

2009-2010 VIReC Database and Methods Cyber Seminar Series

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Measuring Laboratory Use and Results using VA Decision Support System National Extract Data

Session 4
August 3, 2009

Presented by:
Elizabeth Tarlov, RN, PhD



Session Outline

- Overview of VA DSS national lab data
- Finding information in the VA DSS national lab data
- Measurement of laboratory use and results in VA studies
- Examples of VA studies that have used VA DSS national lab data
- Where to go for more help

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- **Overview of VA DSS national lab data**
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Audience Poll

- **Have you ever used the DSS LAB or LAR National Data Extracts (NDE)?**
 - Yes
 - No

- **How would you rate your overall knowledge of the DSS LAB and LAR NDEs?**
 - 1 (No knowledge)
 - 2
 - 3
 - 4
 - 5 (Expert-level knowledge)

DSS Overview

■ What is DSS?

- VA's managerial cost accounting and executive information system

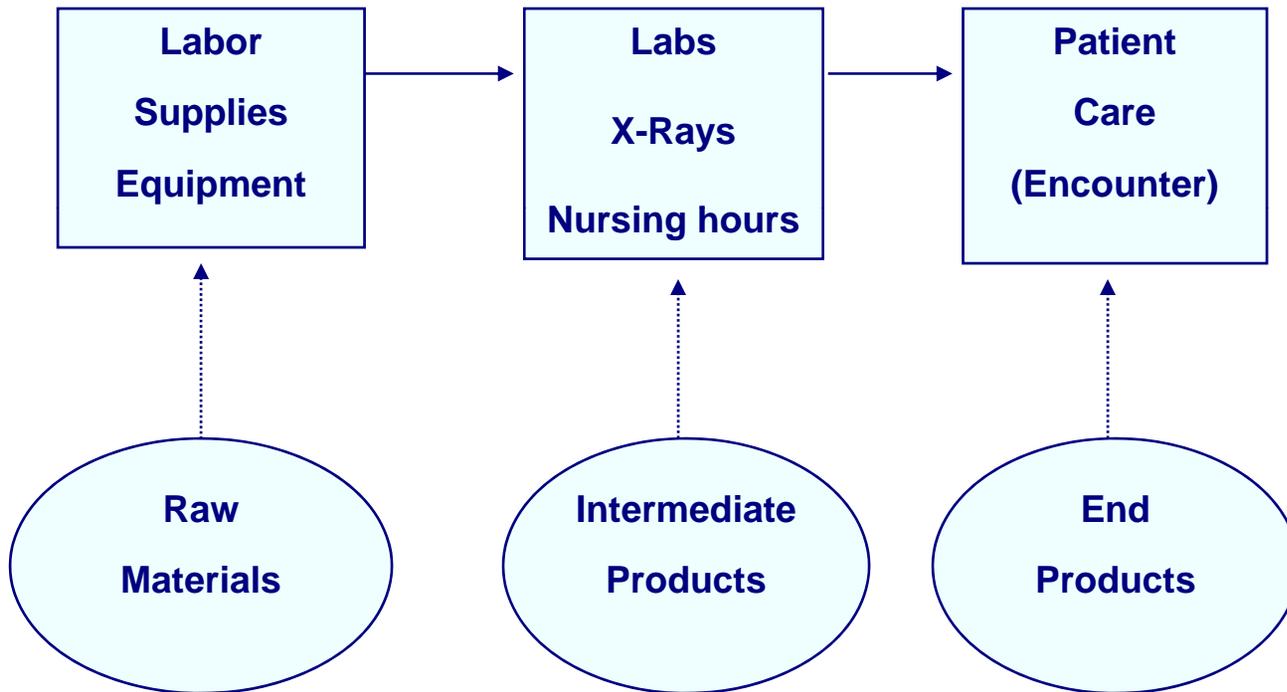
■ What is its primary purpose?

