

VIReC Database & Methods Cyberseminar Series

Examining Veterans' Pharmacy Use with VA and Medicare Pharmacy Data

February 1, 2016

Presented by:

Walid F. Gellad, MD, MPH

Poll Question #1: I am interested in VA data primarily due to my role as _____.

- Research investigator
- Data manager
- Project coordinator
- Program specialist or analyst
- Other (specify)

Poll Question #2: Have you ever used VA Pharmacy Data?

- Yes
- No

Poll Question #3: How would you rate your overall knowledge of VA Pharmacy Data?

- 1 (Never Used)
- 2
- 3
- 4
- 5 (Used Frequently, Very familiar)

Session Objectives

- How has outpatient pharmacy data been used in VA studies?
- Overview of VA and Medicare pharmacy databases
- Finding information in the VA and Medicare pharmacy databases
- Examples of VA studies that have used the VA pharmacy databases
- Where to go for more help

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How has pharmacy data been used in VA studies?

Trends in Medication Use

Support Care Cancer (2012) 20:1649–1657
DOI 10.1007/s00520-011-1255-0

ORIGINAL ARTICLE

Trends in anemia management in lung and colon cancer patients in the US Department of Veterans Affairs, 2002–2008

Elizabeth Tarlov · Kevin T. Stroupe · Todd A. Lee · Thomas W. Weichle · Qiuying L. Zhang · Laura C. Michaelis · Howard Ozer · Margaret M. Browning · Denise M. Hynes

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Abstract

Purpose In 2007, growing concerns about adverse impacts of erythropoiesis-stimulating agents (ESAs) in cancer patients led to an FDA-mandated black box warning on product labeling, publication of revised clinical guidelines, and a Medicare coverage decision limiting ESA coverage. We examined ESA therapy in lung and colon cancer patients receiving chemotherapy in the VA from 2002 to 2008 to ascertain trends in and predictors of ESA use.

Methods A retrospective study employed national VA databases to “observe” treatment for a 12-month period following diagnosis. Multivariable logistic regression analyses evaluated changes in ESA use following the

FDA-mandated black box warning in March 2007 and examined trends in ESA administration between 2002 and 2008.

Results Among 17,014 lung and 4,225 colon cancer patients, those treated after the March 2007 FDA decision had 65% (lung OR 0.35, CI_{95%} 0.30–0.42) and 53% (colon OR 0.47, CI_{95%} 0.36–0.63) reduced odds of ESA treatment compared to those treated before. Declines in predicted probabilities of ESA use began in 2006. The magnitude of the declines differed across age groups among colon patients ($p=0.01$) and levels of hemoglobin among lung cancer patients ($p=0.04$).

Conclusions Use of ESA treatment for anemia in VA cancer care declined markedly after 2005, well before the 2007 changes in product labeling and clinical guidelines. This suggests that earlier dissemination of research results had marked impacts on practice patterns with these agents.

Keywords Lung neoplasms · Colon neoplasms · Anemia/ drug therapy · Physician's practice patterns · Age factors

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Introduction

- Tarlov E, Stroupe KT, et al. *Support Care Cancer*. 2012; 20: 1649–57
- Pharmacy data used to assess trends in medication use

How has pharmacy data been used in VA studies?

Cohort Identification

Arthritis Care & Research
Vol. 64, No. 10, October 2012, pp 1490–1496
DOI 10.1002/acr.21736
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ORIGINAL ARTICLE

Identification of Rheumatoid Arthritis Patients Using an Administrative Database: A Veterans Affairs Study

BERNARD NG,¹ FAWAD ASLAM,² NANCY J. PETERSEN,¹ HONG-JEN YU,³ AND MARIA E. SUAREZ-ALMAZOR¹

Objective. The accuracy of the diagnosis is vital when administrative databases are used for pharmacoepidemiologic and outcome studies. Data pertaining to the utility of databases for rheumatoid arthritis (RA) are sparse and variable. We assessed the utility of various diagnostic algorithms to identify RA patients within the Veterans Health Administration (VHA) databases.

Methods. Using the International Classification of Diseases, Ninth Revision code for RA at 2 visits at least 6 months apart, we identified 1,779 patients between October 1, 1998 and September 30, 2009 in our local Veterans Affairs Medical Center (VAMC) administrative database. Disease-modifying antirheumatic drug (DMARD) use was ascertained from the pharmacy database. Cases were analyzed based on DMARD therapy and RA codes at clinic visits. A total of 543 patients' medical records, selected by stratification and random selection on the basis of their visits, were reviewed to ascertain the clinicians' diagnoses and clinical criteria documentation. Positive predictive values (PPVs) were calculated for various database case identification algorithms using diagnosis of RA by medical record review as the gold standard.

Results. The PPV for identification of RA with 2 RA codes 6 months apart was 30.9%. Addition of DMARD therapy increased the PPV to 60.4%. The PPV further increased to 91.4% when having an RA code at the last VAMC rheumatology clinic visit criterion was added. An algorithm using only 2 administrative RA codes 6 months apart had a low PPV for correctly identifying patients with RA in the VHA database.

Conclusion. Including DMARD therapy and requiring an RA code at the last visit with a rheumatologist increased the performance of the data extraction algorithm.

INTRODUCTION

Computerized administrative databases are frequently used for epidemiologic research. The Veterans Health Administration (VHA) databases, among the largest in the country, are one such example. International Classification of Diseases, Ninth Revision (ICD-9), clinical modification codes are often used to identify subjects for research pur-

vidual patient records, the validity and reliability of using administrative codes as the sole source of patient identification have been debated. A few studies have been undertaken for rheumatic diseases including rheumatoid arthritis (RA), gout, and spondylarthritides (1–3). While the coding accuracy has been good for the latter, the same cannot be said for RA and gout. For RA in particular, the results have been mixed. A study by Singh et al identifying

- Ng B, et al. *Arthritis Care & Research*. 2012; 64: 1490–96
- Pharmacy data used for cohort identification

How has pharmacy data been used in VA studies?

Utilization and Quality

Incidence- Versus Prevalence-Based Measures of Inappropriate Prescribing in the Veterans Health Administration

Brian C. Lund, PharmD,^{ab} Margaret Carrel, PhD,^{ac} Walid F. Gellad, MD,^{de}
Elizabeth A. Chrischilles, PhD,^b and Peter J. Kaboli, MD^f

OBJECTIVES: To describe variations in potentially inappropriate prescribing (PIP) and characterize the extent to which switching to an incidence-based indicator would affect health system quality rankings.

DESIGN: Observational study.

SETTING: Veterans Health Administration in 2011.

PARTICIPANTS: Older adults receiving outpatient primary care.

MEASUREMENTS: PIP was defined according to the National Committee for Quality Assurance High-Risk Medications in the Elderly list. Ranks were separately assigned for prevalent and incident PIP at the regional, network, and healthcare system levels.

RESULTS: National PIP prevalence was 12.3% (167,766/1,360,251), and incidence was 5.8% (78,604/1,360,251). PIP prevalence ranged from 3.5% to 33.1% across healthcare systems (interquartile range (IQR) = 9.2–15.5%). PIP incidence ranged from 1.2% to 14.9% (IQR = 4.1–7.2%). Rank order in PIP prevalence and incidence was correlated (Spearman correlation; $\rho = 0.934$, $P < .001$), although substantial changes in ranks were seen for some healthcare systems, with seven of 139 (5.0%) systems shifting more than 30 rank positions and 21 (15.1%) systems shifting 16 to 30 positions.

