

RESEARCH ARTICLE

Capability for Change at Community Health Centers Serving Asian Pacific Islanders: An Exploratory Study of a Cancer Screening Evidence-based Intervention

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Abstract

Background: Understanding and enhancing change capabilities, including Practice Adaptive Reserve (PAR), of Community Health Centers (CHCs) may mitigate cancer-related health disparities. **Materials and Methods:** Using stratified random sampling, we recruited 232 staff from seven CHCs serving Asian Pacific Islander communities to complete a self-administered survey. We performed multilevel regression analyses to examine PAR composite scores by CHC, position type, and number of years worked at their clinic. **Results:** The mean PAR score was 0.7 (s.d. 0.14). Higher scores were associated with a greater perceived likelihood that clinic staff would participate in an evidence-based intervention (EBI). Constructs such as communication, clinic flow, sensemaking, change valence, and resource availability were positively associated with EBI implementation or trended toward significance. **Conclusions:** PAR scores are positively associated with perceived likelihood of clinic staff participation in cancer screening EBI. Future research is needed to determine PAR levels most conducive to implementing change and to developing interventions that enhance Adaptive Reserve.

Keywords: Primary care issues - health care delivery/HSR - health disparities - special population - underserved/minority

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Introduction

The successful implementation of evidence-based interventions (EBIs) to underserved populations is integral to reducing health disparities. Community health centers (CHCs) provide affordable primary care and preventive services to some of the United States' (U.S.) most vulnerable populations. Existing literature on the dissemination of EBIs among CHCs is limited with early research focused on the introduction of electronic medical record systems (DePue et al., 2002; Amodeo et al., 2006; Miller and West, 2007; Shields et al., 2007; Trafton et al., 2007), diabetic screening (Chin et al., 2001; Walker et al., 2001; Birken et al., 2013), tobacco cessation (De Pue et al., 2002), and mental health psychoeducation (McFarlane et al., 2001). More recently, studies of CHCs have sought to understand broader, more fundamental changes to patient care, such as the long-term impact of quality improvement interventions (Chin, 2010) and newer models of care delivery like the Patient-Centered Medical Home (PCMH) (Birnberg et al., 2011).

Several frameworks for implementing and assessing organizational changes have been constructed (Glasgow et al., 1999; Cohen et al., 2004; Damschroder et al., 2009; Weiner, 2009; Holt et al., 2010). Cohen et al.

(2004) identified attributes of practices that achieved high rates of intervention adoption and described four major domains (i.e., resources, stakeholder motivation, outside motivators, and opportunities for change) in the Practice Change and Development Model (Cohen et al., 2004). While each individual domain is important, the interdependencies among the domains is critical to understanding and executing change. This model was expanded to distinguish an organization's ability to meet daily, ordinary demands, or in other words, its Practice Core (i.e., resources, organizational structure, and functional processes), from its Adaptive Reserve (Miller et al., 2010). Adaptive Reserve is comprised of intangible elements, such as human relationships, which make an organization both stable and flexible during times of change. A practice's Adaptive Reserve (PAR) centers around seven characteristics of successful work relationships (i.e., trust, respect, mindfulness, heedfulness, diversity, mix of social and task-oriented interactions, and channel effectiveness). Under leadership that is open to questions and learning is encouraged, these seven characteristics promote action and reflection that lead to teamwork, improvisation, sensemaking (i.e., the ongoing process of constructing plausible explanations amidst ambiguous cues and shifting conditions in order to sustain

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action) (Jordan, 2009), and the accumulation of stories that enhance positive change.

The National Demonstration Project (NDP) evaluated the PAR after implementation of the Patient-Centered Medical Home (PCMH) model in 36 highly motivated primary care practices across the country. Rooted in the Practice Change and Development Model, the NDP studied the change process using multiple qualitative and quantitative methods. This group developed the Clinician Staff Questionnaire (CSQ), a tool to assess staff perceptions of practice characteristics. The CSQ was most informative in what it revealed about PAR and established these concepts could be measured and quantified (Jaen et al., 2010). The NDP found that PAR was essential to the practices' ability to manage change by being resilient and flexible (Nutting et al., 2010).

To our knowledge, the NDP's Practice Change and Development and the PAR models have not yet been applied to CHCs that serve ethnically and socio-economically diverse patient populations. The impact of EBI implementation is especially important to understand in CHCs where personnel turnover can be high and the work environment is demanding (Rosenblatt et al., 2006; Hayashi et al., 2009). Lewis et al. assessed the impact of implementation in safety net clinics on staff morale and burnout, factors likely related to PAR; however, their study did not explicitly assess the capability of the clinics to implement EBIs (Lewis et al., 2012). A search of the literature on dissemination and implementation at CHCs yielded a limited number of articles, and none focused on CHCs serving Asian American, Native Hawaiian, and other Pacific Islander populations.

