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Reviewed work(s):
Source: *Medical Care*, Vol. 44, No. 8 (Aug., 2006), pp. 768-773
Published by: Lippincott Williams & Wilkins
Stable URL: http://www.jstor.org/stable/40221352
Accessed: 13/06/2012 16:11

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# Effect of Using Information From Only One System for Dually Eligible Health Care Users

*Margaret M. Byrne, PhD,* Mark Kuebeler, MS,† Kenneth Pietz, PhD,† and Laura A. Petersen, MD, MPH†*

**Objective:** We sought to determine whether all diagnoses and total illness burden of patients who use both the VA and Medicare health care systems can be obtained from examination of data from only one of these systems.

**Methods:** Cohorts included all age-eligible Medicare users who also used the VA health care system in fiscal years 2000–2002 but were not enrolled in a Medicare HMO. Relative risk scores (RRS; a measure of illness burden developed by DxCG, Inc., Boston, MA) were calculated using VA, Medicare, and all diagnoses from both VA and Medicare data sources. The relationship between RRS and reliance on Medicare versus the VA system also was explored. We explored whether differences in VA and Medicare RRS were caused by veterans who mainly used pharmacy services or by an underweighting in the RRS calculation of mental health diagnoses. Finally, we explored the relationship between inpatient utilization and RRS in each system.

**Results:** On average for a given patient who used both VA and Medicare services, more diagnoses were recorded in Medicare (~13–15) than in the VA system (~8) for dual users. On average only 2 diagnoses were common to both the VA and Medicare. Medicare data alone accounted for approximately 80% of individuals' total illness burden, and VA data alone lead to RRSs that capture one-third of the total illness burden. The ratio of RRS when calculated using Medicare and VA separately was approximately 2.4. RRS was only weakly to moderately correlated with inpatient utilization in each system.

**Conclusion:** Using data from just Medicare or VA data sources when conducting research on dually eligible veterans may seriously underestimate total illness burden of the population and also may lead to an underidentification of individuals in a particular disease class.

**Key Words:** Medicare, veterans, diagnoses, illness burden, risk adjustment

(*Med Care* 2006;44: 768–773)

Many veterans older than the age of 65 are dual users of the VA and Medicare systems.[1–7] However, many health care researchers have access to only 1 or the other system, and it often is difficult to obtain data from both systems for a given year or cohort. Reliance on just 1 system for diagnosis information, for example, to use in risk adjustment, may give an incomplete picture of the total illness burden for individuals who use both systems. For example, in a recent study, Rosen et al[8] studied veterans in 6 condition classes who used both the VA and Medicare. Using the Diagnostic Cost Groups (DCG) risk-adjustment system, they found that both concurrent and prospective risk scores increased when diagnoses from both systems were used. Thus, use of just 1 system in a study that sought to quantify illness burden among veterans might significantly underestimate the true illness burden of an individual[8] and may also fail to identify all individuals with a particular disease.[9] Thus, researchers who are interested in studying total illness burden of a certain population may need to obtain access to both systems.

Being able to access diagnostic information from both systems for dual users may have benefits beyond determining total illness burden. For example, it will allow researchers to determine whether systems are capturing unique diagnoses or whether diagnoses overlap. This type of finding not only informs us about coding practices but also has implications for how individuals are using the 2 system of health care, ie, are they receiving complementary or duplicative care from the 2 systems? Determining the overlap in coding will be of interest in a number of settings, including those outside of the VA. For example, in 1999 there were approximately 6.2 million Medicare beneficiaries who also were eligible for Medicaid.[10] Both states and the Center for Medicare and Medicaid Services (CMS) have expressed concern about problems of coordination of usage, and possible duplicative usage, between Medicare and Medicaid for dually eligible users.[10,11] However, not enough is known about how each system is used, and the nature and presence of overlap of use.

