

Measuring Outpatient Pharmacy Use in the VA Using VA Pharmacy Data

April 1, 2013

Presented by:

Denise M. Hynes, MPH, PhD, RN



Audience Poll

- **Have you ever used VA Pharmacy Data?**
 - Yes
 - No
- **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 utilization been measured in VA studies?**
- **Overview of VA Pharmacy databases**
- **Finding information in the VA 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 outpatient pharmacy utilization been measured in VA studies?: Trends in Medication Use

- **Tarlov E, Stroupe KT, et al. Trends in anemia management in lung and colon cancer patients in the US Department of Veterans Affairs, 2002-2008. *Support Care Cancer*. 2012; 20:1649–1657**
- **Use of ESA drug over time**

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 · Quying L. Zhang · Laura C. Michaelis · Howard Oarr · 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

The use of erythropoiesis-stimulating agents (ESAs) to manage anemia in cancer is intended to reduce the need for blood transfusions and improve patients’ quality of life. Their effectiveness in reducing blood transfusions has been conclusively demonstrated, but ESAs have also been implicated in higher rates of thrombotic vascular events, tumor promotion, and reduced survival [1–3]. While an increased risk of thrombotic events was noted in studies leading to FDA approval of epoetin alfa (in 1993) and darbepoetin alpha (in 2001), cancer clinical trial results

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How has outpatient pharmacy utilization been measured in VA studies?: Medication Exposure and Outcomes

- Pugh MJV, Copeland LA, Zeber JE, et al. Antiepileptic drug monotherapy exposure and suicide-related behavior in older Veterans. *J Am Geriatr Soc.* 2012 Nov;60(11):2042-7.

- Association of a specific drug with potential adverse event

Antiepileptic Drug Monotherapy Exposure and Suicide-Related Behavior in Older Veterans

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OBJECTIVES: To examine the association between antiepileptic drug (AED) receipt and suicide-related behavior (SRB) in older veterans.

DESIGN: Retrospective database analysis.

SETTING: Veterans Health Administration (VHA) inpatient and outpatient care.

PARTICIPANTS: Veterans aged 65 and older in 2004 to 2006.

MEASUREMENTS: SRB was identified using International Classification of Diseases, Ninth Revision, Clinical Modification codes, and new AED monotherapy was identified using the VHA product variable in pharmacy data. Control conditions and medications were also identified as potential confounders using previously validated algorithms. Cox proportional hazards models controlling for the propensity to receive AEDs examined the association between any AED exposure, specific AEDs, and time to SRB.

RESULTS: Within the eligible sample of 2.15 million individuals, 332 cases of SRB were found. Overall, 98% of participants were male, and 67% were non-Hispanic white. Affective disorders and seven psychiatric conditions were strongly associated with SRB and were

included in the propensity score. AED exposure displayed a significant association with SRB (odds ratio = 4.10, 95% confidence interval [CI] = 3.83-6.63) after adjusting for propensity to receive AEDs. Stratified analyses found similar results for those with (hazard ratio [HR] = 4.00, 95% CI = 2.9-5.5) and without (HR = 4.57, 95% CI = 1.15-18.20) mental health comorbidities. Gabapentin, phenytoin, lamotrigine, levetiracetam, topiramate, and valproate were significantly associated with SRB.

CONCLUSION: Exposure to five common AEDs was associated with SRB in older VHA beneficiaries. Given the strong associations between psychiatric comorbidity and SRB, clinicians treating elderly adults should weigh this potential adverse effect into their considerations for treatment of those receiving AEDs. Particular attention should be given to depression and suicidality screening in people prescribed AEDs. *J Am Geriatr Soc* 60(2012-2017): 2012.

Key words: suicide epidemiology; psychiatric disorder; antiepileptic drugs; geriatric

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On January 31, 2008, the Food and Drug Administration (FDA) released an alert that claimed twice the risk of suicide-related behaviors (SRB), suicidal ideation, attempts, or completion for individuals taking antiepileptic drugs (AEDs: carbamazepine, felbamate, gabapentin, lamotrigine, levetiracetam, oxcarbazepine, pregabalin, tiagabine, topiramate, valproate, and zonisamide).¹ Despite criticisms of the FDA alert, including concerns that not all AEDs were included in the analysis² and technical differences between individual AEDs preventing the drugs from being classified as a single drug category,³ a review of available AED-mortality literature provides support for some of the alert's concerns. For example, two studies documented an increase in suicidality for individuals taking oxcarbazepine, tiagabine, valproate, and gabapentin and

How has outpatient healthcare utilization been measured in VA studies?: Medication Adherence

Predictors of Adherence to Inhaled Medications Among Veterans with COPD

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BACKGROUND: Factors contributing to medication nonadherence among patients with chronic obstructive pulmonary disease (COPD) are poorly understood.

OBJECTIVES: To identify patient characteristics that are predictive of adherence to inhaled medications for COPD and, for patients on multiple inhalers, to assess whether adherence to one medication class was associated with adherence to other medication classes.

DESIGN: Cohort study using data from Veterans Affairs (VA) electronic databases.

PARTICIPANTS: This study included 2,730 patients who underwent pulmonary function testing between 2003 and 2007 at VA facilities in the Northwestern United States, and who met criteria for COPD.

MAIN MEASURES: We used pharmacy records to estimate adherence to inhaled corticosteroids (ICS), ipratropium bromide (IP), and long-acting beta-agonists (LABA) over two consecutive six-month periods. We defined patients as adherent if they had refilled medications to have 80% of drug available over the time period. We also collected information on their demographics, behavioral habits, COPD severity, and comorbidities.

KEY RESULTS: Adherence to medications was poor, with 19.8% adherent to ICS, 30.6% adherent to LABA, and 25.6% adherent to IP. Predictors of adherence to inhaled therapies were highly variable and dependent on the medication being examined. In adjusted analysis, being adherent to a medication at baseline was the strongest predictor of future adherence to that same medication [Odds ratio, 95% confidence interval] ICS: 4.79 (3.22–7.12); LABA: 6.60 (3.92–11.11); IP: 14.13 (10.00–19.97), but did not reliably predict adherence to other classes of medication.

