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Does Community Outsourcing Improve Timeliness of Care for Veterans With Obstructive Sleep Apnea?

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Background: Providing timely access to care has been a longstanding priority for the Veterans Affairs Healthcare System. Recent strategies to reduce long wait times have focused on purchasing community care by a fee-for-service model. Whether outsourcing Veterans Affairs (VA) specialty care to the community improves access is unclear.

Objectives: We compared time from referral to treatment among Veterans whose care was provided by VA versus community care purchased by the VA, using obstructive sleep apnea as an example condition.

Methods: This was a retrospective cohort study of Northern California Veterans seeking sleep apnea care through the San Francisco VA Healthcare System between 2012 and 2018. We used multivariable linear regression with propensity score matching to investigate the relationship between time to care delivery and care setting (VA provided vs. VA-purchased community care). A total of 1347 Northern California Veterans who completed sleep apnea testing

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within the VA and 88 Veterans who completed sleep apnea testing in the community had complete data for analysis.

Results: Among Northern California Veterans with obstructive sleep apnea, outsourcing of care to the community was associated with longer time from referral to therapy (mean \pm SD, 129.6 \pm 82.8 d with VA care vs. 252.0 \pm 158.8 d with community care, *P* < 0.001) and greater loss to follow-up.

Conclusions: These findings suggest that purchasing community care may lead to care fragmentation and not improve wait times nor improve access to subspecialty care for Veterans.

Key Words: Veterans, access to care, health care delivery, health policy

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he Veterans Affairs (VA) Healthcare System is the largest integrated health care system in the United States. It is currently comprised of 170 VA hospitals and more than 1000 outpatient clinics, which together serve over 9 million Veterans each year, approximately one third of whom live in rural areas.^{1–3} Providing timely care to a large and geographically dispersed population can be challenging. To meet the needs of Veterans, the VA has a long-standing history of purchasing health care services from academic affiliates and community providers through a feefor-service reimbursement model. Until recently, this model was known as Fee Basis Care.⁴ However, in 2014, issues with access to care were brought to the forefront due to reports of long wait times and alleged patient deaths in the VA.⁵ In response to these concerns, Congress passed the Veterans Access, Choice and Accountability Act, which funded the Choice Program, a new initiative that expanded the eligibility criteria for community care services.^{6,7} The Choice Program marked a fundamental shift in national policy for outsourcing of Veterans' care. Under Fee Basis care, subspecialty services were purchased from the community when they could not be provided by the VA. Often, distance barriers were taken into consideration when outsourcing care. With implementation of the Choice Program, Veterans were clearly authorized to seek care from a community provider if a nearby VA facility could not provide the necessary service within 30 days ("wait time eligible") or if patients lived more than 40 miles ("mileage eligible") from a VA facility that could provide the service. Between November 2014 and January 2017, ~1.5 million

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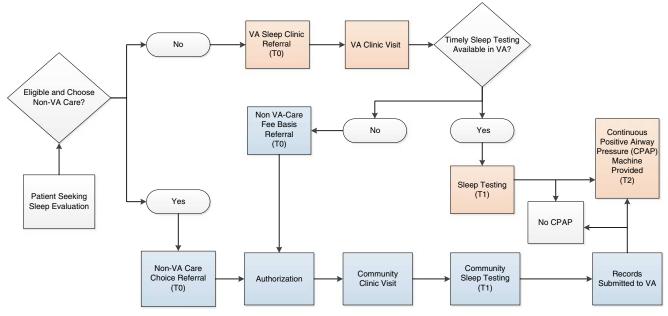


FIGURE 1. Sleep apnea care delivery process map. All Veterans completed sleep apnea evaluation through either Veterans Affairs (VA) Care or authorized non-VA Care (Fee Basis or Choice). The care delivery pathways are outlined above. Orange boxes represent VA Care and blue boxes represent non-VA Care. Three time points of interest are highlighted: sleep clinic referral date (T0), sleep apnea testing date (T1), and continuous positive airway pressure (CPAP) machine provision date (T2) in each care delivery arm. Of note, Veterans who were referred to Fee Basis Care were initially triaged through the VA Sleep Clinic. However, for this analysis, T0 for Fee Basis pathway is defined as the date of Fee Basis referral.

Veterans received care through the Veterans Choice Program representing 17% of all VA users. 8

Whether outsourcing care to the community improves timely care remains unclear. Using obstructive sleep apnea (OSA) as an example, we compared time from referral to treatment among patients whose care was provided by VA versus purchased by VA through the Fee Basis and Choice Programs.

