Mental Health Treatment Quality, Access, and Satisfaction: Optimizing Staffing in an Era of Fiscal Accountability

Matthew Tyler Boden, Ph.D., Clifford A. Smith, Ph.D., John W. Klocek, Ph.D., Jodie A. Trafton, Ph.D.

Objective: Mental health treatment access and quality are influenced by the interplay of structural, organizational, and performance factors—including the number of mental health staff providing direct clinical care relative to patients treated (i.e., staffing ratio), mental health staff productivity, and wait times for scheduled mental health appointments. With no industry standards to follow, the Veterans Health Administration (VHA) developed an outpatient mental health staffing model and a recommended minimum total staffing ratio.

Methods: At the level of VHA health care facility (N=140), we conducted cross-sectional regression analyses to examine the relative importance of outpatient mental health staffing and productivity and mental health patient wait times in predicting measures of mental health treatment access and quality.

Results: Outpatient mental health staffing ratios (especially total and therapist staffing ratios) had substantial, positive relationships with overall mental health treatment access and quality, broadly and in specific domains. Staffing ratios generally had stronger relationships with treatment access and quality than did staff productivity and patient wait times.

Conclusions: Mental health staffing ratios should be a primary consideration when trying to improve mental health treatment access and quality at the facility level. Having more mental health staff of all types is associated with better overall access to and quality of mental health services, and multiple staff types are needed to provide high-quality mental health care. Knowledge gained may guide efforts to address challenges in improving access to and quality of mental health services within and outside of VHA.

Psychiatric Services 2019; 70:168–175; doi: 10.1176/appi.ps.201800229

Optimization of health care system performance is theoretically achieved through improving the health of populations, enhancing patient experience, reducing per capita cost, and improving staff work life (1, 2). Commonly applied to private health care organizations, these principles are no less critical for public health care agencies, where high-quality care at a responsible cost for the American taxpayer is expected. The Veterans Health Administration (VHA) is the largest integrated mental health program in the United States, offering a broad continuum of services. In the past decade, the demand and cost for VHA mental health services have grown significantly (e.g., treatment visits increased from 10.5 to 21.3 million from fiscal years [FYs] 2006 to 2017). Between 2006 and 2017, VHA increased the number of outpatient mental health staff from 6,923 to 15,746. Despite significant budget increases to accommodate expansion, a subset of VHA health care facilities have not kept pace with increasing demand by hiring staff, leading to numerous challenges (e.g., limited access to care and questionable quality of care) and a perception of crisis (3).

Mental health treatment access and quality are influenced by the interplay of structural, organizational, and performance factors, including the number of mental health staff providing direct clinical care relative to patients

HIGHLIGHTS

- As demand for mental health services grows, health care systems may seek to address factors that potentially influence treatment access and quality, such as mental health staffing ratios, mental health staff productivity, and wait time for scheduled mental health appointments.
- VHA provides a population-based staffing ratio model and an efficiency-based model, which considers productivity and wait times for mental health outpatients.
- Outpatient mental health staffing ratios had substantial and generally stronger (positive) relationships to VHA's core mental health access/quality metrics than did productivity and wait times.
- Staffing ratios were strong predictors of mental health access/quality, regardless of the complexity of care provided at the health care facility.

treated (i.e., staffing ratio), mental health staff productivity, and wait times for scheduled mental health appointments. Up to two-thirds of a typical health care organization's operating budget is attributed to staffing costs (4). Thus optimal management of staff is required to maintain cost-efficiency while providing accessible and high-quality treatment. Yet a paucity of research demonstrates optimal mental health staffing levels, and there is no single industry standard on mental health provider staffing ratios in private or public integrated health care systems. To date, studies of mental health staffing have focused on the psychiatry workforce, on calculations of community mental health caseload, and on staffing models based on known or theoretical workloads, demand projections, calculation of needs, and measurement of efficiency (5–14).