CONCLUSIONS: Among patients with COPD, past adherence to one class of inhaled medication strongly predicted future adherence to the same class of medication, but only weakly predicted adherence to other classes of medication.

KEY WORDS: medication adherence; pulmonary diseases; health behavior; veterans.
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INTRODUCTION

Multiple randomized controlled trials have demonstrated the efficacy of pharmacological treatment of chronic obstructive pulmonary disease (COPD) at improving symptoms and quality of life, while reducing the frequency of exacerbations.^{1–4} Medications cannot be effective when they are not taken. Medication adherence represents a complex set of health behaviors that is not clearly understood. Patients who demonstrate better adherence to an assigned treatment, including placebo treatment in the context of efficacy trials, have been shown to experience better outcomes.⁵ Although there is a paucity of information about adherence to pharmaceutical therapy for COPD, existing information suggests that medication nonadherence is common.⁶

In contrast to other chronic conditions such as hypertension and diabetes, there is limited information about predictors of nonadherence to inhaled medication therapies among patients with COPD.^{7–11} Moreover, the studies of adherence to COPD medications have largely focused on short-acting bronchodilators. Given the wealth of recently published data demonstrating the efficacy of long-acting inhaled therapies for COPD, understanding characteristics of associated medication adherence represents an important opportunity to identify areas where interventions may be designed to improve adherence to therapies with documented benefit. We sought to assess predictors of adherence to inhaled therapies for COPD and, for patients on multiple inhaled medications, to assess whether adherence to one class of medication predicts adherence to other classes of medication.

METHODS

Settings and Subjects

We performed a cohort study of Veterans who had pulmonary function testing. Our study population was identified from the 14,541 patients from three sites within the Veterans Integrated Service Network 20 (VISN 20) medical facilities, who had pulmonary function tests (PFTs) performed between January 2003 and December 2007. Pulmonary function testing was obtained as part of routine

■ Huetsch JC, Uman JE, Udris EM, Au DH. Predictors of Adherence to Inhaled Medications Among Veterans with COPD. *J Gen Intern Med.* 2010; 27(11):1506–12

■ Examined adherence using info from medication refill pattern data

How has outpatient pharmacy utilization been measured in VA studies?: Medication Use

■ Gellad WF, Aspinall SL, Handler SM, Stone RA, Castle N, Semla TP, Good CB, Fine MJ, Dysken M, Hanlon JT. Use of Antipsychotics Among Older Residents in VA Nursing Homes. *Med Care.* 2012;50: 954–960.

■ Identified specific drug class use in nursing home patients

ORIGINAL ARTICLE

Use of Antipsychotics Among Older Residents in VA Nursing Homes

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Maurice Dysken, MD||| and Joseph T. Hanlon, PharmD*†‡¶††||

Background: Antipsychotic medications are commonly prescribed to nursing home residents despite their well-established adverse event profiles. Because little is known about their use in Veterans Affairs (VA) nursing homes (ie, Community Living Centers [CLCs]), we assessed the prevalence and risk factors for antipsychotic use in older residents of VA CLCs.

Methods: This cross-sectional study included 3692 Veterans age 65 or older who were admitted between January 2004 and June 2005 to one of 133 VA CLCs and had a stay of ≥ 90 days. We used VA Pharmacy Benefit Management data to examine antipsychotic use and VA Medical SAS datasets and the Minimum Data Set to identify evidence-based indications for antipsychotic use (eg, schizophrenia, dementia with psychosis). We used multivariable

logistic regression and generalized estimating equations to identify factors independently associated with antipsychotic receipt.

Results: Overall, 948/3692 (25.7%) residents received an antipsychotic, of which 59.3% had an evidence-based indication for use. Residents with aggressive behavior [odds ratio (OR) = 2.74, 95% confidence interval (CI), 2.04–3.67] and polypharmacy (9-drug OR = 1.84, 95% CI, 1.41–2.40) were more likely to receive antipsychotics, as were users of antidepressants (OR = 1.37, 95% CI, 1.14–1.66), anxiolytic/hypnotics (OR = 2.30, 95% CI, 1.64–3.23), or drugs for dementia (OR = 1.52, 95% CI, 1.21–1.92). Those residing in Alzheimer/dementia special care units were also more likely to receive an antipsychotic (OR = 1.66, 95% CI, 1.26–2.21). Veterans with dementia but no documented psychosis were as likely as those with an evidence-based indication to receive an antipsychotic (OR = 1.10, 95% CI, 0.82–1.47).

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Portions of this research were presented as a paper at the VA Health Services Research and Development (HS&RD) Annual Meeting in National Harbor, MD, on February 17, 2011 and as a poster at the Society of General Internal Medicine Annual Meeting in Phoenix, AZ, on May 5, 2011.

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Conclusion: Antipsychotic use is common among VA nursing home residents aged 65 and older, including those without a documented evidence-based indication for use. Further quality improvement efforts are needed to reduce potentially inappropriate antipsychotic prescribing.

Key Words: nursing homes, antipsychotics, Veterans, pharmacopsychiatry

(*Med Care* 2012;50: 954–960)

Neuropsychiatric symptoms are common in dementia and are one of the reasons individuals with dementia are placed in nursing homes.^{1,2} There are no Food and Drug Administration (FDA)-approved medications for common dementia-associated behavioral symptoms such as wandering, agitation, and aggression. Nonetheless, antipsychotics are commonly used in nursing homes off-label to treat patients with dementia and behavioral symptoms, in addition to treating those with psychotic illnesses for whom antipsychotics are FDA approved (eg, schizophrenia).^{3–9} In 2006, nearly 30% of nursing home residents in a large national study received an antipsychotic medication, of which 32% had no identified indication for use.³ Recently, the Office of the Inspector General in the Department of Health and Human Services addressed this potential overuse, reporting that 22% of Medicare part D claims for atypical

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How has outpatient healthcare utilization been measured in VA studies?: Cohort Identification

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ORIGINAL ARTICLE

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

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Objective. The accuracy of the diagnosis is vital when administrative databases are used for pharmacoepidemiologic and outcomes 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 purposes. While the strategy promises to be cost effective and less labor intensive than extracting information from indi-

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 spondylarthritis (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 originating

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Dr. Ng has received consultant fees, speaking fees, and/or honoraria (less than \$10,000) from UCB Pharmaceuticals. Address correspondence to Bernard Ng, MBS, MMed, Assistant Professor, Section of Allergy, Immunology and Rheumatology, MCI, Michael E. DeBakey VA Medical Center, 2002 Holcombe Boulevard, Mail Stop 152, Houston, TX 77030. E-mail: bernardng@gmail.com.

