



Published in final edited form as:

*Obesity (Silver Spring)*. 2019 January ; 27(1): 161–165. doi:10.1002/oby.22350.

## Geographic Variation in Obesity, Behavioral Treatment, and Bariatric Surgery for Veterans

Matthew L. Maciejewski, PhD<sup>1,2,3</sup>, David E. Arterburn, MD MPH<sup>4,5</sup>, Theodore S. Z. Berkowitz, MSc<sup>1</sup>, Hollis J. Weidenbacher, PhD<sup>1</sup>, Chuan-Fen Liu, PhD<sup>6,7</sup>, Maren K. Olsen, PhD<sup>1,8</sup>, Luke M. Funk, MD MPH<sup>9,10</sup>, James E. Mitchell, MD<sup>11</sup>, and Valerie A. Smith, DrPH<sup>1,2</sup>

<sup>1</sup>Center for Health Services Research in Primary Care, Durham Veterans Affairs Health Care System, Durham, NC

<sup>2</sup>Department of Population Health Sciences, Duke University, Durham, NC

<sup>3</sup>Division of General Internal Medicine, Department of Medicine, Duke University, Durham, NC

<sup>4</sup>Kaiser Permanente Washington Health Research Institute, Seattle WA

<sup>5</sup>Department of Medicine, University of Washington, Seattle WA

<sup>6</sup>Center for Health Services Research in Older Adults, Puget Sound Health Care System, Seattle, WA

<sup>7</sup>Department of Health Services, School of Public Health, University of Washington, Seattle WA

<sup>8</sup>Department of Biostatistics and Bioinformatics, Duke University, Durham, NC

<sup>9</sup>William S. Middleton VA, Madison, WI

<sup>10</sup>Department of Surgery, University of Wisconsin-Madison, Madison WI

<sup>11</sup>Department of Psychiatry and Behavioral Science, University of North Dakota, Fargo, ND

### Abstract

**Objective:** To describe geographic variation in Veterans' prevalence of obesity, participation in Veterans Administration's (VA) behavioral weight management program (MOVE!), and receipt of bariatric surgery in fiscal year (FY) 2016.

**Methods:** In this retrospective cohort study of Veterans with obesity who received VA care in FY2016, we obtained electronic health record data on weight, height, outpatient visits to the MOVE! program, and bariatric surgeries. For each Veterans Integrated Service Network (VISN)

---

Users may view, print, copy, and download text and data-mine the content in such documents, for the purposes of academic research, subject always to the full Conditions of use:[http://www.nature.com/authors/editorial\\_policies/license.html#terms](http://www.nature.com/authors/editorial_policies/license.html#terms)

**Corresponding author:** Matthew Maciejewski, Ph.D., Durham VA Medical Center (152), 508 Fulton St., Durham, NC 27705, [matthew.maciejewski@va.gov](mailto:matthew.maciejewski@va.gov).

**Conflicts:** MLM reported receiving personal fees from the University of Alabama, Birmingham, for a workshop presentation, grants from the Department of Veterans Affairs, a contract from the National Committee for Quality Assurance and ownership of Amgen stock due to his spouse's employment. DEA reported receiving grants from PCORI and NIH. CFL reported receiving grants from the Department of Veterans Affairs. MKO reported receiving grants from PCORI and NIH. VS reported receiving grants from NIA and the Marcus Foundation. TSZB, HJW and JEM report no conflicts.

region, we present the prevalence rate of Veterans with obesity (body mass index [BMI]  $\geq 30$  kg/m<sup>2</sup>), MOVE! participation rates, and bariatric surgery rates.

**Results:** The prevalence of obesity in Veterans ranged from 30.5%-40.5% across VISNs in FY2016. MOVE! participation among Veterans with obesity was low (2.8-6.9%) across all VISNs, but Veterans with class II and III obesity (BMI  $\geq 35$ ) had higher MOVE! participation rates (4.3-10.8%) than Veterans with class I obesity. There was 20-fold variation across VISNs in receipt of bariatric surgery among Veterans with BMI  $\geq 35$ , ranging from 0.01% to 0.2%. Among Veterans with BMI  $\geq 35$  participating in MOVE!, there was 46-fold variation in bariatric surgery provision, ranging from 0.07% to 3.27%.

**Conclusions:** Despite Veterans' high prevalence of obesity, behavioral and surgical weight management participation is low and varies across regions.

## Keywords

bariatric surgery; behavioral weight management; weight loss; obesity; Veterans

---

## Introduction

The Veterans Health Administration (VA) has strong incentives to offer weight management services to all eligible and interested Veterans because enrolled Veterans rely on VA care for many years<sup>1</sup> and their prevalence of overweight and obesity is higher than in the general population. In 2014, 37% of Veterans obtaining VA primary care were overweight (body mass index [BMI] 25.0-29.9 kg/m<sup>2</sup>) and 41% were obese (BMI  $\geq 30$ ).<sup>2</sup> Unlike any other health care system in the United States, VA offers a population-based behavioral weight management program, called MOVE!, via group visits or individual counseling sessions to Veterans who are overweight and have associated comorbidities (e.g. hypertension, diabetes, gastroesophageal reflux disease) or are obese.<sup>3</sup> MOVE! is offered in every VA medical center (VAMC) and Veterans are exempt from copayments for MOVE! visits.<sup>4</sup> According to the 2014 VA-Department of Defense clinical practice guidelines,<sup>5</sup> Veterans should participate in MOVE!, and pharmacologic or surgical intervention for weight loss are adjuncts to MOVE! participation. Prior work indicated that only 2-12% of eligible Veterans participate in MOVE!, and weight change associated with MOVE! is modest (mean of 0.13-3.3 kg loss).<sup>6-8</sup>

Despite evidence of significant weight loss and survival benefits,<sup>9,10</sup> bariatric surgery is only available in a subset of VAMCs, and only 400-500 Veterans receive bariatric surgery annually nationwide.<sup>11</sup> To be eligible to receive bariatric surgery at one of the 22 VA medical centers that currently offers it, Veterans must have a BMI  $\geq 40$  or BMI  $\geq 35$  with an obesity related comorbidity (e.g., diabetes, hyperlipidemia) and have attempted behavioral or pharmacologic weight loss.

