Diabetes in Nonveterans, Veterans, and Veterans Receiving Department of Veterans Affairs Health Care

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OBJECTIVE — To compare behavioral risk factors and health and disease characteristics among three groups of adults with diabetes: nonveterans, veterans not receiving Department of Veterans Affairs (VA) health care, and veterans using VA services.

RESEARCH DESIGN AND METHODS — Two data sources were used to describe the veteran population. First, the 2000 Behavioral Risk Factor Surveillance System (BRFSS) characterized the U.S. adult population by preventive health practices and risk behaviors linked to chronic and preventable diseases. New to the 2000 survey were questions on veteran status, which were administered in all states. Second, VA administrative and veterans benefits data were analyzed to describe comorbidity, education services, and veterans benefits.

RESULTS — The estimated prevalence of diabetes in male veterans receiving VA care was 16%. Male veterans with diabetes using VA care were more likely to be nonwhite, not employed, have lower income, lower health status, and more activity limitations than male veterans not using these services. Computerized records indicate VA users with diabetes also had high concurrent comorbidity. Frequency of VA diabetes and preventive care services, as measured by selected quality indicators, was equivalent to or higher than the levels reported by veterans not receiving VA care and nonveterans. In addition to health care, nearly one-fourth of veterans with diabetes also received monthly awards for compensation and pension.

CONCLUSIONS — Males receiving VA care with self-reported diabetes indicated receiving preventive care services at equivalent or higher levels than their counterparts receiving care outside the VA and nonveterans.

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Diabetes is a major U.S. public health problem, disproportionately affecting older, minority, and low-income individuals. People with diabetes have a two- to fourfold excess of cardiovascular, peripheral arterial, and cerebrovascular disease compared with people without diabetes (1–3). These individuals undergo two-thirds of all lower-limb amputations and experience a higher incidence of renal failure and blindness than people without diabetes (4–6). U.S. diabetes goals for 2010 include targeting process measures and behaviors that contribute to the development of diabetes complications (7).

The Department of Veterans Affairs (VA) is one of the largest health care systems in the U.S. There were 6.8 million veterans who enrolled in 2002 to receive VA care. They were prioritized into seven groups with preferential treatment going to veterans with a service-connected disability who had conditions rated 50% or more disabling (priority 1). Priority 7 veterans, with no service-connected disabilities and adequate financial means, made copayments for medical care and medications and were provided on a medical acuity and space-available basis. Unlike health maintenance organizations, some veterans receive both VA care and non-VA private care. The VA data systems capture primarily the encounters and outcomes occurring within the system, although some contract care is provided in other settings. The extent of the dual health care and preventive care is of interest but has been difficult to quantify nationally, particularly in veterans younger than age 65.

In 2002, 4.5 million of the enrolled veterans made 46.5 million VA outpatient clinic visits, and 564,700 veterans were hospitalized in VA medical centers (8). VA users were reported to have a higher prevalence of major chronic conditions (9). Diabetes was the third most common VA diagnosis and accounted for 25% of pharmacy costs and over 1.7 million hospital bed days (10).

There is limited population-based information on people with diabetes to compare behavioral risk factors and characteristics among nonveterans, veterans not using the VA, and veterans using VA health care. Therefore, the purpose of this article was to present demographic, behavioral, and health care findings on nonveterans, veterans not using VA services, and those using VA services based on national survey and patient care data.

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Abbreviations: BRFSS, Behavioral Risk Factor Surveillance System; VA, Department of Veterans Affairs.

A table elsewhere in this issue shows conventional and Système International (SI) units and conversion factors for many substances.

RESEARCH DESIGN AND METHODS

Data sources

Data for this article came from two data sources: *1*) the 2000 BRFSS survey (11) and 2) the VA veteran health and benefit databases, which are described in detail in a subsequent article (12).

The 2000 Behavioral Risk Factor Surveillance System (BRFSS) survey was conducted in all 50 states and the District of Columbia with funding and coordination provided by the U.S. Centers for Disease Control and Prevention. This is the largest continuously conducted telephone survey in the world. The survey is designed to identify emerging health issues, document health trends, and compare health and behavioral characteristics in the population. Methodology and validation of this cross-sectional survey are described in detail elsewhere (13).