In 2012, a report by the Office of the Inspector General (11–03021–133) suggested that many VHA facilities did not have sufficient mental health services to meet demand in a timely manner. With no industry standard to follow, the VHA Office of Mental Health Operations (OMHO; now the Office of Mental Health and Suicide Prevention) developed a staffing model that set a minimum target for full-time-equivalent (FTE) mental health staff per 1,000 veterans treated in outpatient mental health settings. The model was developed in conjunction with a hiring initiative undertaken to bolster staffing at facilities with access concerns. OMHO rigorously tracked staffing through program oversight and informally demonstrated associations between outpatient mental health staffing ratios and measures of mental health treatment access and quality.

As demand for mental health services continues to grow, health care system leaders and mental health managers may seek to improve mental health care access and quality by bolstering mental health staffing ratios, while also addressing productivity and wait times. There are benefits and costs associated with addressing each factor, both locally and at a health care system level. To guide these efforts, VHA provides mental health onboard clinical (MHOC) staffing and productivity data (15) and the Specialty Productivity–Access Report and Quadrant (SPARQ) tool (16). SPARQ is an efficiency-based model in which provider productivity (i.e., the sum of work relative value units [wRVUs]) and wait times are evaluated for staffing and managerial actions. Given the direct costs of staffing, using efficiency-based models to modify productivity and wait times may be appealing. Yet optimal efficiency may not fully address potentially unserved mental health need that could be identified via a population-based staffing model. We propose that a population-based staffing ratio model is of equal or greater importance for ensuring treatment quality and population access to the full continuum of mental health services as mandated in the VA uniform mental health services package (17). To test this hypothesis, we conducted a straightforward empirical cross-sectional analysis examining relations between staffing, productivity, and wait times and VHA's core metrics for assessment of access to and quality of mental health services (i.e., Strategic Analytics for Improvement and Learning [SAIL] metrics) (18).

METHODS

We examined hypotheses at the level of VHA health care facility (N=140). Mental health staffing, productivity, wait times, and SAIL data are routinely collected and updated as part of program evaluation and improvement. Data for the analyses reported in this article were obtained from quarter 2 (Q2) of FY 2017. An institutional review board determined that the study did not require a review.

Measures

MHOC staffing ratio. We calculated outpatient mental health staffing ratios by facility for each pay period in Q2. Ratios were calculated separately for total staff, psychiatrists, other prescribers (clinical nurse specialists, nurse practitioners, physician assistants, clinical pharmacists, and other medical doctors), and therapists (psychologists, social workers, marriage and family therapists, licensed professional counselors, and other counselors). We first calculated FTE for an individual staff member by multiplying the proportion of patient encounters occurring in outpatient mental health clinics by hours worked and then multiplying the product by the percentage of the staff member's time allocated to direct clinical care. We divided this factor, which represents hours of direct clinical care in outpatient mental health settings (mental health clinical hours) by 80 (possible hours in a pay period) to obtain the outpatient mental health FTE per staff member. For each pay period, we summed the FTEs for individual staff by type (total, psychiatrists, other prescribers, and therapists) and facility, divided those values by the number of facility outpatients treated in mental health programs in the prior four quarters, and multiplied by 1,000. We then averaged staffing ratios (by type and facility) to obtain quarterly values (15).

MHOC productivity. Facility outpatient mental health productivity by provider type (total, psychiatrists, other prescribers, and therapists) was calculated by summing wRVUs in Q2 across pay periods (from Centers for Medicare and Medicaid Services and VHA-imputed values) and outpatient mental health clinical hours, dividing the former by the latter, and multiplying by 466.75 (bookable hours in the quarter) to obtain quarterly values. This efficiency metric (i.e., wRVU per clinical hour multiplied by bookable hours) assessed productivity of clinicians as they provide care to mental health outpatients, rather than productivity across all assigned clinical duties.

Wait time. Wait time was operationalized as total percentage of mental health appointments completed within 30 days of when the appointment was scheduled or requested/preferred (for new patients) or requested/preferred (for

established patients). Thus this measure utilized the average wait times of both new and established patients. Data were obtained for the final month of Q2 in FY 2017.