Prior VA research found that the prevalence of obesity varied across VAMCs from a low of 28% to a high of 49%,<sup>2</sup> but no studies have examined geographic variation in receipt of behavioral and surgical weight loss interventions among Veterans eligible for these programs. The Dartmouth Atlas has reported that rates of bariatric surgery among Medicare

enrollees between 2007 and 2011 varied more than 12-fold between the lowest and highest utilizing hospital referral regions in the United States.<sup>12</sup>

The purpose of this report is to describe geographic variation in Veterans' prevalence of obesity, participation in MOVE!, and receipt of bariatric surgery in FY2016. Given findings of geographic variation in prior VA studies of obesity prevalence<sup>2</sup> and all-cause hospitalization rates,<sup>13,14</sup> we expect to observe significant variation in the prevalence of obesity and receipt of behavioral and surgical weight management interventions. Given that VA is the largest health care system in the United States, this descriptive analysis may identify opportunities to increase Veterans' access to existing weight management interventions, which could serve as a model for implementation of population-based weight management interventions in other integrated health care systems.

## Methods

### Data and Cohorts

Veterans with obesity were initially identified from the population of all Veterans who received VA care in fiscal year (FY) 2016 (10/1/2015-9/30/2016) and had a recorded height and weight indicating obesity [body mass index (BMI) (weight in kg / (height in meters)<sup>2</sup>) 30] from VA's Corporate Data Warehouse (CDW; Supporting Information Figure S1). Since weight measurements for a given person can be highly variable within a year and include clinically implausible values due to data entry or other errors, a multi-step outlier-detection algorithm was applied. This algorithm identifies multiple weight measures on the same day and weights that deviated from clinically plausible trends over time by comparing standard deviations of consecutively measured weights (see appendix of prior weight change paper<sup>10</sup> for details).

Veterans with obesity were assigned to the VA medical centers (VAMCs) and their corresponding Veteran Integrated Service Networks (VISNs) where they had the most outpatient visits in FY2016. VISNs are administrative units and regional systems of care used by VA to allocate resources nationwide. To calculate obesity rates by VISN, we constructed the denominator for each VISN as the number of Veterans obtaining primary care in VA in FY2016 from the VA CDW. The denominator of primary care users was chosen because primary care visits are the main source of outpatient weight in VA, primary care users represent the largest group of Veterans routinely obtaining medical care in VA, and the standard of care in primary care is to refer Veterans with weight problems to MOVE! program.

Participation in VA's behavioral weight management program, MOVE!, for each Veteran with obesity was identified from VA outpatient visit data. MOVE! participation was indicated for Veterans with obesity who had one or more outpatient visits to the MOVE! program in FY2016 via clinic stop codes 372 and 373. Stop codes are administrative codes for identifying outpatient clinics providing different types of outpatient care (e.g., primary care, endocrinology, MOVE!).

From the cohort of Veterans with obesity (Supporting Information Figure S1), the subset with one or more BMI measures in FY 2016 indicating class II (BMI=35-39.9) or class III obesity (BMI ≥40) were identified to construct a cohort of Veterans eligible for bariatric surgery. From this cohort of Veterans with class II or class III obesity, we identified Veterans who received bariatric surgery in FY2016 either in VAMCs or in the community but financed by VA based on ICD-10 procedure codes and CPT codes (Supporting Information Table S1).

## Analyses

To understand geographic variation in obesity (BMI ≥30) among Veterans using VA primary care in FY2016, we determined the prevalence of obesity in each VISN. In the cohort of Veterans with obesity, we calculated MOVE! participation rates from each VISN among Veterans with obesity, stratified by class I obesity (BMI 30-34.9) and class II or III obesity (BMI ≥35).

To examine geographic variation in receipt of bariatric surgery in FY2016, we examined the proportion of Veterans with class II or III obesity and the proportion of MOVE! participants with class II or III obesity who received bariatric surgery in each VISN. Participation in MOVE! is a pre-surgical requirement for Veterans in most VISNs, so MOVE! is the most common referral pathway to bariatric surgery in VA. All analyses are presented graphically and all VISNs are anonymized for confidentiality. This study was approved by the Institutional Review Boards of the Durham and Madison VAMCs Duke University and the Kaiser Permanente Washington Health Research Institute.

## Results

### Regional Variation in Obesity, MOVE! Participation, and Bariatric Surgery

The prevalence of obesity in FY2016 ranged from 30.5% in VISN A to 40.5% in VISN S (Figure 1). MOVE! participation rates among Veterans with class I obesity (BMI 30-34.9) were low in all VISNs (Figure 2) with rates ranging from 2.8% in VISN R to 6.9% in VISN Q. Veterans with class II and III obesity (BMI ≥35) had higher MOVE! participation rates in FY2016 than Veterans with class I obesity, ranging from 4.3% in VISN R to 10.8% in VISN L (Figure 3; see Supporting Information Figure S2 for patient volume).