CONCLUSION: Prevalence- and incidence-based indicators of prescribing quality were strongly correlated. Transitioning to incidence-based indicators would not produce an initial disruption in quality rankings for most health-

care systems and might yield more-salient measures for tracking healthcare quality. *J Am Geriatr Soc* 2015.

Key words: medication safety; quality of care; pharmacotherapy; pharmacoepidemiology

Prescribing quality is the domain of healthcare quality that ensures the safe and effective use of prescription medications. When all potential lapses in quality along the prescribing pathway are considered, it has been estimated that only 4% to 21% of individuals obtain optimal benefit from their medications.¹ This is particularly problematic for older adults, given an accumulated number of comorbidities, complex medication regimens, declining functional status, and physiological changes associated with less-predictable pharmacokinetics and pharmacodynamics.^{2,3} A common approach to measuring and tracking healthcare quality is the use of quality indicators, and several indicators of prescribing quality in older adults have been developed.⁴⁻⁷ For example, the Healthcare Effectiveness Data and Information Set (HEDIS) is an indicator-based tool that the National Committee for Quality Assurance has endorsed and that more than 90% of U.S. health plans use to measure performance.⁸ Among the HEDIS measures is an indicator of High-Risk Medications in the Elderly (HRME), a list of medications whose potential risks have been deemed according to consensus review generally to outweigh potential benefits when prescribed to older adults. Because this definition does not constitute an abso-

- Lund et al., *JAGS*. 2015; 63(8):1601-7.
- VA DSS data used to measure the quality of medication prescribing.

From the ^aCenter for Comprehensive Access and Delivery Research and

How has pharmacy data been used in VA studies?

Utilization and Quality

The Quality of Medication Treatment for Mental Disorders in the Department of Veterans Affairs and in Private-Sector Plans

Katherine E. Watkins, M.D., M.S.H.S., Brad Smith, Ph.D., Ayse Akincigil, Ph.D., Melony E. Sorbero, Ph.D., Susan Paddock, Ph.D., Abigail Woodroffe, Ph.D., Cecilia Huang, Ph.D., Stephen Crystal, Ph.D., Harold Alan Pincus, M.D.

Objective: The quality of mental health care provided by the U.S. Department of Veterans Affairs (VA) was compared with care provided to a comparable population treated in the private sector.

Methods: Two cohorts of individuals with mental disorders (schizophrenia, bipolar disorder, posttraumatic stress disorder, major depression, and substance use disorders) were created with VA administrative data (N=836,519) and MarketScan data (N=545,484). The authors computed VA and MarketScan national means for seven process-based quality measures related to medication evaluation and management and estimated national-level performance by age and gender.

Results: In every case, VA performance was superior to that of the private sector by more than 30%. Compared with individuals in private plans, veterans with schizophrenia or major depression were more than twice as likely to receive appropriate initial medication treatment, and veterans with depression were more than twice as likely to receive appropriate long-term treatment.

Conclusions: Findings demonstrate the significant advantages that accrue from an organized, nationwide system of care. The much higher performance of the VA has important clinical and policy implications.

Psychiatric Services in Advance (doi: 10.1176/appi.ps.201400537)

- Watkins et al., *Psychiatric Services*. 2015: epub ahead of print.
- VA DSS data used to measure the quality of medication prescribing.

How has pharmacy data been used in VA studies?

Utilization and Quality

Adherence to hormonal contraception among women veterans: differences by race/ethnicity and contraceptive supply

Sonya Borrero, MD, MS; Xinhua Zhao, PhD; Maria K. Mor, PhD; Eleanor B. Schwarz, MD, MS; Chester B. Good, MD, MPH; Walid F. Gellad, MD, MPH

OBJECTIVE: The objective of the study was to assess the adherence to hormonal contraception (pill, patch, ring, or injectable) among women veterans and examine the relationships between race/ethnicity and the months of contraceptive supply dispensed with contraceptive adherence.

STUDY DESIGN: We conducted a retrospective analysis of the Department of Veterans Affairs (VA) national databases to examine the adherence to hormonal contraception over 12 months among women aged 18-45 years who had hormonal contraceptive coverage during the first week of fiscal year 2008. We examined several adherence indicators including gaps between refills and months of contraceptive coverage. Descriptive statistics and multivariable models were used to examine the associations between race/ethnicity and contraceptive supply dispensed with adherence.

RESULTS: Our cohort included 6946 women: 47% were white, 6% were Hispanic, 22% were black, and 25% were other race or had missing race information. Most women (83%) received a 3 month

supply of contraception at each fill. More than 64% of women had at least 1 gap in coverage of 7 days or longer. Only 22% of women received a full 12 months of contraception without any gaps (perfect adherence). Compared with whites, Hispanics were significantly more likely to experience gaps (64% vs 70%; $P = .02$), and Hispanics and blacks received fewer months of contraceptive coverage (9.3 vs 8.9 and 9.0, $P < .001$). Compared with women receiving 3 month supplies, those receiving 1 month supplies had a higher likelihood of a gap (63% vs 72%, $P < .001$), fewer months of coverage (9.3 vs 6.9, $P < .001$), and a lower likelihood of perfect adherence (22% vs 11%, $P < .001$).

CONCLUSION: Adherence to hormonal contraception among women veterans is poor. Efforts to improve contraceptive adherence and lower risk of unintended pregnancy are needed; dispensing more months of supply for hormonal contraception may be a promising strategy.

Key words: adherence, contraception, female veterans, race/ethnicity, unintended pregnancy

- Borrero et al., *Am J Obstet Gynecol.* 2013; 209:103.e1-e11.
- VA PBM data used to measure medication adherence.

How has pharmacy data been used in VA studies?

Cohort Identification and Utilization

Research

Original Investigation | LESS IS MORE

Dual Use of Department of Veterans Affairs and Medicare Benefits and Use of Test Strips in Veterans With Type 2 Diabetes Mellitus

Walid F. Gellad, MD, MPH; Xinhua Zhao, PhD; Carolyn T. Thorpe, PhD, MPH; Maria K. Mor, PhD; Chester B. Good, MD, MPH; Michael J. Fine, MD, MSc

IMPORTANCE Self-monitoring of blood glucose is a costly component of care for diabetes mellitus, with unclear benefits for patients not taking insulin. Veterans with dual Department of Veterans Affairs (VA) and Medicare benefits have access to test strips through both systems, raising the potential for overuse.

OBJECTIVES To examine the patterns of test strip receipt among older veterans with diabetes and determine whether receipt of strips from dual health care systems is associated with overuse.

DESIGN, SETTING, AND PARTICIPANTS We performed a cross-sectional, retrospective cohort study using national VA administrative data linked to Medicare Parts A, B, and D claims for fiscal years 2008 and 2009. A total of 363 996 community-dwelling veterans 65 years or older with diabetes who used the VA health care system and received test strips in fiscal year 2009 were included in the study.

EXPOSURES Receipt of test strips from the VA only, Medicare only, or both the VA and Medicare; covariates included sociodemographics, comorbidity, diabetes complications, and hemoglobin A_{1c} level.

MAIN OUTCOMES AND MEASURES Quantity of test strips dispensed and overuse of test strips, defined as more than 1 strip per day (>365 strips per year) among those taking no diabetes medications, oral diabetes medications alone, or long-acting insulin without short-acting insulin or more than 4 strips per day (>1460 strips per year) among those taking short-acting insulin.