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Supported by the Department of Veterans Affairs (Project XVA 33-093). The funding agreement ensured the authors' independence in designing the study, interpreting the data, writing, and publishing the report. The views expressed are solely those of the authors and do not necessarily represent those of the VA. Dr. Petersen is a Robert Wood Johnson Foundation Generalist Physician Faculty Scholar (grant number 045444) and a recipient of the American Heart Association Established Investigator Award. Dr. Byrne holds a National Cancer Institute career development award (CA101812-02).

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ISSN: 0025-7079/06/4408-0768

Results from this study will provide an example of overlap in a different system, and may illustrate how states and CMS can begin to interpret their data on dual users.

Second, within the VA, this study could provide very useful information if the Department of Veterans Affairs and CMS were considering merging their health care systems for dually eligible individuals. In this case, results from this research will provide much needed information on the total illness burden of dually eligible veterans and also vital information on patterns of use of the 2 systems. Regardless, these data provide valuable information on the relative importance of each program to VA patients.

Thus, in this study, we examined the effect of considering only VA data or only Medicare data when studying diagnoses and relative risk scores (RRS) for veterans who use both VA and Medicare services. We included in our study all veterans who are age-eligible for Medicare and have health care utilization in both systems. We examined the overall number of diagnoses that are recorded in each system, and overlap of diagnoses. In addition, we examined the contribution of each system's recorded diagnoses on individuals' overall illness burden measured using the DCG methodology. We explored how these findings are related to reliance of veterans on the Medicare system. Finally, we examined how the number of diagnoses and magnitude of RRS calculated from each system are related to inpatient utilization in each system. Results from this study provide important information for researchers studying dually eligible users, highlighting potential limitations of reliance on any 1 system's data for some questions, and offering reassurance of the validity of 1 set of data for other purposes (eg, budget allocation purposes).

## METHODS

### Cohort Construction

Cohorts of VA users during fiscal years 2000–2002 who were older than the age of 65 during a given year were developed from the annual VA cost databases created by the VA Allocation Resource Center.[12] Patients with a recorded age older than 120 years, a recorded date of death before the beginning of the fiscal year, or enrolled in a Medicare HMO at any time during the fiscal year were excluded from the cohorts.

### Illness Burden Measures

The measure of patient illness burden used in this analysis is the RRS generated from the DCG model developed by DxCG, Inc. (www.dxcg.com). Previous work has shown that the DCG methodology has strong clinical validity in the VA population, with risk of mortality increasing monotonically with more severe DCG categories.[13]

The DCG software calculates RRSs as follows.[14] First, more than 15,000 International Classification Disease, Clinical Modification (ICD-9-CM) codes are clustered into 184 clinically homogeneous Condition Categories (CCs) according to similarities in resource use. Patients may fall into multiple CCs. Condition Categories that are related and affect the same organ system are then arranged hierarchically to create Hierarchical Condition Categories (HCCs). For each organ system, patients are assigned to their most severe/expensive CC with in a hierarchy. This approach prevents patients from being counted more than once in a disease category (eg, acute myocardial infarction and angina). Like Condition Categories, there are 184 Hierarchical Condition Categories. A patient may have more than one HCC. DxCG Inc. (Boston, MA) used regression models on a specific benchmark population (here a 5% nationally representative random sample of Medicare beneficiaries from 1996–1997) to assign predicted costs to individual HCCs. Thus, veterans are assigned to HCCs, costs are assigned to each HCC, and total predicted cost per veteran is then calculated as the sum of the predicted HCC costs. The RRS for an individual is then calculated as the ratio of the individual's total predicted cost over the average observed cost of the benchmark (Medicare) population.

For these analyses, we used the concurrent model which was calibrated on a Medicare population and includes all diagnoses. Patients with 5-digit ICD-9 diagnosis codes that were numerically invalid or incompatible with the patient's age or sex were excluded from the analysis (6.3–7.5% of patients in each year).

ICD-9-CM diagnosis codes were obtained for patients from VA administrative databases (outpatient encounters databases, and inpatient discharge databases for acute inpatient care, extended care, observation care, and care at non-VA facilities), and Part A and Part B Medicare claims files (MEDPAR inpatient/skilled nursing facility, Home Health Agency, Hospice, Outpatient, Carrier, and Durable Medical Equipment). In each system, up to 10 diagnoses may be recorded for each inpatient and outpatient health care visit.