SPARQ quadrant. Based on an importance performance analysis framework (19, 20), the SPARQ tool groups facilities into quadrants by specialty (e.g., psychiatry) on the basis of two orthogonal dimensions: wait time and productivity across each clinician's total clinical time (16). Wait time includes wait times for both new and established patients, as described earlier. Values for productivity and wait times are Z scores based on the distribution across VHA's 140 health care facilities, and facilities are represented in one of four quadrants: optimized (productivity above mean, wait time below mean), underresourced (productivity and wait time above mean), inefficient (productivity below mean, wait time above mean), overresourced (productivity and wait time below mean). We formed three dummy-coded psychiatry specialty indicator variables representing optimized, underresourced, or overresourced facilities versus inefficient facilities (21).

Mental health SAIL composites. For Q2, we obtained three mental health SAIL composite measures (population coverage, continuity of care, and experience of care) as well as the mental health domain score, a metacomposite of the three composite measures (18, 22). Population coverage includes measures assessing proportions of veterans with identified mental disorders who receive mental health services promised by the VA uniform mental health service package (18). Continuity of care includes process measures assessing patients' likelihood of receiving evidence-based treatment over time and the extent to which mental health services are provided in a coordinated, proactive manner. Experience of care includes survey response scales assessing veteran and provider opinions regarding access, quality, and coordination of care. Constituent measures of the composites are updated quarterly, except survey data are updated yearly. To reflect stable program characteristics, composite measures are "rolling" variables, given that they include one new quarter of data along with the three quarters of prior data (18, 22). Positive and negative scores represent the difference from average facility scores in units of standard deviation, with positive scores indicating better-than-average performance and negative scores indicating worse-than-average performance.

Facility complexity. FY 2017 facility complexity was obtained from the VHA facility complexity model (23). Facilities are rated on a five-level scale based on factors such as provision of complex clinical programs, intensive care, operative complexity, and allocation of research funds.

Data Analysis

Our primary analyses consisted of three sets of four hierarchical multiple regression analyses, with each mental health SAIL composite serving as a dependent variable in a single regression within each set. The first set included total staffing ratio and total staff productivity as predictors, whereas the second set included as predictors staffing ratios and productivity for psychiatrists, other prescribers, and therapists. Also included in sets 1 and 2 were mental health patient wait time and facility complexity. The third set included total staffing ratio, dummy-coded SPARQ quadrant, and facility complexity as predictors. In all analyses, we included staffing ratio in step 1 to examine unadjusted relationships with the SAIL measures. In step 2, we additionally included facility complexity and mental health staff productivity and wait time (or SPARQ quadrant) to examine the relations between each predictor and SAIL composite measures when analyses were adjusted for all predictors.

RESULTS

Preliminary correlational analyses examined associations between all variables. SAIL composites and staffing ratios were associated to a small-to-moderate degree, and SAIL composites were associated with productivity to a generally small degree and with wait times to a generally moderate degree (Table 1).

In step 1 of the first set of regression analyses, total staffing ratio predicted a substantial and statistically significant portion of the variance in SAIL composites (8%−27%). When the analyses were adjusted for productivity, wait time, and complexity in step 2, total staffing ratio predicted 6% to 23% of the variance in SAIL composites (Table 2). Total staffing ratio predicted a larger proportion of variance in mental health domain and population coverage (23%) than productivity and wait time combined (11% and 14%, respectively). Wait time and total staffing ratio each predicted 11% of the variance in experience of care, making it the only SAIL composite for which total staffing ratio was not the strongest predictor. Although total staff productivity significantly predicted mental health domain and population coverage, it predicted a smaller portion of the variance than staffing ratio (3% versus 23%, mental health domain; 12% versus 23%, population coverage). Wait time predicted a significant portion of all SAIL composite variance (2%–11%).