RESULTS Overall, 260 688 older veterans (71.6%) with diabetes received strips from the VA only, 82 826 (22.8%) from Medicare only, and 20 482 (5.6%) from the VA and Medicare. Veterans receiving strips from both the VA and Medicare received more strips (median, 600; interquartile range [IQR], 350-1000) than the Medicare only (median, 400; IQR, 200-700) and VA only (median, 200; IQR, 100-500) groups ($P < .001$) and had substantially greater odds of overuse than the VA only group (55.4% vs 15.8%) (adjusted odds ratio [OR], 16.3; 95% CI, 14.6-18.1 for no medications; 55.3% vs 6.0%; OR, 19.8; 95% CI, 18.9-20.8 for oral medications; 87.4% vs 65.5%; OR, 3.69; 95% CI, 3.30-4.14 for long-acting insulin; and 32.8% vs 13.5%; OR, 3.24; 95% CI, 3.05-3.45 for short-acting insulin). Patterns were similar when using more conservative thresholds of overuse.

CONCLUSIONS AND RELEVANCE Veterans who receive glucose test strips through both the VA

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- Gellad W, Zhao X, Thorpe C, et al. *JAMA Intern Med.* 2015; 175(12):1942-1949.
- VA PBM and Medicare Part D data used for cohort identification and to assess the use of diabetes meds and test strips

How has pharmacy data been used in VA studies?

Cohort Identification and Utilization

Original Investigation | LESS IS MORE

Rates of Deintensification of Blood Pressure and Glycemic Medication Treatment Based on Levels of Control and Life Expectancy in Older Patients With Diabetes Mellitus

Jeremy B. Sussman, MD, MS; Eve A. Kerr, MD, MPH; Sameer D. Saini, MD, MS; Rob G. Holleman, MPH; Mandi L. Klamerus, MPH; Lillian C. Min, MD; Sandeep Vijan, MD, MS; Timothy P. Hofer, MD, MS

IMPORTANCE Older patients with diabetes mellitus receiving medical treatment whose blood pressure (BP) or blood glucose level are potentially dangerously low are rarely deintensified. Given the established risks of low blood pressure and blood glucose, this is a major opportunity to decrease medication harm.

OBJECTIVE To examine the rate of BP- and blood glucose-lowering medicine deintensification among older patients with type 1 or 2 diabetes mellitus who potentially receive overtreatment.

DESIGN, SETTING, AND PARTICIPANTS Retrospective cohort study conducted using data from the US Veterans Health Administration. Participants included 211 667 patients older than 70 years with diabetes mellitus who were receiving active treatment (defined as BP-lowering medications other than angiotensin-converting enzyme inhibitors or angiotensin receptor blockers, or glucose-lowering medications other than metformin hydrochloride) from January 1 to December 31, 2012. Data analysis was performed December 10, 2013, to July 20, 2015.

EXPOSURES Participants were eligible for deintensification of treatment if they had low BP or a low hemoglobin A_{1c} (HbA_{1c}) level in their last measurement in 2012. We defined very low BP as less than 120/65 mm Hg, moderately low as systolic BP of 120 to 129 mm Hg or diastolic BP (DBP) less than 65 mm Hg, very low HbA_{1c} as less than 6.0%, and moderately low HbA_{1c} as 6.0% to 6.4%. All other values were not considered low.

MAIN OUTCOMES AND MEASURES Medication deintensification, defined as discontinuation or dosage decrease within 6 months after the index measurement.

RESULTS The actively treated BP cohort included 211 667 participants, more than half of whom had moderately or very low BP levels. Of 104 486 patients with BP levels that were not low, treatment in 15.1% was deintensified. Of 25 955 patients with moderately low BP levels, treatment in 16.0% was deintensified. Among 81 226 patients with very low BP levels, 18.8% underwent BP medication deintensification. Of patients with very low BP levels whose treatment was not deintensified, only 0.2% had a follow-up BP measurement that was elevated (BP \geq 140/90 mm Hg). The actively treated HbA_{1c} cohort included 179 991 participants. Of 143 305 patients with HbA_{1c} levels that were not low, treatment in 17.5% was deintensified. Of 23 769 patients with moderately low HbA_{1c} levels, treatment in 20.9% was deintensified. Among 12 917 patients with very low HbA_{1c} levels, 27.0% underwent medication deintensification. Of patients with very low HbA_{1c} levels whose treatment was not deintensified, fewer than 0.8% had a follow-up HbA_{1c} measurement that was elevated (\geq 7.5%).

CONCLUSIONS AND RELEVANCE Among older patients whose treatment resulted in very low levels of HbA_{1c} or BP, 27% or fewer underwent deintensification, representing a lost opportunity to reduce overtreatment. Low HbA_{1c} or BP values or low life expectancy had little association with deintensification events. Practice guidelines and performance measures should place more focus on reducing overtreatment through deintensification.

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Corresponding Author: Jeremy B. Sussman, MD, MS, Department of Veterans Affairs Center for Clinical Management Research, North

- Sussman et al. *JAMA Intern Med.* 2015; 175(1):26-34
- VA CDW data used for cohort identification and to assess the use of blood pressure and diabetes medications.

How has pharmacy data been used in VA studies?

Utilization and Quality

Tight Glycemic Control and Use of Hypoglycemic Medications in Older Veterans With Type 2 Diabetes and Comorbid Dementia

DOI: 10.2337/dc14-0599

OBJECTIVE

Older adults with diabetes and dementia are at increased risk for hypoglycemia and other adverse events associated with tight glycemic control and are unlikely to experience long-term benefits. We examined risk factors for tight glycemic control in this population and use of medications associated with a high risk of hypoglycemia in the subset with tight control.

RESEARCH DESIGN AND METHODS

This retrospective cohort study of national Veterans Affairs (VA) administrative/clinical data and Medicare claims for fiscal years (FYs) 2008–2009 included 15,880 veterans aged ≥ 65 with type 2 diabetes and dementia and prescribed antidiabetic medication. Multivariable regression analyses were used to identify sociodemographic and clinical predictors of hemoglobin A_{1c} (HbA_{1c}) control (tight, moderate, poor, or not monitored) and in patients with tight control, subsequent use of medication associated with a high risk of hypoglycemia (sulfonylureas, insulin).

RESULTS

Fifty-two percent of patients had tight glycemic control (HbA_{1c} <7% [53 mmol/mol]). Specific comorbidities, older age, and recent weight loss were associated with greater odds of tight versus moderate control, whereas Hispanic ethnicity and obesity were associated with lower odds of tight control. Among tightly controlled patients, 75% used sulfonylureas and/or insulin, with higher odds in patients who were male, black, or aged ≥ 75 ; had a hospital or nursing home stay in FY2008; or had congestive heart failure, renal failure, or peripheral vascular disease.

CONCLUSIONS

Many older veterans with diabetes and dementia are at high risk for hypoglycemia associated with intense diabetes treatment and may be candidates for deintensification or alteration of diabetes medications.

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Xinhua Zhao,^{1,4} Maria Mor,^{1,5} and
Michael J. Fine^{1,3}

- Thorpe et al., *Diabetes Care*. 2015; 638(4):588-95.
- VA PBM and Medicare Part D data used for cohort identification and VA PBM data to assess the use of hypoglycemic medications.

