ORIGINAL RESEARCH

Characteristics of Veterans With Non-VA Encounters Enrolled in a Trial of Standards-Based, Interoperable Event Notification and Care Coordination

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Introduction: **Understanding how veterans use Veterans Affairs (VA) for primary care and non-VA for acute care can help policy makers predict future health care resource use. We aimed to describe characteristics of veterans enrolled in a multisite clinical trial of non-VA acute event notifications and care coordination and to identify patient factors associated with non-VA acute care.**

Methods: **Characteristics of 565 veterans enrolled in a prospective cluster randomized trial at the Bronx and Indianapolis VA Medical Centers were obtained by interview and chart review.**

Results: **Veterans' mean age was 75.8 years old, 98.3% were male, and 39.2% self-identified as a minority race; 81.2% reported receiving the majority of care at the VA. There were 197 (34.9%) veterans for whom a non-VA acute care alert was received. Patient characteristics significantly associated with greater odds of a non-VA alert included older age (OR = 1.05; 95% CI, 1.04-1.05); majority of care received is non-VA (OR = 1.83; 95% CI, 1.06-3.15); private insurance (OR = 1.39; 95% CI, 1.19-1.62); and higher income (OR = 4.01; 95% CI, 2.68-5.98).**

Conclusions: **We identified several patient-level factors associated with non-VA acute care that can inform the design of VA services and policies for veterans with non-VA acute care encounters and reintegration back into the VA system. (J Am Board Fam Med 2021;34:301–308.)**

Keywords: **Access to Health Care, Cluster Randomized, Continuity of Patient Care, Health Behavior, Health Information Exchange, Health Services Research, Patient Care, Population Health, Primary Health Care, Prospective Studies, Veterans Health Administration**

Introduction

Coordinating the delivery of patient care across settings and providers remains a challenge for health systems across the globe.[1] This is true even for veterans in the United States who, although enrolled in an integrated network managed by the Veterans Health Administration (VHA), often receive care from providers inside and out of the VHA network.

Veterans older than 65 years of age have historically had the option of using health care services from the VHA, community providers via Medicare, or both.[2] Among 2.6 million VHA–Medicare dually eligible veterans, nearly 1 million receive care in both the Veterans Affairs health care system and in systems outside VA.[3] Furthermore, this proportion is expected to increase given recent legislation and policies impacting the US Department of Veterans

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Affairs (VA). Specifically, the Veterans Access, Choice, and Accountability Act of 2014 ("Choice Act") allows veterans to receive care from community providers if the expected wait time for a VHA appointment is greater than 30 days or if the nearest provider is more than 40 miles away.[4] The VA Mission Act of 2018 expanded efforts at the VA to provide timely and accessible care to veterans through community providers with an emphasis on the coordination of VA and community care.[5]

In this era of increasing community care options, understanding how veterans dually use VHA for primary care and non-VA acute care can help policy makers predict future use of VA and non-VA health care resources. Prior studies have shown that dual use of VA and non-VA health care services is common.[6–9] However, these prior examinations largely focused on use of non-VA specialty care, non-VA primary care, or VA inpatient care. Two prior studies examined inpatient use both in and out of the VA, although these studies focused on specific disease cohorts (eg, veterans with diabetes, veterans with rheumatoid arthritis).[10,11] There are no published examinations of non-VA acute care among a general population of VHA patients who receive the majority of their primary care in the VA.

The aim of this study was to identify patient characteristics associated with non-VA acute care encounters in a cohort of older veterans at the Bronx and Indianapolis VA Medical Centers. This study is part of a larger trial that examines the impact of VA provider notification and care coordination when older veterans use non-VA inpatient or emergency department (ED) services, described in detail elsewhere.[12]

Methods

Setting

The VHA is the largest integrated health care system in the United States. The VHA provides care at 1243 health care facilities, including 170 medical centers and more than 1000 outpatient clinics, serving 9 million enrolled veterans each year.