### Reliance

We calculated a reliance measure that indicates how much veterans use Medicare versus the VA system. For this measure, we first calculated the total costs of VA health care received in a year and the total costs in Medicare. Patient-level VA costs were obtained from encounter-level cost files created by the VA Health Economics Resource Center (HERC). HERC developed their costs by combining VA utilization data with non-VA (primarily Medicare) relative value weights to produce costs for hospitalizations and ambulatory care in the VA that are comparable across VA facilities and more analogous to patient bills generated in non-VA health care systems, such as Medicare. Medicare costs were approximated by calculating charges in the Medicare system. Medicare charges were computed from the individual claims records using algorithms developed by the Research Data Assistance Center (ResDAC). The ResDAC algorithms indicate which charges from the claims records should be added together to obtain the overall payment for services when this total payment is not explicitly given in the claim record. For example, the provider payment for an inpatient claim in the MEDPAR file is the sum of the reimbursement made to the provider by Medicare, patient deductibles and coinsurance payments, and any payments made on behalf of the beneficiary by a primary payer other than Medicare.

The ratio of Medicare costs to the sum of Medicare and VA recorded costs is referred to as "Medicare reliance." Because Medicare and VA cost data do not completely coincide, it is not the case that individuals with a reliance measure of 0.5 have exactly half of their health care usage in Medicare. However,

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individuals with a higher reliance measure are more reliant on Medicare for their care than are individuals with a lower reliance measure.

## Analyses

### Descriptive

In each of the study years, ICD-9 CM diagnosis codes were truncated to the first 3 digits for determining whether VA and Medicare based diagnoses matched for each patient. We did this to reduce the sensitivity of the comparisons to potential differences in coding practices between Medicare providers, who must record diagnoses that justify the claims being submitted for payment, and VA providers, who operate under a global budget with salaried physicians, and therefore do not experience strong incentives for coding for billing purposes. The truncated diagnosis codes for each patient were classified as (1) being coded in both systems, (2) being coded only in the VA, or (3) being coded only in Medicare. Descriptive statistics were computed for overall combined numbers of diagnosis codes in these categories. A patient-level analysis was also performed in which the percentage of the total diagnoses found in each separate system was computed for each patient.

RRS based on the pooled set of diagnosis codes from both sources were compared with RRS based on VA diagnosis codes only and RRS based on Medicare diagnoses only. Descriptive statistics for each set of RRS were generated.

### Reasons for RRS Differences

RRSs were greater on average when Medicare data were used than when VA data were used, even when considering the different number of diagnoses in the 2 systems, and we explored 2 reasons why this might be the case. First, since pharmacy benefits were not provided by Medicare during this period, many veterans use the VA primarily for pharmacy services. We explored whether the lower average RRS per patient from the VA data was driven by those veterans who primarily use the VA for pharmacy services. Following Zhu et al,[15] we classified individuals using the VA as "primarily pharmacy users" if they met all of the following 3 criteria: (1) no more than 4 outpatient visits in a fiscal year, (2) nonpharmacy costs of less than $800, and (3) pharmacy costs of over $100 and at least one-third of their VA costs for that fiscal year. We reran our analyses after removing these individuals from our cohorts.

Second, veterans as a whole, and particularly those using the VA health care system, are often thought to have more severe mental health conditions than nonveterans of similar age. The DCG model that we used was calibrated on a Medicare population and thus mental health diagnoses might have been underweighted compared with what they would be in a VA-calibrated model. Thus, we recalculated RRS in the VA and Medicare after removing mental health diagnoses as identified by ICD-9-CM codes 290–319.

### Reliance

We divided our cohorts into deciles of Medicare reliance and recalculated descriptive values of diagnoses and RRS by decile.

