Public Programs

Use of Outpatient Care in Veterans Health Administration and Medicare among Veterans Receiving Primary Care in Community-Based and Hospital Outpatient Clinics

Chuan-Fen Liu, Michael Chapko, Chris L. Bryson, James F. Burgess Jr., John C. Fortney, Mark Perkins, Nancy D. Sharp, and Matthew L. Maciejewski

Objective. To examine differences in use of Veterans Health Administration (VA) and Medicare outpatient services by VA primary care patients.

Data Sources/Study Setting. VA administrative and Medicare claims data from 2001 to 2004.

Study Design. Retrospective cohort study of outpatient service use by 8,964 community-based and 6,556 hospital-based VA primary care patients.

Principal Findings. A significant proportion of VA patients used Medicare-reimbursed primary care (>30 percent) and specialty care (>60 percent), but not mental health care (3–4 percent). Community-based patients had 17 percent fewer VA primary care visits ($p < .001$), 9 percent more Medicare-reimbursed visits ($p < .001$), and 6 percent fewer total visits ($p < .05$) than hospital-based patients. Community-based patients had 22 percent fewer VA specialty care visits ($p < .0001$) and 21 percent more Medicare-reimbursed specialty care visits ($p < .0001$) than hospital-based patients, but no difference in total visits ($p = .80$).

Conclusions. Medicare-eligible VA primary care patients followed over 4 consecutive years used significant primary care and specialty care outside of VA. Community-based patients offset decreased VA use with increased service use paid by Medicare, suggesting that increasing access to VA primary care via community clinics may fragment veteran care in unintended ways. Coordination of care between VA and non-VA providers and health care systems is essential to improve the quality and continuity of care.

Key Words. Access/demand/utilization of services, Medicare, VA health care system, cohort analysis

BACKGROUND

Over the past two decades, the Veterans Health Administration (VA) has reorganized from an inpatient care to an outpatient care-oriented health care system (Kizer and Dudley 2009). Community-based outpatient clinics (community clinics) have been an essential component of this transition (Chapko et al. 2002). By March 2009, VA had 773 community clinics at locations distinct from VA hospital outpatient clinics, considerably expanding the access to primary care for veterans.

In a series of evaluations of patient satisfaction, quality of care, utilization, and expenditures, veterans obtaining VA primary care at community clinics (community-based patients) were compared with veterans obtaining primary care at VA hospital outpatient clinics (hospital-based patients). Satisfaction and quality of care were found to be comparable between community-based and hospital-based patients (Borowsky et al. 2002; Hedeem et al. 2002). Community-based patients had more primary care visits; were less likely to use specialty, mental health, and ancillary and inpatient care in VA compared with hospital-based patients (Fortney et al. 2002); and had lower VA outpatient care costs and total VA costs (Maciejewski et al. 2002, 2007).

Address correspondence to Chuan-Fen Liu, Ph.D., M.P.H., Northwest Center for Outcomes Research in Older Adults, Department of Veterans Affairs, HSR&D, VA Puget Sound Health Care System, 1100 Olive Way, Suite 1400, Seattle, WA 98101; e-mail: chuan-fen.liu@va.gov. Chuan-Fen Liu, Ph.D., M.P.H., is with the Department of Health Services, University of Washington, Seattle, WA. Michael Chapko, Ph.D., and Nancy D. Sharp, Ph.D., are with the Northwest Center for Outcomes Research in Older Adults, Department of Veterans Affairs, Seattle, WA, and are also with the Department of Health Services, University of Washington, Seattle, WA. Chris L. Bryson, M.D., M.S., is with the Northwest Center for Outcomes Research in Older Adults, Department of Veterans Affairs, Seattle, WA, and also with the Division of General Internal Medicine, Department of Medicine, University of Washington, Seattle, WA. James F. Burgess Jr., Ph.D., is with the Center for Organization, Leadership & Management Research, Department of Veterans Affairs, Boston, MA, and also with the Department of Health Policy and Management, School of Public Health, Boston University, Boston, MA. John C. Fortney, Ph.D., is with the South Central Mental Health Illness Research and Education and Clinical Center, North Little Rock, AR, is also with the HSR&D Center for Mental Healthcare and Outcomes Research, Central Arkansas Veterans Healthcare System, North Little Rock, AR, and also with Division of Health Service Research, Department of Psychiatry and Behavioral Sciences, University of Arkansas for Medical Sciences, North Little Rock, AR. Mark Perkins, Pharm.D., is with the Northwest Center for Outcomes Research in Older Adults, Department of Veterans Affairs, Seattle, WA. Matthew L. Maciejewski, Ph.D., is with the Center for Health Services Research in Primary Care, Department of Veterans Affairs, Durham, NC, and also with the Division of General Internal Medicine, Department of Medicine, Duke University Medical Center, Durham, NC.

However, these previous studies did not characterize overall health care utilization among veterans because non-VA services were not included.