Two medical centers within the VHA participated in this study. The first is the James J. Peters VA Medical Center (JJP VAMC) located in the Bronx, New York. The JJP VAMC provides care for more than 26,000 patients annually at a tertiary care facility providing comprehensive inpatient and outpatient services in addition to 4 outpatient clinics. The second medical center is the Richard L. Roudebush VA Medical Center (RLR VAMC) located in Indianapolis, Indiana. The RLR VAMC serves more than 62,000 patients annually via a tertiary care facility that provides comprehensive inpatient care and 3 outpatient clinics. Both medical centers also serve as teaching hospitals and regional referral sites.

Population

A veteran was eligible for the larger study if he or she (1) was followed in the geriatric or primary care clinics at either the Bronx or Indianapolis VA Medical Centers; (2) was 65 years or older; (3) agreed to consent to standards-based, interoperable health information exchange (HIE) between VHA and non-VHA providers; (4) used any non-VHA services (including lab, physician, nursing, pharmacy, and/or hospital services) within 2 years before enrollment in the study according to records in the external HIE network or self-report; and (5) enrolled in the parent study between February 1, 2016 and February 1, 2019. Eligibility for the larger trial was determined based on the fact that veterans 65 years and older are eligible for Medicare, which expands their access to non-VA care, enabling comparison of findings with prior studies on dual use. The number of participants enrolled was 565 out of the total number eligible of 951, resulting in a rate of agreement to enroll among participants to be 59.4%. Most who did not enroll refused without any specific reasons. Those who did give a reason most commonly stated (1) they had no time that day, (2) were not interested in research, or (3) had too many health concerns.

Patients were followed from enrollment until October 1, 2019 or until death, whichever came first.

Data Collection

Baseline data were collected from the veteran or caregiver using a questionnaire administered by a trained research assistant. The questions pertained to a veteran's demographics, use of high-risk medications, functional status, and cognitive function.

Measures

The primary outcome was use of non-VA acute care, defined as non-VA hospital admission or non-VA emergency visit as alerted by the HIE. The following measures were considered possible predictors of the primary outcome:

- Age
- Sex (dichotomous, as recorded in the medical record)
- Race/ethnicity (self-identified)
- Annual income (self-reported, individual)
- Service connectedness (health conditions related to military service)
- Site of receipt of majority of care (self-reported VA or non-VA)
- Has a regular non-VA provider (self-reported yes or no)
- VA ED or hospital admission in the past year
- Insurance type (private, Medicare, Medicaid)
- Chronic disease burden (Charlson Comorbidity Index)
- Self-reported health (poor, fair, good, very good, excellent)
- Travel time to the VA (in minutes)
- Geographic location (rural-urban commuting area [RUCA] codes)

Data Analysis

Statistical analysis included descriptive characteristics of all subjects, stratified by whether they experienced a non-VA acute care encounter. Histograms of each variable were examined to ascertain the distribution of data. Bivariate analyses were used to identify significant differences between those who did and did not experience a non-VA acute care encounter. A chi-squared test was used for discrete variables and a 2-sided *t* test for continuous variables. Among those with a non-VA acute care encounter, we also describe non-VA acute care encounter characteristics (eg, reason for visit, duration), stratified by site (Bronx or Indianapolis).

To examine factors associated with use of non-VA acute care (non-VA hospital admission or non-VA emergency visit), we fit multivariable models with a logit link and binomial distribution using robust standard errors clustered by enrollment site. This approach was employed to take into account within-site cluster correlations. Statistical models included the following potential predictor variables: age, gender, race/ethnicity, annual income, insurance type, service connectedness, perceived health status, chronic condition burden, prior VA use, site of receipt of majority of care (VA or non-VA), regular non-VA provider, travel time to VA, enrollment site, and RUCA codes as well as duration of follow-up to control for time at risk. Two observations were omitted from the analysis due to missing values for the predictor variables. We conducted all analyses using SAS version 9.4 (SAS Institute, Cary, NC).

Ethics

This study, along with its informed consent documents, questionnaires, and data collection templates, was reviewed and approved by the Institutional Review Board (IRB) of Indiana University as well as the VA Research & Development Committee at both the Indianapolis VA Medical Center and the Bronx VA Medical Center.

Results

Characteristics of the Cohort

Descriptive statistics of the study cohort are summarized in Table 1, stratified by those with and without non-VA acute care encounter alerts. Most of the study population was White (60.8%), male (98.3%), had an average travel time to the VA of 39.5 minutes, and resided in urban environments.