Many EBIs have been developed to increase cancer screening rates. Racial and ethnic minorities, especially Asian Americans, are disproportionately under-screened for cancer, including colorectal cancer (Fenton et al., 2008; Jerant et al., 2008; Klabunde et al., 2011). While colorectal cancer incidence and mortality have declined over the last 25 years due to advances in screening and treatment (Jemal et al., 2010; Naylor et al., 2012), these improvements have not been shared equally by all groups (Ayanian, 2010; Howlader et al., 2012; Naylor et al., 2012). Screening rates among minorities (between 46.5-55%) lag behind those of Whites (59.8%) (Centers for Disease Control and Prevention, 2012). In a prior study, Tu et al. developed a highly efficacious intervention promoting colorectal cancer screening among Chinese-American patients in a CHC (Tu et al., 2006). To close the gap between research discovery and program delivery for underserved populations in the U.S., it is necessary to understand and to enhance the capability of CHCs to implement EBIs (Pasick et al., 2004).

Our research sought to understand the applicability of the PAR model (specifically the PAR scale) to EBI implementation of cancer screening at CHCs serving culturally and linguistically diverse patient populations. We explored factors discussed by CHC key informants, and tested their association with the perceived likelihood of whether other clinic staff members would participate in the implementation of a colorectal cancer screening EBI at the respondent's CHC.

Materials and Methods

In partnership with the Association of Asian and Pacific Community Health Organizations (AAPCHO), this study was conducted at seven AAPCHO member CHCs located in California, Hawaii, Massachusetts, and Washington (Table 1). AAPCHO is a national association dedicated to health promotion of Asian Americans, Native Hawaiians, and other Pacific Islanders in the U.S. Throughout the study, a site director from each CHC worked with the research team from the University of Washington and AAPCHO. All study procedures were approved by the University of Washington's Institutional Review Board. Six of the seven CHCs offered direct participant incentives with gift cards that ranged from \$20 to \$30.

We staggered recruitment across the CHCs with data collection starting in October 2011 and continuing through February 2012. Using stratified random sampling, our recruitment target was ten staff members from each stratum of clinic staff: providers (physicians, nurse practitioners, and physician assistants), nurses, and medical assistants.

Each site director sent an introductory email from

Table 1. Characteristics of CHC Staff Respondents

Staff Respondents (n=153)	n (%)
Female	130 (85.0)
Race/ethnicity*	
White/Caucasian	20 (13.1)
Asian	112 (73.2)
Native Hawaiian/other Pacific Islander	13 (8.5)
Hispanic/Latino/Chicano/Spanish origin	12 (7.8)
Black/African/African-American	2 (1.3)
Other	3 (2.0)
Provider staff type	
Provider	51 (33.3)
Nurse	36 (23.5)
Medical assistant	66 (43.1)
Age (years)	
20-29	35 (23.6)
30-39	46 (31.1)
40-49	20 (20.3)
50 plus	37 (25.0)
[missing]	[5]
Highest level of education completed	
High school or less/GED	15 (9.9)
Associates degree/some college or trade school	53 (35.1)
Bachelor's degree	27 (17.9)
Graduate degree	56 (37.1)
[missing]	[2]
Years employed at clinic	
0-2	25 (16.4)
2-4	49 (32.2)
5-9	38 (25.0)
10 plus	40 (26.3)
[missing]	[1]
Current employment status	
Full-time	133 (87.5)
Part-time	19 (12.5)
[missing]	[1]
Languages spoken*	
English	133 (86.9)
Chinese	44 (28.8)
Spanish	17 (11.1)
Vietnamese	20 (13.1)
Filipino (Tagalog/Ilocano/Visayan)	19 (12.4)
Other	23 (15.0)

*Total exceeds 100% as respondents were allowed to specify more than category

the CHC's Medical Director or Chief Executive Officer/ Executive Director to the selected staff members to encourage their participation, followed by an email with the online survey link. At two and four weeks post-invitation, reminder emails were sent to potential participants. After four weeks, one to two phone call reminders were also attempted at six CHCs. To increase participation, at the advice of four site directors, paper surveys were also mailed to their clinic staff after approximately six weeks.

Survey content

We designed the survey to be completed in fifteen to twenty minutes. Our survey (Appendix 1) included: 1) a minor adaptation of the PAR Scale from the Clinician Staff Questionnaire (Nutting et al., 2010; Jaen et al., 2010) with the word "practice" changed to "clinic"; 2) additional items from the Clinician Staff Questionnaire and newly developed questions based on our key informant interview findings regarding community connectedness; use of tools; integration; stability; communication; clinic flow; decision making; and use/availability of data/information; 3) five items adapted from Weiner's Hypertension Care Survey for Physicians to assess organizational readiness for change; and 4) demographic characteristics.