- Provide managerially-useful information (e.g., productivity measures, costs per unit work, quality assessment) to
 - Managers
 - Undersecretary for Health
 - Secretary
 - Congress

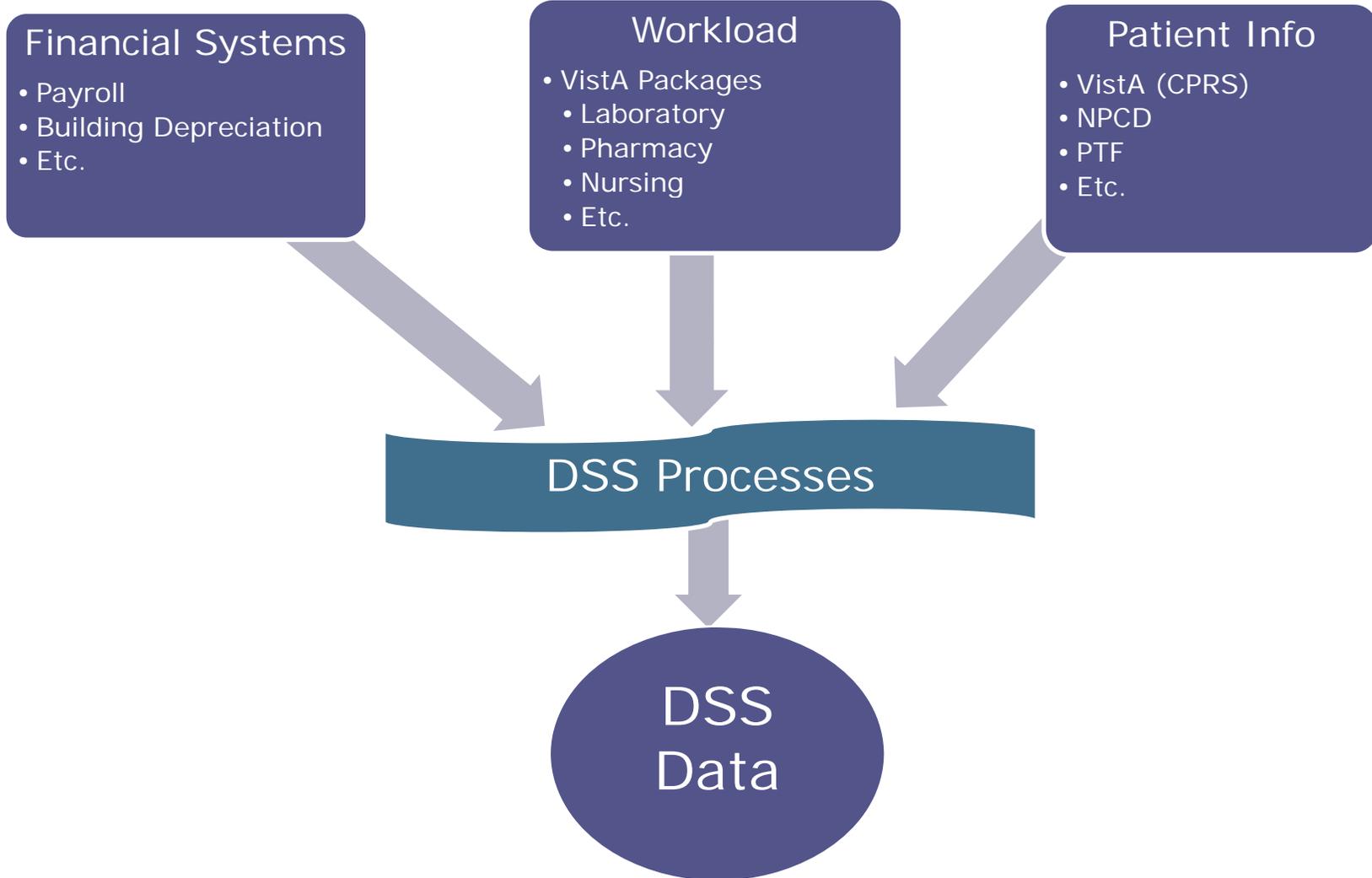


DSS Overview

Health Care Production Process



DSS Source Data



Where to Find DSS Lab Data

- **VISN Support Services Center (VSSC)**
 - Reports
 - Data Cubes
- **Austin Information Technology Center (AITC) Mainframe Computer**
 - National Data Extracts

Where to Find DSS Lab Data

- **VISN Support Services Center (VSSC)**
 - Reports
 - Data Cubes
- **Austin Information Technology Center (AITC) Mainframe Computer**
 - National Data Extracts

today's focus



Where to Find DSS Lab Data

- **VISN Support Services Center (VSSC)**
 - Reports
 - Data Cubes
- **Austin Information Technology Center (AITC) Mainframe Computer**
 - National Data Extracts
 - SAS Files
 - Monthly or quarterly 'updates'
 - Files are cumulative year-to-date

National Data Extracts (NDEs)