The 2000 BRFSS study population sampled >95% of U.S. households with land-line telephones. Disproportionate stratified sampling was used to increase the efficiency of telephone number screening while maintaining a valid probability sample of households with telephones. Sampling and interviewing were conducted during 2 weeks of every month throughout 2000. Within each household, one person aged 18 years or older was selected at random to be interviewed.

Computer-assisted telephone interviews included standardized questions on demographic characteristics, health status, health care use, health habits, selected chronic conditions, and receipt of screening services (14). All survey participants were asked if a doctor had ever told them they had diabetes. In 2000 three new emerging core questions were introduced and used in all states to capture veteran status and use of VA care (Fig. 1). These questions were based on our 1999 pilot experience in the state of Washington (15). In 47 states and the District of Columbia, additional diabetes questions were administered on age of diabetes onset, current diabetes therapy, self-management, and health care utilization.

Using the veteran questions (Fig. 1), veterans were defined as respondents who answered yes to question 1 and answered in question 2 that they were no longer in military service. Nonveterans were defined as answering no to question 1. Using responses to question 3, veterans were divided for analysis into VA users (*a* + *b*) versus nonusers (*c*).

1. Have you ever served on active duty in the United States Armed Forces, either in the regular military or in a National Guard or military reserve unit?
   (a) Yes
   (b) No
   Don't know / refused

2. *[If yes to #1]* Which of the following best describes your current military status? Are you:
   (a) Currently on active duty
   (b) Currently in reserves
   (c) No longer in military service
   Don't know / refused

3. *[If (c) to #2]* In the past 12 months, have you received some or all of your health care from VA facilities?
   (a) Yes, all of my health care
   (b) Yes, some of my health care
   (c) No, no VA health care received
   Don't know / refused

Figure 1—*Questions to ascertain veteran status on the 2000 BRFSS Survey.*

Each survey respondent was assigned a final sampling weight based on his or her overall probability of selection and a poststratification factor that assured that the age, sex, and race distribution of the weighted sample would agree with population estimates from the U.S. Census Bureau. Prevalence estimates were age-standardized using the direct method to all U.S. veterans as estimated from the weighted BRFSS sample. The *P* values were obtained using the Stata svylogit command, which accounted for the sampling weights, clustering within primary sampling units, and sampling strata (16). Data were stratified during analysis to compare nonveteran males/females, veteran males/females, and male VA users.

The second source of data was the VA Austin Automation Center and veterans benefits files. After receiving human subjects approval from the University of Washington Institutional Review Board, a study database was constructed and analyzed to determine VA inpatient and outpatient care and benefits in FY1998. Veterans were defined as having diabetes if they had three or more outpatient clinic visits with at least one visit with a diagnosis of diabetes (ICD-9-CM 250.x) or an inpatient hospitalization with a diabetes diagnosis. ICD-9 and CPT diabetes codes were used to identify diabetes self-management education, diabetes complications, and comorbid conditions. The VA benefits files were the source for data on veterans service-connected and disability compensation and non–service-connected pensions. The VA compensation program provides disability compensation for veterans who are disabled due to an injury or disease incurred in or aggravated during military service and for certain conditions that may develop after discharge from active duty. Benefits are authorized based on the