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■ Ng B, Aslam F, Petersen NJ, Yu HJ, Suarez-Almazor ME. Identification of Rheumatoid Arthritis Patients Using an Administrative Database: A Veterans Affairs Study. *Arthritis Care & Research.* 2012; 64:1490–1496.

■ Used a specific drug type to improve case identification

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Session Objectives

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

Pharmacy Data Sources

■ Local Databases

- VistA
- VISN Warehouses



■ National Data Sources

- PBM
- DSS NDE Pharmacy SAS® Datasets
- Corporate Data Warehouse

Pharmacy Data Sources

■ Other Key Pharmacy Data Sources

- DSS Product Table
- National Drug File



Audience Poll

- **Which national sources of VA pharmacy data have you used in the past?**
 - DSS NDE Pharmacy Data
 - PBM Pharmacy Data
 - Both
 - Neither

VA Pharmacy Data Sources

■ VA Decision Support System (DSS) National Data Extract (NDE) Pharmacy SAS Datasets

- Became available in 2003
- Data from FY2002 to present
- Primary source of data is VistA
- All inpatient and outpatient prescriptions dispensed by a VAMC or VA Consolidated Mail Outpatient Pharmacy (CMOP)
- Housed at Austin Information Technology Center (AITC) and directly accessible



VA Pharmacy Data Sources

■ VA Pharmacy Benefits Management (PBM) Database

- Available since 2000
- Data from FY1999 to present
- Primary source of data is VistA
- Contains both inpatient and outpatient prescriptions



PBM vs. DSS

	PBM	DSS
Cost	Drug supply cost	Actual cost (ACT_COST) Dispensing cost (DISPCOST) Supply cost (VS_COST)
Access	Researcher requested extract	Direct access
Data availability	FY1999 (Outpatient) FY2004 (Inpatient)	FY2002 (Outpatient & Inpatient)
Directions for use	SIG available (also components of SIG available: SCHED, UNT_DOSE, DSP_UNT)	

Key Pharmacy Variables

Variable	DSS	PBM
Days Supply	X	X
Drug Description	X	X
Quantity	X	X
NDC	X	X
Medication class	X	X

Other DSS and PBM 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
- Available on DSS website

■ National Drug File

- Key Variables
 - VA_PRODUCT, FEEDER, NDF_NDC, VA_CLASS

Other CDW Pharmacy Data

■ Key Product Tables

- Pharmacy BCMA
 - Dispensed Drug, Medication Log, Medication Variance + Missing Dose Request
- Pharmacy Outpatient
 - RxOutPat Prescriptions, RxOutPat Fill, RxOutPat Sig, RxOutPat Med Instructions

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Assessing Outpatient Pharmacy Use: Finding info in VA Pharmacy Datasets

■ Where can I find cost variables?

■ DSS and PBM contain different cost variables

- PBM: cost of the drug product from the supplier
- DSS:

- 1) **Dispensing Cost (DISPCOST)**: direct pharmacist labor for dispensing the prescription and the mailing costs
- 2) **Supply Cost (VS_COST)**: Drug product cost and 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



Assessing Outpatient Pharmacy Use: Finding info in VA Pharmacy Datasets

■ Why is the NDC for the same prescription different on the PBM record than on the DSS record?

- The NDC's are obtained from different sources
- Differences can result if Local Drug File has not been updated to reflect supply that was stocked when medication was dispensed
- Different NDC's will refer to the same drug, dosage, and strength, but may indicate a different manufacturer and/or package size



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

- **Cohort identification**
 - *Can pharmacy data be used to identify specific groups of patients?*
- **Medication utilization**
 - *Recent year? Longer historical view? Does 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 outpatient pharmacy utilization been measured in VA studies?: Medication Exposure and Outcomes

- **Pugh MJV, Copeland LA, Zeber JE, et al. Antiepileptic drug monotherapy exposure and suicide-related behavior in older Veterans. *J Am Geriatr Soc.* 2012; 60(11):2042-7.**

- **Objective:** To examine the association between antiepileptic drug (AED) receipt and suicide-related behavior (SRB) in older veterans

Antiepileptic Drug Monotherapy Exposure and Suicide-Related Behavior in Older Veterans

Mary Jo V. Pugh, PhD,^{1,2} Laurel A. Copeland, PhD,^{1,2} John E. Zeber, PhD,^{1,2} Chen-Pin Wang, PhD,^{1,2} Megan E. Arman, MPH,¹ Eric M. Mortenson, MD, MS,^{1,2} Jeffrey V. Tabares, MS,² Anne C. Van Cott, MD,¹ Toby L. Cooper, PharmD,¹ and Joyce A. Cramer, BS^{1,2}

OBJECTIVES: To examine the association between antiepileptic drug (AED) receipt and suicide-related behavior (SRB) in older veterans.
DESIGN: Retrospective database analysis.
SETTING: Veterans Health Administration (VHA) inpatient and outpatient care.
PARTICIPANTS: Veterans aged 65 and older in 2004 to 2006.
MEASUREMENTS: SRB was identified using International Classification of Diseases, Ninth Revision, Clinical Modification codes, and new AED monotherapy was identified using the VHA product variable in pharmacy data. Comorbid conditions and medications were also identified as potential confounders using previously validated algorithms. Cox proportional hazards models controlling for the propensity to receive AEDs examined the association between any AED exposure, specific AEDs, and time to SRB.
RESULTS: Within the eligible sample of 2.15 million individuals, 332 cases of SRB were found. Overall, 99% of participants were male, and 67% were non-Hispanic white. Affective disorders and seven psychiatric conditions were strongly associated with SRB and were

included in the propensity score. AED exposure displayed a significant association with SRB (odds ratio = 4.10, 95% confidence interval [CI] = 3.83-6.63) after adjusting for propensity to receive AEDs. Stratified analyses found similar results for those with (hazard ratio [HR] = 4.00, 95% CI = 2.9-5.5) and without (HR = 4.57, 95% CI = 1.15-18.20) mental health comorbidities. Gabapentin, phenytoin, lamotrigine, levetiracetam, topiramate, and valproate were significantly associated with SRB.