Among all Veterans with class II or III obesity in FY2016, there was 20-fold variation in receipt of bariatric surgery. These rates ranged from a low of 0.01% in VISNs B and I to a high of 0.2% in VISN D (Figure 4). Restricting the denominator to Veterans with class II or III obesity who participated in MOVE!, bariatric surgery rates were higher in all VISNs but there was 46-fold variation across VISNs, ranging from 0.07% in VISN I to 3.27% in VISN D (Figure 5).

## Discussion

This is the first study to examine geographic variation in the prevalence of obesity, MOVE! participation, and receipt of bariatric surgery among Veterans. To provide context to regional variation in the provision of bariatric surgery, we described participation in VA's system-

wide behavioral weight loss intervention (MOVE!) because participation in this program is required in many VISNs prior to consideration for bariatric surgery. Results were stratified by Veterans with class I obesity who are ineligible for bariatric surgery and Veterans with class II and III obesity who meet BMI eligibility criteria for both behavioral treatment and bariatric surgery. To provide context to the regional variation in MOVE! participation, we presented geographic variation in obesity prevalence.

We found that VISN-level prevalence of obesity in FY2016 ranged from 30.5%-40.5%, which is consistent with recent work showing that the prevalence of obesity in 2015 varied across VAMCs from 28% to 49%.<sup>2</sup> The VISN-level estimates aggregated obesity prevalence from multiple VAMCs, which likely explains why the upper bound of obesity prevalence at the VISN level is lower than that from the prior VAMC-level analysis.

Consistent with a recent systematic review,<sup>6</sup> we found that MOVE! participation in FY2016 ranged from 2.8-6.9% across all VISNs for Veterans with class I obesity, but was a bit higher (4.3-10.8%) in Veterans with class II and III obesity. The latter is encouraging because mortality risk<sup>15</sup> and health expenditures<sup>16</sup> increase with more severe obesity. The low rates of MOVE! participation in all VISNs and the 2-fold difference in participation across VISNs may be driven by patient preferences, local constraints in the availability of MOVE! staff to lead group and individual sessions, limited availability of classrooms to provide sessions, or other factors (e.g., in-person sessions held during business hours).<sup>17-19</sup> To increase MOVE! participation rates, VA may need to provide more resources to support more MOVE! sessions in each VA medical center, including outside of regular business hours. VA has introduced a home telehealth version of MOVE! and a MOVE! Coach mobile application to expand the reach of MOVE! by making it available in more convenient modes.<sup>20</sup> Data on Veterans' utilization of these modalities is not yet available and so was not included in our results. The content and structure of the MOVE! program was also refined to incorporate aspects of the well-regarded Diabetes Prevention Program following a recent VA demonstration.<sup>21</sup>

Finally, receipt of bariatric surgery was extremely low in VA in FY2016, given that 0.07% to 3.27% of Veterans with class II or III obesity who participated in MOVE! received bariatric surgery in FY2016. When not restricting to MOVE! participants, bariatric surgery rates were even lower (0.01-0.2%) with 20-fold variation. These rates of provision of bariatric surgery among MOVE! participants are comparable to rates reported in Canada in 2015-2016 that do not condition on prior behavioral weight loss.<sup>22</sup> In the United States, it is estimated that 196,000 patients underwent a bariatric procedure in 2015,<sup>23</sup> which represents roughly 0.6% of the more than 36 million US adults with class II and III obesity.<sup>24</sup>

The variability in bariatric surgery rates across VISNs is likely due to several patient and health care system factors.<sup>25,26</sup> Patient factors that may contribute to regional variation include patient preferences for surgical intervention or cultural differences in acceptability of obesity by VISN. Health care system factors relate to physician and medical center constraints because a bariatric surgery center does not exist in every VISN. Among VISNs with a bariatric surgery center, it is possible that there is variability in MOVE! or primary care staff willingness to discuss the option of bariatric surgery or in the number of full-time

equivalent surgeons available to perform on interested and eligible patients. Further, primary care physicians and MOVE! coordinators may vary in their willingness to refer Veterans with obesity for bariatric surgery due to risk misperceptions or not knowing to whom to refer Veterans deemed to be good surgical candidates.<sup>26</sup>

Given that the estimated prevalence of obesity is 41% in Veterans and 38% in adults in the United States,<sup>27</sup> there is a critical need for health care systems to develop scalable and affordable population-based weight management strategies. The VA is an ideal health care system in which to develop such a strategy because it is the largest health care system in the United States and the prevalence of obesity is unabated.<sup>28</sup> Further, effective population-based strategies have the promise to be high value to Veterans and the VA health care system itself because Veterans rely on VA care for many years.<sup>1</sup> Social policy changes, such as changes to the built environment and healthy eating initiatives, may also be necessary to limit further increases in obesity prevalence because obesity is a complex and prevalent condition in all health care systems in the United States. Collective action with social policy spanning public and private payers may be needed to complement health care interventions that multiple health care systems are attempting simultaneously.

This analysis suggests that Veterans with obesity in some regions currently are likely to be underserved by behavioral and surgical weight management interventions. It is unclear from this descriptive analysis the extent to which patient, provider or health care system factors contribute to this finding or the extent to which the major factors are modifiable. Future research integrating patient, provider, and health care system data is needed to identify the relative contributions of these different factors. For example, Veterans' MOVE! participation and weight change could be examined by linking patient-level data to medical center-level data from a national survey of VA medical centers fielded in 2017 to understand their staffing, referral and care processes. Such an analysis would complement a prior non-VA study that examined contributors to geographic variation in bariatric surgery in Medicare, which found no association between undergoing bariatric surgery and system-level factors, such as the number of bariatric surgeons, number of surgical centers, or percentage of patients with recent primary care utilization.<sup>29</sup> Only through such investigation can modifiable factors at each level be clearly identified and then modified using evidence-based change strategies.