Clinical NDEs



■ LAB

- Workload and costs
- Test-level

■ LAR

- Laboratory results for a defined list of tests (currently, 76)
- Test-level

■ PHA

■ RAD

■ ECS/ECQ

National Data Extracts

Clinical NDEs

- LAB
- LAR
- PHA
- RAD
- ECS/ECQ

Other NDE Classifications

- “Core” Extracts
 - OutPat, TRT, DISCH, OBS
- Financial
- Program Activity

LAB & LAR NDE SAS Files

- **Data available from**
 - FY 2002 (LAB)
 - FY 2000 (LAR)
- **NDE File organization**
 - FY 2004 forward
 - 21 different files for each fiscal year, each NDE
 - By VISN (includes inpatient and outpatient data)



LAB & LAR NDE SAS Files

- **Data available from**
 - FY 2002 (LAB)
 - FY 2000 (LAR)
- **NDE File organization**
 - FY 2004 forward
 - 21 different files for each fiscal year, each NDE
 - By VISN (includes inpatient and outpatient data)
 - FY 2000 (LAR) – FY 2003
 - 8 different files for each fiscal year, each NDE
 - Groups of VISNs (4 groups)
 - Inpatient and outpatient data in separate files



LAB & LAR NDE SAS Files File Naming Convention / Mainframe Location*

RMTPRD.MED.DSS.SAS.FYxx.VISNyy.ndename

For example,

- RMTPRD.MED.DSS.SAS.FY09.VISN01.LAB
 - Contains FY 2009 inpatient and outpatient data from facilities in VISN 1

* Naming for FY2000 – FY2003 reflects different file organization – see VIREC website.

LAB & LAR NDE SAS Files File Naming Convention / Mainframe Location*

RMTPRD.MED.DSS.SAS.FYxx.VISNyy.ndename

For example,

- RMTPRD.MED.DSS.SAS.FY09.VISN01.LAB
 - Contains FY 2009 inpatient and outpatient data from facilities in VISN 1
- RMTPRD.MED.DSS.SAS.FY05.VISN12.LAR
 - Contains FY 2005 inpatient and outpatient data from facilities in VISN 12

* Naming for FY2000 – FY2003 reflects different file organization – see VIREC website.

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What information can I find in the LAB and LAR NDEs?

LAB

- Tests performed
 - separate record for each individual laboratory test for which there are billable tests
 - Includes those performed at point-of-care and some research records
 - Where and when performed
- Costs and other information pertinent to accounting
- Patient information

LAR

- Test results
 - patient-specific results for 76 tests
 - For those 76, all records entered into VistA (i.e., all in LAB)
- Patient information

What won't I find in the LAB and LAR NDE's?

What won't I find in LAB and LAR?

- Tests that are not patient-specific
 - e.g., tests done as lab controls or other standardization procedures
- Research records only if considered VA patient and an encounter is generated in VistA PCE file
- Diagnoses, procedures, and other clinical information
- Gender, race/ethnicity



Key Variables

LAB	LAR
Test identifier	Test identifier
Where performed	Result
Referral flag	Units reported
Clinic Stop Code	Result date

How do I find records containing the test I'm interested in?

LAB NDE

- **VA_LMIP:** Laboratory Management Index Program
 - Also called NLT code
 - Entered by lab staff
 - Assigned locally
 - Not standardized
- **FEED_KEY**
 - 5-digit character variable
 - Usually an LMIP code



How do I find records containing the test I'm interested in?

LAB NDE

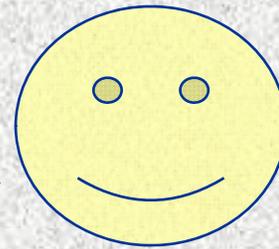
- **IPNUM:** Intermediate Product Number
 - Assigned by DSS based on LMIP
 - One IPNUM may be assigned to >1 LMIP
- **TESTNAME**
 - DSS-derived IP description
 - File maintained by individual site teams



How do I find records containing the test I'm interested in?

LAB NDE

- VA_LMIP
- FEED_KEY
- IPNUM
- TESTNAME



Best



How do I find records containing the test I'm interested in?

LAR NDE

■ DSSLARNO – Result ID

- Assigned by DSS, 1 – 76
- No other identifier in this file
- List of available tests on VIREC and DSS websites (at end)



How do I find test results?

