Development and Validation of a Short-Form Safety Net Medical Home Scale

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Objective. To develop a short-form Safety Net Medical Home Scale (SNMHS) for assessing patient-centered medical home (PCMH) capability in safety net clinics.

Data Sources/Study Setting. National surveys of federally qualified health centers (FQHCs). Interviews with FQHC directors.

Study Design. We constructed three short-form SNMHS versions and examined correlations with full SNMHS and related primary care assessments. We tested usability with FQHC directors and reviewed scale development with an advisory group.

Data Collection. Federally qualified health center surveys were administered in 2009 and 2013, by mail and online. Usability testing was conducted through telephone interviews with FQHC directors in 2013.

Principal Findings. Six-, 12-, and 18-question short-form SNMHS versions had Pearson correlations with full scale of 0.84, 0.92, and 0.96, respectively. All versions showed a level of convergent validity with other primary care assessment scales comparable to the full SNMHS. User testers found short forms to be low-burden, though missing some PCMH concepts. Advisory group members expressed caution over missing concepts and appropriate use of short-form self-assessments.

Conclusions. Short-form versions of SNMHS showed strong correlations with full scale and may be useful for brief assessment of safety net PCMH capability. Each short-form SNMHS version may be appropriate for different research, quality improvement, and assessment purposes.

Key Words. Uninsured/safety net providers, primary care, psychometrics

Safety net clinics have made significant investments to increase patient-centered medical home (PCMH) capability to improve health care and outcomes, with federal and state governments providing technical assistance and financial support (Centers for Medicare and Medicaid Services 2016; Health Resources and Services Administration 2016). In this context, it is important to assess the level of adoption of the PCMH model for

quality improvement and policy evaluation purposes. However, the complexity and burden of existing PCMH recognition programs and assessment instruments have deterred serial measurement. We have previously developed the Safety Net Medical Home Scale (SNMHS), a 51-item tool for evaluating PCMH adoption (Birnberg et al. 2011). Researchers have used the scale to assess PCMH capability for studies of a multistate safety net PCMH demonstration project (Birnberg et al. 2011; Gunter et al. 2017) and a large academic medical center (Aysola et al. 2015). The SNMHS has also been used in national studies of federally qualified health centers that assessed the association between PCMH capability and clinic operating costs (Nocon et al. 2012) and clinical quality measures (Shi et al. 2015), as well as a study identifying factors associated with PCMH adoption (Gao et al. 2016). Still, users of the scale expressed a desire for a shorter assessment tool, which may promote wider adoption.

Therefore, we sought to develop a short-form version of the SNMHS. A shorter scale may be useful to conduct more frequent assessment and to reduce respondent burden. A short-form SNMHS can also provide national benchmarks for PCMH adoption since the full SNMHS was administered to most health centers in 2009 and 2013. Currently, we are aware of only one other brief, publicly available PCMH self-assessment tool, the Medical Home Index in Adult Primary Care Short Version (MHIAPC-SV) and the related pediatric-focused, the Medical Home Index: Short Version (MHI-SV) (Center for Medical Home Improvement 2006, 2009). The MHIAPC-SV and the MHI-SV each describe three levels of performance across each of 10 PCMH indicators which have been derived from CMHI's original Medical Home Index-Full Version (MHI-FV).

We describe the development and testing of short-form versions of the SNMHS. Our goal was to develop a short-form scale based on the original SNMHS that has face validity, represents the core concepts of the medical home, and has extremely low response burden. The University of Chicago Institutional Review Board approved this study.

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METHODS

Scale development work involved three phases: first, a core team developed and tested the initial short-form scales; second, the team conducted user-tests of the short-form scales among health center directors and chief executive officers; third, the team reviewed the scale development with an external advisory group. Below, we provide context on the original SNMHS, describe data sources used for analysis, and provide detail on the three major steps in scale development.

Characteristics of the Safety Net Medical Home Scale

The SNMHS assesses six domains: Access to Care and Communication with Patients, Patient Tracking and Registry, Test and Referral Tracking, Care Management, Quality Improvement, and Care Coordination. Initial development and testing of the SNMHS occurred in 2008 and included input from an advisory committee in a 1-day in-person meeting to obtain initial feedback and follow-up edits reviewed by email (see Birnberg et al. 2011). The SNMHS produces 0 to 100-point scores for each domain and a total PCMH score with a 0 to 100-point scale. Where possible, response options for questions in the SNMHS rely on concrete criteria or thresholds to support consistency and comparability of responses. For example, questions that ask how frequently a practice is performed are tied to quantitative thresholds—"usually" is specifically characterized as "75–100 percent of the time," "often" is characterized as "50–74 percent of the time," and so on. The SNMHS demonstrated high internal consistency reliability for the total PCMH score (Cronbach's $\alpha = 0.84$) and individual PCMH domains (Cronbach's α range, 0.60–0.89). The SNMHS also demonstrated convergent validity with two survey tools that have content validity for PCMH concepts: the Assessment of Chronic Illness Care (ACIC) tool ($r = 0.64$, $p < .001$) and the Patient-Centered Medical Home Assessment (PCMH-A) ($r = 0.56$, $p < .001$) (Bonomi et al. 2002; Sidorov 2008; Daniel et al. 2013).