The 46-fold variability in the rate of uptake of bariatric surgery across VISNs is unlikely to reflect variability in informed patient preferences.<sup>30</sup> These unwarranted variations likely require systems level changes (e.g., policies that provide access to bariatric surgical care) and structural supports (i.e., patient decision aids and provider training in shared decision making) that help to ensure informed patient choice. The decision to undergo bariatric surgery should be based on a high-quality shared decision making process.<sup>31</sup> The essential components of this process are clear communication of the clinician's expert judgment, elicitation of the patient's own values and preferences, and use of a patient decision aid that provides objective information about all clinically appropriate treatment options and encourages the patient to be meaningfully involved in decision making.<sup>32</sup> It is important to note that there would be less relative variation if the levels of MOVE! participation and bariatric surgery were higher, because relative variation is a function of the levels.



This descriptive analysis includes limitations that should be acknowledged. First, these results may not generalize to non-Veterans receiving primary care in non-VA health care systems or to Veterans since FY16. Second, we describe MOVE! participation in 2016 that is lower than cumulative participation since MOVE! started in 2006 and define participation as one or more visits, which represents a snapshot of current variation in its most inclusive form. Third, eligibility for bariatric surgery was limited to a BMI criterion, which modestly overstates eligibility and modestly understates uptake. Fourth, this study cannot disentangle the reasons for variation in uptake of MOVE! and bariatric surgery because data for mechanisms, such as provider attitudes or local policies were not available. These areas deserve future research.

In conclusion, obesity is very common among Veterans and participation rates in MOVE! and bariatric surgery were low and highly variable across regions. These results suggest that access to these interventions and shared decision making conversations regarding the efficacy and safety of these interventions could be improved throughout VA. Given the prevalence of overweight and obesity and Veterans' long-time reliance on VA for care, an effective population-based strategy to address this epidemic could reduce geographic variation by increasing treatment rates and improve the quality of care for Veterans with obesity, patient satisfaction with care, and long-term health outcomes.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

## Acknowledgements:

Helpful feedback from Sue Raffa, National Director of MOVE!, are gratefully acknowledged. Funding from NIDA R01DA040056 and VA HSR&D (RCS 10-391 to Dr. Maciejewski, VA Career Development Award (CDA) 015-060 to Dr. Funk) are acknowledged.

## References

1. Liu CF, Manning WG, Burgess JF, Jr., et al. Reliance on Veterans Affairs Outpatient Care by Medicare-eligible Veterans. *Med Care*. 2011 ;49(10):911–917. [PubMed: 21685810]
2. Breland JY, Phibbs CS, Hoggatt KJ, et al. The Obesity Epidemic in the Veterans Health Administration: Prevalence Among Key Populations of Women and Men Veterans. *J Gen Intern Med*. 2017;32(Suppl 1):11–17.
3. Kahwati L, Lance TX, Jones KR, Kinsinger LS. RE-AIM evaluation of the Veterans Health Administration's MOVE! Weight Management Program. *Translating Behavioral Medicine*. 2011;1:551–560.
4. Maciejewski ML, Yancy WS, Jr., Olsen M, et al. Demand for weight loss counseling after copayment elimination. *Prev Chronic Dis*. 2013;10:E49. [PubMed: 23557640]
5. Group TMOaOW. VA/DOD Clinical practice guidelines for screening and management of overweight and obesity. Version 2.0. Washington, DC: Department of Veteran Affairs, Department of Defense;2014.
6. Maciejewski ML, Shepherd-Banigan M, Raffa SD, Weidenbacher HJ. Systematic Review of Behavioral Weight Management Program MOVE! for Veterans. *Am J Prev Med*. 2018;54(5):704–714. [PubMed: 29550164]
7. Littman AJ, Damschroder LJ, Verchinina L, et al. National evaluation of obesity screening and treatment among veterans with and without mental health disorders. *Gen Hosp Psychiatry*. 2015;37(1):7–13. [PubMed: 25500194]