Many individuals have access to more than one health care system through multiple health insurance programs. In VA, a significant proportion of veterans also have coverage through private insurance, Medicaid, Medicare, TRICARE through military services, or Indian Health Services (Wright et al. 1997; Borowsky and Cowper 1999; Wright et al. 1999; Shen et al. 2003; Hynes et al. 2007; Ross et al. 2008; Kramer, Vivrette, and Satter 2009; Liu et al. 2009). Eligibility for non-VA health care provides veterans with increased choice, access, and flexibility in their health care (Petersen and Wright 1999; Weeks et al. 2005a; Weeks, Mahar, and Wright 2005b) and may provide access to services unavailable in their local VA system (Hoff and Rosenheck 1998; Petersen and Wright 1999; Bean-Mayberry et al. 2004; Weeks et al. 2005a). However, the continuity and coordination of care may suffer, especially for individuals with chronic conditions requiring ongoing and effective management. Historically, some government dual utilization (e.g., Medicare/Medicaid dual use) has had some degree of coordination (Holahan, Miller, and Rousseau 2009a, b); however, there is little or no formal coordination between VA and Medicare services. Use of non-VA health care may lead to duplication of care, resulting in an inefficient allocation of financial resources and underestimation of health care costs (Boyd et al. 2005; Hester, Cook, and Robbins 2005; Rosen et al. 2005). Finally, provider- or system-level performance measures may be affected if non-VA services are not included.

It is unclear whether there are differences in the use of non-VA care by veterans who receive primary care in community-based versus hospital-based clinics. A critical question is whether the observed lower VA use and expenditures among community-based patients are offset by higher non-VA use or expenditures. This issue has not been addressed previously, because previous evaluations of community clinics examined only VA care. The overall use of outpatient services may be lower for community-based patients because these patients appear to be healthier than VA hospital-based patients (Maciejewski et al. 2002, 2007). Alternatively, the overall use may be similar, but community-based patients offset their lower use of VA services by greater use of services covered by Medicare. A previous study in three rural states of northern New England found that community-based patients used more services covered by Medicare for their primary care, specialty care, and inpatient care than VA hospital-based patients (Weeks et al. 2005a). The study did not classify outpatient visit types in VA and Medicare consistently but used data

unique to each system, which makes the interpretation of cross-system comparisons difficult.

The objective of this study was to examine trends in primary care, specialty care, and mental health service use in VA and Medicare in a cohort of Medicare-eligible veterans who obtained primary care in 72 VA hospital clinics and 108 VA community clinics (Maciejewski et al. 2007). This analysis allows us to understand how outpatient service use has changed over time and whether these trends differ between hospital-based and community-based patients, and to assess whether the increased access to VA primary care in community clinics has resulted in an unintended fragmentation of care between VA and Medicare.

SIGNIFICANCE

Community clinics improve access to primary care for veterans who live a significant distance from VA hospitals. Medicare eligibility creates another point of access to care for veterans, and incorporating both Medicare and VA data provides a more complete picture of the total outpatient service use by community-based and hospital-based patients, to assess total health care needs. Outpatient service use may differ for community-based and hospital-based patients, and community-based patients may experience problems with coordination, continuity, and quality of care if they are more likely to use outpatient services paid by Medicare or switch between health care systems. While access to both systems may improve patient choice and, therefore, satisfaction, duplication of services could add to federal health care costs.

METHODS

Sample and Data

The study sample was selected from our previous community clinic cost evaluation study (Maciejewski et al. 2007). In the previous study, the sampling frame included community clinics operating in 2001 that were established before 1999, had stable VA expenditure estimates, a sufficient number of patients for statistical analyses ($n \geq 200$), and data available in VA administrative databases. The final sample included 108 relatively large community clinics that were at “steady state,” affiliated with 72 VA hospitals located in all

states in the United States except Alaska. This previous study included a sample of 66,366 elderly and nonelderly veterans receiving primary care in these community and affiliated hospital clinics (Maciejewski et al. 2007).

We applied additional inclusion and exclusion criteria for the current study. First, we excluded veterans who died before the end of 2001, the first year of the follow-up period for outpatient use ($n = 4,033$). Deaths were identified using dates of death from VA and Medicare data. Second, we excluded those who were not Medicare-enrolled or were Medicare-enrolled but without both Medicare Parts A and B during the entire study period ($n = 33,360$), as indicated by the Medicare entitlement/buying indicator of the Medicare denominator files. We required both Part A and Part B data because this analysis focused on outpatient services. Third, we excluded veterans who developed end-stage renal disease (ESRD) and became eligible for the Medicare ESRD program before or during 2000–2004 ($n = 422$), because their benefits under the Medicare ESRD program and their health needs were likely to be significantly different from non-ESRD patients. ESRD status was determined by the ESRD code in the Medicare status indicator, current reason for entitlement, or original reason for entitlement variable in the Medicare denominator files. Fourth, we excluded all Medicare managed care enrollees using the health maintenance organization (HMO) enrollment indicator in the Medicare denominator files ($n = 5,506$), because Medicare databases do not collect service utilization data on these patients. Finally, we excluded Medicare-eligible veterans who did not use primary care in VA in 2000 ($n = 7,525$) as defined below. These criteria resulted in a sample of 15,520 Medicare-enrolled veterans located in 49 of 50 U.S. states, including 6,556 hospital-based primary care users and 8,964 community-based primary care users in 2000. The criteria for the selection of community clinics and VA hospitals in the previous study (Maciejewski et al. 2007) led to a sampling process for this study sample that was not entirely nationally representative. Our study sample was similar to a national sample of Medicare-eligible veterans using VA care (Morgan et al. 2009), but it was slightly younger, more likely to be white, lived farther away from a VA hospital or community clinic, and had somewhat fewer individuals covered by Medicaid.

