=645)



Severity of Illness Distribution
CDB CY 2007 Population With PSI 11
(N=5,454)



Severity of Illness Distribution by Participating Hospital



Note: Severity of illness based on 3M's APR-DRG grouper used in UHC's CDB risk-adjustment

PRF Project Summary of Key Findings

- AHRQ algorithm shows **~93.2**% **positive predictive value** for **PSI 11** cases
- **SOI** classification **extreme** in **>75%** of study population and CDB cases
- **80.6%** of the study population received a preoperative **ASA status of 3 or 4**
- **1/2** the study population had **more than one patient safety indicator**
- Most common anesthesia was **general;** neuromuscular blocking **reversal** agent was used in **1/3** of these cases
- **23.3%** of the study population **did not survive** to discharge
- **8%** of surviving patients were **discharged on ventilator support**
- **3.6%** of surviving patients had related **readmissions** within 30 days of discharge
- **Questions remain** whether PSI 11 rate reflects quality of care

Pressure Ulcer 2008/2009 Project Methods and Enrollment Criteria

Methods

- Retrospective medical record review for a target of 40 cases per site meeting enrollment criteria (20 cases in each of 2 patient groups):
  - ✓ *Group 1: Patients with hospital acquired pressure ulcers **with*** ICD-9-CM code of decubitus ulcer *as secondary diagnosis*
  - ✓ *Group 2: Patients with hospital acquired pressure ulcers **without*** ICD-9-CM code of decubitus ulcer *as secondary diagnosis*
- All patients meeting the inclusion criteria will be enrolled in reverse chronological order by discharge date, beginning with cases discharge on June 30, 2008, and proceeding back in time until **20 evaluable Group 1 cases** and **20 evaluable Group 2 cases** are enrolled

Denominator Enrollment Criteria for All Cases:

- ≥18 years of age
- LOS > 4 days
- **Excludes** cases with ICD-9-CM code of decubitus ulcer in the principal diagnosis field or in a secondary diagnosis field if present on admission (POA)

NOTE: **33** UHC AMC hospitals have signed up to submit patient-level data for a target of **1,320** cases

Numerator Populations

Patient Group 1:

- Identified as a case with hospital acquired decubitus ulcer (PSI 3) by AHRQ Patient Safety Indicator SAS software documentation 3.1 (i.e. discharged case **with** ICD-9-CM code of decubitus ulcer in any secondary diagnosis)

Patient Group 2:

- NOT Identified as a case with hospital acquired decubitus ulcer (PSI 3) by AHRQ Patient Safety Indicator SAS software documentation 3.1 (i.e. discharged case **without** an ICD-9-CM code of decubitus ulcer in any secondary diagnosis)
- Documentation in medical record of presence of pressure ulcer
- Cases with 1 of the 14 selected high risk* DRGs (see listing on next slide)

*NOTE: The 14 “high risk” DRGs were identified by selecting DRGs that had ICD-9-CM coded rates of decubitus ulcer in secondary diagnosis > 80 per 1,000 cases (based on CDB cases from Q2/07 to Q1/08)

Pressure Ulcer High Risk DRGs

DRG	Description
465	Aftercare w/ history of malignancy as secondary DX*
575	Septicemia w/ MV96+ hours age >17
542	Trach w/ MV 96+hrs or PDX except face,mouth & neck DX w/o major OR PX
541	Trach w/ MV 96+hrs or PDX except face,mouth & neck DX w/ major OR PX
578	Infectious & Parasitic Diseases w/ OR PX
238	Osteomyelitis
129	Cardiac arrest –unexplained*
576	Septicemia w/o MV96+ hours age >17
287	Skin graft/wound debridement; endocrine / nutritional / metabolic disorders*
113	Amputation for circulatory disorders except upper limb & toe
123	Circulatory disorders w/ AMI, expired
565	Respiratory system DX w/ ventilator support 96+ hours
072	Nasal trauma & deformity*
320	Kidney & UTI age > 17 w/CC

NOTE: The 14 “high risk” DRGs were identified by selecting DRGs that had ICD-9-CM coded rates of decubitus ulcer in secondary diagnosis > 80 per 1,000 cases (based on CDB cases from Q2/07 to Q1/08)

* < 100 denominator cases

Anticipated Findings in 2008/2009 Pressure Ulcer Project

- Screened cases will yield data on POA versus HAC pressure ulcers and use of POA flag
- Prevalence of pressure ulcers that are not included in physician documentation
- Performance related to routine documentation of skin assessment
- Use of staging in documentation of pressure ulcers
- Specific patient characteristics and other circumstances common to patients with hospital acquired pressure ulcers
- Prevalence of routine use of special beds, bed coverings, and other devices to protect skin
- Identification of best practices
- Illuminate opportunities for improvement

questions