Data Sources

We used data from three different administrations of the SNMHS to develop and analyze potential short-form versions of the scale. In 2009 and 2013 the SNMHS was embedded into national surveys of Federally Qualified Health Centers sponsored by The Commonwealth Fund. In each administration, the

survey was sent to Executive Directors or Chief Executive Officers of all health center grantees with at least one community-based primary care site. While the exact position title of the individual may vary across health centers, HRSA requires that all health centers identify an Executive Director or Chief Executive Officer role as the individual who “reports to the health center’s governing board and is responsible for overseeing other key management staff in carrying out the day-to-day activities necessary to fulfill the HRSA-approved scope of project” (HRSA 2017). Respondents completed surveys either by mail or online. Full details on these survey administrations have been published elsewhere (Doty et al. 2010). A third administration of the SNMHS provided the data for our analyses of convergent validity of the short forms. These data are from a survey of 65 safety net clinics in five states participating in a medical home demonstration project (Birnberg et al. 2011).

Initial Development of Short-Form SNMHS Versions

An eight-member research team initially reviewed SNMHS items to develop the short forms. The research team included expertise on primary care, health care quality, health disparities, and survey design and analysis (see Acknowledgements for individual listings). All initial survey development work was conducted with data from 2009, the most recent data available when short-form scale development work began. Assessment of potential short-form items was guided by four main criteria: (1) face validity so items represented key aspects of PCMH domains; (2) discriminatory power so items differentiated high- and low-performing PCMHs; (3) representativeness so an item adequately correlated with the domain and total PCMH scores; and (4) clarity, so questions were easy to understand. Initially, each group member created a “priority list” of items that he or she believed best preserved the content of each domain based on face validity. The priority lists were pooled, and the group discussed and selected items for a short-form SNMHS. Group members were provided with analyses of the 2009 health center survey responses, including correlations between individual questions, questions and domain scores, and questions and total scores; distributions of resulting total PCMH and domain scores using various combinations of questions included in the initial priority list; and correlation with external sources to examine the performance of the full scale and short-form scales with the PCMH-A and the ACIC. Group members suggested reduced sets of items until consensus was reached on three short-form SNMHS versions of decreasing length: 18, 12, and 6 questions (Table 2).

User Testing of Short-Form Versions

Eight health center (HC) Chief Executive Officers (CEOs) or Executive Directors (EDs) from the MidWest Clinicians' Network served as user testers. Participants recorded the time to complete the 6-item, 12-item, and 18-item short-form SNMHS. Participants provided feedback via phone interviews regarding survey clarity, burden, and face validity for PCMH concepts. Participants received a \$150 honorarium.

External Advisory Group Review of Short-Form Scale Development

We convened an advisory group to review the short-form development process and the results of the statistical analysis and user testing described above. The group included individuals who participated in the development of the 2009 and 2013 FQHC Surveys, as well as stakeholders from organizations that provide technical assistance to FQHCs on PCMH transformation, advocate for FQHCs on policy issues, and administer federal funding and data collection on FQHCs.

Statistical Analysis

We provide descriptive characteristics on health centers that responded to the 2009 Commonwealth Fund National Surveys of Federally Qualified Health Centers and the subset of health centers that responded to both the 2009 and 2013 surveys. We provide several summary statistics of PCMH capability measured by the SNMHS for the total score and individual PCMH domains: mean, standard deviation (SD), median, range, frequency, and/or proportion. We also characterize the distribution of the differences between the score obtained from the full scale compared to each short-form scale to show how different any individual health center's short-form SNMHS score could be from the full scale.

We show Pearson correlation coefficients between short-form and full scale for total PCMH score and domain scores. We use Cronbach's alpha to assess internal consistency reliability. We assess convergent validity using two related primary care assessment scales, the Patient-Centered Medical Home Assessment (PCMH-A) and the Assessment of Chronic Illness Care (ACIC). The PCMH-A is an interactive tool that allows primary care practices to self-evaluate progress in the PCMH transformation process (Daniel et al. 2013). The ACIC helps providers assess their delivery of care for chronic illness.

Both the PCMH-A and ACIC were administered to 54 clinics participating in the Safety Net Medical Home Initiative in 2009 (Birnberg et al. 2011).

We report results of user testing, including average time to completion of the short-form surveys and themes from the interviews. We summarize themes of the external advisory group discussion. The study received institutional review board (IRB) approval from the University of Chicago Biological Sciences Division IRB.