Non-VA Alerts

Out of a total of 565 patients enrolled in the trial, 197 (34.9%) had a non-VA acute care encounter alert during the study period (Table 1). The Bronx had 39 ED visits and 51 hospital admissions for a total of 90 non-VA encounters. Indianapolis had 66 ED visits and 41 hospital admissions for a total of 107 non-VA encounters. The average length of stay (LOS) for a hospital admission was 5.3 days (SD 5.5) (Bronx mean LOS: 6.7 days [SD 6.4]; Indianapolis mean LOS: 3.4 days [SD 3.1]). Overall, the most common diagnosis groups reported for non-VA encounters were cardiovascular other than chest pain, trauma, gastrointestinal, musculoskeletal pain, and infection (Table 2).

Comparison of Those with and without an Alert

In unadjusted analyses, participants with and without non-VA alerts were similar in terms of gender and chronic disease burden. In unadjusted analyses, veterans who experienced a non-VA alert were older on average (77.1 vs 75.2 years; $P = .019$), more likely White race (68.0% vs 57.1%; $P = .026$); and more likely to have private insurance (58.9% vs 48.6%; $P = .020$) and an income >$100,000 (7.6% vs 2.2%; $P = .009$) (Table 1). Veterans who experienced a non-VA alert were also more likely to have

Table 1. Baseline Characteristics of Veterans Enrolled Between 2016 and 2019 Stratified by Non-VA Alert Status

Variable	Alert (n = 197) No. (%) or Mean ± SD	No Alert (n = 368) No. (%) or Mean ± SD	Overall (n = 565) No. (%) or Mean ± SD
Male sex	194 (98.5)	361 (98.1)	555 (98.3)
Age, years*	77.1 ± 8.0	75.2 ± 7.5	75.8 ± 7.7
Race/ethnicity			
White	134 (68.0)	210 (57.1)	344 (60.9)
Black	36 (18.3)	79 (21.5)	115 (20.4)
Hispanic	18 (9.1)	52 (14.1)	70 (12.4)
Asian	1 (0.5)	1 (0.3)	2 (0.4)
Multiracial	3 (1.5)	9 (2.5)	12 (2.1)
Other	5 (2.5)	17 (4.6)	22 (3.9)
Total annual individual income, $			
0 to 10,000	10 (5.1)	19 (5.2)	29 (5.1)
10,001 to 25,000	62 (31.5)	119 (32.3)	181 (32.0)
25,001 to 50,000	54 (27.4)	116 (31.5)	170 (30.1)
50,001 to 100,000	38 (19.3)	78 (21.2)	116 (20.5)
100,001 to 250,000	13 (6.6)	8 (2.2)	21 (3.7)
> 250,000	2 (1.0)	0	2 (0.4)
Unknown/refused	18 (9.1)	28 (7.6)	46 (8.1)
Insurance type			
Medicare	174 (88.3)	321 (87.2)	495 (87.6)
Medicaid	19 (9.6)	41 (11.1)	60 (10.6)
Private*	116 (58.9)	179 (48.6)	295 (52.2)
Perceived health status			
Excellent	14 (7.1)	32 (8.7)	46 (8.2)
Very good	37 (18.9)	88 (23.9)	125 (22.2)
Good	67 (34.2)	145 (39.4)	212 (37.6)
Fair	65 (33.2)	84 (22.8)	149 (26.4)
Poor	13 (6.6)	19 (5.2)	32 (5.7)
Any service connectedness	103 (52.3)	184 (50.0)	287 (50.8)
Chronic conditions			
Charlson Comorbidity Index	1.4 ± 1.6	1.4 ± 1.9	1.4 ± 1.8
Chronic pulmonary disease	35 (17.8)	66 (17.9)	101 (17.9)
Congestive heart failure	20 (10.2)	35 (9.5)	55 (9.7)
Diabetes	86 (43.7)	160 (43.5)	246 (43.5)
Enrollment site			
Bronx, NY	90 (45.7)	190 (51.6)	280 (49.6)
Indianapolis, IN	107 (54.3)	178 (48.4)	285 (50.4)
Travel time to VA, minutes*	43.0 ± 28.6	37.6 ± 24.6	39.5 ± 26.2
RUCA[†*]			
Metropolitan	152 (77.2)	323 (87.8)	475 (84.1)
Micropolitan	25 (12.7)	29 (7.9)	54 (9.6)
Small town	6 (3.1)	6 (1.6)	12 (2.8)
Rural	9 (4.6)	7 (1.9)	16 (2.8)
Unknown	5 (2.5)	3 (0.8)	8 (1.4)
VA use in year before enrollment			
Total # VA ED visits	0.7 ± 1.7	0.7 ± 1.4	0.7 ± 1.5
VA hospitalization	22 (11.2)	54 (14.7)	76 (13.5)