Our dependent variables of interest were: 1) the PAR composite scores scaled from 0.00 to 1.00, with higher scores representing greater agreement with PAR items (i.e., 0.00=complete disagreement and 1.00=perfect agreement), and 2) the respondent's perceived likelihood of "other clinic staff" participating in a proposed colorectal cancer screening EBI (5-point response categories for analysis recoded into two groups: "not at all/ not very/ somewhat likely" versus "very/ extremely likely").

Statistical analysis

To adjust for interdependencies of survey responses from clinic staff nested within CHCs, multilevel regression analyses were performed using either linear mixed models for the continuous PAR dependent variable, or generalized linear mixed models (GLMM) for the dichotomized EBI-participation dependent variable. Correlated responses were accounted for by including CHC-specific random intercepts in all models. Analyses were performed in SAS version 9.3 (SAS Institute, Cary, N.C., U.S.).

For our analysis, we initially examined CHC-level summary characteristics as reported in the Bureau of Primary Health Care Uniform Data System (UDS) 2010 and 2011, along with individual-level demographic responses from our survey. Estimated PAR composite scores were then computed by allowing up to two missing item responses (out of a set of 23 items) and applying a mean substitution for a missing response based on data from the remaining non-missing responses. Of the 153 survey participants, 131 provided complete data for all 23 PAR-related items; 16 had one missing item response; and four had two missing item responses. Two participants were assigned no PAR composite score.

The distribution of the PAR composite scores was descriptively summarized by CHC, age, position type (provider, nurses, or medical assistant), and number of

years worked at their current clinic. The degree of within-CHC correlation in the PAR scores was estimated with an intraclass correlation coefficient (ICC) of 0.055 and represents the degree to which PAR scores from staff are more similar within a CHC (cluster) than those from different CHC sites. Comparisons in mean PAR scores among clinic staff position types and the number of years worked at their current clinic were performed using mixed effects regression models.

When assessing the perceived likelihood of CHC clinic staff participating in the proposed colorectal cancer screening EBI, GLMM logistic regression models were performed by using a categorized PAR measure ("0.00<0.60" [referent] versus "0.60<0.80" versus "0.80-1.00") as an independent variable, or by using individual survey items. Depending on the item response distributions, these independent variables were contrasted as either "strongly disagree/disagree/neutral/agree" [referent] versus "strongly agree," or as "strongly disagree/ disagree/ neutral" [referent] versus "agree/strongly agree."

Results

Clinic staff characteristics

Among 232 randomly selected CHC staff members, 153 completed the survey with a 66% overall response rate (61-79% at six CHCs and 46% at the CHC that did not provide participant incentives). Respondents were overwhelmingly female and Asian American, Native Hawaiian, or other Pacific Islander (Table 1). Providers, nurses, and medical assistants were all represented on the survey and their ages were evenly distributed. The vast majority of respondents was full-time employees and had worked in the clinic for at least two years.

CHC and CHC patient characteristics

Based on information from 2011 UDS data, our seven CHC partners served on average 23,900 patients (s.d. 13,300) yearly. CHC patients were predominantly Asian American (60.0%); Native Hawaiian or other Pacific Islanders (17.4%); and had limited English proficiency (50.4%). Most patients lived below the 100% Federal poverty limit (mean 61.3%, median 63%, s.d. 9.4%) and were either uninsured (37.4%) or on Medicaid (40.6%). Based on self-report from the clinic sites, six of the seven CHCs are located in urban regions (85.7%), and one is situated in a rural setting (14.3%).

Practice adaptive reserve

Our partner CHCs' PAR scores ranged from 0.64 to 0.77 with a mean of 0.70 (s.d. 0.14) and were evenly distributed across demographic factors, including age, staff position type (provider vs. medical assistant vs. nurse; $p=0.06$), and number of years worked at current clinic. Table 2 demonstrates that the higher PAR scores were associated with greater perceived likelihood that clinic staff would participate in the EBI. Nearly two-thirds of respondents who reported their CHC had an above-average level of Adaptive Reserve (i.e., PAR score >0.80) thought that the colorectal cancer screening EBI would be implemented.

Among the other constructs analyzed, we found that certain clinical tools, such as frequent and good communication; clinic flow; sensemaking; and use/availability of data, were associated with the perceived likelihood of clinic staff's participation in the EBI (Table 3). In general, respondents identified communication and the use of data to guide clinical decisions with a higher perceived likelihood of EBI implementation. Respondents who did not feel that the pace of change

was too fast at their site were more likely to think that staff would participate in the EBI. Several other items were also positively associated with perceived EBI participation and trended toward significance: electronic medical records, clinic flow, and sensemaking. Lack of autonomy was negatively associated and also trended towards significance. After adjusting for the effects of the PAR, staff members who found data collection tools and meetings useful in their work were more likely to perceive the EBI would be implemented in their clinic.

