

Validating the Patient Safety Indicators (PSIs) in the VA: a Multi-Faceted Approach

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Project Team

- Collaboration between VA's HSR&D Service, the National Center for Patient Safety (NCPS), and AHRQ (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

Project Development

- Outgrowth of previous VA HSR&D grant to evaluate the PSIs using VA administrative data (2001-2004)
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 - Rivard P, et al. Creating learning organizations: Are Patient Safety Indicators (PSIs) a step in the right direction? *Health Services Research* 2006; 41(4, Part II): 1633-1653.
 - Rosen AK, et al. Evaluating the Patient Safety Indicators (PSIs): How well do they perform on VA data? *Medical Care* 2005; 43(9): 873-884.
 - Rosen AK, et al. Tracking Rates of Patient Safety Indicators over Time: Lessons from the VA. *Medical Care* 2006; 44(9): 850-861.
 - Rivard P, et al. Using Patient Safety Indicators to Estimate the Impact of Potential Adverse Events on Outcomes. In press, *Medical Care Research and Review*, 2007.
 - Romano P, et al. Validating Selected Patient Safety Indicators: Can Administrative Data be Used to Assess Safety Performance? Submitted, *Health Services Research*, 2007.
 - Rivard P, et al. Is there an Association between AHRQ's PSIs and Hospital Teaching Status? Submitted to *Advances in Patient Safety*. Agency for Healthcare Research and Quality, 2007.
 - Shimada S, et al. Racial Disparities in Patient Safety Indicator (PSI) Rates in the Veterans Health Administration. Submitted to *Advances in Patient Safety*. Agency for Healthcare Research and Quality, 2007.

Project Development

- Increasing interest within the VA and outside on
 - Comparing hospitals nationally on safety performance
 - Developing accurate hospital report cards
 - Pay-for-performance
- Concerns among VA managers, researchers, policy makers
 - PSIs may present inaccurate picture of individual hospital's performance & unfair comparisons of VA hospitals vs. private sector hospitals
 - PSIs are not validated measures!!!!
- HSR&D-funded meeting of key stakeholders, researchers, and AHRQ collaborators in October 2006 to develop and frame proposal to validate the PSIs

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:
 1. Develop collaborations with key stakeholders to guide in PSI selection and validation
 2. Investigate the criterion validity of the PSIs by review of the VA's EMR
 3. Identify explicit processes and structures of care associated with individual PSIs (assess attributional validity)
 4. Revise and improve the PSIs using multiple data sources and settings of care
 5. Assess the utility validity of the PSIs for QI and performance measurement



Objective 1: Develop Collaborations with Key Stakeholders

Steering committee (stakeholders) duties:

- Meet regularly throughout the project
- Act as an oversight group
- Develop selection criteria to guide PSI selection and validation process
- Assess usefulness and relevance of specific PSIs for VA

Objective 2: Investigate the Criterion Validity of the PSIs Using the EMR

- First Step: Identify False Positives
 - Are cases flagged by the AHRQ PSIs present in the EMR?

- Second Step: Identify False Negatives
 - Are cases present in the EMR **not** flagged by the AHRQ PSIs?

Objective 2: First Step

Identify False Positives

Hospital Selection

- Divide hospitals into major surgery vs. minor/no surgery hospitals
- Apply PSI software to 2006 VA inpatient data
- Use AHRQ PSI composite measure to rank 2 groups of hospitals on risk-adjusted PSI rates
- Within each group, select 3 hospitals with lowest and 3 hospitals with highest score
- Stratify remaining hospitals into quartiles; randomly select 2 hospitals from each stratum for each group
- N= 14 major surgery hospitals, 14 minor/no surgery hospitals

Objective 2: First Step

Identify False Positives

- 1,680 flagged discharges to identify false positives (4 discharges flagged for each PSI at 28 hospitals; 112 flagged cases per PSI)
- May use 2002-2006 data for low-frequency PSIs to reach 112
- Modify AHRQ chart-abstraction forms for selected PSIs for VA
- Obtain national access to EMRs through VistAWeb in VA
- Pilot test abstraction tools and train nurse abstractors
- Examine inter-rater reliability
- Conduct chart abstraction using explicit criteria over a period of 18 months

Objective 2: Second Step

Identify False Negatives

- a) Use an existing “gold standard” (e.g., the VA National Surgical Quality Improvement Project (NSQIP) for 5 surgical PSIs) (about 100 cases).
- b) Identify subgroups of discharges that may be at high risk of specific PSIs. Screen EMRs of these patients using keyword searches. Each “hit” (keyword) will have chart reviewed for PSI.
- c) Use other VA databases to identify cases with PSIs and match with unflagged cases in discharge data (e.g., VA Nursing Outcomes Database for decubitus ulcer) (about 100 cases).