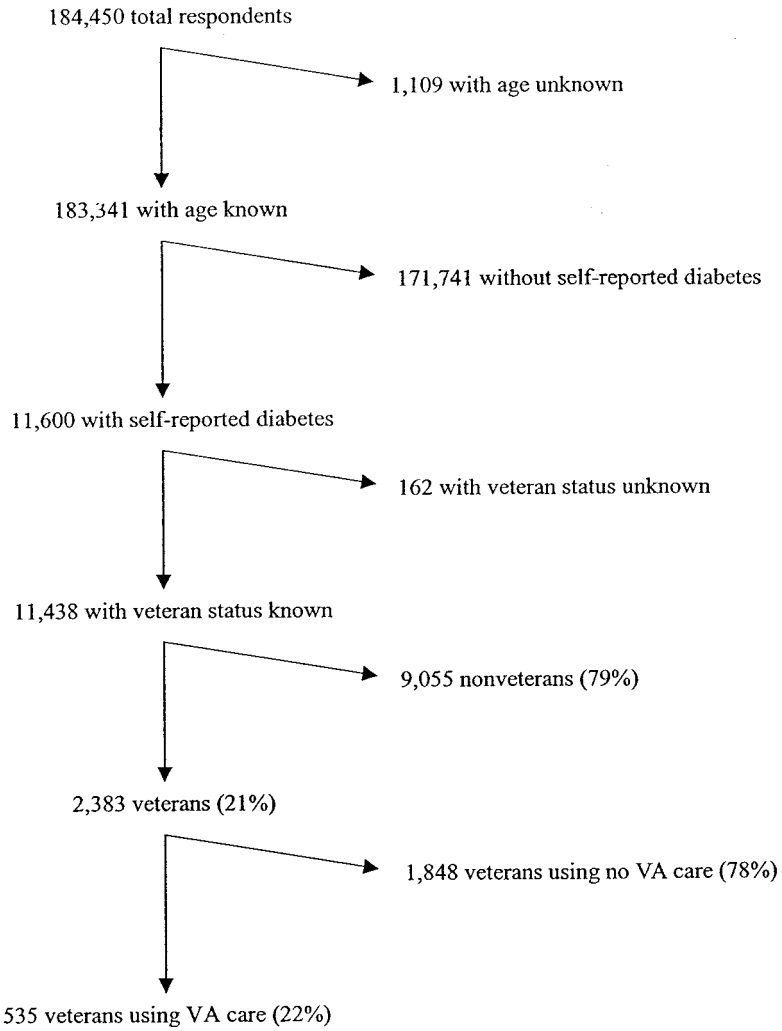

Figure 2—*2000 BRFSS survey of adults with diabetes by veteran status and use of VA health care*

severity of claimed disabilities, and in the case of non–service-connected pension, financial need is also considered. If the service-connected disabilities are evaluated as 30% or more, veterans are entitled to additional financial allowances for dependents. Veterans benefits were determined by linking veterans identified with diabetes to the VA benefits file. A descriptive analysis was conducted using SAS (17).

RESULTS — Diabetes was self-reported by 11,600 of the 183,341 adult survey respondents with known age in the 2000 BRFSS survey. Veteran status was unknown for 162 respondents, leaving 11,438 for analysis. Figure 2 shows that among those with diabetes, 21% were veterans, and of those, 22% reported using VA health care. The diabetes prevalence in all male veterans was 12%, whereas it was 16% in male veterans using VA services when age-standardized to the male veteran population.

U.S. veterans with diabetes tend to be older than the nonveteran male population. The mean age for nonveterans with diabetes was 58.1 years while it was 65.3 years for veterans.

Among the BRFSS nonveteran respondent population, 34% were male and 66% were female. In contrast, the veteran respondents were 97% male and 3% female. The sample included 97 female veterans with diabetes, 20 of whom were VA users. Because the group of female diabetic VA users was too small in size for age adjustment or reporting crude percentages, BRFSS data presented on VA users includes only males.

The racial/ethnic distribution of the population with diabetes indicated that, among females, nonwhite status was observed more often in nonveterans than veterans (26 vs. 11%). Among males with diabetes, ~25% of nonveterans were white. Similarly 24% of male VA users were nonwhite. By comparison, there were significantly fewer nonwhite male veterans who did not use VA health care (16%) (Table 1).

Less than a high school education was more common in female and male nonveterans compared with female and male veterans. Of males, 16% of VA users had not completed high school compared with only 7% of the VA nonusers. Unemployment was reported most frequently by female veterans (78%) and male VA users (69%). The reasons for not being employed included inability to find work, retirement, and disability. A low annual income (<$15,000) was reported significantly more frequently by nonveterans (23–27%) and male veterans using VA services (23%) than by female nonveterans (19%) and male veterans not receiving VA care (8%).

Fair or poor health status was reported by approximately half of male and female nonveterans. Fair or poor health status was also reported by 56% of male VA users compared with only 34% in male veterans not receiving VA health care. An activity limitation of 7 or more of the last 30 days was significantly more common among veteran male VA users (45%) than in veteran male VA nonusers (29%).