RESULTS

Characteristics of Responding Health Centers

Table 1 displays characteristics of the 795 health centers that responded to the Commonwealth Fund Surveys of FQHCs in 2009. The study sample included health centers from all nine U.S. Census Divisions, with the Pacific (18.6 percent) and South Atlantic (17.6 percent) comprising the largest proportions. On average, health centers reported have 8.0 full-time equivalent providers (SD = 10.2) and 16,023 patients (SD = 17,026). Health centers that completed both the 2013 and 2009 surveys ($n = 522$) were statistically significantly different from those who completed the 2009 survey only ($n = 273$). Those who completed both surveys were smaller (in terms of number of providers and patients served) and served an older population that was less likely to be female or have Medicaid insurance.

Short-Form Safety Net Medical Home Scales: Content, Distributions, Validity, and Reliability

Content. Table 2 shows the items included in the three short-form versions of the SNMHS. Each of the versions preserves the six-domain structure of the original SNMHS.

Distributions. Table 3 shows the study sample's distribution of PCMH scores under the full-scale and short-form versions of the SNMHS, as well as selected psychometric properties of each scale for the Total PCMH Score. Overall, short-form versions provided similar estimates of the average PCMH scores to the full SNMHS. For the Total PCMH Score, the short forms differed from the full-scale mean by 1.2 points (18-item), 1.0 points (12-item), and 3.3 points (6-item), on the 0–100 scale. Among PCMH domains, short forms produced scores similar to the full scale for Access to Care and Communication with

Table 1: Characteristics of Health Centers That Responded to the Survey in 2009 and 2013

	<i>Short-Form Development Sample (2009 Survey)</i>	<i>Test-Retest Sample (Responded to 2009 and 2013 Surveys)</i>	<i>p-Value*</i>
Total Health Center Respondents (#)	795	522	n/a
U.S. Census Division			
New England (#, %)	70 (8.8)	49 (9.4)	.497
Middle Atlantic (#, %)	70 (8.8)	45 (8.6)	
East North Central (#, %)	96 (12.1)	68 (13.0)	
West North Central (#, %)	61 (7.7)	39 (7.5)	
South Atlantic (#, %)	140 (17.6)	85 (16.3)	
East South Central (#, %)	57 (7.2)	35 (6.7)	
West South Central (#, %)	72 (9.1)	44 (8.4)	
Mountain (#, %)	62 (7.8)	46 (8.8)	
Pacific (#, %)	148 (18.6)	101 (19.3)	
US Territory (#, %)	19 (2.4)	10 (1.9)	
Urban location (#, %)	324 (43.7)	199 (41.2)	.058
Annual patient volume, 000's (#, SD) [†]	16.0 (17.0)	15.0 (15.7)	<.001
Provider full-time equivalents (#, SD)	8.0 (10.2)	7.6 (9.8)	.002
Patient age, years (#, SD) [†]	32.8 (6.0)	33.3 (6.2)	.001
Percent female (%), SD) [†]	58.2 (7.2)	57.7 (7.3)	.002
Percent Medicaid insured (%), SD) [†]	30.5 (15.5)	29.2 (15.3)	.002

*Test of difference (Wilcoxin rank-sum or chi-squared) in health center characteristics between those responding to 2009 and 2013 survey ($n = 522$) compared to those only responding to 2009 surveys ($n = 273$).

[†]Mean and standard deviation of percentages reported by health center, not weighted by health center size or patient volume.

Patients, Test and Referral Tracking, and Care Management, with the largest magnitude difference in mean being 5.2 points. Short-form mean scores exceeded an 8-point difference from the full scale for at least one short-form version for Patient Tracking and Registry, Quality Improvement, and Care Coordination.

Validity. Short-form versions showed similar criterion validity as the full SNMHS, with similar correlations to other primary care assessment scales (Table 3). The six-item scale performed worst on criterion validity with 0.49 correlation with the PCMH-A (compared to 0.56 for the full scale) and 0.54 correlation with the ACIC (0.64 for full scale).

Short-form versions showed high correlations with the full SNMHS for total PCMH score (Table 4): 0.96 (18-item), 0.92 (12-item), and 0.84 (6-item). Among PCMH domains, correlations remained high at the domain level for

Table 2: Summary of Questions for 18-, 12-, and 6-Item Short-Form SNMHS Candidate Scales