Continued

Table 1. Continued

Variable	Alert (n = 197) No. (%) or Mean ± SD	No Alert (n = 368) No. (%) or Mean ± SD	Overall (n = 565) No. (%) or Mean ± SD
Receives majority of care*			
VA	146 (74.1)	313 (85.1)	459 (81.2)
Non-VA	46 (23.4)	48 (13.0)	94 (16.6)
Unknown/refused	5 (2.5)	7 (1.9)	12 (2.1)
Has a regular non-VA provider* (Yes, No)	119 (60.4)	181 (49.2)	300 (53.1)

ED, emergency department; VA, Veterans Affairs; SD, standard deviation.
* Bivariate analysis for Alert and No Alert comparisons was statistically significant at $P < .05$.
†Rural-urban commuting area codes:
Metropolitan, population > 50,000.
Micropolitan, population 10,000-49,999.
Small town, population 2500-9999.
Rural, population < 2500.

Table 2. Characteristics of Hospitalizations and Emergency Department Visits Among Veterans Who Experienced a Non-VA Alert between 2016 and 2019 Stratified by Enrollment Site*

Variable	Overall No. (%) or Mean ± SD	Bronx No. (%) or Mean ± SD	Indianapolis No. (%) or Mean ± SD
Alert type			
Hospital admission	92 (46.7)	51 (56.7)	41 (38.3)
Emergency department	105 (53.3)	39 (43.3)	66 (61.7)
Hospitalization length of stay, days	5.3 ± 5.5	6.7 ± 6.4	3.4 ± 3.1
Diagnosis group			
Cardiovascular—other than chest pain	24 (13.9)	13 (16.3)	11 (11.8)
Trauma	21 (12.1)	10 (12.5)	11 (11.8)
Gastrointestinal	18 (10.4)	11 (13.8)	7 (7.5)
Musculoskeletal pain	15 (8.7)	3 (3.8)	12 (12.9)
Infection	14 (8.1)	7 (8.8)	7 (7.5)
Neurologic	11 (6.4)	5 (6.3)	6 (6.5)
Respiratory—other than pneumonia	11 (6.4)	6 (7.5)	5 (5.4)
Genitourinary—other than hematuriaor infection	6 (3.5)	3 (3.8)	3 (3.2)
Chest pain	5 (2.9)	2 (2.5)	3 (3.2)
Pneumonia	5 (2.9)	3 (3.8)	2 (2.2)
Hematuria	4 (2.3)	1 (1.3)	3 (3.2)
Inflammation	1 (0.6)	—	1 (1.1)
Musculoskeletal—other than painor trauma	1 (0.6)	—	1 (1.1)
Unknown	25 (14.5)	8 (10.0)	17 (18.3)
Other	12 (6.9)	8 (10.0)	4 (4.3)

SD, standard deviation; VA, Veterans Affairs.
*Alert type n = 197; Hospitalization length of stay n = 87, this variable was missing 5 values; Diagnosis group n = 173, this variable was missing 24 values.

a regular non-VA provider (60.4% vs 49.2%; $P = .011$) and endorse that they receive the majority of their care outside the VA (23.4% vs 13.0%; $P = .006$). Veterans who experienced a non-VA alert were less likely to live in a metropolitan area (77.2% vs 87.8%; $P = .002$) and spent more time traveling to the VA on average (43.0 vs 37.6 minutes; $P = .019$) (Table 1).