### RRS and Utilization

For those dual users with any hospitalizations, we compared the number of bed days of care, number of discharges, and inpatient costs in each of the 2 systems. Cost and utilization data for the VA were obtained from HERC discharge cost files. Medicare cost and utilization data were obtained from the MEDPAR claims files. Correlation analysis was used to determine whether the individual RRS in each system was correlated with utilization of care in that same system.

# RESULTS

## Descriptive Results

Table 1 is a comparison of the number of and RRS of the following populations: all male age-eligible Medicare beneficiaries, veterans who use both the VA and Medicare health care systems, and veterans who use only the VA health care system. [Data are not available for veterans who use only the Medicare system.] Approximately 25% to 30% of all veterans who use at least some VA health care use only the VA system, and this percentage has decreased over time. From these figures, we can calculate that ~7% to 9% of all male, elderly Medicare beneficiaries also use the VA system.

Table 2 shows Medicare, VA, and overall unique diagnoses and RRS. Individuals had an average of approximately 20 total unique diagnoses (from pooling Medicare and VA data) in each of the 3 years, with approximately 8 being recorded in the VA and 13 to 15 in Medicare. Of interest, little overlap was found between recorded unique diagnoses in the VA and Medicare, with only just more than 2 diagnoses being common to both the VA and Medicare. There were more diagnoses recorded on average in Medicare, and this disparity increased over time from 50% more in FY 2000 to 75% more in FY 2002.

For each patient, we calculated the percentage of total diagnoses that were found in each of the 2 systems. On

**TABLE 1.** Comparison of Numbers and RRS (Mean [SD]) for Elderly Male Medicare Beneficiaries, Veteran Dual Users, and Veterans Who Solely Use the VA for Health Care Services

| | FY 2000 | FY 2001 | FY 2002 |
|---|---|---|---|
| No. individuals | | | |
| Male Medicare users ages 65 or older* | 14,119,000 | 14,260,623 | 14,411,865 |
| Veteran dual users, ages 65 or older | 846,887 | 1,053,814 | 1,281,008 |
| Veteran VA only users ages 65 or older | 381,847 | 409,211 | 423,805 |
| RRS of individuals | | | |
| Veteran dual users ages 65 or older | 1.52 (2.18) | 1.52 (2.17) | 1.53 (2.20) |
| Veteran VA only users ages 65 or older | 0.69 (1.18) | 0.67 (1.15) | 0.65 (1.11) |

*Data for 2000 obtained from Health Care Financing Review: Medicare and Medicaid Statistical Supplement. Website. Available at: http://www.cms.hhs.gov/review/supp/2002/table6.pdf. Accessed March 28, 2006.

Data for 2001 and 2002 obtained from Centers for Medicare and Medicaid Website. Available at: http://www.cms.hhs.gov/researchers/pubs/datacompendium/. Accessed March 28, 2006.



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**TABLE 2.** Mean (SD) Number of Unique Diagnoses and RRS From Using Medicare and VA Databases; Average of Individual Level Percentages of Total Diagnoses That are Found in Each System

| | FY 2000 | FY 2001 | FY 2002 |
|---|---|---|---|
| Sample size | 846,887 | 1,053,814 | 1,281,008 |
| No. diagnoses pooled | 19.59 (11.08) | 20.39 (11.29) | 20.89 (11.63) |
| in VA | 8.59 (7.13) | 8.49 (6.83) | 8.42 (6.61) |
| in Medicare | 12.99 (10.89) | 14.09 (11.29) | 14.83 (11.70) |
| No. diagnoses in common | 1.99 (2.11) | 2.19 (2.15) | 2.36 (2.20) |
| No. diagnoses not in common | 17.61 (10.04) | 18.21 (10.23) | 18.53 (10.54) |
| Percentage of pooled diagnoses found in VA | 47.50 (28.62) | 45.73 (27.83) | 44.86 (27.07) |
| Percentage of pooled diagnoses found in Medicare | 62.47 (29.07) | 64.95 (28.29) | 66.53 (27.58) |
| RRS | | | |
| Using pooled diagnoses | 1.52 (2.18) | 1.52 (2.18) | 1.53 (2.20) |
| Using VA diagnoses | 0.54 (1.08) | 0.50 (1.00) | 0.48 (0.95) |
| Using Medicare diagnoses | 1.17 (1.97) | 1.21 (2.01) | 1.24 (2.06) |

average, VA diagnoses overlapped with 47.50% of those in the pooled set of diagnoses, and Medicare diagnoses overlapped with 62.47% in FY 2000. Over time, the VA overlap decreased and Medicare overlap increased slightly.