Domain	Brief Question Summary and Number*	Item		
		18	12	6
1: Access to Care and Communication with Patients	<i>In addition to regular office hours, please indicate when the following types of patient visits (regular or well visits) can be scheduled? Select all that apply. (Question 13b)</i>	x	x	
	Early, Evening, Weekend hours			
	<i>How often do you think your patients are able to receive a same or next-day appointment when they request one? (Question 16b)</i>	x	x	
	Usually (75–100% of the time), Often (50–74%), Sometimes (25–49%), Rarely (1–24%), Never			
2: Patient Tracking and Registry	<i>How often do you think your patients can get telephone advice on clinical issues on weekends or after regular office hours? (Question 16d)</i>	x	x	x
	Usually (75–100% of the time), Often (50–74%), Sometimes (25–49%), Rarely (1–24%), Never			
	<i>Do you currently use an electronic list of all medications taken by a patient (including those prescribed by other doctors)? (Question 11e)</i>	x	x	
	Yes, used routinely; Yes, used occasionally; No			
	<i>With the patient medical records system you currently have, how easy would it be for the staff to generate a list of patients by lab result? (Question 12c)</i>	x	x	x
	Easy (<24 hours); Somewhat difficult (<1 week); Difficult (1 week); Cannot generate			
	<i>With the patient medical records system you currently have, how easy would it be for the staff to generate a list of patients who are due or overdue for tests or preventive care? (Question 12d)</i>	x		
	Easy (<24 hours); Somewhat difficult (<1 week); Difficult (1 week); Cannot generate			
	<i>With the patient medical records system you currently have, how easy would it be for the staff to generate a list of all patients taking a specific medication? (Question 12e)</i>	x		
	Easy (<24 hours); Somewhat difficult (<1 week); Difficult (1 week); Cannot generate			

Continued

Table 2: Continued

Domain	Brief Question, Summary and Number*	Item		
		18	12	6
3: Care Management	How often, if ever, are patients sent reminder notices for preventive or follow-up care? (Question 13a)	x	x	
	Usually (75–100% of the time), Often (50–74%), Sometimes (25–49%), Rarely (1–24%), Never			
	How often, if ever do providers receive an alert/prompt at point of care for appropriate care services needed by patients? (Question 13b)	x	x	x
	Usually (75–100% of the time), Often (50–74%), Sometimes (25–49%), Rarely (1–24%), Never			
4: Test and Referral Tracking	Indicate which members of your staff routinely coordinate care with providers outside of your clinic as part of their regular jobs? Select all that apply. (Question 17d)	x		
	Physicians, Advance Practice Providers, Nurses, Other Clinical Staff, Non-Clinical Staff			
	How often, if ever, are all labs ordered tracked until results reach clinicians? (Question 13d)	x	x	x
	Usually (75–100% of the time), Often (50–74%), Sometimes (25–49%), Rarely (1–24%), Never			
5: Quality Improvement	When patients are referred to specialists or subspecialists outside the clinic, how often does your clinic track specialist/subspecialist referrals until the consultation report returns to the referring provider? (Question 21c)	x		
	Usually (75–100% of the time), Often (50–74%), Sometimes (25–49%), Rarely (1–24%), Never			
	Does the clinic have enough information systems to provide timely data and feedback to staff on QI activities to support QI activities? (Question 4b)	x		
	Do not have; Yes, but need more; Yes, and have enough			
	Is the following performance data collected and reported at the clinic: clinical outcomes? Select all that apply. (Question 5a)	x	x	x
	At the provider level, at the group practice level, not collected or reported			
	Is the following performance data collected and reported at the clinic: Surveys of patient satisfaction and experiences with care? (Question 5b)	x	x	
	At the provider level, at the group practice level, not collected or reported			

Continued

Table 2: Continued

Domain	Brief Question Summary and Number*	Item		
		18	12	6
6: Care Coordination	How difficult is it for your providers to obtain timely appointments for office visits with specialists or subspecialists outside the clinic for Medicaid Fee-for-Service patients? (Question 20aiii)	x	x	x
	Easy, somewhat difficult, very difficult			
	When patients are referred to specialists or subspecialists outside the clinic, how often does the referring provider receive a report back from the specialist/subspecialist about care given to the patient? (Question 21a)	x		
	Usually (75–100% of the time), Often (50–74%), Sometimes (25–49%), Rarely (1–24%), Never			
	Thinking about the hospital to which your patients are most commonly admitted, if a patient is admitted to the hospital or emergency department how often does your clinic receive a discharge summary or report from the hospital to which your patients are usually admitted? (Question 22c)	x	x	
	Usually (75–100% of the time), Often (50–74%), Sometimes (25–49%), Rarely (1–24%), Never			

Notes: SNMHS is Safety Net Medical Home Scale (Birnberg 2011).

*Question numbers refer to The Commonwealth Fund 2009 Survey of Health Clinics Involved in the Safety Net Medical Home Initiative. Available at: http://www.commonwealthfund.org/~media/files/publications/other/2011/cmwf_surveyfinal722.pdf?la=en.