Total Cases for Abstraction Based on 15 PSIs

- 1,680 flagged discharges to identify false positives (4 discharges flagged for each PSI at 28 hospitals) (112 flagged cases per PSI)
- 1,680 for matched controls
- 100 re-abstracted cases to determine inter-rater reliability
- 100 cases for false negatives (NSQIP)
- 100 cases for false negatives (other databases)
- 500 additional cases: false negatives, revise PSIs
- Total # of charts for abstraction: 4,160

Objective 3: Identify Processes and Structures of Care Associated with Individual PSIs

- First Step: Is a specific PSI associated with explicit processes of care (e.g., general processes of care and/or evidence-based patient safety practices)?
- Second Step: Do high-performing facilities have higher rates on structures and processes of care than lower-performing facilities?

Objective 3: First Step

Examine Association Between Explicit Processes of Care and Individual PSIs

- Match 1,680 flagged PSI cases with 1,680 controls (unflagged cases matched on demographic and clinical characteristics) to determine whether flagged cases are more likely to experience “process failures”
- Use propensity score methodology to perform matching; chi-square tests used to examine proportion of failure rates among cases and controls

Objective 3: Second Step

Do high-performing facilities have higher rates on structures and processes of care than lower-performing facilities?

- EMR lacks information on structural characteristics of hospitals; documentation on processes of care may be incomplete
- Conduct site visits at 6 facilities
 - Sites selected based on PSI composite score (2 highest, 2 lowest, 2 “average-scored”)
 - Structured interviews performed with selected staff at each site to gather data on safety and quality
- Assess differences between sites on structures and processes using qualitative methods

Objective 4: Revise and Improve the PSIs

- a) Add additional data elements to inpatient data:
 - Present-on-admission (POA) diagnoses, do-not-resuscitate (DNR) codes, selected clinical, laboratory and pharmacy data elements
- b) Link inpatient data with outpatient/inpatient data 30/60 days preceding index hospitalization (obtain POA diagnoses)
- c) Link inpatient data with outpatient/inpatient data 30/60 days following index hospitalization to evaluate whether additional PSIs are detected
- d) Link VA and Medicare data to examine PSI readmission in private sector
- e) Use text query searches (Objective 2) to improve coding
- f) Modify PSI numerators and denominators on inclusion/exclusion criteria
- g) Recalculate false positives and negatives


Objective 4: Example of PSI Modification

“Decubitus Ulcer”

- Additional POA information from preceding inpatient/outpatient data or EMR: distinguish between ulcers acquired in-hospital vs. those that were POA. Eliminate cases with POA from denominator
- Add patients with spinal cord injury and those admitted from long-term care facilities to the denominator: “high-risk” groups in the VA

“Failure to Rescue”

- Restrict denominator to surgical patients (NQF): difficult to distinguish POA conditions from complications among medical patients
- Add DNR information from NSQIP or from EMR: if DNR found, eliminate case from denominator



Objective 5: Assess the Utility of the PSIs for QI and Performance Measurement

- First step: Conduct focus groups with end-users to obtain baseline perceptions of PSI utility and information on barriers to/facilitators of implementation
- Second step: Conduct Breakthrough Series (QI initiative) with selected hospitals to assess utility of PSIs for QI and performance measurement

Objective 5: First Step

Assess Baseline Utility Validity

- Develop and disseminate hospital-level PSI reports to six sites
- Conduct focus groups with end-users to obtain baseline perceptions of PSI utility and information on barriers/facilitators of implementation
- Redesign and disseminate hospital-level PSI reports based on feedback

Objective 5: Second Step

Assess Utility Validity of PSIs for QI and Performance Measurement

- Conduct modified Breakthrough Series (BTS) at 30 hospitals on selected surgical PSIs
- Assess whether PSIs facilitate actions that lead to improvements in care (case-finding, root cause analyses)
- After BTS, conduct focus groups:
 - Examine how PSIs are used
 - Assess whether PSIs led to QI and performance measurement
 - Assess value and utility of hospital-level PSI reports

Overall Goal

- Develop a validated and reliable set of patient safety measures that broadly reflect the interests of VA stakeholders, **but that are generalizable beyond the VA.**

Diagram of Study Objectives

DEVELOP COLLABORATIONS WITH STAKEHOLDERS

CRITERION VALIDITY

Identification by:

- VistAWeb
- NSQIP
- Text queries on VA databases

Run PSIs

Identify false negatives

Identify true positives

Matched controls
False positives
Re-abstraction

ATTRIBUTIONAL VALIDITY

Examine EMR

Site visits

Processes of care

Structures of care

Formative evaluation

CONSTRUCT/PREDICTIVE/CRITERION VALIDITY

Qualitative review

Revise and improve PSIs

Add clinical, lab, and POA data

Calculate false positives

Calculate false negatives

UTILITY VALIDITY

Process evaluation

Feedback PSI info

Conduct Breakthrough Series

Site visits

Utility validation



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