The main data sources included 1999–2004 Medicare claims data, 2000–2004 VA administrative data, and 2000 U.S. Census data. We identified 2001–2004 primary care, specialty care, and mental health care utilization from the VA outpatient care files and Medicare carrier standard analytical files. The primary independent variable of interest is whether a veteran received primary care from a hospital clinic or a community clinic. Veterans

were defined as hospital or community clinic users (hospital-based versus community-based) in each year based on the majority of VA primary care visits in that year. Similar results were found when a sensitivity analysis was conducted using only the 2000 definition of hospital or community clinic user. Medicare denominator files were used to identify Medicare and Medicaid eligibility and managed care enrollment. We obtained patient characteristics from Medicare denominator files and VA outpatient care files, including age, gender, race, marital status, Medicaid status, VA copayment status, original reason for Medicare eligibility (age versus disability), and the distance from the veteran's home ZIP code to the closest VA facility, either a VA hospital or a community clinic. We constructed a diagnostic cost groups (DCG) case-mix adjustment measure for each patient by incorporating inpatient and outpatient diagnoses from VA and Medicare in 2000. Finally, we used the 2000 U.S. Census data for income and education at the ZIP code level and population density at the county level.

Outpatient Visit Types

To compare outpatient use between VA and Medicare, we developed a visit-type classification algorithm using provider specialty and current procedural terminology (CPT) procedure codes that are present in both systems. This approach allows us to construct comparable outpatient visit types from two data systems with different data-generating processes. The classification algorithm is described in detail in a recent paper by Burgess et al. (2010). We included face-to-face encounters with selected providers, including physicians, nurse practitioners, physician assistants, and nonphysician mental health providers (psychologists and social workers). We classified provider specialties into three categories: primary care, specialty care, and mental health care. We classified CPT procedure codes into general categories: anesthesia, evaluation/management (E/M), medicine, psychiatry, and surgery. We further classified E/M CPT codes into primary care and specialty care. Finally, based on the combination of provider specialty and procedure codes, we classified each encounter into one of the three visit types: primary care, specialty care, and mental health care. We calculated the number of outpatient visits by visit type in each year for VA, Medicare, and total (VA+Medicare) visits, which were the outcomes of interest in this study. We classified patients into four mutually exclusive groups for each visit type in each year: VA use only, Medicare use only, dual use of VA and Medicare, and no use.

Analysis

Descriptive and bivariate statistics, including *t*-tests and χ^2 tests, assessed differences in patient characteristics between community-based and hospital-based patients at the cohort identification year (2000). The unit of analysis for utilization comparisons was the person-year. Veterans who died during 2002–2004 were censored at the year of death. We used Wilcoxon nonparametric tests to compare differences in utilization between the systems due to skewness of the utilization data. For multivariate analysis, we estimated the annual number of visits using generalized estimating equations with a negative binomial distribution, a log link function, repeated measures, and exchangeable correlation options to account for the correlation between repeated measures on an individual. The multivariate analysis adjusted for patient characteristics, ZIP code–level characteristics, and year fixed effects. Adjusted incidence rate ratios (aIRRs) and differences in the predicted number of outpatient visits were generated from negative binomial regression models to examine whether VA, Medicare, and total (VA+Medicare) outpatient visits differed between community-based and hospital-based patients. For example, an aIRR for VA primary care visits of 0.8 implies that the expected number of VA primary care visits for community-based patients is 20 percent lower than visits for hospital primary care patients, holding other variables constant. We also conducted a sensitivity analysis restricted to patients aged 65 years or older, but results were similar; therefore, we present pooled results throughout this paper.

All analyses were adjusted for the sampling weights from the original community clinic cost evaluation study (Maciejewski et al. 2007). Analyses were conducted using *STATA* 10 (StataCorp 2007). Human subjects approvals for these analyses were obtained from the Boston, Little Rock, Durham, and Seattle VA Medical Centers.