In the second set of regression analyses, examining psychiatrist, other prescriber, and therapist staffing, therapist staffing ratios were the strongest and most consistent predictor of SAIL composites, when analyses were adjusted for staffing of other provider types (predicting 3% to 15% of the variance) (Table 3). Psychiatrist staffing ratio significantly predicted mental health domain and population coverage (predicting 6% of the variance), whereas prescriber staffing ratio significantly predicted only experience of care (predicting 3% of the variance).

These patterns were similar to those found in step 2, when productivity, wait time, and complexity were included in the model. Therapist staffing ratio was a consistent and moderate predictor of all SAIL composites (predicting 3%

TABLE 1. Zero-order correlations between measures of mental health treatment access and quality at 140 VHA health care facilities[a]

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Mental health domain																		
2. Population coverage	.65**																	
3. Continuity of care	.77**	.21*																
4. Experience of care	.77**	.23**	.45**															
5. Total staffing ratio	.52**	.44**	.29**	.40**														
6. Psychiatrist staffing ratio	.28**	.29**	.15	.18*	.26**													
7. Prescriber staffing ratio	.16	.05	.10	.21*	.30**	−.12												
8. Therapist staffing ratio	.45**	.39**	.22*	.38**	.87**	.13	.15											
9. Total staff productivity	.04	.20*	−.02	−.01	−.30**	.23**	−.18*	−.27**										
10. Psychiatrist productivity	−.01	.20*	−.05	−.16	−.13	−.05	−.24**	−.06	.60**									
11. Prescriber productivity	−.02	.09	−.05	−.07	−.03	−.22*	.02	−.03	.45**	.38**								
12. Therapist productivity	.03	.05	.07	−.05	−.26**	.03	−.16	−.37**	.64**	.16	.18*							
13. Wait time	.38**	.24**	.21*	.38**	.15	.18*	.04	.13	.05	.04	−.11	.08						
14. SPARQ, inefficient[b]	−.16	−.13	−.04	−.18*	−.04	.05	−.06	−.08	−.22**	−.34**	−.11	−.10	−.44**					
15. SPARQ, optimized[b]	.33**	.30**	.18*	.25**	.25**	.20*	−.08	.24**	.22*	.42**	.12	−.07	.37**	−.35**				
16. SPARQ, underresourced[b]	−.29**	−.02	−.27**	−.34**	−.21*	−.26**	−.03	−.14	.26**	.37**	.31**	.14	−.41**	−.24**	−.32**			
17. SPARQ, overresourced[b]	.04	−.18*	.07	.19*	−.04	−.03	.16	−.06	−.24**	−.43**	−.28**	.04	.36**	−.34**	−.44**	−.30**		
18. Facility complexity	.09	.07	.10	.02	.17*	−.40**	.10	.15	−.25**	−.15	.07	−.02	−.09	−.07	−.02	.10	.01	
M	.12	−.02	.27	.02	7.36	1.07	.51	4.22	438.43	759.06	563.87	438.86	.98	—	—	—	—	2.91
SD	1.01	.98	1.04	1.00	1.52	.36	.31	1.11	70.47	168.47	211.98	62.44	.02	—	—	—	—	1.53
Minimum	−2.48	−2.30	−3.05	−3.32	4.61	.09	.00	1.91	316.59	310.30	.00	287.21	.88	—	—	—	—	1.00
Maximum	3.48	2.50	2.94	3.05	13.72	2.07	1.58	8.26	675.07	1,299.43	1,308.51	618.72	1.00	—	—	—	—	5.00

[a] Correlations are represented by Pearson coefficients for two continuous variables, point-biserial coefficients for one continuous and one dichotomous variable, and phi coefficients for two dichotomous variables.

[b] Facilities were grouped by Specialty Productivity–Access Report and Quadrant (SPARQ), as follows: inefficient (productivity below mean, wait time above mean), N=30, 21%; optimized (productivity above mean, wait time below mean), N=44, 31%; underresourced (productivity and wait time above mean), N=25, 18%; and overresourced (productivity and wait time below mean), N=41, 29%.