Table 3. Multivariable Logistic Regression Results for Odds of a Non-VA Alert, Spring 2016–Winter 2019 (n = 563)

Variable	OR (95% CI)*
Male sex (ref = female)	1.15 (0.55, 2.43)
Age, years	1.05 (1.04, 1.05)
Race/ethnicity (ref = White)	
Black	0.84 (0.55, 1.27)
Other	0.66 (0.42, 1.03)
Total annual individual income, $ (ref = ≤ 100,000)	
> 100,000	4.01 (2.68, 5.98)
Unknown/refused	1.22 (0.88, 1.68)
Insurance type	
Medicare (ref = no Medicare)	0.97 (0.57, 1.64)
Medicaid (ref = no Medicaid)	1.19 (1.17, 1.21)
Private (ref = no private)	1.39 (1.19, 1.62)
Perceived health status (ref = excellent)	
Very good	0.96 (0.51, 1.80)
Good	1.10 (0.71, 1.70)
Fair	2.21 (1.24, 3.94)
Poor	2.01 (0.91, 4.46)
Any service connectedness (ref = no)	0.97 (0.75, 1.26)
Chronic conditions	
Charlson Comorbidity Index	0.96 (0.89, 1.03)
Chronic pulmonary disease (ref = no)	1.06 (0.55, 2.05)
Congestive heart failure (ref = no)	1.44 (1.06, 1.95)
Diabetes (ref = no)	1.02 (0.93, 1.12)
Follow-up time, days	1.00 (1.00, 1.00)
Enrollment site (ref = Bronx, NY)	
Indianapolis, IN	1.24 (0.80, 1.92)
Travel time to VA, minutes	1.00 (1.00, 1.01)
RUCA (ref = metropolitan)†	
Micropolitan	1.93 (1.89, 1.97)
Small town	1.60 (1.35, 1.89)
Rural	2.67 (2.06, 3.47)
Unknown	4.63 (4.48, 4.80)
VA use in year before enrollment	
Total # VA ED visits	1.13 (1.12, 1.13)
VA hospitalization (ref = no)	0.63 (0.57, 0.69)
Has a regular non-VA provider (ref = no)	1.21 (0.82, 1.78)
Receives majority of care (ref = VA)	
Non-VA	1.83 (1.06, 3.15)
Unknown/refused	0.84 (0.83, 0.85)

ED, emergency department; VA, Veterans Affairs; CI, confidence interval; OR, odds ratio.
*Adjusted for other variables in the column.
†Rural-urban commuting area codes:
Metropolitan, population > 50,000.
Micropolitan, population 10,000–49,999.
Small town, population 2500–9999.
Rural, population < 2500.

Regression Model

Results of a regression model for predicting non-VA alerts are shown in Table 3. Patient characteristics significantly associated with greater odds of a non-VA alert included older age (OR per additional year = 1.05; 95% CI, 1.04-1.05); endorsing that majority of care received is non-VA (OR = 1.83; 95% CI, 1.06-3.15); private insurance (OR = 1.39; 95% CI, 1.19-1.62); and higher income (OR = 4.01; 95% CI, 2.68-5.98). An increased number of VA ED visits in the year before baseline was associated with greater odds of an alert (OR = 1.13; 95% CI, 1.12-1.13), whereas, conversely, VA admission in the year before baseline was associated with lower odds of an alert (OR = 0.63; 95% CI, 0.57-0.69). Living in an isolated rural (OR = 2.67, 95% CI, 2.06-3.47), small rural (OR = 1.60; 95% CI, 1.35-1.89), or large rural city (OR = 1.93; 95% CI, 1.89-1.97) was associated with higher odds of an alert. The odds of an alert were higher for those who had a self-perceived state of health as either fair or poor (OR = 2.21; 95% CI, 1.24-3.94; and OR = 2.01; 95% CI, 0.91-4.46, respectively).

Discussion

We characterized patient-level factors that are associated with non-VA acute care use in a cohort of older veterans at two VA medical centers. Approximately one third of the veterans experienced a non-VA acute care episode during the 3-year study period. To our knowledge, this is the first study to identify patient characteristics associated with non-VA acute care encounters among a general population of VHA patients who receive regular care in the VA.