8. Del Re AC, Maciejewski ML, Harris AH. MOVE: weight management program across the Veterans Health Administration: patient- and facility-level predictors of utilization. *BMC Health Serv Res.* 2013;13:511. [PubMed: 24325730]
9. Arterburn DE, Olsen MK, Smith VA, et al. Association between bariatric surgery and long-term survival. *JAMA.* 2015;313(1):62–70. [PubMed: 25562267]
10. Maciejewski ML, Arterburn DE, Van Scoyoc L, et al. Bariatric Surgery and Long-term Durability of Weight Loss. *JAMA Surg.* 2016; 151(11): 1046–1055. [PubMed: 27579793]
11. Gunnar W Bariatric Surgery Provided by the Veterans Health Administration: Current State and a Look to the Future. *J Gen Intern Med.* 2017;32(Suppl 1):4–5. [PubMed: 28271421]
12. Reames BN, Birkmeyer NJ, Dimick JB, et al. Variation in the Care of Surgical Conditions: Obesity. White River Junction, NH: Dartmouth University; 9–16-2014 2014.
13. Ashton CM, Petersen NJ, Soucek J, et al. Geographic variations in utilization rates in Veterans Affairs hospitals and clinics. *N Engl J Med.* 1999;340(1):32–39. [PubMed: 9878643]
14. Finegan MS, Gao J, Pasquale D, Campbell J. Trends and geographic variation of potentially avoidable hospitalizations in the veterans health-care system. *Health services management research : an official journal of the Association of University Programs in Health Administration/ HSMC, AUPHA.* 2010;23(2):66–75.
15. Flegal KM, Kit BK, Orpana H, Graubard BI. Association of all-cause mortality with overweight and obesity using standard body mass index categories: a systematic review and meta-analysis. *JAMA.* 2013;309(1):71–82. [PubMed: 23280227]
16. Kent S, Fusco F, Gray A, Jebb SA, Cairns BJ, Mihaylova B. Body mass index and healthcare costs: a systematic literature review of individual participant data studies. *Obes Rev.* 2017;18(8):869–879. [PubMed: 28544197]
17. Arigo D, Funderburk J, Hooker S, et al. Veterans Health Administration’s MOVE! Weight Management Program: Primary Care Clinicians’ Perceptions of Program Implementation. *Mil Med.* 2015; 180(10): 1027–1033. [PubMed: 26444464]
18. Arigo D, Hooker S, Funderburk J, et al. Provider and staff perceptions of veterans’ attrition from a national primary care weight management program. *Prim Health Care Res Dev.* 2015;16(2):147–156. [PubMed: 24589352]
19. Jay M, Chintapalli S, Squires A, Mateo KF, Sherman SE, Kalet AL. Barriers and facilitators to providing primary care-based weight management services in a patient centered medical home for Veterans: a qualitative study. *BMC family practice.* 2015;16:167. [PubMed: 26572125]
20. Masheb RM, Chan SH, Raffa SD, et al. State of the art conference on weight management in VA: Policy and research recommendations for advancing behavioral interventions. *J Gen Intern Med.* 2017;32(Suppl 1):74–78. [PubMed: 28271431]
21. Damschroder LJ, Reardon CM, AuYoung M, et al. Implementation findings from a hybrid III implementation-effectiveness trial of the Diabetes Prevention Program (DPP) in the Veterans Health Administration (VHA). *Implement Sci.* 2017;12(1):94. [PubMed: 28747191]
22. obese CON-Rce. Report Card on Access to Obesity Treatment for Adults in Canada 2017 Edmonton, AB2017.
23. Ponce J, DeMaria EJ, Nguyen NT, Hutter M, Sudan R, Morton JM. American Society for Metabolic and Bariatric Surgery estimation of bariatric surgery procedures in 2015 and surgeon workforce in the United States. *Surg Obes Relat Dis.* 2016;12(9):1637–1639. [PubMed: 27692915]
24. Hales CM, Fryar CD, Carroll MD, Freedman DS, Ogden CL. Trends in Obesity and Severe Obesity Prevalence in US Youth and Adults by Sex and Age, 2007–2008 to 2015–2016. *JAMA.* 2018;319(16): 1723–1725. [PubMed: 29570750]
25. Funk LM, Jolles S, Fischer LE, Voils CI. Patient and Referring Practitioner Characteristics Associated With the Likelihood of Undergoing Bariatric Surgery: A Systematic Review. *JAMA Surg.* 2015;150(10):999–1005. [PubMed: 26222655]
26. Funk LM, Jolles SA, Greenberg CC, et al. Primary care physician decision making regarding severe obesity treatment and bariatric surgery: a qualitative study. *Surg Obes Relat Dis.* 2016;12(4):893–901. [PubMed: 26948943]



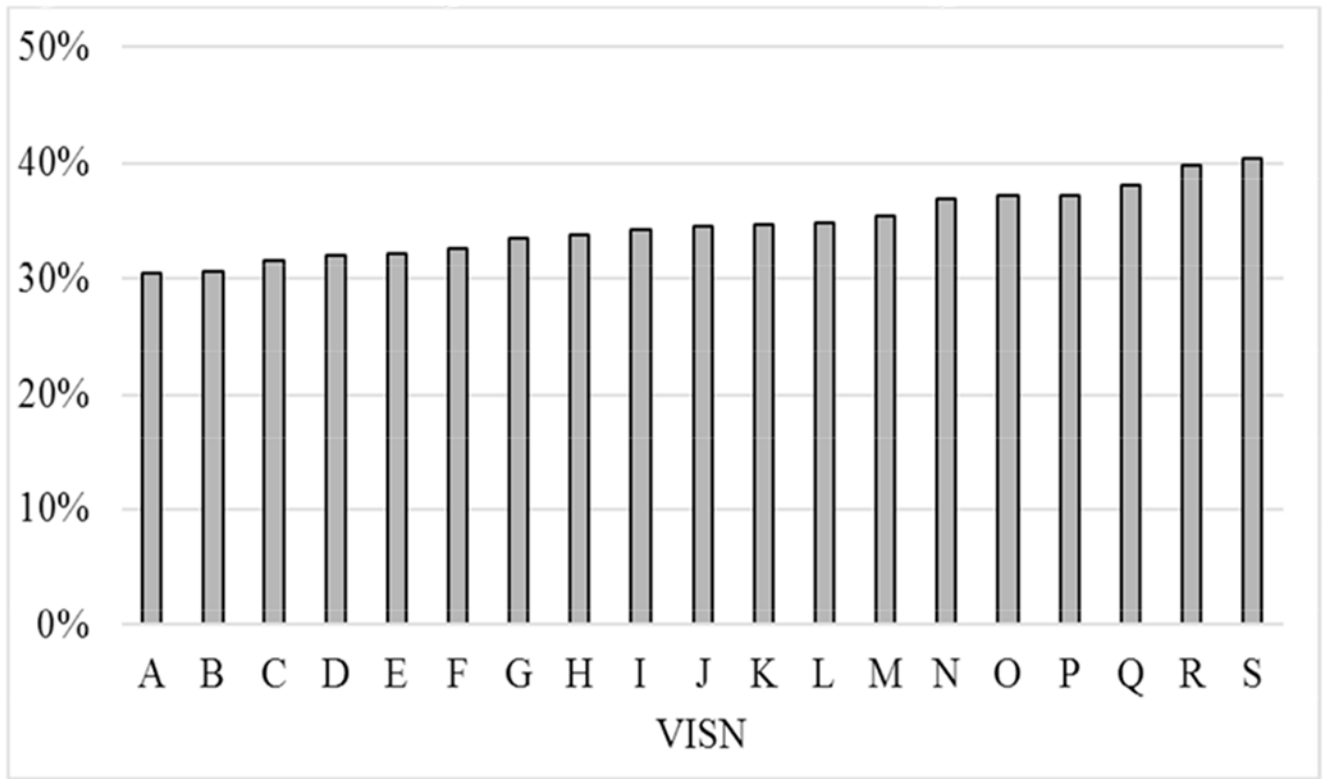
27. Flegal KM, Kruszon-Moran D, Carroll MD, Fryar CD, Ogden CL. Trends in Obesity Among Adults in the United States, 2005 to 2014. *JAMA*. 2016;315(21):2284–2291. [PubMed: 27272580]
28. Raffa SD, Maciejewski ML, Zimmerman LE, et al. A System-Level Approach to Overweight and Obesity in the Veterans Health Administration. *J Gen Intern Med*. 2017;32(Suppl 1):79–82. [PubMed: 28271428]
29. Macht R, Rosen A, Horn G, Carmine B, Hess D. An Exploration of System-Level Factors and the Geographic Variation in Bariatric Surgery Utilization. *Obes Surg*. 2016;26(7):1635–1638. [PubMed: 27034061]
30. Wennberg JE. Unwarranted variations in healthcare delivery: implications for academic medical centres. *BMJ*. 2002;325(7370):961–964. [PubMed: 12399352]
31. Arterburn DE, Courcoulas AP. Bariatric surgery for obesity and metabolic conditions in adults. *BMJ*. 2014;349:g3961. [PubMed: 25164369]
32. Weinstein JN, Clay K, Morgan TS. Informed patient choice: patient-centered valuing of surgical risks and benefits. *Health Aff (Millwood)*. 2007;26(3):726–730. [PubMed: 17485750]