RESULTS

Patient Characteristics

Table 1 summarizes baseline patient characteristics of community-based and hospital-based primary care users in 2000. There were small but statistically significant differences in age, marital status, race, service-related disability, receiving free care in VA, original reason for Medicare eligibility, and distance to the closest VA facility. Compared with hospital-based patients, community-based patients were slightly older (70.0 versus 69.0 years, $p = .001$), slightly more likely to be married (68.0 versus 65.0 percent, $p = .0279$), somewhat

Table 1: Baseline Patient Characteristics of Community-Based and Hospital-Based Primary Care Users in 2000*

<i>Patient Characteristic</i>	<i>Community-Based (n = 8,964)</i>	<i>Hospital-Based (n = 6,556)</i>	<i>p-value</i>
Age (mean, SD)	70.0 (9.0)	69.0 (9.9)	.001
< 45 (%)	2.2	2.2	.8894
45–54 (%)	7.0	10.8	< .0001
55–64 (%)	8.4	9.2	.3259
> 64 (%)	82.4	77.9	.0001
Female (%)	2.68	2.68	.9996
Married (%)	68.0	65.0	.0279
White (%)	90.8	87.1	< .0001
Medicaid (%)	5.0	5.7	.3087
Free care in VA (%)	80.9	85.2	< .0001
Service-related disability percentage (mean, SD)	17.5 (27.1)	20.5 (30.5)	.001
Diagnostic cost group (DCG) [†] (mean, SD)	0.95 (0.66)	0.99 (0.67)	.076
Original reason for Medicare eligibility due to age (%)	68.5	63.1	.001
Distance to VA [‡] , miles (mean, SD)	20.5 (30.0)	22.6 (22.7)	.037
Per capita income in ZIP code (mean, SD)	19,474 (6030)	19,452 (8532)	.901
Population per square mile in ZIP code (mean, SD)	801 (3186)	944 (5277)	.336
Percentage high school graduate in ZIP code (mean, SD)	79.5 (0.10)	79.6 (0.11)	.773

*All comparisons were adjusted for sampling weights.

[†]Measured at 2000 including diagnoses from both VA and Medicare.

[‡]Include VA hospitals and community clinics.

VA, Veterans Health Administration.

more likely to be white (90.8 versus 87.1 percent, $p < .0001$), had a lower service-related disability percentage (17.5 versus 20.5, $p = .001$), and lived closer to a VA facility (20.5 versus 22.6 miles, $p = .037$). Compared to hospital-based patients, community-based patients were less likely to receive free care in VA (80.9 versus 85.2 percent, $p < .0001$) and were more likely to have the original reason for Medicare eligibility due to age (68.5 versus 63.1 percent, $p = .01$). Finally, community-based patients and hospital-based patients had similar DCG risk scores (0.95 versus 0.99, $p = .089$).

Proportions of Medicare and VA Use by Visit Type

The largest proportion of veterans in this cohort used primary care only in VA, but this proportion declined over time (Figure 1, top panel). Figure 1 illustrates the proportion of VA, Medicare, dual, and no use by visit type. The proportion

Figure 1: Outpatient Use in Veterans Health Administration and Medicare by Visit Type, 2001–2004

of veterans using primary care in both VA and Medicare remained stable over time, but the proportions of veterans obtaining primary care only in Medicare or not obtaining care in either system increased over time. Hospital-based patients were more likely than community-based patients to obtain primary care only at VA in any year (2001: 59.1 versus 49.5 percent; 2002: 56.4 versus 44.3 percent; 2003: 52.1 versus 36.8 percent; 2004: 53.4 versus 36.8 percent; $p < .001$ for all years), but they were less likely to receive primary care only in Medicare (2001: 6 versus 9.7 percent; 2002: 7.3 versus 13.1 percent; 2003: 9.4 versus 16.8 percent; 2004: 8.7 versus 17.7 percent; $p < .001$ for all years). At both community-based and hospital-based clinics, proportions of veterans using VA care declined, while those using Medicare increased from 2001 to 2003; these proportions remained fairly stable from 2003 to 2004. The decline in the use of VA care and the increase in the use of services reimbursed by Medicare over time remained statistically significant after controlling for patient characteristics. The proportion of veterans with dual use of primary care in VA and Medicare or no use of primary care in either system was slightly lower for hospital-based patients than community-based patients in all years.

The largest proportion of veterans used specialty care in both VA and Medicare, and this proportion remained stable over time (Figure 1, middle panel). The proportion of veterans obtaining specialty care only in VA decreased over time, while the proportion of veterans obtaining specialty care only in Medicare increased over time. The time trends remain statistically significant after adjusting for patient characteristics. Hospital-based patients were more likely than community-based patients to obtain specialty care only in VA (2001: 35.6 versus 23.7 percent; 2002: 34.2 versus 21.1 percent; 2003: 31.8 versus 18.8 percent; 2004: 31.6 versus 17.5 percent; $p < .001$ for all years) and were less likely to obtain specialty care only in Medicare (2001: 12.2 versus 21.9 percent; 2002: 14.6 versus 23.7 percent; 2003: 15.6 versus 26.8 percent; 2004: 17.9 versus 28.6 percent; $p < .001$ for all years).