*p<0.05, **p<0.01

TABLE 2. Results of hierarchical multiple regression analyses (set 1) predicting mental health SAIL composites, by step and predictor[a]

Step and predictor	Mental health domain			Population coverage			Continuity of care			Experience of care		
		R^2			R^2			R^2			R^2	
	β	Semipartial	Adjusted	β	Semipartial	Adjusted	β	Semipartial	Adjusted	β	Semipartial	Adjusted
Step 1			.26***			.19***			.08***			.16***
Total staffing ratio	.52***	.27		.44***	.20		.29**	.08		.40***	.16	
Step 2			.37***			.33***			.09***			.25***
Total staffing ratio	.52***	.23		.52***	.23		.27**	.06		.35***	.11	
Total staff productivity	.19**	.03		.37***	.12		.07	.00		–.01	.00	
Wait time	.30***	.08		.15*	.02		.17*	.03		.33***	.11	
Facility complexity	.07	.00		.08	.01		.09	.01		–.01	.00	

[a] Predictors: total staffing ratio and productivity, wait time, and facility complexity. SAIL, Strategic Analytics for Improvement and Learning.
*p<0.05, **p<0.01, ***p<0.001

to 12% of the variance), whereas psychiatrist staffing ratio significantly predicted only mental health domain and population coverage. Provider productivity generally predicted a small and nonsignificant portion of the variance in SAIL composites, and wait time significantly predicted mental health domain and experience of care.

As shown in Table 4, total staffing ratio was a significant predictor of mental health domain and population coverage and was a stronger predictor of the variance in these composite measures than were SPARQ variables (17% versus 6% and 15% versus 5%, respectively). Total staffing ratio and SPARQ quadrants predicted the variance in continuity of care (4% versus 3%) and experience of care (9% versus 10%) to a similar extent. Compared with being in an inefficient SPARQ quadrant, being in an optimized SPARQ quadrant significantly and positively predicted mental health domain, population coverage, and experience of care, and being in an overresourced SPARQ quadrant significantly predicted experience of care.

DISCUSSION AND CONCLUSIONS

Our study is among the first to demonstrate substantial and positive relationships between population-based mental health staffing ratios and access to and quality of mental health services (24, 25). It is also among the first to suggest that mental health staffing may be relatively more important than other factors that can be addressed by mental health managers to improve access to and quality of mental health services.

VHA provides substantial mental health programming across a broad continuum of evidence-based care modalities to a population that utilizes mental disorder treatment at a high rate. For example, in 2013, 26% of the overall VHA population used mental health specialty services (26). Thus our results provide information needed for optimizing mental health care, within and outside VHA. Specifically, this study provides guidance on likely resource needs of health care systems that, like VHA, provide extensive, broad, and nuanced mental health treatment in numerous, disparate facilities to a population that varies considerably in illness severity and treatment need (26). Our results suggest that mental health staffing ratios, especially ratios of total staff and therapists, should be a primary consideration when trying to improve access to and quality of mental health services at the facility level.

Notably, staffing ratios generally had stronger relationships with overall access to and quality of mental health services (broadly and in specific domains, such as population access) compared with staff productivity and patient wait times, regardless of whether productivity and wait times were evaluated separately or together by SPARQ quadrant. Thus increasing mental health staff relative to patients may have more influence on access and quality than singular efforts to increase productivity or reduce wait times. Additionally, staffing ratios were strong predictors of access to

and quality of mental health services, regardless of the complexity of care provided at the health care facility.

By demonstrating that higher mental health staffing ratios were associated with better access to and quality of mental health services, our results extend the mental health staffing literature (5–14). Caseload or case management staffing models are insufficient for VHA, given the size of the health care system and increasing demands for mental health services; reported panel sizes would require a substantially larger mental health workforce than is available and do not reflect efficiencies obtained through team-based care in an integrated health care system. For veterans with serious mental illness, who need ongoing intensive mental health services, VHA maintains dedicated programs where small caseloads (e.g., 10 veterans) are expected (17). However, most veterans seeking mental health care benefit from time-limited, episodic treatment, in which veterans receive treatment as needs arise. VHA developed the efficiency-based SPARQ tool to address natural inefficiencies in mental health treatment. Although intuitively appealing, efficiency-based tools may create the appearance that VHA medical facilities are balanced and aligned while a significant portion of the population needing treatment remains unscheduled for care.