Among behavioral characteristics measured (Table 1), male veterans with diabetes had a significantly higher prevalence of having "ever smoked" (70%) than male nonveterans with diabetes (60%). The highest frequency of "current smoking" was among male veterans using VA services (23%). Current drinking behaviors were similar for female veterans and nonveterans. Alcohol consumption was highest in male veterans who were not VA users. Among females, chronic drinking was more common in veterans than nonveterans; however, binge drinking was more common among nonveteran women.

Frequency of diabetes duration ≥25 years was highest in nonveterans and male VA users (24–27%) compared with female veterans and male veterans not using VA health care (14–17%) (Table 2). Insulin use was significantly more com-

Table 1—*Sociodemographic and behavioral characteristics of adults with diabetes by veteran status and sex*

	Females		Males			
Characteristics	Nonveterans	Veterans	Nonveterans	Veterans	VA users	VA nonusers
Sociodemographic (%)						
Nonwhite	26	11	25	18†	24‡	16
<High school graduate	27	5*	33	9†	16‡	7
Not employed	65	78	51	54†	69‡	49
Annual income < $15,000	27	19	23	11†	23‡	8
Health status fair/poor	51	57	52	39†	56‡	34
Limited activity 7+ days/last 30 days	31	50	34	33	45‡	29
Behavioral (%)						
Ever smoked?	43	44	60	70†	73	68
Current smoker?	17	16	19	19	23	18
Current drinker?	26	27	40	48	40	49
Chronic drinker?	25	48*	36	45	46	45
Binge drinker?	11	2	24	21	22	22

Data are age-standardized to all U.S. veterans as estimated from the weighted BRFSS sample (11). *$P \leq 0.05$ comparing female nonveterans to female veterans; †$P \leq 0.05$ comparing male nonveterans to male veterans; ‡$P \leq 0.05$ comparing male veteran VA users to male veteran VA nonusers.

mon in male VA users (31%) than in male veteran nonusers (24%). Of female veterans with diabetes, 43% reported using insulin. Daily monitoring of blood glucose ranged from 42–53% across the U.S. adult population with diabetes but did not differ significantly by veteran status or VA use. Self–foot checks performed less than weekly were reported more frequently by nonveteran males. Of adults with diabetes, ≥78% reported a glycated hemoglobin test in the last year; however, a higher percentage of male VA users had never heard of this test (hemoglobin "A1C") compared with all other groups.

Male VA users reported significantly more physician visits and provider foot exams in the past year than any other group. Significantly more male VA users received diabetes education (65%) than

Table 2—*Diabetes and preventive care findings by veteran status and sex*

	Females		Males			
Variable	Nonveterans	Veterans	Nonveterans	Veterans	VA users	VA nonusers
Duration ≥25 years	27	14	26	19†	24	17
On insulin	30	43	23	25	31‡	24
Oral agent	66	41	73	69	75	68
Daily self blood glucose monitoring	53	49	42	49	50	48
Foot check <weekly	20	16	23	18†	14	18
HbA_{1c} in past year	83	78	87	87	83‡	87
Never heard of test	7	5	5	5	12‡	4
MD visit in past year	90	83	91	90†	95‡	89
Provider foot exam in past year	65	68	64	69	79‡	66
Ever told have diabetic eye disease	23	11*	30	23†	24	22
Diabetes education	48	55*	45	51†	65‡	47
Foot sores	12	31	14	11	14	10
No eye exam >2 years	14	4	17	12†	10	14
BP checked last 2 years?	100	100	100	100	99	100
Ever had cholesterol checked?	94	100	91	95	98	93
Cholesterol checked in last 5 years?	93	100	90	94	97	93
Sigmoidoscopy ever?	45	78	66	66	92‡	63
Fecal occult blood last 2 years	35	77	33	31	56	29

Data are percent and are age-standardized to all U.S. veterans as estimated from the weighted BRFSS sample (11). *$P \leq 0.05$ comparing female nonveterans to female veterans; †$P \leq 0.05$ comparing male nonveterans to male veterans; ‡$P \leq 0.05$ comparing male veteran VA users to male veteran VA nonusers. BP, blood pressure.

