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Validating the Patient Safety Indicators (PSI) in the VA: A Multi-Faceted Approach

Slide Presentation from the AHRQ 2008 Annual Conference

On September 10, 2008, Amy Rosen, Ph.D., made this presentation at the 2008 Annual Conference. Select to access the [PowerPoint® presentation](#) (800 KB; [Plugin Software Help](#)).

Slide 1

Validating the Patient Safety Indicators (PSIs) in the Department of Veterans' Affairs (VA): a Multi-Faceted Approach

- Funding: VA Health Services Research and Development (HSR&D) Service
SDR 07-002 : 10/01/07-9/30/11
- Amy Rosen, Ph.D., Principal Investigator

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Project Team

- Collaboration among:
 - VA's HSR&D Service
 - National Center for Patient Safety (NCPS)
 - AHRQ (Quality Indicators [QI] team and individual investigators)
- VA and non-VA clinicians, surgical experts, nurse abstractors
- National steering committee:
 - Representatives from VA Office of Quality Performance, NCPS
 - Nursing Services, Surgery, Patient Care Services
 - Selected members of the AHRQ QI team
 - Selected Patient Safety/QI Managers and other potential end-users

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Overall Project Goal

- Develop a validated and reliable set of patient safety measures that broadly reflect the interests of key VA stakeholders, *but that are generalizable beyond the VA.*
- Specific Objectives:
 - Develop collaborations with key stakeholders to guide in PSI selection and validation
 - Investigate the criterion validity of the PSIs by review of the VA's Electronic Medical Record (EMR)
 - Identify processes and structures of care associated with individual PSIs

- Revise and improve the PSIs using multiple data sources and settings of care
- Assess the utility validity of the PSIs for QI and performance measurement

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Goal 1: Develop Stakeholder Collaboration

- Stakeholders' meeting (Dec, 2007):
 - Approved selection of PSIs
 - Approved plan to validate AHRQ's Phase I/Phase II PSIs
 - Reviewed field consultation interview questions:
 - Recommended focus on general questions on patient safety
 - Suggested less attention on specific PSIs in field consultations:
 - Field consultations held to examine the validity of the PSIs, not to judge facilities' performance
- Contact with stakeholders subsequent to meeting:
 - Approved final interview protocols "TO/THRU" memo to sites asking them to participate

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Goal 2: Identify False Positives—*Are Cases Flagged by the AHRQ PSIs Present in the EMR?*

- Obtained national access to electronic medical record (EMR): "VistaWeb"
- Hired and trained two nurse abstractors to conduct chart abstraction
- Modified AHRQ Phase I and Phase II chart abstraction tools for VA:
 - Pilot testing and clinician review
 - Five tools "ready for prime time," five almost ready, five being developed de novo
- Completed validation of pulmonary embolism/deep vein thrombosis (PE/DVT)
- Currently abstracting charts for iatrogenic pneumothorax
- Currently piloting web-based application (InfoPath) for gathering and entering chart-abstracted data

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Formatting Features of InfoPath

- This slide shows the conditional formatting features of InfoPath; these features enable more efficient chart abstraction.
 - A1: Is there documentation that the patient had a post-operative or deep vein thrombosis during this admission?
 - Yes:
 - PE
 - DVR
 - No
 - Unable to determine
 - Record excluded
 - A2: Documentation of ascertainment of event If YES to A1, Describe documentation found in the medical record.

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Hospital Selection

- Ran PSI software (v. 3.1a) on VA inpatient data (2003-2007):

- Obtained rates of individual PSIs and PSI composites
- Used 12 PSIs:
 - PSIs 1-15
 - Excluded PSIs 1, 5, 8
- Population:
 - 158 VA hospitals
- Sample for chart abstraction:
 - 28 hospitals, 112 charts per PSI

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Sample Selection Methodology

1. Stratified population by observed and expected #s of PSIs:
 - Group 1: at least 4 observed and 4 expected (n =28)
 - Group 2: at least 2 observed and 2 expected (n=33)
 - Group 3: at least 1 observed and 1 expected (n=18)
 - Total for Groups 1-3: 79 hospitals
2. Ranked 79 by AHRQ PSI composite (denominator weights):
 - Chose top 3 and bottom 3 from each group
 - Randomly selected from remaining hospitals within each group: group 1=4, group 2=4, group 3=2 to obtain 28 hospitals (10, 10, and 8, respectively)
 - Geographic distribution and ICU severity taken into account
3. Selected 6 hospitals for field consultations and ranked them based on PSI composite:
 - Geographic location and size taken into account