CONCLUSION: Exposure to five common AEDs was associated with SRB in older VHA beneficiaries. Given the strong associations between psychiatric comorbidity and SRB, clinicians treating elderly adults should weigh the potential adverse effect over their consideration for treatment of those receiving AEDs. Particular attention should be given to depression and suicidality screening in people prescribed AEDs. *J Am Geriatr Soc* 60(2012):2042-2047, 2012.

Key words: suicide; epidemiology; psychiatric disorder; antiepileptic drugs; geriatric

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On January 31, 2008, the Food and Drug Administration (FDA) released an alert that claimed to raise the risk of suicide-related behaviors (SRB), suicidal ideation, attempts, or completion for individuals taking antiepileptic drugs (AEDs) carbamazepine, felbamate, gabapentin, lamotrigine, levetiracetam, oxcarbazepine, pregabalin, rufinamide, topiramate, valproate, and zonisamide.¹ Despite criticisms of the FDA alert, including concerns that not all AEDs were included in the analysis² and technical differences between individual AEDs preventing the drugs from being classified as a single drug category,³ a review of available AED-safety literature provides support for some of the alert's concerns. For example, two studies documented an increase in suicidality for individuals taking carbamazepine, rufinamide, valproate, and gabapentin and

Medication Exposure and Outcomes: Pugh et al. *J Am Geriatr Soc.* 2012

- **January 2008, FDA released alert claiming twice risk of suicide-related behavior in patients taking antiepileptic drugs (AEDs)**
 - Elderly patients were under-represented in FDA analysis
- **This study compares suicide-related behavior in older Veterans with and without AEDs**
 - Cohort of patients age 65 years
- **Drugs were identified according to the generic name using VHA product variable**
- **How was pharmacy data used?**
 - Cox proportional hazards models used to compare time to event (suicide-related behavior) for patients with or without AED exposure

Medication Exposure and Outcomes: Pugh et al. *J Am Geriatr Soc.* 2012

■ Study timeline

For Veterans 65 or older between FY04-06,
Incident Exposure was:

- Initial AED (Veterans *with* AED)
- First VHA use (Veterans *without* AED)

12 month follow-up period

- 12 months of prior VHA use
- 12 months without AED

- Follow-up Measure:
- Suicide-related behavior

Medication Exposure and Outcomes: Pugh et al. *J Am Geriatr Soc.* 2012

AED exposure:

90,263 (4.2%)

No AED Exposure:

2,056,911 (95.8%)

Table 2. Cox Proportional Hazard Model Analysis: Relationship Between Antiepileptic Drug (AED) Exposure and Suicide-Related Behavior, Using Inverse Probability-Weighted Propensity Score to Control for Possible Confounders

Parameter	Hazard Ratio (95% Confidence Interval)
Model 1: Incident exposure to any AED versus none	3.90 (2.93–5.19) ^a
Model 2: Incident exposure to an AED versus none	
Carbamazepine	1.19 (0.30–4.68)
Gabapentin	2.56 (1.96–4.16) ^a
Lamotrigine	36.63 (15.89–84.46) ^a
Levetiracetam	8.23 (1.41–48.11) ^a
Phenobarbital	1.65 (0.40–6.74)
Phenytoin	5.33 (1.55–18.34) ^a
Topiramate	6.83 (1.90–24.51) ^a
Valproate	15.44 (9.44–25.44) ^a

Oxcarbazepine, zonisamide, and pregabalin are not presented in specific drug analysis because the numbers were too small to calculate stable estimates.

^aP < .05.

How has outpatient healthcare utilization been measured in VA studies?: Medication Adherence

Predictors of Adherence to Inhaled Medications Among Veterans with COPD

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BACKGROUND: Factors contributing to medication nonadherence among patients with chronic obstructive pulmonary disease (COPD) are poorly understood.

OBJECTIVES: To identify patient characteristics that are predictive of adherence to inhaled medications for COPD and, for patients on multiple inhalers, to assess whether adherence to one medication class was associated with adherence to other medication classes.

DESIGN: Cohort study using data from Veterans Affairs (VA) electronic databases.

PARTICIPANTS: This study included 2,730 patients who underwent pulmonary function testing between 2003 and 2007 at VA facilities in the Northwestern United States, and who met criteria for COPD.

MAIN MEASURES: We used pharmacy records to estimate adherence to inhaled corticosteroids (ICS), ipratropium bromide (IP), and long-acting beta-agonists (LABA) over two consecutive six-month periods. We defined patients as adherent if they had refilled medications to have 80% of drug available over the time period. We also collected information on their demographics, behavioral habits, COPD severity, and comorbidities.

KEY RESULTS: Adherence to medications was poor, with 19.8% adherent to ICS, 30.6% adherent to LABA, and 25.6% adherent to IP. Predictors of adherence to inhaled therapies were highly variable and dependent on the medication being examined. In adjusted analysis, being adherent to a medication at baseline was the strongest predictor of future adherence to that same medication [Odds ratio, 95% confidence interval] ICS: 4.79 (3.22–7.12); LABA: 6.60 (3.92–11.11); IP: 14.13 (10.00–19.97), but did not reliably predict adherence to other classes of medication.