Table 3: Summary of Total PCMH and Domain Scores Using Full SNMHHS and Short-Form Versions

	<i>N</i> = 795*	<i>Full Scale</i>	<i>Short Forms</i>		
		<i>51-Items</i>	<i>18-Item</i>	<i>12-Item</i>	<i>6-Item</i>
Total PCMH score					
Mean (SD), ± from full		61.0 (12.3), n/a	62.2 (13.7), 1.2	62.0 (15.7), 1.0	64.3 (18.0), 3.3
Cronbach's alpha		0.84	0.74	0.61	0.47
Correlation w/PCMH-A		0.56	0.57	0.51	0.49
Correlation w/ACIC		0.64	0.61	0.55	0.54
1: Access to care and communication with patients mean (SD), ± from full		66.2 (14.5), n/a	66.0 (20.0), -0.2	66.0 (20.0), -0.2	69.6 (35.3), 3.4
2: Patient tracking and registry mean (SD), ± from full		63.8 (24.7), n/a	51.9 (32.0), -11.9	53.8 (34.9), -10.0	65.6 (37.8), 1.7
3: Care management mean (SD), ± from full		69.6 (23.7), n/a	74.8 (26.2), 5.2	73.9 (35.4), 4.3	73.9 (35.4), 4.3
4: Test referral and tracking mean (SD), ± from full		48.7 (18.7), n/a	51.6 (22.4), 2.9	49.7 (30.1), 1.0	50.3 (37.8), 1.6
5: Quality improvement mean (SD), ± from full		59.1 (15.4), n/a	62.4 (19.2), 3.3	67.5 (22.1), 8.4	70.8 (26.4), 11.7
6: Care coordination mean (SD), ± from full		58.4 (18.3), n/a	66.4 (20.0), 8.1	60.7 (24.4), 2.3	55.3 (32.9), -3.1

Notes: PCMH is Patient-Centered Medical Home. SNMHHS is Safety Net Medical Home Scale (Birnberg 2011). SD is standard deviation. PCMH-A is Patient-Centered Medical Home Assessment (Daniel 2013). ACIC is Assessment of Chronic Illness Care (Bonomi 2002).

*Number of respondents for any given cell differs due to respondents with missing data for some questions. Range of sample size variation across all cells is from 742 to 793 respondents.

Table 4: Correlations and Differences between Full SNMHS and Short-Form Versions

	<i>18-item</i>	<i>12-item</i>	<i>6-item</i>
Total PCMH score			
Correlation*	0.96	0.92	0.84
Difference (Median, [Min, Max]) [†]	1.4 [−10.9, 12.6]	1.2 [−18.8, 17.4]	3.7 [−30.2, 31.5]
Domain 1: Access to care and communication with patients			
Correlation*	0.93	0.93	0.68
Difference (Median, [Min, Max]) [†]	0.7 [−30.6, 25.0]	0.7 [−30.6, 25.0]	10.4 [−66.7, 54.2]
Domain 2: Patient tracking and registry			
Correlation*	0.91	0.78	0.67
Difference (Median, [Min, Max]) [†]	−10.0 [−50.0, −30.0]	−6.7 [−74.1, 66.7]	3.3 [−90.0, 76.7]
Domain 3: Test and referral tracking			
Correlation*	0.85	0.78	0.75
Difference (Median, [Min, Max]) [†]	4.2 [−37.5, 50.0]	4.2 [−66.7, 66.7]	4.2 [−66.7, 66.7]
Domain 4: Care management			
Correlation*	0.89	0.80	0.80
Difference (Median, [Min, Max]) [†]	3.3 [−33.3, 53.1]	0.0 [−53.6, 55.0]	2.5 [−62.5, 67.5]
Domain 5: Quality improvement			
Correlation*	0.83	0.71	0.61
Difference (Median, [Min, Max]) [†]	3.3 [−26.7, 38.3]	10.0 [−45.0, 58.6]	10.0 [−60.0, 74.1]
Domain 6: Care coordination			
Correlation*	0.88	0.84	0.63
Difference (Median, [Min, Max]) [†]	8.3 [−28.8, 43.8]	2.1 [−72.5, 52.1]	−2.1 [−72.5, 60.0]

Notes. SNMHS is Safety Net Medical Home Scale (Birnberg 2011).
*Pearson correlation coefficient between short-form SNMHS score and full-SNMHS score.
[†]Mean difference is calculated by subtracting the score based on the full SNMHS from the short-form SNMHS score, then taking the mean of that difference across all clinics. Min and Max difference indicate the largest difference in score between short-form and full-SNMHS; Min is where short form provides a lower score than full; Max is where short form provides a higher score than full.

the 18-item (0.83–0.93) and 12-item (0.71–0.93) and were slightly lower for the 6-item scale (0.62–0.80).

When examining the range of differences in scores between short-form and full scales for any given clinic, we found that the PCMH scores may differ substantially for some clinics (Table 4). While the median difference in score across the full sample of clinics was only 1.4 points when comparing the 18-

item short form to the full scale, an individual clinic could have a short-form score as much as 10.9 points lower than the full-scale score or 12.6 points higher. These minimum and maximum score differences are even higher for the 6-item scale, with the short form producing a score that is as much as 30.2 points lower or 31.5 points higher than the full scale on the 0–100 score range.