For outpatient mental health care, a vast majority of veterans did not use any services in VA or Medicare (Figure 1, bottom panel). The proportion of veterans using mental health care only in VA, only in Medicare, or in both VA and Medicare remained stable over time. Veterans who used mental health services were much more likely to obtain mental health care only in VA (hospital-based: 22.9–24.3 percent; community-based: 13.6–14.6 percent). A very small proportion of hospital-based and community-based patients used outpatient mental health care only in Medicare (hospital-based: 1.6–2.3 percent; community-based: 2.0–2.1 percent) or in both VA and Medicare (hospital-based: 1.2–2.1 percent; community-based: 1.2–1.4 percent).

Unadjusted Number of Visits by Visit Type

Figure 2 displays the numbers of VA, Medicare, and total (VA+Medicare) visits for each year in the study period. Overall, community-based and hospital-based patients had similar total primary care visits each year (2001: 3.72 versus 3.97; 2002: 3.89 versus 3.53; 2003: 3.85 versus 3.43; 2004: 3.55 versus 3.79; $p > .05$ for all years). However, community-based patients had fewer VA primary care visits (2001: 2.32 versus 2.89; 2002: 2.00 versus 2.71; 2003: 1.69 versus 2.48; 2004: 1.73 versus 2.50; $p < .001$ for all years) and more primary care visits financed by Medicare (2001: 1.39 versus 1.07; 2002: 1.53 versus 1.17; 2003: 1.73 versus 1.37; 2004: 1.82 versus 1.29; $p < .001$ for all years). Use of VA primary care decreased in both groups over time, while use of primary care services covered by Medicare increased over time (Figure 2, top panel).

Community-based patients in 2001 had fewer specialty care VA visits than hospital-based patients (4.04 versus 5.78, $p < .001$), but more specialty care visits covered by Medicare (7.30 versus 5.33, $p < .001$) (Figure 2, middle panel). Community-based patients had more total specialty care visits than hospital-based patients in 2001 (11.34 versus 11.11, $p < .001$), but the difference in the mean total (VA+Medicare) specialty care visits between the two groups was small. A similar utilization pattern was observed in 2002–2004.

Finally, community-based patients had fewer total mental health care visits than hospital-based patients (1.06 versus 1.99, $p < .001$) in 2001, with the majority of visits occurring in VA for both community-based and hospital-based patients (0.82 versus 1.72, $p < .001$) (Figure 2, bottom panel). There was no significant difference between community-based and hospital-based patients in the number of mental health visits covered by Medicare (0.24 versus 0.27, $p > .05$). A similar utilization pattern was observed in 2002–2004.

Adjusted Number of Visits

Table 2 shows the aIRRs and difference in the predicted annual number of visits from generalized estimating equation models, and approximate bivariate results from Figure 2. Compared with hospital-based patients, community-based patients had 17 percent (0.37 visits) fewer VA primary care visits (aIRR = 0.83, $p < .001$), 9 percent (0.14 visits) more visits covered by Medicare (aIRR = 1.09, $p < .001$), and 6 percent (0.22 visits) fewer total (VA+Medicare) visits (aIRR = 1.06, $p < .05$). Community-based patients had 22 percent (1.06 visits) fewer specialty care visits in VA (aIRR = 0.78, $p < .0001$) and 21 percent (1.43 visits) more visits covered by Medicare (aIRR = 1.21, $p < .0001$) than hospital-based patients, but showed no significant difference in total specialty

Figure 2: Mean Number of Outpatient Visits in Medicare and Veterans Health Administration by Visit Type, 2001–2004

Table 2: Adjusted Incidence Rate Ratios of Annual Outpatient Utilization of Community-Based and Hospital-Based Patients

Utilization	Community-Based Patients (Reference = Hospital-Based Outpatient Patients)	
	Incidence Rate Ratio [†] (95% CI)	Difference in Predicted Visits per Year [‡]
Primary care		
VA	0.83 (0.79 – 0.87)***	– 0.37
Medicare	1.09 (1.02 – 1.18)***	0.14
Total	0.94 (0.91 – 0.98)*	– 0.22
Specialty care		
VA	0.78 (0.73 – 0.82)***	– 1.06
Medicare	1.21 (1.14 – 1.27)***	1.43
Total	1.00 (0.97 – 1.04)	0.06
Mental health care		
VA	0.77 (0.66 – 0.90)***	– 0.16
Medicare	1.35 (0.96 – 1.91)	0.04
Total	0.80 (0.70 – 0.93)***	– 0.14

[†]Adjusted for patient characteristics, ZIP code-level characteristics, year fixed effects, and sampling weights.

[‡]The predicted number of visits was calculated using the regression coefficients and patient characteristics of a typical veteran in 2003. A typical veteran patient was defined using the mean values of all continuous patient variables and the modal values of all dichotomous patient variables.

* $p < .05$; ** $p < .01$; *** $p < .001$

VA, Veterans Health Administration.

care visits (aIRR = 1.00, $p = .80$). Finally, community-based patients had 23 percent (0.16 visits) fewer VA mental health visits (aIRR = 0.77, $p < .0001$) and 20 percent (0.14 visits) fewer total visits (aIRR = 0.80, $p = .004$) than hospital-based patients, but there was no significant group difference in the number of mental health visits covered by Medicare (aIRR = 1.25, $p = .086$).