CONCLUSIONS: Among patients with COPD, past adherence to one class of inhaled medication strongly predicted future adherence to the same class of medication, but only weakly predicted adherence to other classes of medication.

KEY WORDS: medication adherence; pulmonary diseases; health behavior; veterans.
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INTRODUCTION

Multiple randomized controlled trials have demonstrated the efficacy of pharmacological treatment of chronic obstructive pulmonary disease (COPD) at improving symptoms and quality of life, while reducing the frequency of exacerbations.^{1–4} Medications cannot be effective when they are not taken. Medication adherence represents a complex set of health behaviors that is not clearly understood. Patients who demonstrate better adherence to an assigned treatment, including placebo treatment in the context of efficacy trials, have been shown to experience better outcomes.⁵ Although there is a paucity of information about adherence to pharmaceutical therapy for COPD, existing information suggests that medication nonadherence is common.⁶

In contrast to other chronic conditions such as hypertension and diabetes, there is limited information about predictors of nonadherence to inhaled medication therapies among patients with COPD.^{7–11} Moreover, the studies of adherence to COPD medications have largely focused on short-acting bronchodilators. Given the wealth of recently published data demonstrating the efficacy of long-acting inhaled therapies for COPD, understanding characteristics of associated medication adherence represents an important opportunity to identify areas where interventions may be designed to improve adherence to therapies with documented benefit. We sought to assess predictors of adherence to inhaled therapies for COPD and, for patients on multiple inhaled medications, to assess whether adherence to one class of medication predicts adherence to other classes of medication.

METHODS

Settings and Subjects

We performed a cohort study of Veterans who had pulmonary function testing. Our study population was identified from the 14,541 patients from three sites within the Veterans Integrated Service Network 20 (VISN 20) medical facilities, who had pulmonary function tests (PFTs) performed between January 2003 and December 2007. Pulmonary function testing was obtained as part of routine

■ **Huetsch JC, Uman JE, Udris EM, Au DH. Predictors of Adherence to Inhaled Medications Among Veterans with COPD. *J Gen Intern Med.* 2010; 27(11):1506–12**

■ **Objective: To assess predictors of adherence to inhaled therapies for COPD and, for patients on multiple inhaled medications, to assess whether adherence to one class of medication predicts adherence to other classes**

Medication Adherence:

Huetsch et al. *J Gen Intern Med.* 2012

- **Cohort consisted of patients with pulmonary function tests between January 2004 and December 2007 who**
 - Had spirometric evidence of COPD
 - Had a ReComp (medication adherence) measure for one or more COPD medications
- **Medicare adherence assessed for 3 drug classes:**
 - inhaled corticosteroids (ICS)
 - ipratropium bromide (IP)
 - long-acting beta-agonists (LABA)
- **ReComp used to measure adherence**

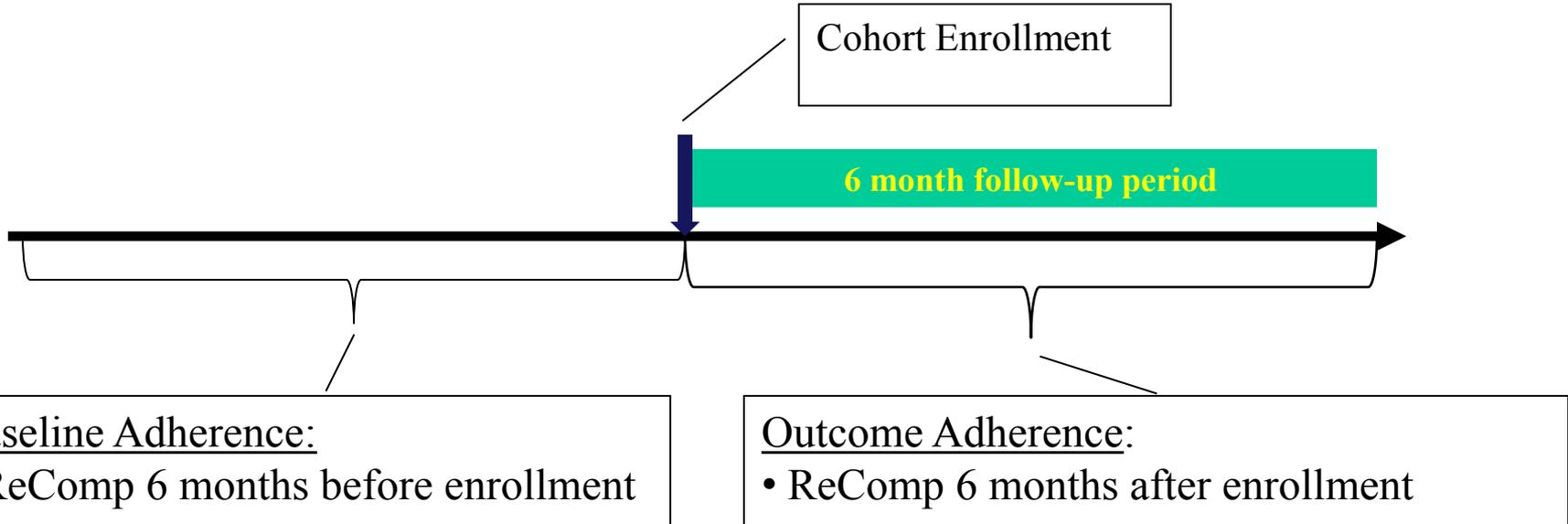
Medication Adherence:

Huetsch et al. *J Gen Intern Med.* 2012

- **ReComp is an algorithm to measure medication adherence**
 - 1 indicates medication available to patient during all days during period of interest
 - 0 indicates no medication available to patient during period of interest
- **For Outcome Adherence**
 - ReComp ≥ 0.8 was considered adherent
- **For Baseline Adherence**
 - Poor (score: 0 to <0.20)
 - Moderate (score: ≥ 0.20 to <0.80)
 - Good (score: ≥ 0.80 to <1.0)
 - Excellent (score: 1.0).

Medication Adherence: Huetsch et al. *J Gen Intern Med.* 2012

■ How was pharmacy data used?