Having more mental health staff of all types was associated with better overall access to and quality of mental health services. Additionally, results of analyses including various staff types suggested that multiple staff types (especially therapists and, to a lesser extent, psychiatrists) are needed to provide high-quality mental health care. The unique roles served by mental health staff of various types are likely important in providing the diverse range of treatments needed to address the clinical needs of persons with mental health conditions. For example, psychiatrists and other prescribers are experts in biomedical treatments, such as prescribing effective medications, whereas psychologists focus on the provision of psychosocial treatments, such as evidence-based psychotherapy. There is overlap in scope of practice that can be completed by different types of staff. For

TABLE 3. Results of hierarchical multiple regression analyses (set 2) predicting mental health SAIL composites, by step and predictor[a]

	Mental health domain			Population coverage			Continuity of care			Experience of care		
		R^2			R^2			R^2			R^2	
Step and predictor	β	Semipartial	Adjusted	β	Semipartial	Adjusted	β	Semipartial	Adjusted	β	Semipartial	Adjusted
Step 1			.25**			.19***			.05*			.18***
Psychiatrist staffing ratio	.24**	.06		.24**	.06		.13	.02		.16	.02	
Prescriber staffing ratio	.13	.02		.03	.00		.08	.01		.18*	.03	
Therapist staffing ratio	.40***	.15		.35***	.12		.19*	.03		.34***	.11	
Step 2			.36***			.29***			.08*			.27***
Psychiatrist staffing ratio	.25**	.04		.31***	.07		.15	.02		.09	.01	
Prescriber staffing ratio	.14	.02		.09	.01		.09	.00		.14	.02	
Therapist staffing ratio	.41***	.12		.36***	.10		.20*	.03		.33***	.08	
Psychiatrist productivity	.04	.00		.23**	.04		–.01	.00		–.14	.02	
Prescriber productivity	.02	.00		.05	.00		–.03	.00		.03	.00	
Therapist productivity	.17*	.02		.14	.02		.15	.02		.08	.01	
Wait time	.27***	.07		.13	.02		.15	.02		.32***	.09	
Facility complexity	.14	.02		.17*	.02		.14	.01		.00	.00	

[a] Predictors: psychiatrist, prescriber, and therapist staffing ratios and productivity, wait time, and facility complexity. SAIL, Strategic Analytics for Improvement and Learning.
*p<0.05, **p<0.01, ***p<0.001

TABLE 4. Results of hierarchical multiple regression analyses (set 3) predicting mental health SAIL composites, by step and predictor[a]

Step and predictor	Mental health domain			Population coverage			Continuity of care			Experience of care		
		R^2			R^2			R^2			R^2	
	β	Semipartial	Adjusted	β	Semipartial	Adjusted	β	Semipartial	Adjusted	β	Semipartial	Adjusted
Step 1			.26***			.19***			.08**			.16***
Total staffing ratio	.52***	.27		.44***	.20		.29**	.08		.40***	.16	
Step 2			.32***			.23***			.11**			.26***
Total staffing ratio	.44***	.17		.42***	.15		.21*	.04		.33***	.09	
SPARQ quadrant[b]												
Optimized	.28**	.04		.23*	.03		.11	.01		.27**	.04	
Underresourced	−.07	.00		.14	.01		−.17	.02		−.10	.01	
Overresourced	.16	.02		−.02	.01		.08	.00		.29**	.05	
Facility complexity	.02	.00		−.01	.00		.08	.01		−.02	.00	

[a] Predictors: total staffing ratio, Specialty Productivity–Access Report and Quadrant (SPARQ), and facility complexity. SAIL, Strategic Analytics for Improvement and Learning.
[b] Facilities grouped together in the inefficient quadrant served as the comparison.
*$p<0.05$, **$p<0.01$, ***$p<0.001$

example, psychologists, other counselors, and social workers can all deliver types of evidence-based psychotherapies. Having a variety of staff may enable more efficient or cost-effective care delivery. For example, midlevel staff might treat stable patients or those whose needs are less complex, allowing doctoral level staff to treat patients with more complex conditions. Thus it would be unwise to focus solely on increasing the number of psychiatrist FTE (12).