- **RESULT** – Test Result
 - Result of the test identified by DSSLARNO
 - Up to 4 decimal digits
- **TESTUNIT** – Units in which the test are reported

DSSLARNO \implies **RESULT + TESTUNIT = Test Result**

Example: Total Thyroxine (T-4)

- DSSLARNO = 0022
- RESULT = 4.2
- TESTUNIT = mcg/dl



0022

4.2 + mcg/dl = **Thyroxine 4.2 mcg/dl**

What about Non-numeric Results?

For example: HIV Antibody

Translation Value	Test Result
0	Negative, Non-Reactive
1	Positive, Reactive
2	Borderline, Indeterminate
3	Test not performed, Quantity not sufficient or other reason
5	Result cannot be translated

Can I link LAB and LAR records?

- **Theoretically . . . Yes**
 - Using **SCRSSN** + **ENC_NUM** (or, **ENC_NUM** alone)
- **But some LAB records will not have a LAR match**
 - Local site test name / DSS test name issue
 - Results in facility or VISN-specific sudden drop-off in number of LAR records.

Solution: LOINC Codes

- Universal identifier
- Highly specific - Identifies test, method of analysis
- Records pulled based on LOINC
- Implemented nationwide for FY 2009
- Should result in better match between LAB and LAR records

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Case Scenario #1

Diabetes Quality of Care: Hgb A1c Frequency

Question:

We're conducting a retrospective cohort study of care quality among patients with Diabetes. We'd like to measure frequency of Hemoglobin A1c testing among our cohort in FY 2008. Should we use the LAR file to obtain this information?

Case Scenario #1

Diabetes Quality of Care: Hgb A1c Frequency

Question:

We're conducting a retrospective cohort study of patients with Diabetes care quality. We'd like to measure frequency of Hemoglobin A1c testing among our cohort in FY 2008. Should we use the LAR file to obtain this information?

Answer:

No!

Remember the test-name linking issue?

Case Scenario #1

Diabetes Quality of Care: Hgb A1c Frequency

Goal:

Measure frequency of Hemoglobin A1c testing among our cohort in FY 2008.

Procedure:

Use the **LAB file**.

1. Obtain IPNUM or LMIP(s) for Hgb A1c test:

- DSS Intermediate Products table (URL at end)
- Search on name ("Description" field) *and all variants*.
e.g., Glycohemoglobin, Glycosylated Hemoglobin,
Glycated Hemoglobin, Hb A1c
- Can double check by searching on IP numbers already found.

Case Scenario #1

Diabetes Quality of Care: Hgb A1c Frequency

Procedure (cont'd):

1. Obtain IPNUM or LMIP(s) for Hgb A1c test
2. In **LAB** NDE: Identify study patients' records using SCRSSN

Case Scenario #1

Diabetes Quality of Care: Hgb A1c Frequency

Procedure (cont'd):

1. Obtain IPNUM or LMIP(s) for Hgb A1c test:
2. In LAB NDE: Identify study patients' records using SCRSSN
3. Keep only FY 2008 records:
 - Several date variables <Pause for a special message about LAB and LAR dates> ☺
 - SVC_DTE (service date)
 - YYYYMMDD
 - Default = Year and month that VistA extract was performed, concatenated with '01' for day

Case Scenario #1

Diabetes Quality of Care: Hgb A1c Frequency

Procedure (cont'd):

1. Obtain IPNUM or LMIP(s) for Hgb A1c test:
2. In LAB NDE: Identify study patients' records using SCRSSN
3. Keep only FY 2008 records
4. Pull records with IPNUMs identified in Step 1.

Case Scenario #1

Diabetes Quality of Care: Hgb A1c Frequency

Procedure (cont'd):

1. Obtain IPNUM or LMIP(s) for Hgb A1c test:
2. In LAB NDE: Identify study patients' records using SCRSSN
3. Keep only FY 2008 records
4. Pull records with IPNUMs identified in Step 1.
5. Wait! Eliminate 'duplicates' resulting from send-out or referral labs.
 - Drop if REF_FLG (referral flag) = 'Y'

Yield: All study cohort records for Hemoglobin A1c tests performed in FY 2008

Case Scenario #2

Preventing Kidney Disease: Change in Serum Creatinine

Question (from the historical files):

“We’re planning a study of the effectiveness of church attendance in preventing chronic kidney disease among patients with hypertension and diabetes. We will recruit 2500 participants receiving care in 10 facilities across 4 VISNs. One of our outcome measures is change in serum creatinine over the study period, June, 2008 to September, 2010. Can we use the DSS LAR NDE for this? Do you have any advice for us?”