Reliability. Cronbach's alpha decreased as the number of items in each scale decreased (Table 3). When we repeated our comparison of short-form SNMHS scales against the full scale using data from the 2013 administration of the survey, we found very similar performance between 2009 and 2013. While the mean PCMH scores increased between 2009 and 2013, reflecting improvement in PCMH capability over time, the correlations between short-form SNMHS scores and the full scale were less than or equal to 0.01 different between years (Table 5).

User Testing Results

All user testing participants were from federally qualified health centers (FQHCs) in four states (Ohio-2, Illinois-2, Kansas-2, Missouri-1). The number

Table 5: Test-Retest Results for Total PCMH Score 2009 vs. 2013 Full- and Short-Form SNMHS Versions

Year	SNMHS Version	Full	18-Item	12-Item	6-Item
2009	Mean (SD)	61.0 (12.3)	62.2 (13.7)	62.0 (15.7)	64.3 (18.0)
	Correlation*	n/a	0.96	0.92	0.84
	Differences (Median, [Min, Max]) [†]	n/a	1.4 [−10.9, 12.6]	1.2 [−18.8, 17.4]	3.7 [−30.2, 31.5]
2013	Mean (SD)	73.5 (10.6)	75.2 (12.1)	75.4 (13.4)	76.8 (15.6)
	Correlation*	n/a	0.96	0.92	0.83
	Differences (Median, [Min, Max]) [†]	n/a	1.9 [−13.1, 14.5]	2.3 [−18.3, 17.3]	3.7 [−27.4, 25.5]

Notes. *N* = 522 clinics responding in both 2009 and 2013.

SNMHS is Safety Net Medical Home Scale (Birnberg 2011).

*Pearson correlation coefficient between short-form SNMHS score and full-SNMHS score.

[†]Mean difference is calculated by subtracting the score based on the full SNMHS from the short-form SNMHS score, then taking the mean of that difference across all clinics. Min and Max difference indicate the largest difference in score between short-form and full-SNMHS; Min is where short form provides a lower score than full; Max is where short form provides a higher score than full.

of community-based primary care sites within the health center ranged from 1 to 6. The number of physicians/nurse practitioners ranged from 4 to 26 (mean = 14). Overall, participants reported positive experiences with completing the short-form versions of the SNMHS. All respondents noted low response burden of the short-form SNMHS versions.

The mean time (minutes) for completion was 18-item scale (6:06, range 4:26–9:20), 12-item (4:17, range 2:40–6:35), and 6-item (1:59, range 0:53–3:35). Respondents were concerned about missing PCMH components in each short-form version; however, there was no clear consensus on which important aspects should be added. For the 18-item version, two respondents reported that this version omitted content on patient education, two respondents noted lack of content on team-based care or team functioning, and two respondents reported lack of content on e-communication between patients and providers. Other missing items mentioned by respondents in the short-form scales were patient engagement, patient-self-management, community resources, empanelment, and panel management.

External Advisory Group Feedback

The advisory group identified potential uses of a short-form tool. As HRSA currently only obtains PCMH capability information on health centers that obtain formal PCMH recognition (for example, through the National Committee on Quality Assurance, NCQA), this tool could provide useful information on PCMH capabilities among health centers without NCQA recognition. Additionally, as there are no current plans to re-administer the 2009 and 2013 Commonwealth Fund Surveys, the short-form SNMHS could provide a low-burden option for obtaining further information on national changes in PCMH capabilities in conjunction with existing surveys such as the Uniform Data System (UDS) reports completed by HCs annually (BPHC 2015). The advisory group recommended leveraging existing health center networks and primary care associations to disseminate a short-form version of the SNMHS to potential users. Participants noted that communications around the short-form SNMHS should candidly acknowledge the limitations of the tool. For example, participants emphasized the importance of describing the PCMH concepts that are missing from the scale (e.g., team functioning). Participants cautioned that future users of the short-form scale may misinterpret findings from the tool and conclude that the PCMH is not effective, when it may be that the short-form tool does not assess key PCMH components. However, the group did not recommend additional survey items to

add to the short-form versions to address the measurement gaps, noting that no other tools currently provide measures to adequately assess these topics in a sufficiently brief measure.

The advisory group suggested that any dissemination of a short-form SNMHS should be accompanied by a description of the intended goals of using a short-form SNMHS, with a range of options with pros and cons for each short-form scale, rather than to identify one specific short-form version for all users. Finally, participants mentioned that dissemination should anticipate pushback from different audiences about the potential uses of the tool and that users should understand that short-form versions of the SNMHS were not designed to be used for accountability purposes in health centers.

DISCUSSION

Short-form versions of the SNMHS have high correlations with the full SNMHS, for the total PCMH score as well as individual domains. Short-form versions also correlate well with two other primary care assessment scales, the PCMH-A and ACIC. Short-form versions of the SNMHS have demonstrated face validity and are regarded as low-burden tools among health center participants who found that they were able to complete the short-form questions in 1–10 minutes depending upon whether the 6- or 18-item version was used.