OSA is one of the most common chronic medical conditions among Veterans and has historically been associated with long wait times due to the limited availability of sleep care specialists.^{9,10} When left untreated, OSA can lead to adverse cardiovascular and cerebrovascular outcomes. A continuous positive airway pressure (CPAP) machine is the primary therapy prescribed for patients with OSA. To expedite therapy, Veterans sleep care is frequently outsourced to the community (Fig. 1). We sought to evaluate differences in time from referral to therapy (1) between VA provided and VA-purchased (community) care; and (2) between 2 programs for VA-purchased community care: Fee Basis Care and Choice.

METHODS

Activities undertaken in this study were part of a quality improvement project and did not constitute research, in whole or in part, so in compliance with Veterans Affairs Program Guide 1200.21, a quality improvement waiver was granted.

Data Source and Study Population

The San Francisco VA Health Care System provides services to Veterans through the San Francisco VA Medical

Center and 6 community-based outpatient clinics in Santa Rosa, Eureka, Ukiah, Clearlake, San Bruno, and downtown San Francisco. Together, this network serves a catchment of ~35,000 Northern California Veterans. All Veterans who completed sleep apnea testing either through the San Francisco VA Healthcare System or through authorized community care (Fee Basis Care or Choice) between fiscal year 2013-2018 (October 1, 2012 through September 30, 2018) were included in this study. VA administrative and claims data were used to identify 3 time points of interest: sleep medicine referral date, sleep apnea testing date, and CPAP provision date in 2 care delivery arms: VA ("in-house") care and community (Fee Basis or Choice) care. Sleep studies were identified by CPT codes (95800, 95801, 95805, 95806, 95807, 95810, 95811, G0398, G0399, G0400), CPAP provision dates were identified by HCPCS (E0452, E0470, E0471, E0472, E0601, VA123), and sleep consults were identified by a VA sleep-specific stop code 349 associated with sleep medicine consults. Review of electronic health records was completed for all outsourced care patients and a sample of 5% of VA patients by one of the authors (B.K.) familiar with the VA electronic health record system to verify the accuracy of data extraction. The data extraction algorithm was accurate for VA care patients; however, for outsourced care patients, the algorithm inconsistently identified sleep medicine referral dates due to missing VA sleep-specific stop codes associated with community care sleep referrals. Thus, manual chart review was used as the gold standard to identify the time points of referral, sleep study, and CPAP provision for the community care group.

Demographic information including age, race, ethnicity, rurality,¹¹ driving distance to nearest VA primary care, and comorbidities was obtained from electronic health records. ICD-9 and ICD-10 comorbidity codes were used to calculate a Charlson Comorbidity Score.^{12,13} A patient was assumed to have the disease if the code appeared during the year they underwent sleep testing or any year prior, dating back to a 2-year lookback period.

Time to care delivery was defined by 3 time points: (T0) sleep apnea referral date, (T1) sleep apnea testing date, and (T2) CPAP provision date. The primary endpoint of interest was time from referral to CPAP provision (T0 to T2). Secondary endpoints of interest were: (1) time from referral to sleep testing (T0 to T1); and (2) time from sleep testing to CPAP (T1 to T2). Patients with a complete $T0 \rightarrow T1 \rightarrow T2$ (referral \rightarrow testing \rightarrow CPAP) sequence within a 22-month time span were included in time to treatment analysis (Fig. 1). An upper limit of 22 months was set to ensure uniform observation time between VA and non-VA care. Patients with missing demographic information were excluded from the analysis (see Figure, Supplemental Digital Content 1, http://links.lww.com/MLR/C163) because they could not be matched on these variables.

For patients who did not receive CPAP, we performed chart review of a 5% random sample (65 patients) who received care within VA and all patients referred to community care. The reason for absence of CPAP was documented in the electronic health records for VA care patients but could not be consistently ascertained for community care patients. Thus, we conducted unstructured qualitative telephone interviews with the community care patients who did not received a CPAP. Patients were asked to confirm (1) that they had completed sleep apnea testing through community care, (2) received the test results, and (3) received a CPAP. Responses to the questions were coded into the following categories: (1) negative community sleep apnea test, (2) positive sleep apnea test but received no follow-up, (3) did not receive results of community sleep apnea test, and (4) declined CPAP based on personal preference (see Figure, Supplemental Digital Content 1, http://links.lww.com/MLR/C163).

Statistical Analysis

T tests were used to compare mean time to care delivery (T0 to T1, T1 to T2, and T0 to T2) between (1) VA care versus community care and (2) Fee Basis versus Choice. This comparison was done first with the 1347 patients in the VA care cohort and again with a subset of the VA care cohort matched to community care in a 2:1 ratio using propensity score matching. We used 2:1 matching to optimize power in the analysis while still comparing similar groups of patients as there were more patients in the VA care cohort than community care. Matching was performed with R Matchit package.^{14,15} Propensity scores were calculated by logistic regression models including age at testing, race/ethnicity, rurality, fiscal year, driving distance to closest VA primary care site, and Charlson Comorbidity Score.^{12,13} These variables were selected to control for potential confounders and reduce bias by comparing similar groups of patients. In addition to propensity matching, we conducted a sensitivity

analysis using Coarsened Exact Matching¹⁶ and there were no differences in results using the alternative matching algorithm. Postmatching diagnostics (graphical and numeric) indicated good balance of the chosen demographics. Ordinary least squares multivariable linear regression was used to investigate the relationship between time to care delivery (T0 to T2) and care setting (VA or community care), adjusting for age, race, rurality, and Charlson Comorbidity Score. The interaction between care setting and rurality was examined and found to be significant (P = 0.024). However, because there were only 8 urban patients who had received community care, we reported a sensitivity analysis restricted to rural patients rather than the interaction model. Owing to heteroscedasticity of the errors in the models, we applied the MacKinnon and White robust HC1 estimator to the SEs.¹⁷ Robust SEs were estimated using the lmtest package and all analyses were performed using R version 3.6.1.^{18,19}

RESULTS

Patient Characteristics

Veterans Affairs Versus Community Care

Between October 2012 and September 2018, 1347 Northern California Veterans who completed sleep apnea testing within the VA and 88 Veterans who completed sleep apnea testing in the community had complete data for analysis. Baseline characteristics, including age at testing, ethnicity, and Charlson Comorbidity Scores, were similar between groups (Tables 1, 2). However, there was a significant difference in race, rurality, and driving distance to closest VA primary care site between the VA and community care cohorts. More Veterans who received sleep apnea care within the VA identified as either Black/African American (11.2%) or Asian/Pacific Islander (12.2%) compared with those who had received community care. Veterans whose care was outsourced were more likely to live in rural areas (89.2% with Fee Basis Care, 92.2% with Choice vs. 29.0% rural with VA care, P < 0.001).

Fee Basis Care Versus Choice

The fiscal year trends noted in Table 1 highlight the shift from Fee Basis Care to Choice after 2015. Veterans receiving care through Choice were on average slightly older than Veterans who had received care through Fee Basis. Veterans receiving care through Choice had a lower Charlson Comorbidity Score than the Fee Basis Care cohort. However, there was no difference in race, ethnicity, rurality, or driving distance to closest VA primary care site.

Time to Care Delivery

Veterans Affairs Versus Community Care

Outsourcing of care led to significantly delays in CPAP therapy initiation (Table 3). The mean time from referral to CPAP (T0 to T2) was shorter with VA care (mean \pm SD, 134.2 \pm 102.1 d) compared with community care (252.0 \pm 158.8 d). Furthermore, both the mean time from referral to sleep testing (T0 to T1) and testing to CPAP (T1 to T2) was shorter with VA care than community care. The median time from referral to CPAP and interquartile range

		Community Care				
Demographics	VA Care, N = 1347	Fee Basis, $N = 37$ Choice, $N = 51$		VA vs. Community, P	Fee Basis vs. Choice, P	
Mean age (SD)	58.7 (14.5)	57.9 (13.0)	64.3 (9.6)	0.07	0.01	
Fiscal year (column %)				< 0.001	< 0.001	
FY 13	164 (12.2)	1 (2.7)	0 (0.0)			
FY 14	194 (14.4)	8 (21.6)	0 (0.0)			
FY 15	227 (16.9)	23 (62.2)	0 (0.0)			
FY 16	234 (17.4)	4 (10.8)	8 (15.7)			
FY 17	258 (19.2)	0 (0.0)	29 (56.9)			
FY 18	270 (20.0)	1 (2.7)	14 (27.5)			
Race (column %)				< 0.001	0.70	
White	857 (63.6)	29 (78.4)	39 (76.5)			
Black or African American	151 (11.2)	1 (2.7)	1 (2.0)			
Asian or Pacific Islander	165 (12.2)	1 (2.7)	0 (0.0)			
American Indian	20 (1.5)	2 (5.4)	2 (3.9)			
Unknown	154 (11.4)	4 (10.8)	9 (17.6)			
Ethnicity (column %)				0.93	0.66	
Hispanic or Latino	119 (8.8)	4 (10.8)	3 (5.9)			
Not Hispanic or Latino	1228 (91.2)	33 (89.2)	48 (94.1)			
Rurality (column %)				< 0.001	0.92	
Urban	956 (71.0)	4 (10.8)	4 (7.8)			
Rural	391 (29.0)	33 (89.2)	47 (92.2)			
Mean driving distance (SD)*	11.7 (13.0)	17.7 (17.8)	17.5 (17.8)	< 0.001	0.96	
Mean Charlson Score (SD)	1.6 (2.2)	2.2 (2.6)	1.3 (1.5)	0.94	0.04	

TABLE 1. Patient	Demographics	VA Versus	Community	/ Care	(No Matching)
	Demographics	W/ WCIJUJ	Community	Curc	

P-values are from *t* tests for quantitative measures and χ^2 tests for categorical measures.

*Mean drive distance in miles from nearest VA primary care cite.

VA indicates Veterans Affairs.

were also shorter with VA Care compared with non-VA community care (median [interquartile range]: 112 [86] d in VA care and 195 [229] d in non-VA care). Similar results hold for both the original VA cohort and the smaller matched VA cohort. After adjusting for age, race, rurality, and Charlson Comorbidity Score, the mean time from referral to CPAP (T0 to T2) was on average 125.0 days [95% confidence interval (95% CI), 89.6–160.4; P < 0.001] longer with community care compared with VA care. The difference in time to treatment between VA care and community care was more pronounced among urban patients than rural patients (Fig. 2). When restricting to rural patients only, time from referral to treatment (T0 to T2) was on average 102.4 days (95% CI, 65.3–139.5 d) longer in community care than VA settings (P < 0.001).

Fee Basis Care Versus Choice

Time from referral to CPAP (T0 to T2) improved with the implementation of Choice. Average time from referral to CPAP was 308.2 ± 166.1 days with Fee Basis and 211.1 ± 141.3 days with Choice (P=0.004, Table 3). This improvement was driven by a reduction in time from referral to sleep testing (T0 to T1) that offset an increase in time from sleep testing to CPAP. After adjustment for age, race, rurality, and Charlson Score, time from referral to treatment was on average 95.0 days (95% CI, 21.9–168.1 d) shorter with Choice care than with Fee Basis care (P=0.01).

Loss to Follow-up

A total of 866 patients (36%) who had completed testing within the VA and 60 patients (49%) who had

completed testing through Choice did not receive a CPAP. VA care patients were not provided a CPAP if the patient (1) had a negative sleep apnea, (2) preferred to try alternative therapies such as lateral sleep, mandibular advancement device or surgery, or (3) declined CPAP and further sleep apnea treatment. In contrast, among patients whose care had been outsourced through Choice, nearly 40% of those who had not received a CPAP reported either lack of follow-up for a positive sleep study or had not received the results of their community sleep study (see Figure, Supplemental Digital Content 1, http://links.lww.com/MLR/C163).

DISCUSSION

The primary aim of this study was to use sleep apnea as an example case to compare time from referral to treatment among Veterans receiving care provided by VA versus community outsourcing of care. We evaluated differences in time from referral to therapy between (1) VA provided and VA-purchased (community) care and (2) between Fee Basis Care and Choice. We found that among Northern California Veterans, outsourcing of sleep apnea care led to significant delays in initiation of CPAP therapy. Compared with VA care, Veterans who received community care initially through Fee Basis and then subsequently through Choice experienced longer wait times both from initial referral to sleep apnea testing as well as from testing to provision of CPAP therapy. These delays were more pronounced among urban Veterans. Although the implementation of the Choice Program improved time from referral to testing compared with the previous Fee Basis Care model, the overall time to therapy remained longer with Choice care compared with VA care. In

Does	Community	^v Outsourcing	Improve	Timeliness

Demographics	VA Care, N = 176	Community Care (Fee Basis & Choice), N = 88	Р
Mean age (SD)	59.6 (14.1)	61.6 (11.5)	0.26
Fiscal year (column %)			0.69
FY 13	0 (0.0)	1 (1.1)	
FY 14	16 (9.1)	8 (9.1)	
FY 15	49 (27.8)	23 (26.1)	
FY 16	20 (11.4)	12 (13.6)	
FY 17	53 (30.1)	29 (33.0)	
FY 18	38 (21.6)	15 (17.0)	
Race (column %)			0.78
White	145 (82.4)	68 (77.3)	
Black or African	3 (1.7)	2 (2.3)	
American			
Asian or Pacific Islander	3 (1.7)	1 (1.1)	
American Indian	4 (2.3)	4 (4.5)	
Unknown	21 (11.9)	13 (14.8)	
Ethnicity (column %)			0.66
Hispanic or Latino	10 (5.7)	7 (8.0)	
Not Hispanic or Latino	166 (94.3)	81 (92.0)	
Rurality (column %)			0.94
Urban	18 (10.2)	8 (9.1)	
Rural	158 (89.8)	80 (90.9)	
Mean driving distance (SD)	15.5 (13.0)	17.5 (17.7)	0.29
Mean Charlson Score (SD)	1.4 (2.0)	1.7 (2.1)	0.38

TABLE 2. Patient Demographics	VA Versus Community Care
(After Matching)	

P-values are from *t* tests for quantitative measures and χ^2 tests for categorical measures. VA care data were matched to community care (Fee Basis or Choice) data in a 2:1 ratio. Matching was based on age at testing, fiscal year, race/ethnicity, rurality, driving distance from nearest VA primary care site (in miles), and Charlson Comorbidity Score.

VA indicates Veterans Affairs.

addition, patients who received care through Choice were less likely to receive a CPAP machine for treatment of sleep apnea and more likely to be lost to follow-up.

Prior studies have evaluated new interventions to improve Veterans' access to care. These interventions have included implementation of electronic consults, expansion of telemedicine, and mental health-primary care integration and have generally been associated with improvements in VA wait times.^{20–24} However, very few studies have directly compared wait times between VA care and VA-purchased (community) care. This study is among the first to examine the direct impact of purchased care on timeliness of subspecialty care delivery. Recent studies have begun to examine the financial implications of purchasing non-VA care. For sleep apnea, outsourcing of care represents a \$8831 greater cost per 100 Veterans referred through Fee Basis and a \$15,814 greater cost per 100 Veterans referred through Choice compared with care delivered by VA providers.²⁵ These estimates likely underestimate the actual differences as VA care typically costs less than Medicare rates and the purchased care estimates do not include care coordination costs.²⁶ Further work that examines the impact of personnel, equipment, and care coordination costs will help us better understand the financial implications of outsourcing of subspecialty care.

We suspect that the key findings in this study—longer time from referral to treatment, greater care fragmentation, and more loss to follow-up with community care-are partially attributable to (1) the limited availability of specialists in the community and (2) the disintegration of VA's integrated health care system when care is outsourced. Improving access by outsourcing subspecialty care relies on the assumption that wait times are shorter in the private sector. Recent information suggests that this is not the case²⁷—while wait times have steadily decreased in the VA, they have remained stagnant in the community.²² Thus, urban Veterans may have experienced long wait times due to limited community sleep specialist availability. In addition, many Veterans enrolled in VA live in health professional shortage areas. The maldistribution of health services, especially subspecialty care, a cross the United States poses a challenge as outsourcing alone is an insufficient solution to improve access.²⁸ Lastly, the VA's electronic health record system facilitates continuity between inpatient and outpatient encounters and between primary care and subspecialty care. When care is outsourced, information exchange is often incomplete, continuity is disrupted, and care becomes fragmented. The responsibility of care coordination inadvertently shifts from the system to the patient. We suspect that the disintegration of an integrated health care system contributed to the longer wait times noted with community care.

However, the implementation of the Choice program did improve time from referral to treatment compared with the previous Fee Basis Care model. This improvement was driven by a shorter time from referral to sleep study. As part of the implementation of the Choice Program, the VA established the Office of Community Care which oversees the

- Mean (SD)	VA		Community Care		Р	
	Unmatched, N = 1347	Matched, N = 176	Fee Basis, N = 37	Choice, $N = 51$	VA (Matched) vs. Community Care	Fee Basis vs. Choice
Referral to sleep study (T0 to T1)	105.0 (77.3)	105.2 (62.2)	234.8 (147.7)	97.2 (76.3)	< 0.001	< 0.001
Sleep study to CPAP (T1 to T2)	29.2 (71.1)	24.4 (59.2)	73.4 (71.0)	113.9 (123.3)	< 0.001	0.077
Referral to CPAP (T0 to T2)	134.2 (102.1)	129.6 (82.8)	308.2 (166.1)	211.1 (141.3)	< 0.001	0.004

P-values are from *t* tests.

CPAP indicates continuous positive airway pressure; VA, Veterans Affairs.

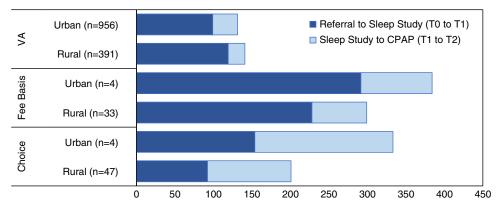


FIGURE 2. Mean time to treatment: urban versus rural Veterans. CPAP indicates continuous positive airway pressure.

delivery operations that allow Veterans to receive care and services through providers outside the VA. In addition, third party contractors were hired to facilitate the scheduling of community care appointments for Veterans, which improved care coordination. We suspect that the improvement in time from referral to sleep study (T0 to T2) between Fee Basis and Choice is at least partially attributable to this policy. Yet, implementation of Choice also inadvertently increased time from sleep study to CPAP therapy (T1 to T2). We hypothesize that this increased time interval was due to a change in workflow (Fig. 1). With Fee Basis Care, Northern California Veterans were first seen by a specialist within the VA, which facilitated continuity even when sleep testing was outsourced. With Choice, patients were sent directly to community providers, often bypassing VA subspecialty care services. By bypassing VA specialty providers, the Choice program may have unintentionally further increased subspecialty care fragmentation. Care fragmentation has been a significant source of frustration reported by both patients and providers alike.²⁹⁻³² Future interventions will need to better facilitate communication and care coordination between VA providers and community subspecialists when care must be outsourced.

Limitations

This study has a few limitations. First, the study population was restricted to Northern California Veterans seeking care through the San Francisco VA Healthcare System. The workflows outlined in this study are specific to this health care system. Further work is needed to replicate these findings on a national level. Second, we use sleep apnea as a disease model to study the subspecialty care delivery process because of the clear time points of referral, diagnosis, and treatment in this medical condition. The results may not be generalizable to all diseases. Third, the small number of urban Veterans who used community care in this study limits the inference that can be drawn regarding outsourced care wait times among the urban population. Lastly, it is conceivable that outsourcing of sleep apnea care led to improvements in VA wait times. Although this outcome is a possibility, given the large difference in wait times noted between VA and non-VA care and the increasing volume of sleep studies completed annually within the VA over this time period, we suspect that outsourcing of care had only a minor, if any, impact on VA wait times.

CONCLUSIONS AND FUTURE DIRECTIONS

These findings have important implications for the VA in light of the new Maintaining Internal Systems and Strengthening Integrated Outside Networks (MISSION) Act, which was signed into law on June 8, 2018.³³ Under the MISSION Act, the eligibility criteria for community care has again expanded. Veterans who are unable to obtain a subspecialty appointment in under 28 days or have > 60-minute drive time to the VA are eligible for community care. However, it remains to be seen whether these new benchmarks will result in improved access to care. We suspect that for sleep apnea, they may not.

This study helps to inform the fundamental question at the heart of VA health care reform-in order to improve access to care, should the VA invest in building and expanding services internally ("make model") or focus on outsourcing care to the private sector ("buy model"). For care that is outsourced, how can the VA still guarantee timely and cost-effective care? We recommend that future studies evaluate the implications of outsourcing of care across 4 domains: (1) timeliness of care delivery, (2) patient and provider satisfaction, (3) cost effectiveness and economic impact, which should include assessment of care coordination costs, and (4) health care quality and outcomes. Targeted evaluations across these domains will better inform future policies on how best to invest resources to improve access to subspecialty care. We envision that the optimal solution will include a combination of building and expanding services internally ("make model") and outsourcing care to the private sector ("buy model"). Complex subspecialty care that requires longitudinal follow-up and significant care coordination may be better managed within an integrated health care system while single encounters that do not require substantial follow-up can more easily be outsourced. Lastly, given issues with wait times in the private sector, the 28-day wait time eligibility mandated by the MISSION Act may not lead to improved access, especially among Veterans living in urban settings. We suggest that local VA Medical Centers be empowered to facilitate shared decision making between patients and subspecialty providers who will be best equipped with the local knowledge required to make informed decisions regarding optimal care.

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