Table 3—*Veterans with diabetes receiving diabetes education in VA facilities, FY1998 (N = 415,910 unique individuals)*

Service and code	Number of persons	Percent of all veterans with diabetes	Number of sessions	Number of sessions/patient
Patient education materials (99071)	96,126	23	198,215	2.1
Group/individual classes (99078)	67,878	16	213,207	3.1
Dietary surveillance/counseling (V65.3 ICD-9)	64,699	16	109,398	1.7
Dietary counseling, individual (*99402-4)	101,522	24	243,977	2.4
Dietary counseling, group (*99411-2)	18,895	5	80,152	4.2
Medication management (90862)	62,033	15	279,331	4.5
Telephone calls (*99371-3)	198,155	48	658,043	3.3

*Related to length/complexity of encounter

male VA nonusers (47%). Male and female veterans reported that their physicians told them they had diabetic eye disease significantly less often than nonveterans of same sex after age-standardization. The prevalence of foot sores ranged from 11% to 14% across all groups except female veterans who reported a nonsignificant 31% prevalence.

Self-report of select preventive health care services was available in the BRFSS 2000 survey. No eye exam in the last 2 years was reported less often by veterans than nonveterans and among male VA users compared with male VA nonusers. Blood pressure and cholesterol checks were common across all groups. Male VA users reported a significantly higher frequency of sigmoidoscopy (92%) than male VA nonusers. Female veterans exceeded their nonveteran counterparts (78 vs. 45%), but this did not achieve statistical significance. Similarly screening for fecal occult blood was highest in female veterans (77%) and male VA users (56%) compared with other groups (29–35%).

The VA Austin database was the source for further description of the population of 429,918 veterans with diabetes who received outpatient (n = 415,910) and inpatient (n = 78,705) VA care in FY1998. Analysis of comorbidity among veterans with diabetes indicated 67% had high blood pressure, 41% had coronary artery disease, 15% had chronic obstructive pulmonary disease, 12% had cancer, and 12% had depression (data not shown).

The Austin database was used to determine use of patient education services. Table 3 shows the seven different types of patient education provided to veteran recipients over a 12-month interval. These services included provision of education materials (23%), attending group or individual classes (16%), receiving dietary education (16%), individualized dietary counseling (24%), group dietary counseling (5%), medication management (15%), and telephone assistance (48%). The veterans receiving these services received them on average of 1.7–4.5 times by type of service. The quality of patient self-management education is high across the VA. American Diabetes Association recognition for meeting national standards for excellence in diabetes education has been received at 50 medical centers. The VA does not bill veterans for self-management instruction; therefore, this recognition is entirely voluntary.

A service-connected disability was documented in 31% of veterans with diabetes. Service-connected veterans had a median of 14 outpatient visits in FY1998 compared with 11 visits in non–service-connected veterans. There were no significant differences between service- and non–service-connected veterans in terms of average hospitalizations or average hospital days (data not shown). Table 4 shows monthly award by percent service-connected and non–service-connected diagnosis. These benefits to males with diabetes approach $1.8 billion and are paid by the VA. Veterans benefits are not part of the VA health care budget.

CONCLUSIONS — The BRFSS now provides valuable information on health, health risk behaviors, and preventive care needs of veterans. Using these data, we were able to describe behavioral characteristics and preventive care practices in U.S. adults with diabetes by veteran status and VA use. Veterans were primarily male and the diabetes prevalence among VA

Table 4—*Average monthly award amount and related disability for service and non–service-connected veterans with diabetes*

	Service-connected diagnosis		Non–service-connected diagnosis	
Rated %	Number	Amount ± SD	Number	Amount ± SD
0	581	$ 68 ± 3	2,871	$291 ± 228
10	23,746	$ 96 ± 6	251	$413 ± 294
20	14,477	$ 185 ± 18	372	$395 ± 288
30	15,302	$ 309 ± 29	876	$417 ± 294
40	12,335	$ 446 ± 54	1,887	$433 ± 315
50	9,739	$ 629 ± 71	2,337	$423 ± 300
60	12,866	$ 1180 ± 598	7,270	$427 ± 320
70	9,479	$ 1565 ± 558	10,018	$486 ± 333
80	6,949	$ 1807 ± 451	4,852	$496 ± 336
90	3,633	$ 1948 ± 348	1,229	$494 ± 336
100	23,486	$2,276 ± 656	15,702	$611 ± 387
Total	132,593	$ 939 ± 913	47,665	$500 ± 354

Source: VA Compensation and Pension Mini-Master File, Veterans Benefits Administration.

health care users was 16% compared with the U.S. diabetes prevalence of 7.2% (18).