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Session Objectives

- How has outpatient pharmacy data been used in VA studies?
- **Overview of VA and Medicare pharmacy databases**
- Finding information in the VA and Medicare pharmacy databases
- Examples of VA studies that have used the VA pharmacy databases
- Where to go for more help

Pharmacy Data Sources

- Local Databases
 - VistA, All VA pharmacy data are entered, processed, and stored in VistA
- National Data Sources
 - Pharmacy Benefit Management (PBM)
 - Managerial Cost Accounting (MCA) System National Data Extract (NDE) Pharmacy Datasets (formerly Decision Support System or DSS)
 - Corporate Data Warehouse (CDW)
 - Medicare Part D events data from Part D Slim File

Pharmacy Data Sources

- Other Key Pharmacy Data Sources
 - DSS Product Table
 - National Drug File
- Note: These are summary data, not person-level files

Poll Question #4: Which national sources of pharmacy data have you used in the past?

- MCA NDE Pharmacy Data
- PBM Pharmacy Data
- CDW Pharmacy Data
- Part D Slim File
- None

VA Pharmacy Data Sources

- VA Pharmacy Benefits Management (PBM) Database
 - Outpatient data available from FY1999
 - Inpatient data available from FY2003
 - Source of pharmacy data is local VA facilities' VistA systems
 - Includes records for inpatient and outpatient prescriptions from VA pharmacies or Consolidated Mail Outpatient Pharmacy (CMOP)
 - Housed by PBM and available through custom extracts

VA Pharmacy Data Sources

VA Outpatient PBM file key variables include:

Variable	Meaning	Example data
Va_product	VA Product	DICLOFENAC NA 50MG TAB,EC
Va_class	VA Class	MS102 NONSALICYLATE NSAIs,ANTIRHEUMATIC
generic	Generic name	DICLOFENAC
Sig	Directions of use	TAKE 1 50 MG TABLET ORAL BID TO RELIEVE PAIN
Dsp_unt	Dispensing Unit	TAB
Day_supply	Day of Supply	21
Tl_qty	Total quantity	42
Price_dsp	Price per Dispensing Unit	0.151
Tl_cost	Total Drug Cost	6.342
rel_date	Release date	1/1/2015
NDC	National Drug Code	00228-2550-11
CMOP_IND	CMOP indicator	Y

VA Pharmacy Data Sources

- MCA (formerly DSS) NDE Pharmacy Datasets
 - Data available from FY2005
 - Includes records for inpatient and outpatient prescriptions from VA pharmacies or Consolidated Mail Outpatient Pharmacy (CMOP)
 - Source of pharmacy data is the local VA facilities' VistA systems
 - Housed at Corporate Data Warehouse (CDW) from FY2005 and available through custom extracts

VA Pharmacy Data Sources

- CDW Pharmacy Data
 - Data available from FY 2000
 - Source of pharmacy data is VistA
 - CDW has two pharmacy production domains
 - Outpatient Pharmacy
 - Bar Code Medication Administration (BCMA)

VA Pharmacy Data Sources

Select CDW Outpatient Pharmacy Tables

- CDW Outpatient Pharmacy Fact tables (RxOut)
 - RxOutPat
 - RxOutPat Fill
 - RxOutPat Sig
 - RxOutPat Medication Instructions
- CDW Outpatient Pharmacy dimension tables (dim)
 - DosageForm
 - DrugClass
 - LocalDrug
 - NationalDrug
 - DrugNameWithoutDose
 - PharmacySite

The 4 RxOut tables link by RX-level Primary key
RxOutpatSID

The 6 Dim Tables link to RxOut tables by each Dim-table specific primary key, such as
DosageFormSID
DrugClassSID

VA Pharmacy Data Sources

Dim.LocalDrug

LocalDrugSID	Sta3n	LocalDrugNameWithDose	DrugClass	NDC	NationalDrugSID	NationalDrugNameWithDose
359967	646	CLONAZEPAM 0.5MG TAB	CN302	00603-2948-21	1377846	CLONAZEPAM 0.5MG TAB

RxOutput

RxOutputSID	Sta3n	RxNumber	IssueDate	CancelDate	PartialPrescriptionFlag	PatientSID	LocalDrugSID	NationalDrugSID
1234567890	646	999999999	2016-12-25	NULL	N	123	359967	1377846

NationalDrugSID	Sta3n	DrugNameWithDose	StrengthNumeric
1377846	646	CLONAZEPAM 0.5MG TAB	0.5

Dim.NationalDrug

RxOutputSID	Sta3n	PatientSID	IssueDate	Sig
1234567890	646	123	2016-12-25	T1T BID

RxOutputSig

VA Pharmacy Data Sources

Data contents and sample records: <http://vaww.virec.research.va.gov/CDW/Documentation.htm>

VA INFORMATION RESOURCE CENTER (VIREC)

<p>VIREC Home</p> <p>VA/CMS Home</p> <p>About Us</p> <p>New Users of VA Data</p> <p>FAQs</p> <p>Acronyms</p> <p>HelpDesk</p>	<div style="border-bottom: 1px solid #ccc; margin-bottom: 10px;"> <h2 style="margin: 0;">CDW Documentation</h2> <h3 style="margin: 0;">Overview</h3> <p>VIREC documentation for the Corporate Data Warehouse (CDW) includes domain layouts, data contents, sample records, and frequencies. This summary information is available by domain or schema.</p> <p>This web page provides access to the most recent version of our CDW documentation. Previous versions are available upon request by contacting the VIREC HelpDesk.</p> <hr/> <h3 style="margin: 0;">New! Factbooks</h3> <p>Descriptions of tables, columns, and values in select CDW Domains. Includes domain-specific SQL "starter language" for those new to CDW, relational databases, and SQL.</p> <p><i>VIREC Factbook: Corporate Data Warehouse (CDW) Inpatient 2.1 Domain (Part I - Inpatient), Version 2</i> Released: June 2015</p> <p><i>VIREC Factbook: Corporate Data Warehouse (CDW) Mental Health 1.0 Domain</i> Released: November 2014</p> <p><i>VIREC Factbook: Corporate Data Warehouse (CDW) Consult 2.1 Domain</i> Released: October 2014</p> <p><i>VIREC Factbook: Corporate Data Warehouse (CDW) Consult 2.0 Domain</i> Released: September 2014</p> <hr/> <h3 style="margin: 0;">Domain Layout</h3> <p>A list of schemas and tables for each CDW domain.</p> <p>View Domain Layout</p> <hr/> <h3 style="margin: 0;">Data Contents</h3> <p>A list of data elements for each CDW domain.</p> <p>View Data Contents</p> <hr/> <h3 style="margin: 0;">Sample Records</h3> <p>Randomly selected records for each CDW domain.</p> <p>View Sample Records</p> </div>
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CDW

- [Overview](#)
- [Data Transition to CDW](#)
- [Documentation](#)

General Resources

- [Data Access](#)
- [Data Sources](#)
- [Data Tools](#)
- [Data Topics](#)
- [Products & Services](#)
- [Special Projects](#)

Comparison of VA Pharmacy Data Sources

	PBM	MCA	CDW
Data Availability	FY1999(Outpatient) FY2003(Inpatient)	FY2005(Outpatient &Inpatient)	FY2000
Cost Data	Drug product total cost Unit Price Patient payment	Drug product total cost (ACT_COST) Dispensing labor cost (DISPCOST) Variable Supply cost (VS_COST)	Unit price
Directions for use	SIG available(also components of SIG available: SCHED, UNT_DOSE, DSP_UNT)	Not available, do not contain dosing instruction or dispensing unit	SIG available
NDC	YES	YES (contained in field FDRKEY)	YES

Comparison of VA Pharmacy Data Sources (cont.)