DISCUSSION

This study compared the use of outpatient services in VA and Medicare among Medicare-eligible veterans who obtained primary care in VA community clinics or hospital outpatient clinics followed over 4 subsequent years. These results indicate that the most frequent source for primary care over time was to obtain care only from VA, particularly for hospital-based patients. In contrast, specialty care was obtained most commonly by dual use of both VA and Medicare (45–50 percent). The proportions of patients who

used both VA and Medicare for primary and specialty care services remained stable over time for both hospital-based and community-based primary care patients. However, use of Medicare only for primary care and specialty care increased during the 4-year observation period, while use of VA only for these outpatient services decreased. Resources in VA for advanced specialty care during this period were generally flat and not expanding, which could be driving this result. The most frequent source for the relatively small proportion of Medicare-eligible veterans who used mental health care services was to obtain care only from VA, a special emphasis service for VA that was expanding during this period.

This study design, following a cohort over 4 years, shows patterns of individual care in ways not possible through examination of aggregate statistics of varying patient compositions. The study shows that the level of fragmentation varies across types of outpatient care and over time. Veterans' specialty care was the most fragmented type of outpatient care, with dual use being the common pattern of care among both community-based and hospital-based patients. Primary care also was fragmented, although less so for hospital-based patients than for community-based patients, suggesting that increasing access to VA primary care via community clinics may fragment outpatient care in unintended ways. This primary care fragmentation, shifting toward Medicare-financed care, increases faster over time in the community-based cohort.

Fragmentation of primary care and specialty care, and trends over time for 2001–2004 suggest that dual users of VA and Medicare would benefit from the integration of health information systems in real time to ensure information continuity between VA and Medicare providers. San Diego VA Medical Center and Kaiser Permanente have recently begun testing shared electronic medical records (Chambers 2010). As more than 30 percent of Medicare-eligible veterans in our study used primary care covered by Medicare and 60 percent used specialty care covered by Medicare, integration of clinical information from Medicare providers into the VA system would affect a large proportion of Medicare-eligible veterans.

These results are consistent with a previous study of veterans from rural settings in three northern New England states (Weeks et al. 2005a). The decrease in the proportion of patients using VA-only primary care could be in part due to regression to the mean, because primary care use in VA at baseline was one of the inclusion criteria for the study cohort. The increase in the proportion of patients using Medicare only implies a shift from VA to Medicare as the cohort ages.

Community-based patients use less VA primary care and specialty care over time compared with hospital-based patients but appear to be offsetting this lower VA use with greater use of services covered by Medicare, rather than using fewer services overall. This finding provides an important context to our earlier papers (Fortney et al. 2002; Maciejewski et al. 2002, 2007) and modifies earlier conclusions that community-based patients had fewer visits and were healthier compared with hospital-based patients. In contrast, this study shows that a lower outpatient service use by community-based patients is true only from the VA perspective, and that there is no significant difference in the DCG risk scores for community-based and hospital-based patients when both VA and Medicare data are used. The risk adjustment and assessment conclusions here are important. Because VA sees only the diagnoses and care from their system, we may systematically underestimate the illness burden and risk for these veterans. These results demonstrate clearly that VA managers must assess total utilization to fully characterize the quality of care and cost experience of Medicare-eligible veterans (Rosen et al. 2005).

Increasing non-VA primary and specialty care use by definition affects the continuity of care and may also impact chronic disease management. Further understanding of the patterns of care and the causes of dual use and switching between systems is important to clarify the ramifications of this widespread, apparent fracturing of care for veterans.

This study shows that mental health was not fragmented among VA primary care patients, because most veterans did not use mental health services and users predominantly went entirely to VA for mental health care (Weeks et al. 2005; Liu et al. 2009). The lower use of mental health services paid by Medicare may also reflect the limited mental health coverage under Medicare. Therefore, the impacts of non-VA use may be minimal for mental health care because of high reliance on VA for this type of care. Our study concurs with other recent research on this question (McCarthy et al. 2008).

This study has several limitations. This is not a random sample of Medicare-eligible veterans in the VA system. Next, the study does not include utilization data provided under other insurance coverage, including Medicaid and private insurance. Further, these results show veteran experience in 2001–2004 before the implementation of Medicare Part D, and so these results may not generalize to more current experience of veterans facing different choices. However, VA pharmaceutical prices and policies have remained attractive to veterans thus far. The study cohort also precedes the influx of returning veterans from the Afghanistan and Iraq wars, which has resulted in considerable increases in VA budgets and provision of more specialty care aimed at these

younger veterans. Finally, there could be important unobserved confounding that might help explain the differences between community-based and hospital-based patients because we did not initially randomize patients into community clinics or hospital outpatient clinics.