Some stakeholders may have concerns about the ways in which a short-form PCMH scale could be used over time, particularly if there are questions about using the short-form SNMHS for accountability purposes, which may include payment, public reporting, or accreditation. Therefore, we caution potential users that the short-form versions of the SNMHS would require further evaluation and validation for this specific use. However, we believe that the individual short-form versions of the SNMHS are suitable for some types of research and PCMH improvement work in health centers. For example, HRSA tracks data on NCQA recognition of health centers but lacks information on the PCMH capabilities of centers that do not obtain NCQA recognition, either because they chose not to apply or they did not meet the requirements for recognition. A tool such as the short-form version of the SNMHS could provide some information for this group of health centers in a low-burden manner. Ongoing administration of short-form versions of the SNMHS could lead to more information about what it takes to be a PCMH in safety net settings, with the option to compare the performance of health

centers over time to the findings from the 2009 and 2013 studies of FQHCs (Birnberg et al. 2011; Ryan et al. 2015).

There may also be a use for a short-form assessment tool in the context of large-scale PCMH improvement efforts where respondent burden is a particular concern. For example, the short-form SNMHS may be useful for a rapid assessment of a group of health centers to identify specific sites for intervention. For individual health center self-assessment, we anticipate that most would choose to use the full SNMHS as the richness of information provided from the longer assessment would be worth the additional response burden. It is also important to note that the short forms of the SNMHS were developed as general markers for high or low PCMH capability overall and along the six specified domains. The short forms should not be used as a PCMH implementation guide or an indication that the functions addressed in the short-form surveys are those that are highest priority for adoption of the PCMH. Clinics in need of assistance in adopting the PCMH model should refer to tools and expertise available specifically for that purpose (see, for example, Safety Net Medical Home Initiative 2017).

Limitations

The short-form versions of the SNMHS have several limitations. First, they are based on the full 51-item SNMHS, which does not cover all aspects of the medical home. The full SNMHS was developed in 2008, and like other scales developed at the time, does not include in-depth coverage of concepts that have been more recently considered to be a core aspect of the PCMH, such as integration of behavioral health and evaluation of social determinants of health. Advisory group participants expressed specific concern that the full SNMHS may be missing important aspects of the medical home, such as team functioning and use of patient panels. The group noted that the short-form SNMHS also overlooks topics on language services for non-English speakers and questions to assess the role of medical assistants in care teams and patient care. Second, like the full SNMHS, the short-form versions are also designed to be administered among clinic Executive Directors. Some users may question whether Executive Directors have adequate knowledge about detailed clinical operations to adequately respond to survey questions and whether other respondents within a clinic would be a better choice for obtaining assessment of PCMH characteristics within a health center. Executive Director respondents are encouraged to take a team approach when answering the questions or to share the survey with a delegate who could respond on their

behalf. They were also encouraged to base their response on data, where available. However, we did not analyze whether involvement of different types of staff was associated with PCMH score nor did we formally include other sources of data (e.g., provider surveys) in our SNMHS score. Recent studies have constructed multisource PCMH assessment measures that may be a promising direction for measurement (Nelson et al. 2014). Future studies assessing clinic PCMH capabilities may also consider studying how the role of respondents and various aspects of the assessment process (e.g., group discussion) may impact scores. Third, all of our data come from health center settings. We have not analyzed the performance of the short or full scales outside of the safety net, and it is possible that the performance of the scale may differ across settings. While there are limitations to the short-form versions of the SNMHS, given the lack of other low-burden options for survey-based medical home assessments, the short-form SNMHS may fill this gap in publicly available tools.

Ultimately, we believe that the short-form versions of the SNMHS described here can be a useful tool for assessing PCMH capability in health centers, when a low-burden, brief assessment is appropriate.