- **Data Comparability:** VIReC compared DSS and PBM data sources on outpatient prescriptions for a cohort, and found that nearly all of the same prescriptions appeared in both files, with a discrepancy rate of only 1.5%.

Reference: VIReC Research User Guide: VHA Pharmacy Prescription Data, 2nd Edition

<http://vaww.virec.research.va.gov/RUGs/Pharmacy/RUG-Pharmacy-2nd-Ed-CY08-RA.pdf>

Medicare Part D

- In 2013, 44% of VHA/Medicare enrolled Veterans are enrolled in Medicare Part D
- Different than Medicare Parts A & B
 - Claims for drugs are paid for by insurance companies, not the Center for Medicare & Medicaid Services (CMS)
 - Insurance companies submit data to CMS on all prescriptions filled
- Data for research use
 - Prescription Drug Event File(PDE)
 - Characteristics File: Plan, Formulary, Pharmacy, Prescriber
 - Slim File is subset of PDE data

Website of VA/CMS repository Data: <http://vaww.virec.research.va.gov/VACMS/Intro/Repository-Data.htm>

Medicare Part D

- Medicare Part D enrollment status in Medicare Enrollment Files
- Important Variables in Medicare Enrollment Files include
 - Number of months of Part D coverage
 - Type of Part D plan (e.g., Managed care plan, prescription drug plan [PDP])
- 13 variables from Medicare Prescription Drug Event (PDE) data are available in Part D Slim File
- Part D Slim File Data are available from VIReC as custom extracts
- Data are available from CY 2006, currently 2006-2012 files are available

Medicare Part D

- Medicare Part D Slim File key variables include:

Variable Name	Meaning	Example data
SRVC_DT	Service date	3-Jul-07
PROD_SRVC_ID	National Drug Code (NDC)	00071015623
QTY_DSPNSD_NUM	Quantity dispensed	30
DAYS_SUPLY_NUM	Days Supply	30
PTNT_PAY_AMT	Patient Payment	29
TOT_RX_CST_AMT	Gross drug Cost	111.11
BN	Brand Name	LIPITOR
GCDF (dosage form)	Dosage form	TA
STR	Drug Strength	20MG
GNN	Generic Name	ATORVASTATIN CALCIUM

Other Pharmacy Data

- DSS Product Table
 - Key Variables
 - IPNum, Feeder Key, Description (short and long), Drug Class
 - Feeder Key => 1st 5 characters are VA product file IEN; last 12 characters are NDC
- http://vaww.dss.med.va.gov/programdocs/pd_products.asp
- National Drug File
 - Key Variables
 - VA_PRODUCT, FEEDER KEY, NDF_NDC, VA_CLASS, RX_OTC, DISP_UNT,
 - <http://www.pbm.va.gov/PBM/NationalFormulary.asp>
- Note: These are not person-level files

Session Objectives

- How has outpatient pharmacy data been used in VA studies?
- Overview of VA and Medicare pharmacy databases
- **Finding information in the VA and Medicare pharmacy databases**
- Examples of VA studies that have used the VA pharmacy databases
- Where to go for more help

Assessing Outpatient Pharmacy Use: Finding info in VA and Part D Pharmacy Datasets

How to search for medications of interest

1. By drug generic names or medication class (not available in Part D Slim file)
2. By National Drug Code (NDC). You can use Medi-Span or other databases to obtain the NDC codes

Assessing Outpatient Pharmacy Use: NDC codes

- A unique 10 digit, 3-segment (4-4-2, 5-3-2, 5-4-1) number, identifying the labeler, the product, and the commercial package size.
- For example, the 10-digit NDC for a 100-count bottle of Prozac 20 mg is 0777-3105-02



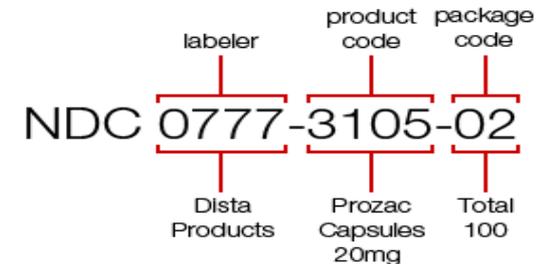
- VA PBM and Part-D use 11-digit NDC

Assessing Outpatient Pharmacy Use: NDC codes



VA PBM NDC	VA Product Name	NDC is really....*
00069422030	HYDROCODONE 5MG/ACETAMINOPHEN 500MG TAB	
00069422030	OXYCODONE HCL 30MG TAB	

Assessing Outpatient Pharmacy Use: NDC codes



VA PBM NDC	VA Product Name	NDC is really....*
00069422030	HYDROCODONE 5MG/ACETAMINOPHEN 500MG TAB	0069-4220-30 (Viagra)
00069422030	OXYCODONE HCL 30MG TAB	0069-4220-30 (Viagra)

*according to FDA National Drug Code Directory, which uses 10 digit NDC

Assessing Outpatient Pharmacy Use: Finding info in VA Pharmacy Datasets

Where can I find cost variables?

- MCA and PBM contain different cost variables
 - PBM: cost of the drug product from the supplier
 - MCA:
 - 1) **Dispensing Cost (DISPCOST)**: direct pharmacist labor for dispensing the prescription and the mailing costs
 - 2) **Supply Cost (VS_COST)**: cost of supplies used in preparing the prescription, such as bottles and labels
 - 3) **Actual Cost (ACT_COST)**: Drug product cost, cost of supplies such as bottles and labels to prepare the prescription, indirect costs, and overhead (not dispcost)

Assessing Outpatient Pharmacy Use: Finding info in VA Pharmacy Datasets

Where can I find cost variables? (Cont.)

- Part D Slim File

- 1) **Patient Pay Amount (PTNT_PAY_AMT):** Amount patient pays for medication
- 2) **Gross Drug Cost (TOT_RX_CST_AMT):**
This variable is derived from the sum of Ingredient Cost Paid, Dispensing Fee Paid, Total Amount Attributed to Sales Tax, Vaccine Administration Fee

Session Objectives

- How has outpatient pharmacy utilization been measured in VA studies?
- Overview of VA and Medicare pharmacy databases
- Finding information in the VA and Medicare pharmacy databases
- **Examples of VA studies that have used the VA Pharmacy databases**
- Where to go for more help

Assessing Outpatient Pharmacy Use: Examples of Questions Addressed with Pharmacy Data

- Cohort identification
 - *Can pharmacy data be used to identify specific groups of patients?*
- Medication utilization
 - *Does a policy change impact medication use?*
- Healthcare quality
 - *Are patients being prescribed medications in accordance with quality measures?*
- Medication adherence
 - *How much of a prescribed medication are patients using?*
- Exposure to specific medications or medication classes
 - *Are specific drugs associated with better/worse outcomes?*
- Combining outpatient and pharmacy data to identify events
 - *Can we identify acute exacerbations of COPD with outpatient and prescription data?*
- Assessing comorbidity or case-mix with medication data

How has pharmacy data been used in VA studies?