This study makes several unique contributions. It is the first geographically dispersed cohort study to examine primary care, specialty care, and mental health care visits by veterans in VA and Medicare using the same definition of visit types in both systems. We also examined changes over time to understand trends in veteran use of care for a fixed cohort within each system for specific types of outpatient care to understand whether VA reliance differs across types of outpatient care following individual VA system users over time. Lastly, we examined differences in outpatient service use between community-based and hospital-based patients, which may create problems for coordination, continuity, and quality of care.

Overall, we found high use of outpatient services financed by Medicare among VA primary care patients for both primary and specialty care, but not mental health care. Patients enrolled in community clinics appear to offset decreased VA use with increased use of primary care and specialty care covered by Medicare, but not mental health care. By the end of the observation period, many VA hospital-based primary care patients and most community-based patients obtained at least some primary and specialty care outside the VA. Therefore, assessing total utilization across VA and Medicare systems is necessary to fully anticipate health care needs among Medicare-eligible veterans. Further, the dual use of VA and Medicare outpatient services may impact chronic disease management and continuity of care, and have profound implications for provider, facility, and system quality measurement, particularly for VA community-based primary care patients.

ACKNOWLEDGMENTS

Joint Acknowledgment/Disclosure Statement: This work was supported by the Office of Research and Development, Health Services Research and Development Service, Department of Veterans Affairs, project number IIR 04-292. Drs. Liu, Chapko, Bryson, Sharp, and Perkins are at the Northwest Center for Outcomes Research in Older Adults at the Seattle VA. Dr. Burgess is at the Center for Organization, Leadership & Management Research at the Boston VA. Dr. Fortney is at the Center for Mental Healthcare and Outcomes Research at the Little Rock VA. Dr. Maciejewski is at the Center for Health

Services Research in Primary Care at the Durham VA. The authors are grateful for helpful comments from Will Manning. The views expressed herein are those of the authors and do not necessarily represent the views of the Department of Veterans Affairs and other affiliated institutions.

Disclosures: None.

Disclaimers: None.

REFERENCES

- Bean-Mayberry, B., C. C. Chang, M. McNeil, P. Hayes, and S. H. Scholle. 2004. "Comprehensive Care for Women Veterans: Indicators of Dual Use of VA and Non-VA Providers." *Journal of the American Medical Women's Association* 59 (3): 192–7.
- Borowsky, S. J., and D. C. Cowper. 1999. "Dual Use of VA and Non-VA Primary Care." *Journal of General Internal Medicine* 14 (5): 274–80.
- Borowsky, S. J., D. B. Nelson, S. M. Nugent, J. L. Bradley, P. R. Hamann, C. J. Stolee, and H. B. Rubins. 2002. "Characteristics of Veterans Using Veterans Affairs Community-Based Outpatient Clinics." *Journal of Health Care for the Poor and Underserved* 13 (3): 334–46.
- Boyd, C. M., J. Darer, C. Boulton, L. P. Fried, L. Boulton, and A. W. Wu. 2005. "Clinical Practice Guidelines and Quality of Care for Older Patients with Multiple Comorbid Diseases: Implications for Pay for Performance." *Journal of the American Medical Association* 294: 716–24.
- Burgess, J. F. Jr., M. L. Maciejewski, C. L. Bryson, M. Chapko, J. Fortney, M. Perkins, N. D. Sharp, and C. F. Liu. 2010. "Importance of Health Sector Context for Evaluating Utilization Patterns across Sectors." *Journal of Health Economics*, doi: 10.1002/hec.1588.
- Chambers, H. 2010. "VA, Kaiser Share Digital Medical Records. San Diego Business Journal." [accessed on May 5, 2010]. Available at <http://www.sdbj.com/news/2010/jan/11/va-kaiser-share-digital-medical-records/>
- Chapko, M. K., S. J. Borowsky, J. C. Fortney, A. N. Hedeon, M. Hoegle, M. L. Maciejewski, and C. VanDeusen Lukas. 2002. "Evaluation of the Department of Veterans Affairs Community-based Outpatient Clinics." *Medical Care* 40 (7): 555–60.
- Fortney, J. C., S. J. Borowsky, A. N. Hedeon, M. L. Maciejewski, and M. K. Chapko. 2002. "VA Community-Based Outpatient Clinics: Access and Utilization Performance Measures." *Medical Care* 40 (7): 561–9.
- Hedeon, A. N., P. J. Heagerty, J. C. Fortney, S. J. Borowsky, D. J. Walder, and M. K. Chapko. 2002. "VA Community-Based Outpatient Clinics: Quality of Care Performance Measures." *Medical Care* 40 (7): 570–7.
- Hester, E. J., D. J. Cook, and L. J. Robbins. 2005. "The VA and Medicare HMOs—Complementary or Redundant?" *New England Journal of Medicine* 353 (12): 1302–3.