Using the set of combined diagnoses, the average RRS in this population was 1.52 to 1.53 over the 3 years of the study. The average RRS when using either VA- or Medicare-only diagnoses was substantially lower: approximately 0.50 for VA and 1.20 for Medicare. The RRS score found using Medicare only data was thus approximately 2.4 times larger than that found using VA only. However, relying solely upon diagnoses recorded in Medicare files would not capture the entire illness burden of individuals who use both VA and Medicare services. Only about 80% of the true value was captured when only Medicare diagnoses were used, and only about a third of the total calculated illness burden was captured using only VA data among patients who used both VA and Medicare services.

## Reasons for RRS Differences

Excluding veterans who primarily use the VA for pharmacy purposes caused the ratio of Medicare to VA RRS to drop approximately 20% to 25% in each of the 3 years (Table 3). When we removed mental health diagnoses and recalculated the ratios, there is a very slight drop in the ratios. Combining the exclusion, the ratios decreased 24% to 28%.

## Reliance

Table 4 shows how the total number of diagnoses and RRS of dual user veterans changes over the deciles of reliance on Medicare. One year of data is shown as all years have extremely similar results. Total illness burden was higher for those with the lowest and highest Medicare reliance, but was substantially greater for those individuals with the highest Medicare reliance. Also shown in the table in parentheses are the

**TABLE 3.** Mean RRS and Ratio of Medicare Only to VA Only RRS to Show the Effect of Excluding Pharmacy-Only Patients (POP) and Mental Health (MH) Diagnoses

| | Complete Cohort | MH Dx Codes Excluded | Excluding POP | Excluding POP, MH Dx Codes Excluded |
|---|---|---|---|---|
| No. patients | | | | |
| FY2000 | 846,887 | 801,438 | 671,315 | 634,114 |
| FY2001 | 1,053,814 | 994,435 | 796,152 | 749,909 |
| FY2002 | 1,281,008 | 1,203,918 | 933,639 | 875,772 |
| Pooled RRS | | | | |
| FY2000 | 1.52 | 1.36 | 1.54 | 1.38 |
| FY2001 | 1.52 | 1.36 | 1.55 | 1.38 |
| FY2002 | 1.53 | 1.37 | 1.56 | 1.39 |
| RRS from Medicare | | | | |
| FY2000 | 1.17 | 1.05 | 1.12 | 1.00 |
| FY2001 | 1.21 | 1.09 | 1.16 | 1.04 |
| FY2002 | 1.24 | 1.11 | 1.19 | 1.06 |
| RRS from VA | | | | |
| FY2000 | 0.54 | 0.49 | 0.63 | 0.57 |
| FY2001 | 0.50 | 0.46 | 0.60 | 0.54 |
| FY2002 | 0.48 | 0.44 | 0.58 | 0.53 |
| Ratio, Medicare:VA | | | | |
| FY2000 | 2.15 | 2.12 | 1.77 | 1.74 |
| FY2001 | 2.40 | 2.37 | 1.94 | 1.90 |
| FY2002 | 2.57 | 2.52 | 2.05 | 2.00 |

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**TABLE 4.** Total Number of Unique Diagnoses and RRS From Pooled Data by Decile of Reliance, FY 2000

| Decile of Medicare Reliance | Diagnoses,* FY 2000 | RRS,† FY 2000 |
|---|---|---|
| 0–10 | 16.2 (0.3) | 1.2 (0.3) |
| 10–20 | 15.8 (0.6) | 1.0 (0.7) |
| 20–30 | 16.1 (0.8) | 1.0 (0.9) |
| 30–40 | 16.7 (1.1) | 1.0 (1.2) |
| 40–50 | 17.5 (1.3) | 1.0 (1.5) |
| 50–60 | 18.3 (1.6) | 1.1 (1.9) |
| 60–70 | 19.1 (1.9) | 1.1 (2.4) |
| 70–80 | 20.3 (2.3) | 1.3 (3.1) |
| 80–90 | 22.1 (2.9) | 1.6 (4.6) |
| 90–100 | 26.3 (5.4) | 2.9 (10.7) |