Trends in Medication Use

Support Care Cancer (2012) 20:1649–1657
DOI 10.1007/s00520-011-1255-0

ORIGINAL ARTICLE

Trends in anemia management in lung and colon cancer patients in the US Department of Veterans Affairs, 2002–2008

Elizabeth Tarlov · Kevin T. Stroupe · Todd A. Lee · Thomas W. Weichle · Qiyang L. Zhang · Laura C. Michaelis · Howard Ozer · Margaret M. Browning · Denise M. Hynes

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Abstract

Purpose In 2007, growing concerns about adverse impacts of erythropoiesis-stimulating agents (ESAs) in cancer patients led to an FDA-mandated black box warning on product labeling, publication of revised clinical guidelines, and a Medicare coverage decision limiting ESA coverage. We examined ESA therapy in lung and colon cancer patients receiving chemotherapy in the VA from 2002 to 2008 to ascertain trends in and predictors of ESA use. **Methods** A retrospective study employed national VA databases to “observe” treatment for a 12-month period following diagnosis. Multivariable logistic regression analyses evaluated changes in ESA use following the

FDA-mandated black box warning in March 2007 and examined trends in ESA administration between 2002 and 2008.

Results Among 17,014 lung and 4,225 colon cancer patients, those treated after the March 2007 FDA decision had 65% (lung OR 0.35, CI_{95%} 0.30–0.42) and 53% (colon OR 0.47, CI_{95%} 0.36–0.63) reduced odds of ESA treatment compared to those treated before. Declines in predicted probabilities of ESA use began in 2006. The magnitude of the declines differed across age groups among colon patients ($p=0.01$) and levels of hemoglobin among lung cancer patients ($p=0.04$).

Conclusions Use of ESA treatment for anemia in VA cancer care declined markedly after 2005, well before the 2007 changes in product labeling and clinical guidelines. This suggests that earlier dissemination of research results had marked impacts on practice patterns with these agents.

Keywords Lung neoplasms · Colon neoplasms · Anemia / drug therapy · Physician’s practice patterns · Age factors

Introduction

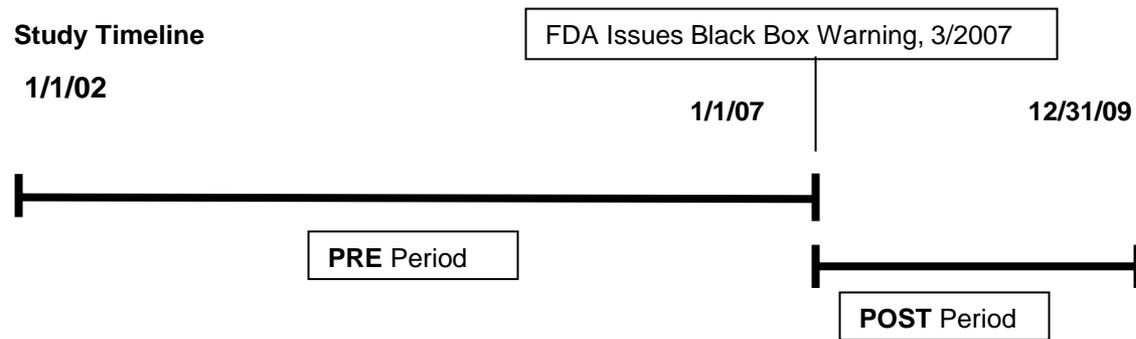
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- Tarlov E, Stroupe KT, et al. Support Care Cancer. 2012; 20:1649–57
- Objective: To examine erythropoiesis-stimulating agent (ESA) therapy in lung and colon cancer patients receiving chemotherapy from 2002 to 2008

Trends in Medication Use:

Tarlov et al. Support Care Cancer. 2012

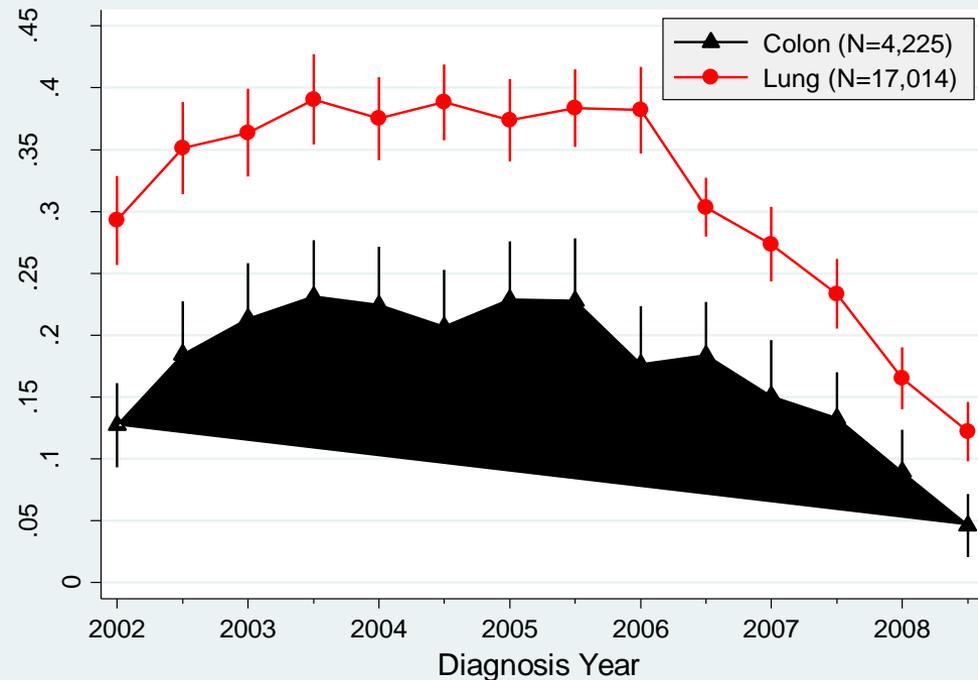


- How was pharmacy data used?
 - Pharmacy data was used to examine
 - Whether ESA use differed before (PRE) or after (POST) the black box warning
 - Trends in ESA use over time

Trends in Medication Use: Tarlov et al. Support Care Cancer. 2012

- Source of pharmacy data
 - PBM and MCA data
- How were ESAs identified in the PBM Database?
 - NDCs were used to identify the ESAs in the PBM database
- NOTE: ESAs also identified from CPT and HCPCS codes from VA inpatient and outpatient encounters

Trends in Medication Use: Tarlov et al. Support Care Cancer. 2012



- ESA use began to decline for both cancer groups before black box warning was issued

How has pharmacy data been used in VA studies?

Utilization and Quality

Tight Glycemic Control and Use of Hypoglycemic Medications in Older Veterans With Type 2 Diabetes and Comorbid Dementia

DOI: 10.2337/dc14-0599

OBJECTIVE

Older adults with diabetes and dementia are at increased risk for hypoglycemia and other adverse events associated with tight glycemic control and are unlikely to experience long-term benefits. We examined risk factors for tight glycemic control in this population and use of medications associated with a high risk of hypoglycemia in the subset with tight control.

RESEARCH DESIGN AND METHODS

This retrospective cohort study of national Veterans Affairs (VA) administrative/clinical data and Medicare claims for fiscal years (FYs) 2008–2009 included 15,880 veterans aged ≥ 65 with type 2 diabetes and dementia and prescribed antidiabetic medication. Multivariable regression analyses were used to identify sociodemographic and clinical predictors of hemoglobin A_{1c} (HbA_{1c}) control (tight, moderate, poor, or not monitored) and in patients with tight control, subsequent use of medication associated with a high risk of hypoglycemia (sulfonylureas, insulin).

RESULTS

Fifty-two percent of patients had tight glycemic control (HbA_{1c} <7% [53 mmol/mol]). Specific comorbidities, older age, and recent weight loss were associated with greater odds of tight versus moderate control, whereas Hispanic ethnicity and obesity were associated with lower odds of tight control. Among tightly controlled patients, 75% used sulfonylureas and/or insulin, with higher odds in patients who were male, black, or aged ≥ 75 ; had a hospital or nursing home stay in FY2008; or had congestive heart failure, renal failure, or peripheral vascular disease.