Case Scenario #2

Preventing Kidney Disease: Change in Serum Creatinine

Question:

"We're planning a study of the effectiveness of church attendance in preventing chronic kidney disease among patients with hypertension and diabetes. We will recruit 2500 participants receiving care in 10 facilities across 4 VISNs. One of our outcome measures is change in serum creatinine over the study period, June, 2008 to September, 2010. Can we use the DSS LAR NDE for this? Do you have any advice for us?"

Answer:

Sounds like a good idea. Here are a few things to keep in mind...

Case Scenario #2

Preventing Kidney Disease: Change in Serum Creatinine

Goal:

Measure change in serum creatinine between June, 2008 and September, 2010.

Measurement Issues:

1. Switch in method used by DSS to extract results from VistA, implemented October 1, 2008
2. Specimen source not indicated

Case Scenario #2

Preventing Kidney Disease: Change in Serum Creatinine

Measurement Issues:

1. Switch in method used by DSS to extract results from VistA, implemented October 1, 2008
 - Pre- FY09: VistA record extract using test name (remember the test-name linking issue?)
 - FY09 forward, LOINC codes
 - Why is this a problem?
 - Discontinuity in 'measurement' may impact the quality of the outcome measure in this longitudinal study
 - Little is known yet about LOINC code implementation and resulting data quality

Case Scenario #2

Preventing Kidney Disease: Change in Serum Creatinine

Measurement Issues:

1. Switch in method used by DSS to extract results from VistA, implemented October 1, 2008
2. Specimen source not indicated
 - TESTNAME = "Serum Creatinine" but some result values out-of-range and suggest urine, rather than serum creatinines
 - No DSS field indicating source of lab specimen
 - Solution going forward: LOINC!
 - LOINC codes are specific to the specimen source
 - When it says "*Serum Creatinine*", it really will be.

Measurement Issues

Take Home Messages

- **DSS Lab Data: Fabulous resource, complex database**
- **Careful examination is warranted**
- **Clinic advice is critical**

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- Where to go for more help

Selected References using VA DSS National Lab Data

Implementation Science



Research article

Open Access

Implementing electronic clinical reminders for lipid management in patients with ischemic heart disease in the veterans health administration: QUERI Series

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Abstract

Background: Ischemic heart disease (IHD) affects at least 150,000 veterans annually in the United States. Lowering serum cholesterol has been shown to reduce coronary events, cardiac death, and total mortality among high risk patients. Electronic clinical reminders available at the point of care delivery have been developed to improve lipid measurement and management in the Veterans Health Administration (VHA). Our objective was to report on a hospital-level intervention to implement and encourage use of the electronic clinical reminders.

Methods: The implementation used a quasi-experimental design with a comparison group of hospitals. In the intervention hospitals (N = 3), we used a multi-faceted intervention to encourage use of the electronic clinical reminders. We evaluated the degree of reminder use and how patient-level outcomes varied at the intervention and comparison sites (N = 3), with and without adjusting for self-reported reminder use.

Results: The national electronic clinical reminders were implemented in all of the intervention sites during the intervention period. A total of 5,438 patients with prior diagnosis of ischemic heart disease received care in the six hospitals (3 intervention and 3 comparison) throughout the 12-month intervention. The process evaluation showed variation in use of reminders at each site. Without controlling for provider self-report of use of the reminders, there appeared to be a significant improvement in lipid measurement in the intervention sites (OR 1.96, 95% CI 1.34, 2.88). Controlling for use of reminders, the amount of improvement in lipid measurement in the intervention sites was even greater (OR 2.35, CI 1.96, 2.81). Adjusting for reminder use demonstrated that only one of the intervention hospitals had a significant effect of the intervention. There was no significant change in management of hyperlipidemia associated with the intervention.

Conclusion: There may be some benefit to focused effort to implement electronic clinical reminders, although reminders designed to improve relatively simple tasks, such as ordering tests, may be more beneficial than reminders designed to improve more complex tasks, such as initiating or titrating medications, because of the less complex nature of the task. There is value in monitoring the process, as well as outcome, of an implementation effort.