Medication Adherence: Huetsch et al. *J Gen Intern Med.* 2012

Table 3. Odds of Medication Adherence Based on Baseline Adherence to Different Classes of Medication

Baseline Adherence (categorized by ReComp score)		Odds of ICS Adherence (95 % CI)	Odds of LABA Adherence (95 % CI)	Odds of IP Adherence (95 % CI)
Inhaled corticosteroid	Poor (0 to <0.20)	1.00	1.00	1.00
	Moderate (≥ 0.20 to <0.80)	0.85 (0.66–1.10)	0.98 (0.67–1.41)	0.88 (0.66–1.18)
	Good (≥ 0.80 to <1.0)	2.87 (1.96–4.20)	1.87 (1.09–3.23)	1.21 (0.77–1.90)
	Excellent (1.0)	4.79 (3.22–7.12)	3.30 (1.89–5.74)	1.88 (1.21–2.92)
Long-acting beta-agonist	Poor	1.00	1.00	1.00
	Moderate	0.88 (0.60–1.29)	1.08 (0.79–1.49)	0.83 (0.56–1.22)
	Good	1.84 (1.17–2.90)	3.61 (2.29–5.47)	1.06 (0.67–1.68)
	Excellent	1.71 (1.03–2.84)	6.60 (3.92–11.11)	1.43 (0.86–2.38)
Ipratropium bromide	Poor	1.00	1.00	1.00
	Moderate	0.85 (0.61–1.19)	1.49 (0.98–2.27)	1.38 (1.10–1.73)
	Good	2.30 (1.46–3.61)	2.24 (1.27–3.94)	2.52 (1.81–3.50)
	Excellent	1.41 (0.94–2.10)	1.82 (1.11–3.00)	14.13 (10.00–19.97)

*Reference group for each model is poor baseline adherence (ReComp score <0.20)

†All models were adjusted for age, gender, race, missed clinic visits, FEV₁, occurrence of ≥ 1 outpatient COPD exacerbations, asthma, lung cancer, and number of medication classes

How has outpatient pharmacy utilization been measured in VA studies?: Medication Use

■ **Gellad WF, Aspinall SL, Handler SM, Stone RA, Castle N, Semla TP, Good CB, Fine MJ, Dysken M, Hanlon JT. Use of Antipsychotics Among Older Residents in VA Nursing Homes. *Med Care*. 2012;50: 954–960.**

■ **Objective: To assess the prevalence and risk factors for antipsychotic use in older residents of VA Community Living Centers**

ORIGINAL ARTICLE

Use of Antipsychotics Among Older Residents in VA Nursing Homes

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Steven M. Handler, MD, PhD*†‡¶†† Roslyn A. Stone, PhD*†‡‡ Nicholas Castle, PhD‡‡
Todd P. Semla, PharmD||§ Chester B. Good, MD*†‡|| Michael J. Fine, MD*†
Maurice Dysken, MD||| and Joseph T. Hanlon, PharmD*†‡¶††||

Background: Antipsychotic medications are commonly prescribed to nursing home residents despite their well-established adverse event profiles. Because little is known about their use in Veterans Affairs (VA) nursing homes (ie, Community Living Centers [CLCs]), we assessed the prevalence and risk factors for antipsychotic use in older residents of VA CLCs.

Methods: This cross-sectional study included 3692 Veterans age 65 or older who were admitted between January 2004 and June 2005 to one of 133 VA CLCs and had a stay of ≥ 90 days. We used VA Pharmacy Benefit Management data to examine antipsychotic use and VA Medical SAS datasets and the Minimum Data Set to identify evidence-based indications for antipsychotic use (eg, schizophrenia, dementia with psychosis). We used multivariable

logistic regression and generalized estimating equations to identify factors independently associated with antipsychotic receipt.

Results: Overall, 948/3692 (25.7%) residents received an antipsychotic, of which 59.3% had an evidence-based indication for use. Residents with aggressive behavior (odds ratio [OR] = 2.74, 95% confidence interval [CI], 2.04–3.67) and polypharmacy (≥ 7 drugs; OR = 1.84, 95% CI, 1.41–2.40) were more likely to receive antipsychotics, as were users of antidepressants (OR = 1.37, 95% CI, 1.14–1.66), anxiolytic/hypnotics (OR = 2.30, 95% CI, 1.64–3.23), or drugs for dementia (OR = 1.52, 95% CI, 1.21–1.92). Those residing in Alzheimer/dementia special care units were also more likely to receive an antipsychotic (OR = 1.66, 95% CI, 1.26–2.21). Veterans with dementia but no documented psychosis were as likely as those with an evidence-based indication to receive an antipsychotic (OR = 1.10, 95% CI, 0.82–1.47).

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Portions of this research were presented at a paper at the VA Health Services Research and Development (HS&RD) Annual Meeting in National Harbor, MD, on February 17, 2011 and as a poster at the Society of General Internal Medicine Annual Meeting in Phoenix, AZ, on May 5, 2011.

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Conclusions: Antipsychotic use is common among VA nursing home residents aged 65 and older, including those without a documented evidence-based indication for use. Further quality improvement efforts are needed to reduce potentially inappropriate antipsychotic prescribing.