CONCLUSIONS

Many older veterans with diabetes and dementia are at high risk for hypoglycemia associated with intense diabetes treatment and may be candidates for deintensification or alteration of diabetes medications.

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Chester B. Good,^{1,2,3,4} Sijian Zhang,¹
Xinhua Zhao,^{1,4} Maria Mor,^{1,5} and
Michael J. Fine^{1,3}

- Thorpe et al., *Diabetes Care*. 2015; 638(4):588-95.
- Objective: To examine risk factors for tight glycemic control in this population and use of medications associated with a high risk of hypoglycemia in the subset with tight control.

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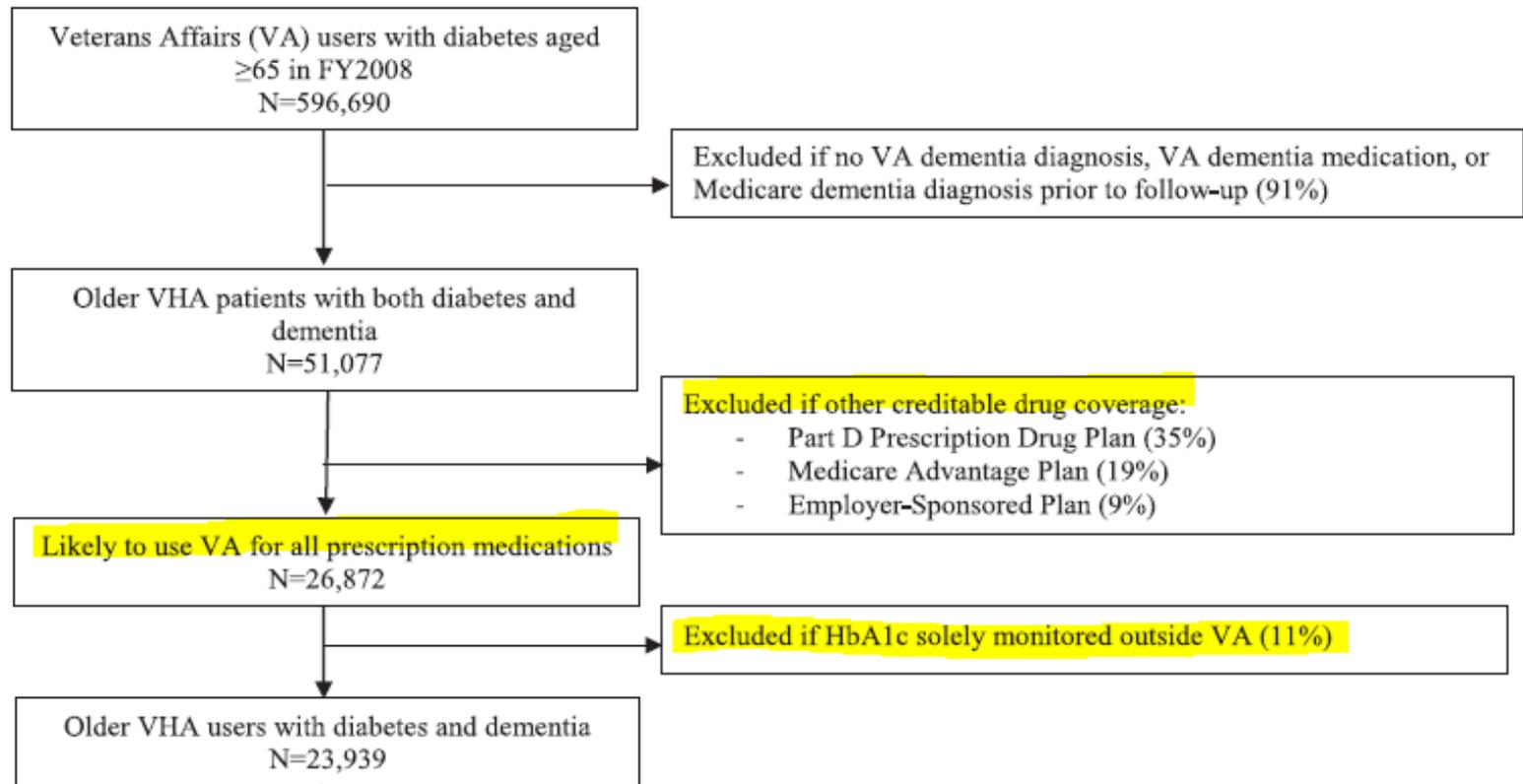
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Tight glycemic control in dementia patients.

Thorpe et al., *Diabetes Care*. 2015: 638(4):588-95.



How has pharmacy data been used in VA studies?

Cohort identification and utilization

Research

Original Investigation | LESS IS MORE

Dual Use of Department of Veterans Affairs and Medicare Benefits and Use of Test Strips in Veterans With Type 2 Diabetes Mellitus

Walid F. Gellad, MD, MPH; Xinhua Zhao, PhD; Carolyn T. Thorpe, PhD, MPH; Maria K. Mor, PhD; Chester B. Good, MD, MPH; Michael J. Fine, MD, MSc

IMPORTANCE Self-monitoring of blood glucose is a costly component of care for diabetes mellitus, with unclear benefits for patients not taking insulin. Veterans with dual Department of Veterans Affairs (VA) and Medicare benefits have access to test strips through both systems, raising the potential for overuse.

OBJECTIVES To examine the patterns of test strip receipt among older veterans with diabetes and determine whether receipt of strips from dual health care systems is associated with overuse.

DESIGN, SETTING, AND PARTICIPANTS We performed a cross-sectional, retrospective cohort study using national VA administrative data linked to Medicare Parts A, B, and D claims for fiscal years 2008 and 2009. A total of 363 996 community-dwelling veterans 65 years or older with diabetes who used the VA health care system and received test strips in fiscal year 2009 were included in the study.

EXPOSURES Receipt of test strips from the VA only, Medicare only, or both the VA and Medicare; covariates included sociodemographics, comorbidity, diabetes complications, and hemoglobin A_{1c} level.

MAIN OUTCOMES AND MEASURES Quantity of test strips dispensed and overuse of test strips, defined as more than 1 strip per day (>365 strips per year) among those taking no diabetes medications, oral diabetes medications alone, or long-acting insulin without short-acting insulin or more than 4 strips per day (>1460 strips per year) among those taking short-acting insulin.

RESULTS Overall, 260 688 older veterans (71.6%) with diabetes received strips from the VA only, 82 826 (22.8%) from Medicare only, and 20 482 (5.6%) from the VA and Medicare. Veterans receiving strips from both the VA and Medicare received more strips (median, 600; interquartile range [IQR], 350-1000) than the Medicare only (median, 400; IQR, 200-700) and VA only (median, 200; IQR, 100-500) groups ($P < .001$) and had substantially greater odds of overuse than the VA only group (55.4% vs 15.8%) (adjusted odds ratio [OR], 16.3; 95% CI, 14.6-18.1 for no medications; 55.3% vs 6.0%; OR, 19.8; 95% CI, 18.9-20.8 for oral medications; 87.4% vs 65.5%; OR, 3.69; 95% CI, 3.30-4.14 for long-acting insulin; and 32.8% vs 13.5%; OR, 3.24; 95% CI, 3.05-3.45 for short-acting insulin). Patterns were similar when using more conservative thresholds of overuse.