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(page number not for citation purposes)

ORIGINAL CONTRIBUTION

PSA Screening Among Elderly Men With Limited Life Expectancies

Louise C. Walter, MD

Daniel Berthelson, MPH

Karla Lindquist, MS

Badrinath R. Konecny, MD

Context: Most guidelines do not recommend prostate-specific antigen (PSA) screening in elderly men who have limited life expectancies because the known harms of screening outweigh potential benefits. However, there are no large-scale studies of actual PSA screening practices in elderly men, according to life expectancy.

Objective: To characterize the extent of PSA screening among elderly men, including those with limited life expectancies.

Design, Setting, and Participants: Cohort study of 597 642 male veterans aged 70 years and older who were seen at 104 US Department of Veterans Affairs facilities during both 2002 and 2003, without a history of prostate cancer, elevated PSA, or prostate cancer symptoms. Charlson comorbidity scores were used to stratify men into 3 groups ranging from best health (score=0) to worst health (score=4).

Main Outcome Measure: Receipt of PSA testing during 2003 was based on US Department of Veterans Affairs data and Medicare claims.

Results: In 2003, 56% of elderly men had a PSA test performed. Although PSA screening rates decreased with advancing age, within each 5-year age group the percentage of men who underwent a PSA test did not substantially decline with worsening health. For example, among men aged 85 years and older, 34% in best health had a PSA test compared with 36% in worst health. In multivariate analyses, many nonclinical factors, such as marital status and region of the country, had a greater effect on PSA screening than health, and screening rates exceeded 60% for some subgroups of men in worst health.

Conclusions: Prostate-specific antigen screening rates among elderly veterans with limited life expectancies should be much lower than current practice given the known harms of screening. More attention to prognosis is needed when making screening PSA recommendations to elderly men.

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fects of screening, such as additional procedures due to false-positive results, psychological distress, or the morbidity associated with treating clinically insignificant prostate cancer detected by screening.^{1,5}

Although Medicare began coverage of screening PSA in 2000, little information is available on actual PSA screening practices in elderly men. National surveys have found that self-reported PSA screening rates decrease among men aged 80 years and older after peaking among men in their 70s.^{6,7} However, screening rates vary. For example, reports of PSA screening in the past year among men aged 80 years and older

range from 26% in the 2000 National Health Interview Survey to 56% in the 2001 Behavioral Risk Factor Surveillance System.^{8,9} Self-reports also consistently overestimate the extent of actual screening.^{5,10} In addition, results from surveys have been mixed regarding associations between PSA screening and

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How have laboratory use and results been measured in VA studies?

Sales, et al., 2008

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**How have laboratory use and results been measured in VA studies?:
Sales, et al., 2008**

- QUERI, exploratory study
- Evaluation of implementation across 3 hospitals
- Hospital-level Laboratory Outcome measures:
 1. Change in proportion of Ischemic Heart Disease (IHD) patients with current LDC-c measurement
 2. Change in proportion of patients with elevated LDL-c receiving lipid-lowering therapy

**How have laboratory use and results been
measured in VA studies?:
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- Hospital-level Laboratory Outcome measures:
 1. Change in proportion of Ischemic Heart Disease (IHD) patients with current LDC-c measurement
 - **LAB** NDE to capture all tests
 - **IPNUM** identifying LDL-c
 - Aggregate measure used as summative measure of intervention effectiveness

**How have laboratory use and results been
measured in VA studies?:
Sales, et al., 2008**

- Hospital-level Laboratory Outcome measures:
 2. Change in proportion of patients with elevated LDL-c receiving lipid-lowering therapy
 - **LAR** NDE to obtain test results
 - **DSSLARNO** to identify LDL-c result
 - Small number of sites so would be feasible to evaluate issues related to result record completeness

How has outpatient healthcare utilization been measured in VA studies?

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MOST SCREENING GUIDELINES do not recommend prostate-specific antigen (PSA) screening in elderly men with limited life expectancies because potential harms of screening, which occur immediately, outweigh potential benefits, which are not expected to occur until several years in the future.¹⁻⁶ For example, the American Cancer Society and the American Urological Association recommend annual PSA screening for average-risk men aged 50 years and older if they have more than a 10-year life expectancy, which is usually defined as having greater than a 50% probability of surviving 10 years.^{1,2} The US Department of Veterans Affairs (VA) and the US Preventive Services Task Force conclude that evidence is insufficient to recommend routine PSA screening, and men with a low probability of surviving 10 years are unlikely to benefit from screening even under favorable assumptions.^{3,4} All agree that currently there is no conclusive evidence that PSA screening reduces prostate cancer mortality at any age or life expectancy and convincing evidence of benefit is unlikely to ever exist for elderly men because ongoing randomized trials of PSA screening have excluded men older than 75 years.⁷ It is these men, especially those in poor health, who will probably experience only the adverse effects

Context Most guidelines do not recommend prostate-specific antigen (PSA) screening in elderly men who have limited life expectancies because the known harms of screening outweigh potential benefits. However, there are no large-scale studies of actual PSA screening practices in elderly men, according to life expectancy.