**What is already known about this subject?**

- In 2014, 37% of Veterans were overweight and 41% were obese
- Population-based behavioral weight management was implemented in VA beginning in 2006

**What does this study add?**

- Demonstrates significant geographic variation in the prevalence of obesity, participation in behavioral weight management and receipt of bariatric surgery
- Access to population-based approaches to weight loss vary, especially access to bariatric surgery



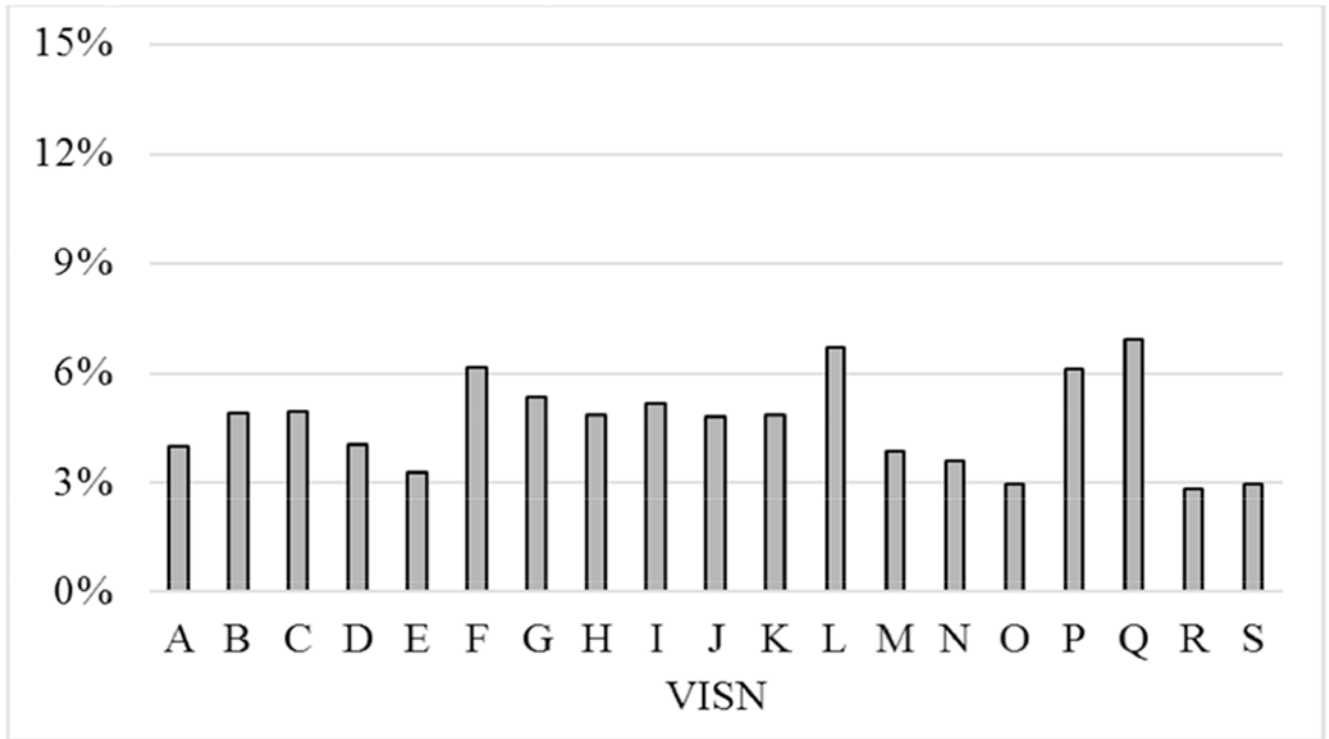
**Figure 1. Prevalence of Obesity in Active VA Users in FY2016, by VISN**  
 Note: BMI = body mass index, VA = Veterans Health Administration, VISN = Veterans Integrated Service Network