Male VA users uniformly reported significantly lower sociodemographic characteristics and health status and higher levels of activity limitation than did male VA nonusers. VA data identified a very high prevalence of major cardiovascular comorbidity. These data suggest the VA serves a more disadvantaged and sicker subset of males with diabetes who may have a greater need for care.

Smoking history and current smoking were highest in male VA users. Males were more often drinkers and reported binge drinking more frequently than females regardless of veteran status. However, the highest frequency of chronic drinkers was seen in female veterans (48%).

Significantly fewer veterans reported a diabetes duration >25 years. This may reflect the military exclusion of individuals presenting with existing diabetes. The higher proportion of male VA users than nonusers who were on insulin and oral hypoglycemic agents may reflect more aggressive treatment and/or more severe diabetes among the VA users. Males with diabetes using VA health care performed as well as or better than their diabetic counterparts on diabetes self-care behaviors. Their lack of awareness of HbA_{1c} terminology may reflect less familiarity with terminology in VA recipients than a difference in ordering glycated hemoglobin tests.

The VA performed well on preventive services offered to veterans with diabetes. High levels of preventive care were evident for physician visits, foot exams, and diabetes patient education. This is consistent with the VA emphasis on quality of care and the performance measurement system. A recent article describing how the quality of health care delivered by the VA and Medicare showed significant improvements in the VA on HbA_{1c}, eye exams and semiannual lipid screening performance measures. The VA scored higher than Medicare on all items except annual eye screening in 2000 (19). This is likely explained by the VA reprioritizing eye care to a high priority for those with any existing eye disease and putting less emphasis on routine eye screening in the absence of retinal abnormalities. Blood pressure and lipids were performed at uniformly high levels across all groups. Among males, sigmoidoscopies and fecal occult blood testing were performed most frequently in VA users.

Diabetes education is provided using a variety of strategies in most VA medical centers as well as VA community-based outpatient clinics. The VA considers diabetes self-management education a necessary component of diabetes care, as it assists persons with diabetes to perform their day-to-day self-management demands and make informed self-care choices. The essential elements of self-management involve the following five interrelated activities: *1*) assessment and feedback on current self-management behaviors, *2*) collaborative setting of specific self-management goals, *3*) identification of barriers and social environmental supports for accomplishing goals, *4*) developing individually tailored problem-solving strategies to overcome obstacles, and *5*) including strategies for follow-up support. These activities lead to the development and refinement of a patient's action plan and reflect an ongoing and regularly updated aspect of veterans' care (20,21).

Unlike other large health care systems, the VA is also an entitlement program providing financial awards to veterans with and without service-connected disabilities. These costs are substantial and reflect a recurring entitlement. In FY1998 the VA spent approximately $1.8 billion dollars for diabetic veterans who had disabilities and received compensation and pension. However, these payments are not necessarily attributable to diabetes. In 2002 the VA spent $25 billion in overall disability compensation, death compensation, and/or pensions for 3.3 million people with and without diabetes. While 82% of these expenditures went directly to veterans, benefits also went to spouses, children, and parents of deceased veterans. The long-term nature of these obligations is exemplified by the 6 children of Civil War veterans and 439 children and widows of Spanish-American War veterans who receive VA benefits.

There are limitations to this analysis. First, the data are self-reported and only individuals with land telephone lines can participate in the BRFSS survey. The increasing use of cell phones and lower availability of telephones in the Southeast and in low-income households may have underrepresented low-income veterans. Second, the 2000 BRFSS did not contain questions on substance abuse, depression, or other mental health conditions that may be overrepresented in the VA care population. With the addition of veteran questions in the 2003 BRFSS survey as regular core questions, opportunities for additional analyses by veteran status will be available. Third, the 2000 BRFSS survey did not uniformly capture information on interventions used by people with diabetes to prevent or delay development of diabetes complications. An optional module on cardiovascular disease was completed in only 15 states. The final limitation was that only a small percentage of women were veterans; thus, these estimates were less stable for this group than for the remainder of the surveyed population.

In summary, the ability to assess veterans' behaviors, health findings, and disease burden is providing valuable information to VA providers, planners, and policymakers. The efforts by the VA to provide high-quality care to veterans with diabetes are reflected in these data.

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