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Results In 2003, 56% of elderly men had a PSA test performed. Although PSA screening rates decreased with advancing age, within each 5-year age group the percentage of men who underwent a PSA test did not substantially decline with worsening health. For example, among men aged 85 years and older, 34% in best health had a PSA test compared with 36% in worst health. In multivariate analyses, many nonclinical factors, such as marital status and region of the country, had a greater effect on PSA screening than health, and screening rates exceeded 60% for some subgroups of men in worst health.

Conclusions Prostate-specific antigen screening rates among elderly veterans with limited life expectancies should be much lower than current practice given the known harms of screening. More attention to prognosis is needed when making screening PSA recommendations to elderly men.

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**How have laboratory use and results been
measured in VA studies?:
Walter, et al., 2006**

- Retrospective cohort study
- PSA screening among elderly men, including those with limited life expectancies
- Used linked VA and Medicare data to more completely capture healthcare use
- Outcome measure: Receipt of PSA testing during 2003

**How have laboratory use and results been
measured in VA studies?:
Walter, et al., 2006**

- Outcome measure: Receipt of PSA testing during 2003
- Measurement issues:
 - Evaluation of extent of missing records in LAR NDE
 - Two different measures:
 - VA – laboratory database
 - Medicare - claims

Session Outline

- Overview of VA DSS national lab data
- Finding information in the VA DSS national lab data
- Measurement of laboratory use and results in VA studies
- Examples of VA studies that have used VA DSS national lab data
- **Where to go for more help**

Data Access

DSS National Data Extracts

Scrambled SSN

- Establish TSO User Account on AITC* Mainframe
 - Coordinated locally through Information Security Officer, Privacy Officer, and ACRS Point of Contact
 - Form 9957
- DSS Non-Disclosure Agreement
 - Sign and submit with 9957
- Forms on VA Intranet
 - <http://vaww.va.gov/NDS/DataAccess/DataAccessForms.asp>
- Call VIREC Help Desk as needed

* Austin Information Technology Center



Data Access

DSS National Data Extracts

Real SSN

- Study-specific approval
- Required approvals include:
 - VHA Privacy Office
 - VHA Security Office
 - VHA Office of Research & Development (ORD)
 - Data Steward
- Coordinated for DSS by National Data Systems (NDS)

Data Access

DSS National Data Extracts

Real SSN (cont'd)

- Requires submission of study documentation in addition to Form 9957 and non-disclosure agreement
- Detailed instructions on NDS intranet website
<http://vaww.va.gov/NDS/DataAccess/VAResearchers.asp>



VIReC Help

■ VIReC Webpage

<http://www.virec.research.va.gov>

- Information on VA data sources and how to access data
- DSS NDEs
 - Research User Guide (RUG)
 - Select variable frequencies
 - Select person-level frequencies
 - Periodic updates and data quality information

VIReC Help (cont'd)

■ HSRData Listserv

- Join at the VIReC Web site
- Discussion among >400 data stewards, managers, and users
- Past messages in archive (on intranet)

■ VIReC Help Desk

- VIReC staff will answer your question and/or direct you to available resources on topics
- VIReC@va.gov
- (708) 202-2413

DSS Resources

- **Decision Support Office Website**

<http://vaww.dss.med.va.gov/index.asp>

- **DSS Help Desk**

<http://vaww.dss.med.va.gov/helpdsktckt.asp>

- **FY2008 DSS National Data Extract Technical Guide**

<http://vaww.dss.med.va.gov/DSS%20Documents/Tech%20Guides/FY08%20NDE%20Technical%20Guide.doc>

- **DSS Product Table**

http://vaww.dss.med.va.gov/programdocs/pd_products.asp

Selected Recent References on VA DSS National Laboratory Data

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Questions?

Upcoming Seminars

- **September 7, 2009**
 - Labor Day, No Lecture
- **October 5, 2009**
 - Research Access to VA Data
 - Linda Kok, MS