Key Words: nursing homes, antipsychotics, Veterans, pharmacoepidemiology

(*Med Care* 2012;50: 954–960)

Neuropsychiatric symptoms are common in dementia and are one of the reasons individuals with dementia are placed in nursing homes.^{1,2} There are no Food and Drug Administration (FDA)-approved medications for common dementia-associated behavioral symptoms such as wandering, agitation, and aggression. Nonetheless, antipsychotics are commonly used in nursing homes off-label to treat patients with dementia and behavioral symptoms, in addition to treating those with psychotic illnesses for whom antipsychotics are FDA approved (eg, schizophrenia).^{3–9} In 2006, nearly 30% of nursing home residents in a large national study received an antipsychotic medication, of which 32% had no identified indication for use.³ Recently, the Office of the Inspector General in the Department of Health and Human Services addressed this potential overuse, reporting that 22% of Medicare part D claims for atypical

Medication Use: Gellad et al. *Med Care*. 2012

- **Antipsychotic medications are commonly prescribed to nursing home residents despite well-established adverse events**
- **Cohort consisted of all residents of VA Community Living Center between 1/1/2004 and 6/30/2005 with at least VA Rx dispensing**
- **Logistic regression used to indentify factors associated with antipsychotic use**

Medication Use: Gellad et al. *Med Care*. 2012

- **How was pharmacy data used?**
- **Pharmacy data from PBM was linked with Minimum Data Sets (MDS) and MedSAS data**
- **For each dispensed drug, study collected**
 - Start and stop date
 - Medication name
 - Medication strength
 - Directions for use (i.e., SIG)
 - Amount dispensed
- **To create a polypharmacy covariate for regression, identified the number of unique drugs per resident**

Medication Use: Gellad et al. *Med Care*. 2012

- **Resident classified based on whether there were indications for antipsychotic medications**
 - Appropriate use included patients with psychiatric diagnosis in which psychotic symptoms are prominent feature or a diagnosis of dementia and psychotic symptoms
 - Potentially inappropriate use were remaining patients without psychiatric diagnosis or psychotic symptoms
 - With dementia
 - Without dementia

Medication Use: Gellad et al. *Med Care.* 2012

TABLE 2. Patient and Facility Characteristics Associated with Antipsychotic Use Among 3692 Older Residents of Veterans Affairs Community Living Centers, From 2004 to 2005

	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Demographics		
Age		
65–74	1.00 (reference)	1.00 (reference)
75–84	0.95 (0.81–1.13)	0.77 (0.64–0.93)
Older than 85	0.77 (0.61–0.97)	0.67 (0.51–0.88)
Race		
Indication by psychosis/dementia diagnosis		
Psychotic diagnosis or symptoms (potentially appropriate)	1.00 (reference)	1.00 (reference)
Dementia without psychosis (potentially inappropriate)	0.98 (0.77–1.24)	1.10 (0.82–1.47)
No dementia or psychosis (potentially inappropriate)	0.20 (0.17–0.24)	0.25 (0.21–0.30)

How has outpatient pharmacy utilization been measured in VA studies?: Trends in Medication Use

■ **Tarlov E, Stroupe KT, et al. Trends in anemia management in lung and colon cancer patients in the US Department of Veterans Affairs, 2002-2008. *Support Care Cancer*. 2012; 20:1649–1657**

■ **Objective: To examine erythropoiesis-stimulating agent (ESA) therapy in lung and colon cancer patients receiving chemotherapy from 2002 to 2008**

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. Wickle · Qinying 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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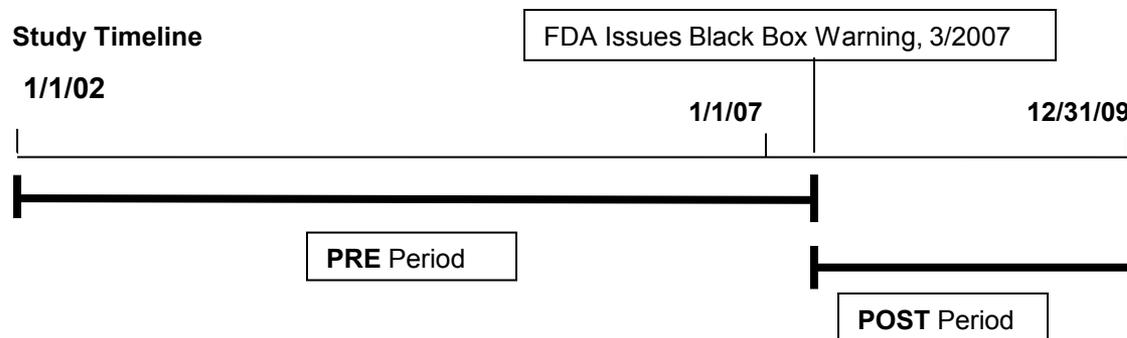
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Introduction

The use of erythropoiesis-stimulating agents (ESAs) to manage anemia in cancer is intended to reduce the need for blood transfusions and improve patients’ quality of life. Their effectiveness in reducing blood transfusions has been conclusively demonstrated, but ESAs have also been implicated in higher rates of thrombotic vascular events, tumor promotion, and reduced survival [1–3]. While an increased risk of thrombotic events was noted in studies leading to FDA approval of epoetin alfa (in 1993) and darbepoetin alpha (in 2001), cancer clinical trial results

Springer

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



■ How was pharmacy data used?

■ Pharmacy data was use 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

Table 2 Odds of receiving ESA treatment

	Adjusted odds ratios ^a (95% confidence limits)	
	Lung cancer (N=17,014)	Colon cancer (N=4,225)
Time period ^b		
PRE	Ref	Ref
POST	0.35 (0.30–0.42)	0.47 (0.36–0.63)

^a Odds ratios obtained from a logistic regression model.