CONCLUSIONS AND RELEVANCE Veterans who receive glucose test strips through both the VA

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- Gellad W, Zhao X, Thorpe C, et al. *JAMA Intern Med.* 2015; 175(1):26-34
- Objective: To examine the patterns of test strip receipt among older Veterans with diabetes and determine whether receiving strips from dual health systems is associated with overuse

Dual Use of Test Strips

Gellad W, Zhao X, Thorpe C, et al. *JAMA Intern Med.* 2015

- **Design:** Cross-sectional, retrospective cohort.
- **Setting:** National VA administrative data linked to Medicare Parts A, B & D claims, fiscal years (FY) 2008-2009.
- **Participants:** 363,996 community-dwelling Veterans age ≥ 65 with diabetes who used the VA Healthcare System and received test strips, FY 2009.
- **Source of Pharmacy Data:** VA PBM Data and Part D files

Dual Use of Test Strips

Gellad W, Zhao X, Thorpe C, et al. *JAMA Intern Med.* 2015

How was pharmacy data used?

1. Use PBM Data to search diabetes meds by VA drug class and generic names combined with diagnosis codes from MedSAS to define the study cohort of Type II diabetes patients
2. Use PBM data AND Part D files (CY2008 and CY2009) to classify patients based on type of diabetes medications. For Part D medication search, we used NDC codes that we obtained from Medi-Span

Dual Use of Test Strips

Gellad W, Zhao X, Thorpe C, et al. *JAMA Intern Med.* 2015

How was pharmacy data used (continued)?

3. Use PBM data to search for and quantify test strips
4. Use Medicare DME files to search for and quantify test strips in Medicare (Medicare test strips are not in Part D data, instead, DME (Durable Medical Equipment supplies))

Dual Use of Test Strips

Gellad W, Zhao X, Thorpe C, et al. *JAMA Intern Med.* 2015

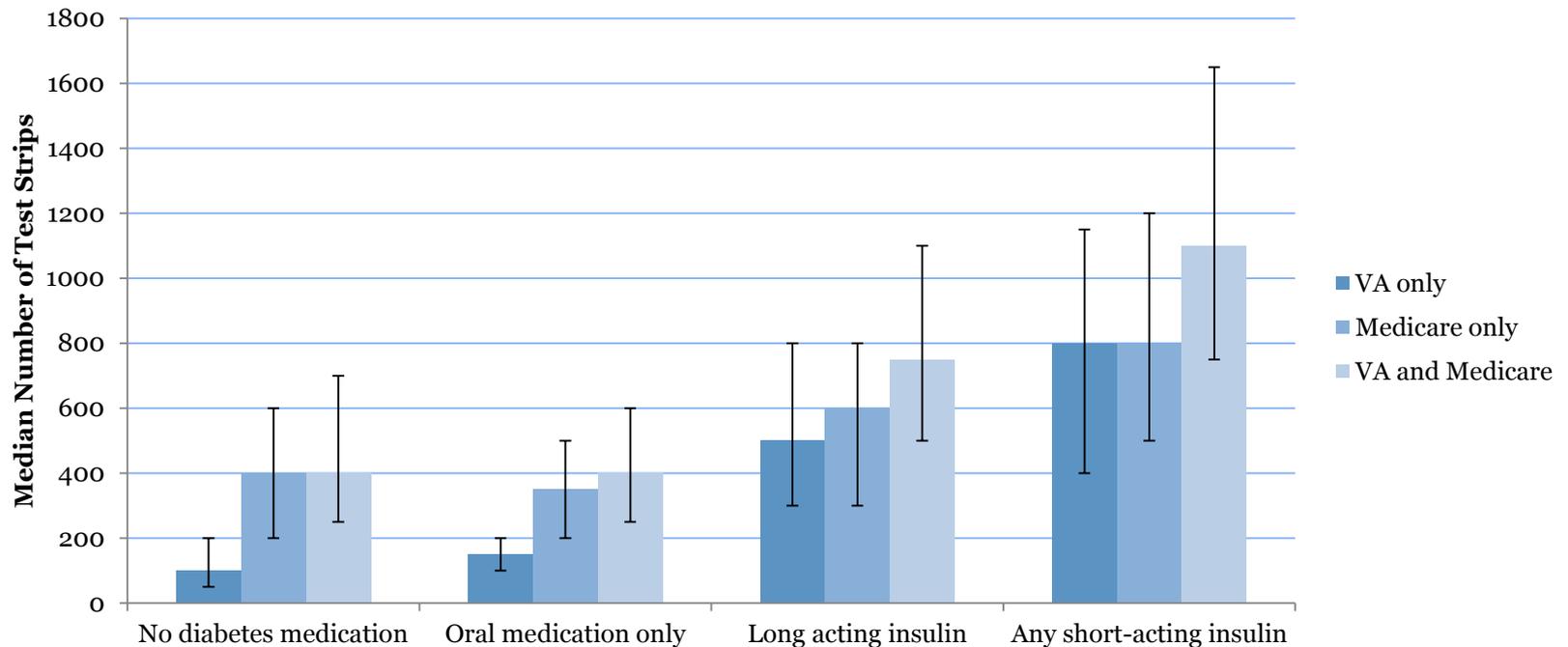
The study found that

- Overall, 260 688 older veterans (71.6%) with diabetes received strips from the VA only, 82 826 (22.8%) from Medicare only, and 20 482 (5.6%) from *both* the VA and Medicare.

Dual Use of Test Strips

Gellad W, Zhao X, Thorpe C, et al. *JAMA Intern Med.* 2015

Quantity of test strips received by Veterans age 65+ with diabetes by source of strips, categorized by type of diabetes medication use



The bars represent the median number of strips dispensed, and the black lines represent interquartile ranges.

Dual Use of Test Strips

Gellad W, Zhao X, Thorpe C, et al. *JAMA Intern Med.* 2015

Source of Diabetes Medications	Overall	No medication N=108,468	Oral meds only N=287,458	Long acting insulin +/- oral meds N=51,376	Any short acting insulin N=88,564
VA only	67.9%	0.0%	85.8%	83.5%	84.1%
CMS only	4.6	0.0	6.8	4.2	3.6
Both	7.2	0.0	7.4	12.3	12.3
None	20.2	100.0	0.0	0.0	0.0

Session Objectives

- How has outpatient pharmacy utilization been measured in VA studies?
- Overview of VA and Medicare pharmacy databases
- Finding information in the VA and Medicare pharmacy databases
- Examples of VA studies that have used the VA Pharmacy databases
- **Where to go for more help**

VIReC Help

- VA/CMS Website
 - <http://vaww.virec.research.va.gov/Index-VACMS.htm>
- VIReC Webpage
 - <http://vaww.virec.research.va.gov/Pharmacy/Overview.htm>
 - Information on VA pharmacy sources
 - Resource users guide for pharmacy data
 - <http://vaww.virec.research.va.gov/RUGs/Pharmacy/RUG-Pharmacy-2nd-Ed-CYo8-RA.pdf>
- ResDAC (<http://www.resdac.org/>)

VIReC Help (cont'd)

- HSRData Listserv
 - Join at the VIReC Web site
 - Discussion among >1100 data stewards, managers, and users
 - Past messages in archive (on intranet)
- VIReC HelpDesk
 - VIReC staff will answer your question and/or direct you to available resources on topics
 - VIReC@va.gov
 - (708) 202-2413

Questions?

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