*Number in parentheses is the ratio of the number of Medicare diagnoses to VA diagnoses.
†Number in parentheses is the ratio of Medicare RRS to VA RRS.

ratios of Medicare to VA diagnoses and RRS for each decile. The ratio of RRSs rises faster than does that for the diagnoses, although overall RRS for the middle deciles is quite constant, indicating more serious diagnoses are being recorded in Medicare in the higher deciles along with less serious diagnoses in the VA.

## RRS and Utilization

Table 5 provides information on utilization for those dual user veterans who had a hospitalization in a given system. More dual users were hospitalized in the Medicare system, but average number of discharges per individual was similar in the 2 systems. Veterans hospitalized in the VA had substantially longer total bed days of care for each year, but lower average RRS. We ran correlations of utilization and RRS for each year and each system. Pearson's correlations ranged from 0.44 to 0.55 for the VA data on discharges and cost, and 0.50 to 0.58 for Medicare data on discharges, costs and bed days of care. Correlations between RRS and bed days of care in the VA were lower at 0.30.

**TABLE 5.** Average (SD) Utilization and RRS in Each Health Care System for Dual Users Who Have Been Hospitalized at Least Once

| | FY 2000 | FY 2001 | FY 2002 |
|---|---|---|---|
| In Medicare | | | |
| Number | 195,110 | 252,289 | 303,547 |
| RRS | 3.30 (2.96) | 3.30 (2.98) | 3.42 (3.06) |
| Discharges | 1.78 (1.34) | 1.79 (1.35) | 1.80 (1.37) |
| Bed days of care | 12.78 (20.59) | 12.60 (20.40) | 12.81 (20.85) |
| Inpatient cost* | 13.60 (22.80) | 14.13 (17.24) | 14.87 (17.85) |
| In VA | | | |
| Number | 85,505 | 87,523 | 91,756 |
| RRS | 2.42 (2.19) | 2.44 (2.17) | 2.49 (2.20) |
| Discharges | 1.79 (1.33) | 1.76 (1.31) | 1.73 (1.28) |
| Bed days of care | 21.50 (42.36) | 21.12 (42.53) | 19.89 (39.75) |
| Inpatient cost* | 20.12 (30.43) | 20.93 (31.79) | 21.70 (32.40) |

*Costs are in $1000.

## DISCUSSION

We studied overlap of diagnostic codes in patients who use both Medicare and VA services. We found that research on patients who are dual users of 2 systems of health care may substantially underestimate true illness burden and fail to identify individuals with a particular clinical condition if data from only one of the health care systems is available. Overall, we found that the percentage of male, elderly Medicare beneficiaries who also use the VA is fairly low, whereas dual usage among VA users is much higher, and has increased over the period of this study. Thus, research and findings concerning number of diagnoses and illness burden in Medicare which only uses Medicare data may be little impacted by dual users. However, research in VA populations must take much more care to determine whether a lack of data from the Medicare system affects the validity of results.

The lack of overlap of coding between the 2 systems was not an expected finding. Although VA and Medicare health care utilization has been found to be complementary rather than duplicative,[16] we *had* hypothesized at the beginning of this research project that the majority of patients' conditions would be coded—although not treated—in both systems. This appears not to be the case. Very little overlap of diagnoses exists between data from the 2 systems, and thus RRS calculated by using only 1 system of data will underestimate true illness burden by approximately 20% to 66%.