^b PRE/POST time periods defined in relation to March 1, 2007

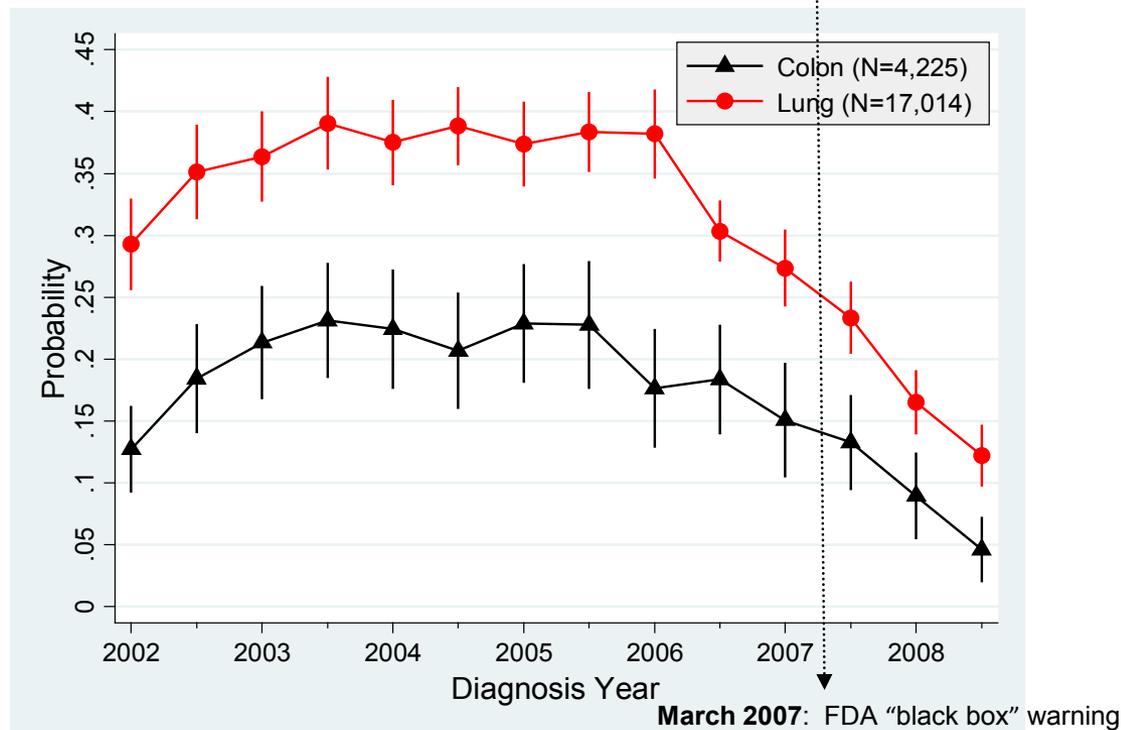
- **For lung cancer patients**

- Odds of ESA use decreased 65% in the POST period

- **For colon cancer patients**

- Odds of ESA use decreased 53% in the POST period

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 outpatient healthcare utilization been measured 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

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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 purposes. While the strategy promises to be cost effective and less labor intensive than extracting information from indi-

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 spondylarthritis (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 originating

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Dr. Ng has received consultant fees, speaking fees, and/or honoraria (less than \$10,000) from UCB Pharmaceuticals.

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- Ng B, Aslam F, Petersen NJ, Yu HJ, Suarez-Almazor ME. Identification of Rheumatoid Arthritis Patients Using an Administrative Database: A Veterans Affairs Study. *Arthritis Care Research*. 2012; 64:1490–1496.

- **Objective:** To assess the utility of diagnostic algorithms, including prescriptions, to identify RA patients within VHA databases

The views expressed herein are those of the authors and do not necessarily represent those of the Department of Veterans Affairs or Baylor College of Medicine.

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¹Bernard Ng, MBS, MMed, Nancy J. Petersen, PhD, Michael E. DeBakey VA Medical Center Health Services Re-

Cohort Identification:

Ng et al. *Arthritis Care Research*. 2012

- **Study sample consisted of patients having 2 outpatient visits with rheumatoid arthritis (RA) codes at least 2 months apart at Houston VAMC between FY99 and FY09**
- **How was pharmacy data used?**
- **Study tested algorithms to identify RA in through VHA databases using**
 - Presence of at least 2 ICD-9 at least 6 months apart
 - Use of disease-modifying antirheumatic drugs (DMARD) for at least 180 days
 - ICD-9 code for RA at visit to rheumatologist

Cohort Identification:

Ng et al. *Arthritis Care Research*. 2012

■ Study design

- To validate diagnosis of RA, study conducted chart review
- Study evaluated the positive predictive value (PPV) of the diagnostic algorithms using validation from chart review

Cohort Identification: Ng et al. *Arthritis Care Research*. 2012

Table 2. Total population number and sample statistics: PPV, sensitivity, and specificity of different algorithms for random sample of patients with at least 2 RA codes*

	Total population, no.	Estimated no. of RA patients (PPV from random sample × total population)	Random sample statistics, % (95% CI)		
			PPV	Sensitivity	Specificity
All patients (with or without DMARD therapy for ≥180 days)					
Two RA codes (any visit)	1,779	550	30.9 (27.7–34.2)	NA†	NA†
Two RA codes with at least 1 RA code in a rheumatologist visit	1,014	408	40.2 (34.1–46.3)	47.6 (41.4–53.8)	68.3 (62.5–74.1)
Two RA codes with at least 1 rheumatology visit and with the last rheumatologist visit with an RA code	541	364	67.3 (58.9–75.8)	39.3 (30.5–48.0)	91.5 (86.5–96.5)
Patients with DMARD therapy for ≥180 days					
Two RA codes (any visit)	791	478	60.4 (55.3–65.5)	88.1 (84.7–91.5)	74.1 (69.6–78.7)
Two RA codes with at least 1 RA code in a rheumatologist visit	621	466	75.0 (67.2–82.8)	44.6 (35.7–53.6)	93.3 (88.9–97.8)
Two RA codes with at least 1 rheumatology visit and with the last rheumatologist visit with an RA code	430	393	91.4 (85.4–97.4)	38.1 (27.7–48.5)	98.4 (95.7–100.0)

Adding DMARD therapy to the patient identification algorithm increased the PPV

* PPV = positive predictive value; RA = rheumatoid arthritis; 95% CI = 95% confidence interval; DMARD = disease-modifying antirheumatic drug; NA = not applicable.

† Sensitivity and specificity cannot be estimated for all

Highest PPV (91.4%) was found in patients who:

Received DMARDs for at least 180 days

Had an RA code from visit to rheumatologist

Session Objectives

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

VIReC Help

■ VIReC Webpage

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

- Information on VA data sources and how to access data
- Resource users guide for pharmacy data
 - <http://www.virec.research.va.gov/References/RUG/RUG-Pharmacy-2nd-Ed-er.pdf>

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

Questions?

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Upcoming Seminar

Assessing Race and Ethnicity - May 6, 2013

Maria Mor, PhD