Staff productivity predicted some (e.g., mental health domain) but not other (e.g., experience of care) measures of access to and quality of mental health services. Lower wait time, on the other hand, consistently predicted better performance on all mental health SAIL composites. This suggests that the ability to provide an appointment in a timely manner is key to patients' receipt of evidence-based services and satisfaction with care. However, the findings suggest that wait time metrics do not provide information about service gaps for the patient population. In models with total staffing ratio, the association between wait time and population coverage was smaller than for other SAIL composites, and in models with specific staff types there was no association between wait times and population coverage. Wait time metrics do not identify patients who are unable to receive an appointment because services are not available (e.g., a patient who requires daily in-person visits but lives 4 hours from intensive outpatient programming).

Outpatient mental health staffing appears particularly important for ensuring service availability for the full population of patients with diagnosed mental disorders. Managers who want to improve overall mental health performance and, especially, population coverage may benefit from increasing total, psychiatrist, and therapist productivity in addition to increasing staffing ratios. Likewise, managers may benefit from addressing and shortening wait times to improve overall mental health performance, along with perceived experience of care.

Grouping productivity and wait times (as in SPARQ) may not adequately characterize access to and quality of mental health treatment at a given facility. This was demonstrated by differences in the prediction of SAIL composites by productivity and wait times and by the relatively small percentage of the variance in mental health SAIL composites (other than experience of care) predicted in total by SPARQ quadrants. Regardless, our results suggest that staffing ratios should be considered even when utilizing tools that combine wait time and productivity measures, such as SPARQ.

Needed next is a longitudinal investigation of stability of relationships between staffing ratios and access to and quality of mental health services, which can also provide an examination of how changes in staff ratios affect access and quality. Such studies can address limitations with cross-sectional studies, in addition to determining directionality and causality of relationships. Future research might also examine additional factors thought to influence mental health care and access other than staffing, productivity, and wait times (e.g., patient acuity and regional variation in

diagnoses). Last, our staffing ratios (and productivity and wait time variables) were obtained from administrative data. Although potentially less overtly biased than other data, administrative data provide only an indirect measure of clinical care. Clinician self-report would provide a direct measure, although it would be unfeasible to add to the already extensive duties of clinicians and it would be difficult to obtain unbiased and accurate estimates. Thus health care systems may benefit from considering the benefits and potential costs of using different methods and, potentially, using more than one method.

AUTHOR AND ARTICLE INFORMATION

Program Evaluation and Resource Center, Veterans Health Administration (VHA) Office of Mental Health and Suicide Prevention, Menlo Park, California (Boden, Trafton); Center for Innovation to Implementation, VHA Palo Alto Health Care System, Palo Alto, California (Boden); Department of Psychiatry and Behavioral Sciences, Stanford University Medical School, Stanford, California (Trafton); VHA Office of Mental Health and Suicide Prevention, Washington, D.C. (Smith, Klocek). Send correspondence to Dr. Boden (matthew.boden@va.gov).

The authors acknowledge the VHA Program Evaluation and Resource Center, which provided mental health onboard clinical staffing and productivity data and mental health Strategic Analytics for Improvement and Learning data; the VHA Office of Productivity, Efficiency, and Staffing, which provided Specialty Productivity–Access Report and Quadrant (SPARQ) data and facility complexity data; and the VHA Support Service Center, which provided wait time data.

The authors report no financial relationships with commercial interests.

Received May 10, 2018; revisions received August 29 and October 3, 2018; accepted October 11, 2018; published online November 30, 2018.