Higher income, access to private insurance, poorer self-perceived health, and the use of a non-VA provider were associated with a greater likelihood of generating an alert. Decreased reliance on the VA by this population could be related to cost, convenience, preferences, quality of care, or referral by other providers.[13] Both veteran and nonveteran populations are at greater risk for experiencing negative health impacts of fragmented care; thus, decreased reliance on VA care may substantially impact chronic disease management and continuity of care for veterans.[13,14] Chronic condition burden was not a good predictor of a non-VA alert in this study. That is consistent with a prior study that found lower ED and hospital use among older adults with multiple chronic conditions seeing the same physicians over time.[15]

This study also found that older veterans and those living in a rural area were more likely to generate an alert. As the risk of an acute care event increases with age, these patients may seek care at a non-VA hospital that provides needed or preferred resources. This is particularly true in rural areas, given that non-VA hospitals greatly outnumber VA hospitals, and a non-VA hospital is usually closer to an individual seeking care than a VA hospital.[16] Risk did not change based on travel time, although individuals with an alert did have a mean travel time higher than those without an alert.

Importantly, we found that an increased number of VA ED visits in the year prior was associated with an increased risk of a non-VA alert. This could be explained by those who have greater real or perceived acute care needs having increased use of both VA and non-VA acute care settings. Alternatively, patients who repeatedly visit a VA ED but do not feel that their needs are being met may seek care at a non-VA hospital, perhaps because of availability of different services. In addition, we found that a VA hospital admission in the year prior was associated with a decreased risk of a non-VA alert. This could be explained by these patients being more engaged with and remaining in the VA system as a result of care needs after the VA hospitalization.

Not all non-VA acute care events were serious (eg, urinary tract infection, wrist sprain, gout), suggesting that improving accessibility to VA primary care may be another strategy to reduce non-VA acute care use. In addition, coordination and follow-up of non-VA acute care should be a key component of primary care in the VHA. Moreover, recent legislation, including the Choice Act of 2014 and Mission Act of 2018, directs the VHA to expand out-of-network care to veterans.[4,17] Since it is anticipated that non-VHA care visits will increase, it is incumbent on the VHA to strengthen care coordination processes to control quality of care as well as costs.[12]

This study has several limitations. First, this cohort consisted of veterans who volunteered for a prospective trial aimed at improving care coordination. They may represent veterans more likely to use non-VA resources or be at risk for non-VA acute care encounters; however, their demographics are representative of the VA population as a group. Next, we did not include measures of other types of non-VA care (eg, outpatient). This could provide insights into use patterns regarding how veterans use VA and non-VA providers differently and provide a more precise picture of the types of care sought by veterans going outside the VA for care. A potential limitation is that the HIE catchment area covers 90% to 95% of potential non-VA hospitals, leaving the opportunity for some missed acute care events. Those few patients who might have sought care outside the HIE catchment area may have characteristics that could potentially impact our results, yet any effect would be minimal. If anything, the impact would likely strengthen the relationship between rurality and non-VA use. A final limitation is that the characteristics of those who chose not to enroll in the study may be different from those who chose to participate, but this effect cannot be determined.

Our findings have several implications for VA policy makers. First, these findings provide a clear picture of the various subpopulations of veterans who are going outside the VA for care and describe who is at risk of negative health implications due to lack of care coordination. This should drive future work and research to further VA's efforts to help coordinate care. In addition, chronic condition burden was not a good predictor of experience of a non-VA alert in this study, indicating that there might be a need to examine other ways to measure disease burden relative to the use of non-VA care. Next, our study suggests that multiple VA ED visits were more likely to generate a non-VA alert, indicating an opportunity for VA planners to develop an intervention to more closely follow veterans who come through the VA ED.

Future Work

This study is the first to examine patient characteristics associated with non-VA acute care encounters. Patient characteristics of high income, access to private insurance and non-VA providers, older age, rural living, and prior VA ED use were identified as predictors of generating a non-VA alert. Veterans who seek outside care are at risk for negative health implications due to fragmented care. Unfortunately, communication and coordination of care among VHA and non-VHA providers is often absent or delayed, resulting in missed opportunities to improve veterans' outcomes. Health information exchange holds promise to improve the quality of care for patients who see non-VA providers and to improve outcomes following transitions between

VA and non-VA health care providers, by facilitating communication and coordination of care through surveillance of acute events.

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To see this article online, please go to: http://jabfm.org/content/34/2/301.full.

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