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Chart Abstraction

PE/DVT

- Conducted retrospective EMR review of 112 flagged cases.
- Conducted inter-rater reliability (IRR) throughout EMR review.
 - 28 cases (25% of all charts) reviewed for IRR due to:
 - Large numbers of exclusions
 - IRR >90%
 - 89% agreement rate achieved with 1st IRR, 94% with 2nd IRR
- Issues:
 - Length of time to complete chart abstraction (1-1/2 hours for full record; 20 minutes for false positives)
 - Problems with accessing VistaWeb

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Technical Specifications of PE/DVT

- Numerator:
 - Discharges among cases meeting the inclusion and exclusion rules for denominator.
 - ICD-9-CM codes for PE/DVT in any secondary diagnosis field
- Denominator:
 - All surgical discharges age 18 and older.
 - Defined by specific DRGs and an ICD-9-CM code for an OR procedure

- Exclusion criteria for all cases:
 - Preexisting (principal diagnosis or secondary diagnosis present on admission, if known) PE/DVT
 - Procedure for interruption of vena cava the only OR procedure
 - Procedure for interruption of vena cava occurs before or on the same day as first OR procedure
 - Medical Diagnostic Category (MDC) 14 (pregnancy, childbirth, and puerperium)

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Post-operative PE/DVT Validation Results

- Pie chart shows:
 - True Postoperative PE/DVT: 49 cases (44%)
 - Coding-Related Inaccurate Diagnosis: 24 cases (21%)
 - Present on Admission: 16 cases (14%)
 - Pre-Procedure Diagnosis: 13 cases (12%)
 - Remote History of PE/DVT: 10 cases (9%)
- Total # of cases: 112

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False Positives: A Comprehensive Analysis

Classification of False Positives	Number of Cases	Percentage
DVT/PE Present on Admission (POA)	16	25.4%
Pre-Procedure Diagnosis of PE/DVT	13	20.6%
Remote History of DVT or PE (>6 months)	10	15.9%
Arterial (not venous) thrombosis*	4	6.4%
Negative PE/DVT workup*	4	6.4%
"Rule out PE" as cause of death*	3	4.8%
Superficial (not deep) thrombosis or thrombophlebitis*	3	4.8%
Miscellaneous*	10	15.9%
Total	63	100%

* Represents coding-related inaccurate diagnosis

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Coding-Related Inaccurate Diagnosis: *Miscellaneous Category*

Classification of False Positives	Number of cases

Vein stenosis (no thrombosis)	1
PE stands for Physical Exam not Pulmonary Embolus	1
Low dose Coumadin prophylactic not therapeutic	1
Surgery done at outside hospital	1
Cerebral embolization of arteriovenous malformation (AVM)	1
Prophylactic heparin mistaken for therapeutic heparin	1
Right lower extremity (RLE) U/S ordered to r/o abscess at surgical site	1
Unknown	3
Total	10

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PE/DVT Results: Comparison of Studies

	Our study	Zhan study	AHRQ study	NSQIP and PTF study	UHC study
N	112	20,868	155	55,682	1022
PPV	44%	29%	68%	22%	61%
Sensitivity	--	68%	--	66%	--

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Problems in Coding PE/DVT

- PE/DVT PSI designed as initial screen
- Accuracy of method to detect true positives using administrative data affected by:
 - Standards used to assign codes for "other" or secondary conditions—> based on the Uniform Hospital Discharge Data Set (UHDDS).
 - "Other" conditions: those that coexist at the time of admission, develop sequentially, affect the treatment received and/or length of stay, or affect patient care
 - Definition of PE/DVT relative to:
 - UHDDS coding standards,
 - ICD-9-CM Official Coding Guidelines for Coding and Reporting
 - Coding Clinic published by the American Hospital Association (AHA)

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Problems in Coding PE/DVT, cont'd

- False Positive 1: chart review does not document a PE/DVT:
 1. Code was present on admission (POA) and meets UHDDS definition of "other" diagnosis.
 2. Code assigned as a current condition.