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REFERENCES

- Aysola, J., R. M. Werner, S. Keddem, R. SoRelle, and J. A. Shea. 2015. "Asking the Patient about Patient-Centered Medical Homes: A Qualitative Analysis." *Journal of General Internal Medicine* 30 (10): 1461–7.
- Birnberg, J. M., M. L. Drum, E. S. Huang, L. P. Casalino, S. E. Lewis, A. M. Vable, H. Tang, M. T. Quinn, D. L. Burnet, T. Summerfelt, and M. H. Chin. 2011. "Development of a Safety Net Medical Home Scale for Clinics." *Journal of General Internal Medicine* 26 (12): 1418–25.
- Bonomi, A. E., E. H. Wagner, R. E. Glasgow, and M. VonKorff. 2002. "Assessment of Chronic Illness Care (ACIC): A Practical Tool to Measure Quality Improvement." *Health Services Research* 37 (3): 791–820.
- Bureau of Primary Health Care. Uniform Data System. 2015. "HRSA Health Center Program" [accessed on March 30, 2017]. Available at <http://bphc.hrsa.gov/data-reporting/index.html>
- Center for Medical Home Improvement. 2006. "The Medical Home Index — Short Version: Measuring the Organization and Delivery of Primary Care for Children with Special Health Care Needs" [accessed on March 30, 2017]. Available at https://medicalhomeinfo.aap.org/tools-resources/Documents/CMHI-MHI-Pediatric_Short-Version.pdf
- Center for Medical Home Improvement. 2009. "Medical Home Index and Medical Home Family Index and Survey Frequently Asked Questions (FAQs)" [accessed on March 30, 2017]. Available at https://medicalhomeinfo.aap.org/tools-resources/Documents/FAQ_Measurementrev11-09.pdf
- Centers for Medicare and Medicaid Services. 2016. "Multi-Payer Advanced Primary Care Practice" [accessed on March 27, 2017]. Available at <https://innovation.cms.gov/initiatives/Multi-payer-Advanced-Primary-Care-Practice/>
- Daniel, D. M., E. H. Wagner, K. Coleman, J. K. Schaefer, B. T. Austin, M. K. Abrams, K. E. Phillips, and J. R. Sugarman. 2013. "Assessing Progress toward Becoming a

- Patient-Centered Medical Home: An Assessment Tool for Practice Transformation." *Health Services Research* 48 (6): 1879–97.
- Doty, M. M., M. K. Abrams, S. E. Hernandez, K. Stremikis, and A. C. Beal. 2010. *Enhancing the Capacity of Community Health Centers to Achieve High Performance*. New York: Commonwealth Fund. Publication Number 1392.
- Gao, Y., R. S. Nocon, K. E. Gunter, R. Sharma, Q. Ngo-Metzger, L. P. Casalino, and M. H. Chin. 2016. "Characteristics Associated with Patient-Centered Medical Home Capability in Health Centers: A Cross-Sectional Analysis." *Journal of General Internal Medicine* 31 (9): 1041–51.
- Gunter, K. E., R. S. Nocon, Y. Gao, L. P. Casalino, and M. H. Chin. 2017. "Medical Home Characteristics and Quality of Diabetes Care in Safety Net Clinics." *Journal of Community Health* 42 (2): 303–11.
- Health Resources and Services Administration (HRSA). 2016. "HRSA Accreditation and Patient-Centered Medical Home Recognition Initiative" [accessed on March 27, 2017]. Available at <http://bphc.hrsa.gov/qualityimprovement/clinicalquality/accreditation-pcmh/index.html>
- HRSA. 2017. "Draft Health Center Compliance Manual, Chapter 11: Key Management Staff" [accessed on July 20, 2017]. Available at <https://bphc.hrsa.gov/programrequirements/pdf/healthcentercompliancemanual.pdf>
- Nelson, K. M., C. Helfrich, H. Sun, P. L. Hebert, C. F. Liu, E. Dolan, L. Taylor, E. Wong, C. Maynard, S. E. Hernandez, W. Sanders, I. Randall, I. Curtis, G. Schectman, R. Stark, and S. D. Fihn. 2014. "Implementation of the Patient-Centered Medical Home in the Veterans Health Administration: Associations with Patient Satisfaction, Quality of Care, Staff Burnout, and Hospital and Emergency Department Use." *JAMA Internal Medicine* 174 (8): 1350–8.
- Nocon, R. S., R. Sharma, J. M. Birnberg, Q. Ngo-Metzger, S. Lee, and M. H. Chin. 2012. "Association between Patient-Centered Medical Home Rating and Operating Cost at Federally Funded Health Centers." *Journal of the American Medical Association* 308 (1): 60–6.
- Ryan, J., P. Riley, M. K. Abrams, and R. S. Nocon. 2015. "How Strong Is the Primary Care Safety Net? Assessing the Ability of Federally Qualified Health Centers to Serve as Patient-Centered Medical Homes." *Issue Brief (Commonwealth Fund)* 27: 1–3.
- Safety Net Medical Home Initiative. 2017. "Resources and Tools" [accessed on August 8, 2017]. Available at <http://www.safetynetmedicalhome.org/resources-tools>
- Shi, L., D. C. Lock, D. C. Lee, L. A. Lebrun-Harris, M. H. Chin, P. Chidambaran, R. S. Nocon, J. Zhu, and A. Sripipatana. 2015. "Patient-Centered Medical Home Capability and Clinical Performance in HRSA-Supported Health Centers." *Medical Care* 53 (5): 389–95.
- Sidorov, J. E. 2008. "The Patient-Centered Medical Home for Chronic Illness: Is It Ready for Prime Time?" *Health Affairs (Millwood)* 27 (5): 1231–4.

SUPPORTING INFORMATION

Additional supporting information may be found online in the supporting information tab for this article:

Appendix SA1: Author Matrix.