Author Manuscript

Author Manuscript

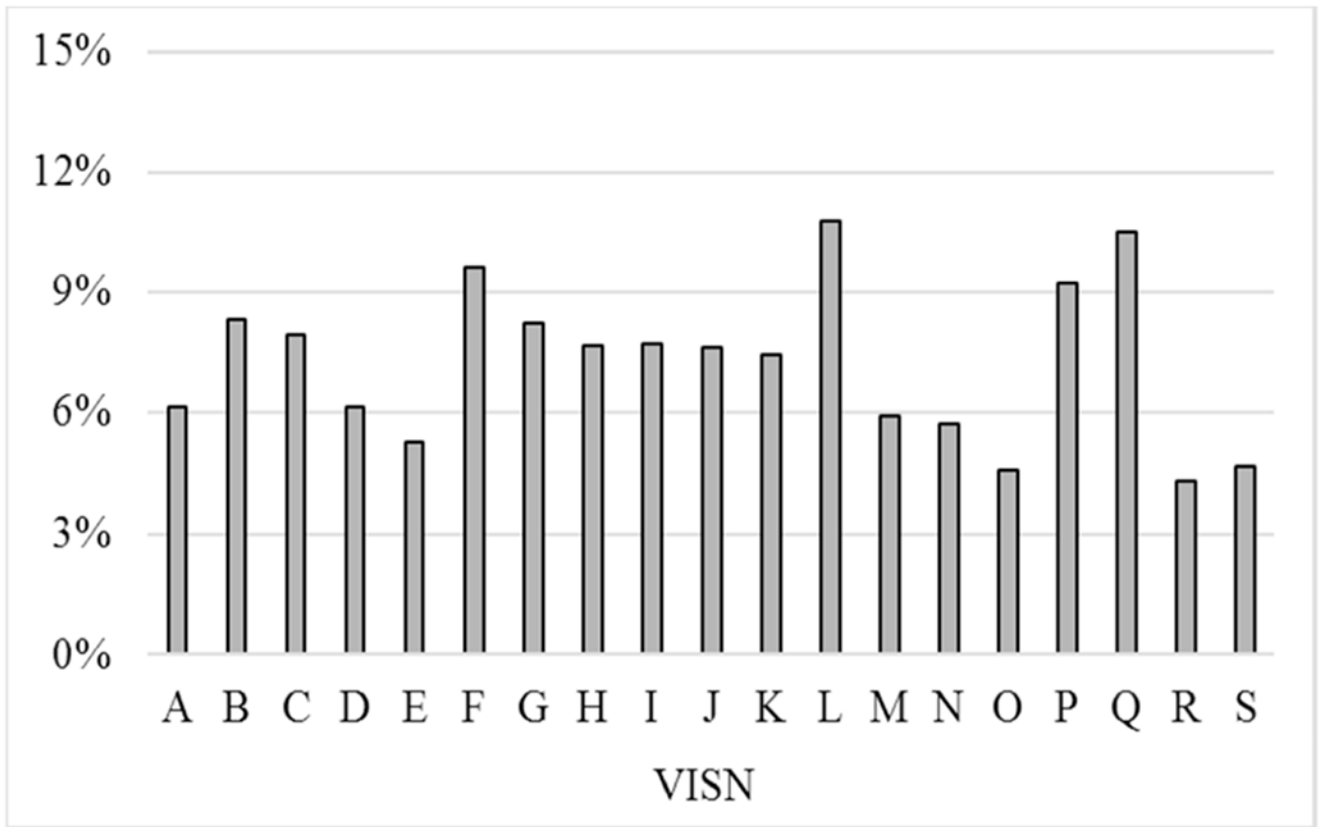
Author Manuscript

Author Manuscript

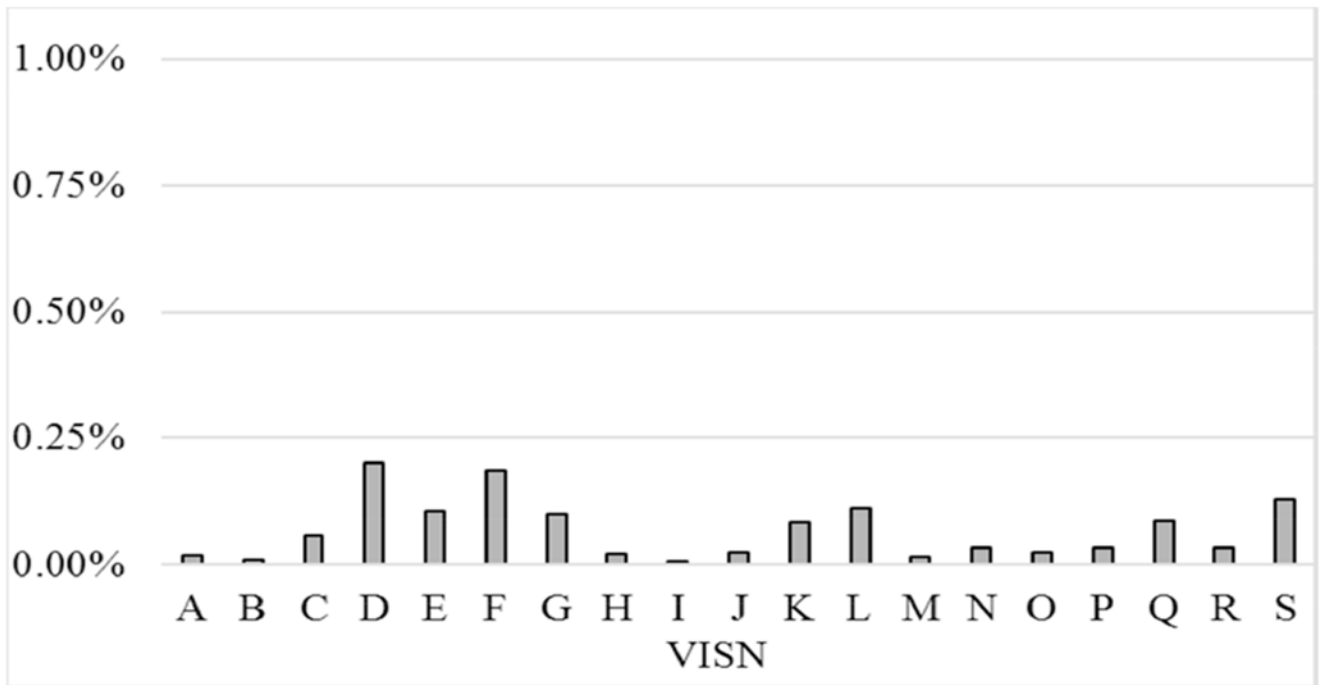


**Figure 2. Proportion of Active VA Users with Class I Obesity (BMI 30-34.9) who Participated in MOVE! in FY2016, by VISN**

Note: BMI = body mass index, VA = Veterans Health Administration, VISN = Veterans Integrated Service Network



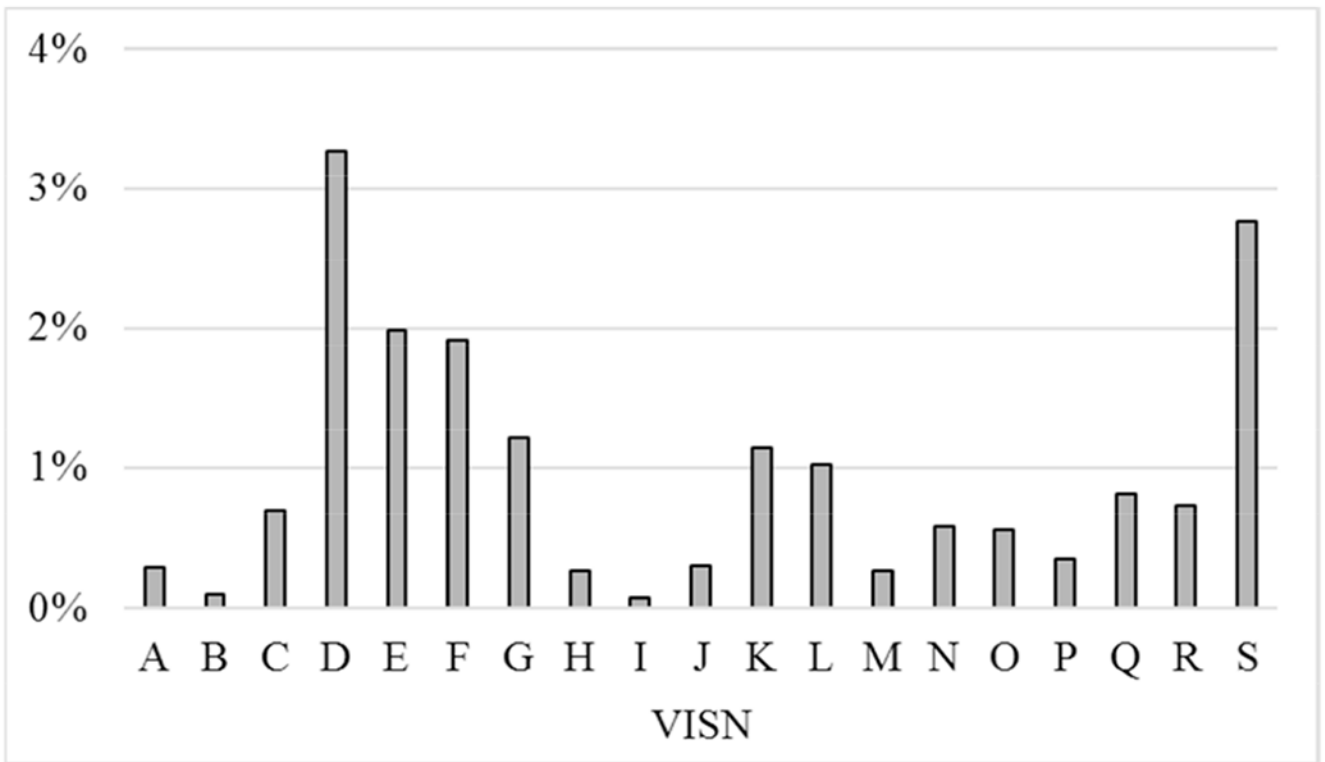
**Figure 3. Proportion of Active VA Users with Class II or III Obesity (BMI ≥ 35) who Participated in MOVE! in FY2016, by VISN**  
 Note: BMI = body mass index, VA =Veterans Health Administration, VISN = Veterans Integrated Service Network



**Figure 4. Proportion of Veterans with BMI 35 who Received Bariatric Surgery in FY2016, by VISN**

Note: BMI = body mass index, VISN = Veterans Integrated Service Network





**Figure 5. Proportion of Veterans with BMI ≥ 35 who Participated in MOVE! and Received Bariatric Surgery in FY2016, by VISN**

Note: BMI = body mass index, VISN = Veterans Integrated Service Network

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript