

Facility-Level Conditions Leading to Higher Reach: A Configurational Analysis of National VA Weight Management Programming

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Abstract

Background: While the Veterans Health Administration (VHA) MOVE! weight management program is effective in helping patients lose weight and is available at every VHA medical center across the United States, reaching patients to engage them in treatment remains a challenge. Facility-based MOVE! programs vary in structures, processes of programming and levels of reach, with no single factor explaining variation in reach. Configurational analysis, based on Boolean algebra and set theory, represents a mathematical approach to data analysis well-suited for discerning how conditions interact and identifying multiple pathways leading to the same outcome. We applied configurational analysis to identify facility-level obesity treatment program arrangements that directly link to higher reach.

Methods: A national survey was fielded in March 2017 to elicit information about more than 75 different components of obesity treatment programs in all VHA medical centers. This survey data was linked to facility-level reach scores available through administrative data. Reach scores were calculated by dividing the total number of Veterans who are candidates for obesity treatment by the number of “new” MOVE! visits in 2017 for each program and then multiplied by 1000. Programs with the top 40% highest reach scores (n=50) were compared to those in the lowest 40% (n=50). Configurational analysis was applied to identify specific combinations of conditions linked to reach rates.

Results: 125 MOVE! program representatives responded to the survey and had complete reach data. The final solution consisted of 5 distinct pathways comprising combinations of program components related to pharmacotherapy, bariatric surgery, and comprehensive lifestyle intervention; 3 of the 5 pathways depended on the size/complexity of medical center. The 5 pathways explained 78% (39/50) of the facilities in the higher-reach group with 87% consistency (39/45).

Conclusions: Specific combinations of facility-level conditions identified through configurational analysis uniquely distinguished facilities with higher reach from those with lower reach. Solutions demonstrated the importance of local context plus specific program components link together to account for a key implementation outcome. These findings will guide system recommendations about optimal program structures to maximize reach to patients who would benefit from obesity treatment such as the MOVE! program.

Background

Obesity poses a major challenge to healthcare systems, including the Veterans Health Administration (VHA) [1, 2]. Obesity is a well-established risk factor associated with increased morbidity in diabetes and hypertension in particular as well as increased mortality overall [3, 4]. Behavioral weight loss programs, pharmacotherapies, and bariatric surgery are effective treatments for obesity [5].

Recent estimates of the prevalence of obesity among Veterans receiving care in VHA are over 40%.[1] Like many large health systems seeking to address the obesity epidemic, the Veterans Health Administration (VHA) healthcare system offers several evidence-based weight management options for patients,

including a system-wide comprehensive lifestyle intervention (CLI) program, pharmacotherapies, and bariatric surgery. [2] Of these, the MOVE! Weight Management Program, the VHA CLI program, was by far the most commonly available: on average, more than 100,000 Veterans participated annually in MOVE!, compared to about 2500 Veterans receiving weight loss medications and a few hundred Veterans who undergo bariatric surgery [2, 6]. For any treatment program to have meaningful population-level impact, programs must successfully reach patients to engage them in treatment.[7] Overall reach to patients who would benefit from obesity treatment in VHA remains suboptimal, as is the case with most health systems.[8, 9]

The aim of this study was to identify characteristics of medical center-based obesity treatment program arrangements that lead to higher reach to patients who would benefit from obesity treatment. This program evaluation qualified as non-research quality improvement activity conducted under the authority of VHA operations, as it was designed and implemented for internal VHA purposes and not designed to produce information to expand the knowledge base of a scientific discipline. In response to the designation of broad categories of activities as non-research in the *Federal Policy for the Protection of Human Subjects (Common Rule) in Title 38 Code of Federal Regulations Part 16 (38 CFR 16.102(l))* published January 19, 2017, the VHA enacted new policies and guidelines for determining non-research activities within VHA. In accordance with these VHA policies and guidelines, this program evaluation was documented as a non-research activity by the Chief Consultant for Preventive Medicine in the VHA National Center for Health Promotion and Disease Prevention on May 29, 2018, an official within VHA expressly authorized to deem projects as non-research activities where formal ethics approval is not required, as defined per *VHA Handbook 1058.05* in the section “Officials Authorized to Provide Documentation of VHA Program Office Non-Research Operations Activities” and later updated in section 5a of the *VHA Program Guide 1200.21*. All authors attest that this program evaluation was part of non-research activity funded by – and conducted under the authority of – the operational jurisdiction of the VHA National Center for Health Promotion and Disease Prevention. This secondary analysis used facility-level administrative survey data collected by the VHA National Center for Health Promotion and Disease Prevention for quality improvement purposes and did not use individual-level identifiable data.

Methods

The National Center for Health Promotion and Disease Prevention (NCP) leads weight management policy and provides support to MOVE! weight management coordinators in VHA. In 2017, NCP collaborated with VHA’s Healthcare Analysis and Information Group (HAIG) to field a comprehensive survey of weight management programming across VHA. The operational survey was administered to 140 medical centers and achieved a 100% response rate. It provides standardized and detailed information about local obesity treatment programming at each of the 140 facilities. Applying configurational analysis methods offers a unique opportunity to explore the link between patient reach and these facility-level treatment arrangements, including bariatric surgery, pharmacotherapy, and a wide range of treatment options within the MOVE! CLI program.

Outcome

Our primary outcome was facility-level reach, which broadly defined, is the extent to which a treatment reaches the population of interest.[10] In this analysis, facility-level reach scores were calculated using treatment data from the VHA Corporate Data Warehouse. For each facility, the score represented the total number of patients with at least one MOVE! visit in 2017 divided by the total number of Veterans at that facility who would benefit from MOVE! in 2017, then multiplying that number by 1000. Of the 140 facilities that responded to the HAIG survey, 125 (89%) had sufficiently complete facility-level reach data necessary to calculate the reach outcome. We next calculated quintiles of reach. Facilities with reach scores within the upper two quintiles (i.e., the top 40%, n = 50) and facilities within the bottom two quintiles (n = 50) were included in the analyses. Facilities with reach within the middle quintile (n = 25) were dropped from the analysis to build in a meaningful gap between the higher reach (i.e., upper 40%) and lower reach (i.e., bottom 40%) facilities; 100 facilities were in the analytic sample.

Configurational Analysis

Configurational analysis draws upon Boolean algebra and set theory to offer a formal, case-based and mathematical approach to cross-case analysis that identifies a “minimal theory,” i.e., a crucial set of difference-making combinations that uniquely distinguish one group of cases with an outcome of interest from another without.[11] The analytic objective of configurational analysis is to identify necessary and sufficient conditions for an outcome to occur, a fundamentally different search target than those used in correlation-based methods.[11–13] Configurational methods expressly allow for causal complexity (when several conditions must jointly appear for an outcome to occur) as well as equifinality (when multiple pathways lead to the same outcome), making it well-suited for discerning different solution pathways related to local context. Configurational analysis is one method within a broader family of configurational comparative methods, which include Qualitative Comparative Analysis (QCA) and more recently Coincidence Analysis (CNA). These methods operate within a different paradigm than traditional methods like logistic regression or qualitative research, and their findings can complement those generated by other approaches [14].

Configurational methods have been applied in political science and sociology since the 1980s and are increasingly being used in health services research. A study by Kahwati et al., for example, used configurational methods to identify facility structure, policies, and processes related to the VA MOVE! program distinguishing 11 higher-performing facilities from 11 lower-performing facilities [15]. More recently, a 2019 Cochrane Review prominently used configurational comparative methods to identify conditions aligned with successful implementation of school-based interventions for asthma self-management [16]; a new comprehensive 2020 handbook on implementation science dedicated a complete chapter to CCMs [17]; and researchers have published numerous articles featuring CCMs in prominent health services journals in 2020, including *BMC Health Services Research* [18–22].

Creating the Analytic Dataset

To create the analytic dataset for the configurational analysis we merged two different datasets. The first was the 2017 HAIG survey of facility-level weight management programs, which had 78 items, with many items featuring multiple skip patterns that generated additional sub-questions. For example, one question asked which of 13 programming options were offered at the facility, including none and “Other” with an open-response option. Checking any of these individual options generated 3–10 additional questions about that respective option. For example, endorsing the presence of a TeleMOVE! Program generated 6 additional questions about that program (e.g., how patients are referred). The HAIG survey achieved a 100% response rate, with all 140 medical centers responding. (For examples of items from 2017 Weight Management Care in VHA Survey, see Additional File 1.)

The second dataset was FY17 facility-level weight management outcome data from the VHA Corporate Data Warehouse; 125 VA medical centers had sufficiently complete facility-level weight outcome data.

In the merged dataset of 125 facilities, we added “facility complexity level” as an additional potential explanatory factor; each facility is assigned one of five complexity levels based on patient characteristics, clinical services offered, educational and research missions, and administrative complexity.[23]

Data Reduction

The merged dataset comprised over 30 factors many which were multi-value, with multiple responses possible. For example, the survey item inquiring about the presence of a MOVE! Coordinator was scaled based on the level of time dedicated to the program, with 6 possible responses ranging from 0–100%.

Our next step was to reduce the number of factors by creating three ordinal meta-factors that combined information from multiple individual factors from the original HAIG survey. For example, the role of MOVE! Coordinator is a key program leadership position. Three separate questions asked related to the MOVE! Coordinator: the presence of a coordinator, the amount of time dedicated to MOVE!, and actual time spent on MOVE! each week. Table 1 lists these questions and the final integrated meta-factor used in the analysis. A similar process was used to create meta-factors indicating the degree of presence of a Physician Champion (another key role) and accessibility of weight loss medications. Two of the three meta-factors used 6-point ordinal scales (0 = None to 5 = Very high/highly active) to represent the “degree of presence” of a local MOVE! coordinator or a MOVE! Physician Champion. The third meta-factor consisted of a 4-point ordinal scale representing “accessibility” of weight-loss medications for MOVE! Participants (1 = medications not routinely considered to 4 = weight loss medications routinely considered with available prescriber).

Table 1
Meta-factors included in configurational analyses

Factor Name	Description
MOVE! Coordinator ^a	0 = None 1 = "MINIMAL" (≤ 10 hours/week) 2 = "MODERATE" (11–20 hours/week) 3 = "HIGH" (21–30 hours/week) 4 = "VERY HIGH_NOT FULLTIME" ($< 100\%$ FTE; ≥ 31 hours/week) 5 = "VERY HIGH_FULLTIME" (100% FTE; ≥ 31 hours/week)
Physician Champion ^b	0 = None 1 = "NEAR ZERO" Not Funded_Minimal Activity (0 FTE; < 1 hour/week) 2 = "FUNDED BUT NOT ACTIVE" Funded_Minimal Activity (10–25% FTE; < 1 hour/week) 3 = "UNFUNDED BUT ACTIVE" Not Funded_Moderate Activity (0 FTE; 1–5 hours/week) 4 = "FUNDED AND ACTIVE" Funded_Moderate-High Activity ($\geq 10\%$ FTE; 1–5 hours/week) 5 = "HIGHLY ACTIVE" (≥ 6 hours/week)
Access to Weight Loss Medications ^c	1 = Weight loss meds NOT routinely considered AND prescriber NOT available 2 = Weight loss meds NOT routinely considered but prescriber is available 3 = Weight loss meds routinely considered but prescriber NOT available 4 = Weight loss meds routinely considered AND prescriber available

Legend

a. Based on 3 survey questions: Q7. Does your facility currently have a permanent MOVE! Coordinator? (YES/NO); Q11. How much dedicated time is allotted for the MOVE! Coordinator role at your facility? (Select 1 of 6 listed options); and Q12. On average, how much time does the MOVE! Coordinator spend on the MOVE! Program each week? (Select 1 of 4 listed options)

b. Based on 3 survey questions: Q13. Does your facility have a MOVE! Physician Champion? (YES/NO); Q16. How much dedicated time is allotted for the MOVE! Physician Champion role at your facility? (Select 1 of 6 listed options); and Q18. On average, how much time each week does the Physician Champion devote to the activities listed in the previous question? (Select 1 of 6 listed options)

c. Based on 2 survey questions: Q23. Are weight loss medications routinely considered during treatment planning for MOVE! participants at your facility? (YES/NO) and Q24. Is a prescriber available to facilitate access to weight loss medications for patients participating in MOVE! (For example, is there a prescriber who works closely with the MOVE! program)? (YES/NO)

Next, we proceeded with data reduction by adopting a configurational approach to factor selection that has been described previously.[18, 20, 21] Briefly, we began by using the “minimally sufficient conditions” (i.e., msc) function within the R package “cna” [24] to look across all candidate factors for all 100 facilities to identify configurations of conditions with strong connections to the outcome condition (i.e., high reach). We considered all one-, two-, and three-condition configurations of conditions instantiated within our dataset that met the designated thresholds for consistency and coverage. Consistency is a metric that indicates how reliably a solution yields an outcome and is calculated as the number of cases with the solution configuration and the targeted outcome divided by the total number of cases with the solution configuration. Coverage is a metric that indicates how broadly a solution accounts for an outcome and is calculated as the number of cases with the configuration and the outcome present divided by the total number of cases with the outcome.

We then generated a “condition table” to list and organize the Boolean output. In a condition table, rows contain all configurations of conditions that meet a specified consistency level while column variables include outcome, conditions, consistency and coverage. We generated condition tables by specifying a consistency threshold of 100% and a coverage score of at least 15% to avoid overfitting. If no configurations met this dual threshold, we iteratively lowered the specified consistency level by 5 points (e.g., from 100–95%, etc.) and repeated the process to generate a new condition table. We continued relaxing the consistency threshold until there were at least two potential configurations of facility-level conditions that met the specified consistency level and the $\geq 15\%$ coverage threshold. We then assessed all configurations that satisfied those thresholds.

Using this approach, we inductively analyzed the entire dataset and reduced the number of factors to those most likely to inform model development in the next steps of configurational analyses. We developed models by iteratively using model-building functions within the “cna” software package in R. We assessed models based on their overall consistency and coverage, as well as potential model ambiguity (when competing models explain the outcome equally well as reflected by similar consistency and coverage scores). [25] After a preliminary model was identified, we optimized coverage by returning to the condition table and considered any additional configurations that met the consistency threshold and also covered $\geq 15\%$ of the cases where the outcome was present but not yet explained. We selected a final model based on the same criteria of overall consistency and coverage, with no model ambiguity. The Coincidence Analysis package (“cna”) in R, R (version 3.5.0), R Studio (version 1.1.383) [24] and Microsoft Excel were used to support analyses.

Results

Facility-level reach measures for the highest reach group ranged from 3.3 to 13.1 per 1000 Veterans; measures for the lowest reach group ranged from 0 to 2.3 per 1000 Veterans.

During the data reduction process, four different categories of factors and ten different conditions were represented by the range of configurations that met our dual threshold criteria (see Table 2). The final solution model comprised conditions that explained 78% (39/50) of the highest-reach facilities with 87% consistency (39/45) and consisted of five distinct pathways. Three of these five pathways were context-dependent: distinct pathways leading to high reach, depended on whether the facility was high-, medium- or low-complexity. Multiple pathways included conditions that spanned across the MOVE! program, pharmacotherapies and/or bariatric surgery; specific components within these treatment domains had to be jointly present to achieve highest reach to patients.

Table 2
List of factors included in configurational solution

Factor Name (Question number in HAIG survey)	Description
MOVE! Program Factors	
MOVE! Coordinator (See Table 1)	High degree of presence (more than 20 hours per week is spent with the MOVE! program)
Be Active and MOVE! ^a (Q21)	Be Active and MOVE! Programming is offered: 0 = No; 1 = Yes
Maintenance Program (Q21)	Maintenance programming is offered: 0 = No; 1 = Yes
Pharmacotherapy Factors	
Pharmacist Expertise (Q30)	Facility has a pharmacist(s) with expertise in weight management medications: 1 = Yes; 2 = No; 3 = Don't Know
Pharmacotherapy offered in MOVE! (Q25)	Pharmacotherapy is considered during treatment planning for MOVE! 0 = No; 1 = Yes
Prescription Refill Restrictions (Q28)	Besides criteria for discontinuation of medication, are there are other restrictions or limits in place for refilling weight management medications: 1 = Yes; 2 = No; 3 = Don't Know
Bariatric Surgery Factors	
Bariatric Surgery Option Offered (Q25)	Bariatric surgery is considered during treatment planning for MOVE! participants: 0 = No; 1 = Yes
Facility Context	

Factor Name (Question number in HAIG survey)	Description
Facility Complexity Level ^b	<p>Highest complexity (1a): Facilities with high volume, high risk patients, most complex clinical programs, and large research and teaching programs</p> <p>High complexity (1b): Facilities with medium-high volume, high risk patients, many complex clinical programs, and medium-large research and teaching programs</p> <p>Mid-High complexity (1c): Facilities with medium-high volume, medium risk patients, some complex clinical programs, and medium sized research and teaching programs</p> <p>Medium complexity (2): Facilities with medium volume, low risk patients, few complex clinical programs, and small or no research and teaching programs</p> <p>Low complexity (3): Facilities with low volume, low risk patients, few or no complex clinical programs, and small or no research and teaching programs</p>

Legend

a. Be Active and MOVE! is an ancillary physical activity module with the MOVE! Program

b. Complexity score is based on size, academic affiliation, trauma center level, and service mix of the facility [26]

Figure 1 provides a visual depiction of configurational results. First, in the top section of the figure, conditions (i.e., when factors take on specific values) are listed in rows. Three conditions relate to context of the medical center (high, medium, or low complexity). Next, three conditions relate to the MOVE! comprehensive lifestyle intervention, three conditions relate to pharmacotherapy and one condition relates to bariatric surgery. Each of the sections are color-coded. Columns on the right indicate which conditions are included in each of the five pathways leading to highest reach scores. Black circles indicate the *presence* of the respective condition, an open circle indicates the *absence* of the condition, and blank space indicates that the condition is not part of that pathway.

The five pathways listed in Fig. 1 are indicated by column. All conditions with circles within that column are part of the pathway and jointly lead to higher reach. Filled circles indicate the presence of a condition, whereas empty circles indicate absence. For example, Solution Pathway 1 (SP1) indicates that the joint presence of a pharmacist with expertise in weight loss medications AND the presence of a local MOVE! coordinator who works with MOVE! more than 20 hours per week AND programs where bariatric surgery is considered as part of treatment planning for MOVE! patients, reach score will be in the highest category of reach. SP3-SP5 each have a condition related to facility complexity; for example, SP5 has three conditions that together, lead to high reach scores: medical center with low complexity AND the *absence* of restriction on refills of weight loss medications AND having maintenance programming to retain weight loss. Note that while the *absence* of refill restrictions is part of the solution for low

complexity facilities (SP5), the *presence* of refill restrictions is the solution pathway for high complexity facilities (SP3).

Figure 1 lists consistency for each of the pathways and ranges from 81% (SP2) to 100% (SP3), indicating high reliability for all pathways. Raw coverage indicates the percentage of high reach sites that included in each solution pathway; raw coverage ranged from 8% (SP3) to 35% (SP2). At the bottom of Fig. 1, individual sites are listed by study identification number. Facilities listed in red italics represent cases that are uniquely covered by that solution pathway. For example, two of the 16 sites covered by SP1 are listed in red italics, indicating that those cases were explained only by that solution pathway and not by any of the other four pathways. A total of 19 sites have the combination of conditions for SP1; 16 sites are high reach and three sites (not listed in figure) are low reach. Thus, consistency is 84% of all cases with the solution path (16/19) and raw coverage is 32% of all cases with higher reach (16/50). Figure 1 also lists overall model consistency and coverage scores that is an aggregated score across all five solution paths. The overall model had a consistency score of 87% (39/45) and a coverage score of 78% (39/50).

Discussion

No single condition explained the 50 facilities with the higher-reach outcome; rather, *combinations* of specific conditions consistently and uniquely distinguished higher reach facilities from lower reach facilities. The final model comprised five solution pathways that each led to higher reach, indicating that multiple combinations can lead to the same outcome; this demonstrates equifinality in solutions. The final model included 78% of the highest reach sites with 87% consistency indicating a meaningful and reliable solution.

VHA convened a State-of-the-Art (SOTA) conference in 2016 to address the epidemic of obesity in the U.S., including among Veterans. Recommendations included the need for integrated multi-component treatment [2], requiring coordination across domains of treatment including bariatric surgery, pharmacotherapy and lifestyle intervention [27] to engage patients in treatments tailored to meet their needs. Our results add credence to this recommendation: all but one solution pathway involved at least two of three domains of care and one pathway included conditions across to all three. Thus, it is insufficient to offer only lifestyle intervention without the availability of pharmacotherapies or pharmacotherapies without bariatric surgery options. Clinical practice guidelines for obesity treatment call for consideration of pharmacotherapy treatment and bariatric surgery concurrent to lifestyle intervention [28]. Within some VHA medical centers, patients participate in the MOVE! weight management program prior to bariatric surgery and may participate in maintenance programming post-surgery.

It is important to note that three of the solution pathways are context-based; the solution pathway depends on complexity of the medical center. A key tenet within implementation science is that programs must be adapted to local conditions to optimize and sustain outcomes [29–31]. Within low complexity medical centers (smaller, often rural centers), having maintenance programming with no restrictions on

weight loss medication refills led to highest reach; this pathway explained all 11 low complexity sites with highest reach in our dataset. For medium complexity centers, the “Be Active and MOVE!” (BAM) physical activity adjunct program combined with offering pharmacotherapy to MOVE! patients led to highest reach. The addition of BAM indicates an exceptionally expansive MOVE! program; only 23% of all facilities reported offering BAM. For high complexity centers, the combination of BAM with restrictions on weight loss medication refills led to highest reach. The inclusion of the latter condition is a bit harder to understand; the presence of restrictions in a high complexity site may indicate active involvement of pharmacists in treatment or may be a proxy for another unmeasured factor.

Limitations

This configurational analysis was conducted using a dataset comprised of program survey responses from all VHA medical centers, combined with administration data to compute reach scores. Though the dataset is large (n = 100 medical centers in the final dataset), our findings may not apply to settings outside the VHA. Information about weight management programming at each facility relied on self-reporting by VHA staff who may or may not have had close involvement with MOVE!, pharmacotherapy treatments, or bariatric surgery. Though coverage was high (78%), 11 of the 50 higher reach facilities were not included in any of the five solution pathways, indicating a possible role for additional factors beyond those in the model.

Conclusions

In this analysis, configurational analyses revealed specific combinations of facility-level obesity treatment programming that consistently and uniquely distinguished highest-reach from lowest-reach facilities. Findings confirm equifinality: there is more than one way to achieve higher reach to patients who may benefit from obesity treatment. Furthermore, findings confirm the importance of tailoring programs to context. Configurational analysis can potentially help address two long-standing challenges in health services research: 1) account for local context in cross-case analyses; and 2) determining the interplay of specific conditions to explain complex causal pathways like reach outcomes within a large complex system of care. Our findings will inform recommendations about optimal program structures for obesity treatment within VHA.

Abbreviations

BAM: Be Active and MOVE!

CNA: Coincidence Analysis

CLI: Comprehensive Lifestyle Intervention

HAIG: VHA Healthcare Analysis and Information Group

NCP: VHA National Center for Health Promotion and Disease Prevention

QCA: Qualitative Comparative Analysis

SOTA: State-of-the-Art

SP: Solution Pathway

VHA: Veterans Health Administration

Declarations

Ethics approval and consent to participate.

Not applicable. This program evaluation qualified as non-research quality improvement activity conducted under the authority of VHA operations, as it was designed and implemented for internal VHA purposes and not designed to produce information to expand the knowledge base of a scientific discipline. In response to the designation of broad categories of activities as non-research in the *Federal Policy for the Protection of Human Subjects (Common Rule) in Title 38 Code of Federal Regulations Part 16 (38 CFR 16.102(l))* published January 19, 2017, the VHA enacted new policies and guidelines for determining non-research activities within VHA. In accordance with these VHA policies and guidelines, this program evaluation was documented as a non-research activity by the Chief Consultant for Preventive Medicine in the VHA National Center for Health Promotion and Disease Prevention on May 29, 2018, an official within VHA expressly authorized to deem projects as non-research activities where formal ethics approval is not required, as defined per *VHA Handbook 1058.05* in the section “Officials Authorized to Provide Documentation of VHA Program Office Non-Research Operations Activities” and later updated in section 5a of the *VHA Program Guide 1200.21*. All authors attest that this program evaluation was part of non-research activity funded by – and conducted under the authority of – the operational jurisdiction of the VHA National Center for Health Promotion and Disease Prevention. This secondary analysis used facility-level administrative survey data collected by the VHA National Center for Health Promotion and Disease Prevention for quality improvement purposes and did not use individual-level identifiable data.

Consent for publication.

Not applicable.

Availability of data and materials.

The original dataset used in this analysis is not publicly available per a Data Use Agreement with the VHA National Center for Health Promotion and Disease Prevention under which this VHA quality improvement project was conducted. Configurational output generated by the R package “cna” that was used in the data analysis is available in de-identified form from the corresponding author on reasonable request.

Competing interests.

The authors declare that they have no competing interests.

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Authors' contributions.

EJM and LJD analyzed and interpreted data and were major contributors in writing the manuscript. RE and JAB prepared and constructed the dataset used in the configurational analyses. MBF, WW,AA, SDR, SAS and LJD were major contributors to interpretation and in writing the manuscript. EJ and LJD prepared the solution visualization in figure 1. All authors reviewed the manuscript.

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Figures

		Solution Pathways					
		SP1	SP2	SP3	SP4	SP5	
Context	Facility Complexity Level	HIGH (1a)			●		
		MEDIUM (1b, 1c, 2)				●	
		LOW (3)					●
Program Conditions	Pharmacy	Pharmacist w Weight RX Expertise	●	●			
		Restrictions on RX Refills			●		○
		PHARM_OPTION_MOVE		●			
	MOVE	MOVE Coordinator > 20 hrs/week	●				
Pharmaceutical Option for MOVE					●	●	
Be Active and MOVE				●	●		
Bariatric Options	Bariatric Option for MOVE	●					
Consistency		84%	81%	100%	92%	85%	
Raw Coverage		32%	34%	8%	22%	22%	
Facilities Included in Pathway		SITE5	SITE16	<i>SITE2</i>	<i>SITE4</i>	SITE5	
		SITE16	SITE18	<i>SITE3</i>	SITE27	<i>SITE6</i>	
		SITE18	SITE32	<i>SITE22</i>	<i>SITE29</i>	<i>SITE7</i>	
		<i>SITE20</i>	SITE34	SITE54	SITE32	SITE18	
		SITE27	SITE38		SITE34	<i>SITE44</i>	
		SITE32	<i>SITE39</i>		SITE59	<i>SITE48</i>	
		SITE34	<i>SITE42</i>		<i>SITE69</i>	<i>SITE62</i>	
		SITE38	SITE46		SITE73	<i>SITE80</i>	
		SITE46	SITE54		<i>SITE82</i>	<i>SITE91</i>	
		SITE55	SITE55		<i>SITE85</i>	<i>SITE96</i>	
		SITE72	<i>SITE56</i>		<i>SITE93</i>	SITE100	
		SITE73	SITE59				
		<i>SITE79</i>	SITE72				
		SITE87	<i>SITE77</i>				
		SITE98	SITE87				
SITE10	SITE98						
Overall Model	Consistency	87% (39/45)					
	Coverage	78% (39/50)					



Figure 1

Summary of configurational findings for higher-reach VA facilities

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [MiechBMCHSRConfigurationalAnalysisAdditionalFile1.pdf](#)