As well as having little overlap in diagnoses, we found that using data from Medicare alone resulted in more diagnoses and, particularly, higher RRS than using VA data alone. In addition, during the 3 years of our study, dual users had progressively more of their diagnoses coded in the Medicare system, perhaps indicating a shift over time in utilization or changes in coding practices. There may be several explanations for the higher number of diagnoses and higher RRS found in Medicare. First, although the VA system has the same upper limit for recorded codes, incentives for coding are not the same in the 2 systems. Physicians and organizations who submit claims to Medicare have a greater incentive to increase the number of diagnoses and procedures coded, to increase reimbursements, than do physicians and networks in the VA.

Second, we found that the higher proportion of diagnoses and RRS in Medicare appears to be partially due to individuals who mainly use the VA for pharmacy services. This finding indicates that the pharmacy-only patients are less severely ill than other individuals in our cohorts. It is consistent with the results of Zhu et al,[15] which showed that pharmacy-only patients have lower average pharmacy expenditures than other VA patients. Other coverage differences which may affect a comparison of RRS, but that we were unable to explore here, include provision of long-term care, spinal cord injury, mental health services for post traumatic stress disorder and other specialized services.

Third, the difference in RRS and diagnoses between the VA and Medicare could be simply due to where veterans choose to receive care for their most serious illnesses or where the most seriously ill veterans are treated. Our utilization data indicate that veterans are more likely to receive inpatient care in Medicare, where both more and more severe diagnoses may be recorded


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than in an outpatient setting. In addition, we do find that the RRS for those veterans who were hospitalized is higher in Medicare, despite the fact that the average number of bed days of care is substantially higher in the VA. This may merely indicate that the length of time spent as an inpatient does not affect substantially the number of most severe diagnoses that are recorded. Indeed, although RRS and utilization were moderately correlated, around 0.5, for most measures, the correlation between RRS and bed days of care in the VA was lower at 0.3.

The idea that veterans might be using Medicare for more serious illnesses is also supported by findings from the reliance analysis. Although RRS remain fairly stable for individuals in deciles from the 0 to 70th, the ratio of Medicare to VA RRS rises substantially. In the middle deciles, although overall illness burden does not change, Medicare is increasingly recording the more serious diagnoses, and the VA the less serious ones. There is a large jump as well in RRS in the highest decile, almost double the 80% to 90% group. Thus dual use veterans who are most ill are using Medicare for the great majority of their care.

The reasons for the increase in this disparity between RRS in Medicare and the VA over time is unknown. We hypothesize that it may be partially explained by our finding that, during recent years, the average number of average bed days of care provided to veterans, as well as the number of discharges, has decreased slightly, whereas rates in Medicare have increased slightly for dual users. Additionally, the underuse of treatments such as angiography has been found in the VA,[17] and it is possible, although unknown, whether underuse might be increasing over time relative to Medicare. Although our study examined only those veterans who have dual use, we do show that the percentage of veterans who use the VA system and are dual users has increased. This increase in dual use may also be attributed to reductions in VA care and possible underuse of some procedures in the VA.

This research has several limitations. First, our cohorts were restricted to those veterans who were not enrolled in Medicare managed care programs, as costs, diagnoses, and utilization information is not available for these veterans. Second, a small number (approximately 7%) of our original cohorts had to be excluded from analyses because of diagnoses codes that were invalid. Third, the RRS used in the analyses was generated by the DxCG software for the Medicare population using Medicare costs. It may not be completely accurate in reflecting the relationship with VA costs for different disease groups. Finally, cost data from the 2 sources may not be entirely comparable.

Results from this study can inform both researchers and policy makers about potential areas of concern when conducting research and making policy decisions for dually eligible patients. For example, studies on specific health care conditions and overall illness burden may not be valid unless data from both systems are available. Thus, researchers who seek to identify a specific disease cohort of patients or measure complete illness burden will probably need to use data from both systems for dual users. On the other had, if policy makers are using diagnoses to determine either payment for specific services (eg, in Medicare), or in global resource allocation (eg, in the VA), they may only want to consider diagnoses and RRS from the system in question. The lack of overlap in diagnoses suggests that physicians are appropriately coding only those diagnoses that they are treating.

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