REFERENCES

1. Berwick DM, Nolan TW, Whittington J: The triple aim: care, health, and cost. Health Aff 2008; 27:759–769
2. Bodenheimer T, Sinsky C: From triple to quadruple aim: care of the patient requires care of the provider. Ann Fam Med 2014; 12: 573–576
3. Shulkin DJ: Beyond the VA crisis—becoming a high-performance network. N Engl J Med 2016; 374:1003–1005
4. Kaplan RS, Haas DA: How not to cut health care costs. Harv Bus Rev 2014; 92:116–122
5. Baker JG: A spreadsheet method for calculating maximum caseload and intake capacity for CMHC psychiatrists. Psychiatr Serv 1997; 48:1578–1581
6. Bhaskara SM: Setting benchmarks and determining psychiatric workloads in community mental health programs. Psychiatr Serv 1999; 50:695–697
7. Burke BT, Miller BF, Proser M, et al: A needs-based method for estimating the behavioral health staff needs of community health centers. BMC Health Serv Res 2013;13:245–257
8. Dial TH, Bergsten C, Haviland MG, et al: Psychiatrist and nonphysician mental health provider staffing levels in health maintenance organizations. Am J Psychiatry 1998;155:405–408
9. Ellis AR, Konrad TR, Thomas KC, et al: County-level estimates of mental health professional supply in the United States. Psychiatr Serv 2009;60:1315–1322
10. Faulkner LR, Goldman CR: Estimating psychiatric manpower requirements based on patients' needs. Psychiatr Serv 48:666–670, 1997
11. Goldman CR, Faulkner LR, Breeding KA: A method for estimating psychiatrist staffing needs in community mental health programs. Hosp Community Psychiatry 1994; 45:333–337
12. Morrison J: A staffing model based on workload in three VA mental health clinics. Psychiatr Serv 1998;49:1091–1093
13. Scheffler R, Ivey SL: Mental health staffing in managed care organizations: a case study. Psychiatr Serv 1998;49:1303–1308
14. Thomas KC, Ellis AR, Konrad TR, et al: County-level estimates of mental health professional shortage in the United States. Psychiatr Serv 2009; 60:1323–1328
15. Kearney LK, Smith C, Kivlahan DR, et al: Mental health productivity monitoring in the Veterans Health Administration: challenges and lessons learned. Psychol Serv 2017 (Epub ahead of print, July 17, 2017)
16. Productivity and Staffing Guidance for Specialty Provider Group Practice. VHA Handbook 1065.0. Washington, DC, Veterans Health Administration, 2015
17. Uniform Mental Health Services in VA medical centers and clinics. VHA Handbook 1160.01. Washington, DC, Veterans Health Administration, 2008
18. Lemke S, Boden MT, Kearney LK, et al: Measurement-based management of mental health quality and access in VHA: SAIL mental health domain. Psychol Serv 2017; 14:1–12
19. Ludke RL, Curry JP, Saywell RM Jr: The community survey and the health services provider. J Health Care Mark 1983; 3:39–52
20. Martilla JA, James JC: Importance-performance analysis. Journal of Marketing 1977; 1:77–79
21. Cohen J, Cohen P, West SG, et al: Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences. Mahwah, NJ, Erlbaum, 2003
22. Schmidt EM, Krahn DD, McGuire MH, et al: Using organizational and clinical performance data to increase the value of mental health care. Psychol Serv 2017; 14:13–22
23. Gao J, Moran E, Almenoff PL, et al: Variations in efficiency and the relationship to quality of care in the veterans health system. Health Aff 2011; 30:655–663
24. Coleman JC, Paul GL: Relationship between staffing ratios and effectiveness of inpatient psychiatric units. Psychiatr Serv 2001; 52: 1374–1379
25. Levine DS, McCarthy JF, Cornwell B, et al: Primary care–mental health integration in the VA health system: associations between provider staffing and quality of depression care. Psychiatr Serv 2017; 68:476–481
26. VA Mental Health Services: Public Report in Response to National Defense Authorization Act of 2013, Public Law no 112-239, section 726. Washington, DC, US Department of Veterans Affairs, 2014