- Hoff, R. A., and R. A. Rosenheck. 1998. "The Use of VA and Non-VA Mental Health Services by Female Veterans." *Medical Care* 36 (11): 1524–33.
- Holahan, J., D. M. Miller, and D. Rousseau. 2009a. "Dual Eligibles: Medicaid Enrollment and Spending for Medicare Beneficiaries in 2005." The Henry J. Kaiser Family Foundation: The Kaiser Commission on Medicaid and the Uninsured [accessed on January 20, 2009]. Available at <http://www.kff.org/medicaid/upload/7846.pdf>
- . 2009b. "Rethinking Medicaid's Financing Role for Medicare Enrollees." The Henry J. Kaiser Family Foundation: The Kaiser Commission on Medicaid and the Uninsured [accessed on January 20, 2009b]. Available at <http://www.kff.org/medicaid/upload/7862.pdf>
- Hynes, D. M., K. Koelling, K. Stroupe, N. Arnold, K. Mallin, M. W. Sohn, F. M. Weaver, L. Manheim, and L. Kok. 2007. "Veterans' Access to and Use of Medicare and Veterans Affairs Health Care." *Medical Care* 45 (3): 214–23.
- Kizer, K. W., and R. A. Dudley. 2009. "Extreme Makeover: Transformation of the Veterans Health Care System." *Annual Review of Public Health* 30: 313–39.
- Kramer, B. J., R. L. Vivrette, and D. E. Satter. 2009. "Dual Use of Veterans Health Administration and Indian Health Service: Healthcare Provider and Patient Perspectives." *Journal of General Internal Medicine* 24 (6): 758–64.
- Liu, C. F., C. Bolkan, D. Chan, E. M. Yano, L. V. Rubenstein, and E. F. Chaney. 2009. "Dual Use of VA and Non-VA Services among Primary Care Patients with Depression." *Journal of General Internal Medicine* 24 (3): 305–11.
- Maciejewski, M. L., M. K. Chapko, A. N. Hedeem, and J. C. Fortney. 2002. "VA Community-Based Outpatient Clinics: Cost Performance Measures." *Medical Care* 40 (7): 587–95.
- Maciejewski, M. L., M. Perkins, Y. F. Li, M. Chapko, J. C. Fortney, and C. F. Liu. 2007. "Utilization and Expenditures of Veterans Obtaining Primary Care in Community Clinics and VA Medical Centers: An Observational Cohort Study." *BMC Health Services Research* 7: 56.
- McCarthy, J. F., K. Zivin, K. L. Austin, H. C. Kales, and M. Valenstein. 2008. "Does Consideration of Medicare Use Affect VA Evaluations of Treatment for New Episodes of Depression?" *Administration and Policy in Mental Health* 35 (6): 468–76.
- Morgan, R. O., L. A. Petersen, J. C. Hasche, J. A. Davila, M. M. Byrne, N. I. Osemene, Wei, and M. L. Johnson. 2009. "VHA Pharmacy Use in Veterans with Medicare Drug Coverage." *American Journal of Managed Care* 15 (3): e1–8.
- Petersen, L. A., and S. Wright. 1999. "Does the VA Provide "Primary" Primary Care?" *Journal of General Internal Medicine* 14 (5): 318–9.
- Rosen, A. K., J. Gardner, M. Montez, S. Loveland, and A. Hendricks. 2005. "Dual-System Use: Are There Implications for Risk Adjustment and Quality Assessment?" *American Journal of Medical Quality* 20 (4): 182–94.
- Ross, J. S., S. Keyhani, P. S. Keenan, S. M. Bernheim, J. D. Penrod, K. S. Boockvar, H. M. Krumholz, and A. L. Siu. 2008. "Dual Use of Veterans Affairs Services and Use of Recommended Ambulatory Care." *Medical Care* 46 (3): 309–16.

- Shen, Y., A. Hendricks, S. Zhang, and L. E. Kazis. 2003. "VHA Enrollees' Health Care Coverage and Use of Care." *Medical Care Research and Review* 60 (2): 253–67.
- StataCorp. 2007. *STATA Reference Manual, Version 10*. College Station, TX: StataCorp.
- Weeks, W. B., D. M. Bott, R. P. Lamkin, and S. M. Wright. 2005a. "Veterans Health Administration and Medicare Outpatient Health Care Utilization by Older Rural and Urban New England Veterans." *Journal of Rural Health* 21 (2): 167–71.
- Weeks, W. B., P. J. Mahar, and S. M. Wright. 2005b. "Utilization of VA and Medicare Services by Medicare-Eligible Veterans: The Impact of Additional Access Points in a Rural Setting." *Journal of Healthcare Management* 50 (2): 95–106, discussion 06–7.
- Wright, S. M., J. Daley, E. S. Fisher, and G. E. Thibault. 1997. "Where Do Elderly Veterans Obtain Care for Acute Myocardial Infarction: Department of Veterans Affairs or Medicare?" *Health Services Research* 31 (6): 739–54.
- Wright, S. M., L. A. Petersen, R. P. Lamkin, and J. Daley. 1999. "Increasing Use of Medicare Services by Veterans with Acute Myocardial Infarction." *Medical Care* 37 (6): 527–28.

SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article:

Appendix SA1: Author Matrix.

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