Table 2. "Other staff" Taking Part in EBI, by Practice Adaptive Reserve (n=148)

PAR	Not at All/ Not Very Likely/ Somewhat Likely		Very Likely/ Extremely Likely	
	n	%	n	%
	0.0<0.6	23	76.7	7
0.6<0.8	49	59.8	33	40.2
0.8-1.0	13	36.1	23	63.9
Combined	85	57.4	63	42.6

*5 missing observations (2 missing PAR; 3 missing "other staff" taking part in EBI).

We examined five items based on Weiner's theory on the organizational readiness for change (Table 4). Respondents who felt their clinics had favorable situational factors, such as availability of time in their schedule, had statistically significant higher odds of perceiving the EBI would be implemented. Likewise, those who felt the EBI would interfere with important clinical activities were less likely to think the screening program would be implemented. Two other constructs, change valence (which describes how people value proposed changes)

Table 3. Logistic Regression Analysis, Modeling the Perceived Likelihood of "other staff" Taking Part in the CRC Screening EBI

Independent Variable (IV)	Construct ¹	Coding ²	P-value ³		Odds Ratio (95% CI) ^a
			IV	IV+PAR ^a	
Practice Adaptive Reserve (PAR, composite score based on 23 items)	(multiple)	PAR	**	----	----
People at this clinic are aware of the needs of the community this clinic serves.	CC	SA	○		
I feel connected culturally to the patients we serve at this clinic.	CC	SA	●		
This clinic attends to the needs of the community.	CC	SA			
At this clinic, we have enough tools that we can use to help our work.	T	A/SA			
This clinic invests in new tools.	T	SA			
I find the following tools useful in everyday work					
Disease Registry	T	SA			
Training.	T	SA	*		
Electronic Medical Records/Electronic Health Records.	T	SA	○	●	2.03 (0.92-4.48)
Data Collection Tools.	T	SA	**	*	2.33 (1.05-5.16)
Panel Management.	T	SA	**		
Meetings	T	SA	***	**	3.17 (1.36-7.36)
Protocols	T	SA	*		
Checklists	T	SA			
We build on existing programs rather than begin new things from scratch.	I	A/SA	•		
Staff at this clinic feels too busy to do something new.	I/Ti	D/SD	*		
This clinic thinks of adding value before trying something new.	V/C	A/SA			
This clinic thinks of saving money before trying something new.	V/C	D/SD			
Things have been changing so fast in our clinic that it is hard to keep up with what is going on.	S/WE	SD	*	●	3.32 (0.81-13.63)
The staff at this clinic pretty much stays the same.	S	A/SA			
This clinic tries new things.	LC	SA	●		
Throughout the clinic, there is frequent and good communication about how the different changes are going.	Co	SA	**	**	23.57 (2.72-203.89)
Everyday information is communicated in this clinic through memos, notes, or emails.	Co	SA	*		
I am encouraged to improve patient care.	Co/Cu	SA	*		
Everything we do follows clinic flow.	CF	SA	*		
Establishing a routine is important to the clinic's work.	CF	SA	*	○	1.78 (0.83-3.79)
It is important for something new to fit the clinic's flow.	CF	SA	*		
People at this clinic feel they have little control over the way they work.	D/A	D/SD		○	0.54 (0.24-1.22)
Decisions are made in this clinic with little input from those doing the work.	D	SD	*		
In this clinic, we have standard ways to do things.	D/St	SA			
Knowing why we need to do things in a new way helps me to deal with change.	Se	SA	●		
I am more committed to do something new when I feel good about the change.	Se	SA			
I am given information to understand why changes are needed or are happening.	Se	SA	**	●	2.51 (0.90-7.01)
We use data to guide our clinic (e.g., performance reviews, assessments).	Da/In	SA	**	*	3.56 (1.30-9.77)
People in this clinic have the information they need to do their jobs well.	Da/In	SA	*		
This clinic makes information available to everyone.	Da/In	A/SA			

¹CC: Community connectedness; T: Tools; I: Integration; Ti: Time; V: Value; C: Costs; S: Stability; WE: Work Environment; LC: Learning culture; Co: Communication; Cu: Culture; CF: Clinic flow; D: Decision-making; St: Standardization; A: Autonomy; Se: Sensemaking; Da: Data; In: Information. ²IV responses recoded for comparison: PAR – "0.00 - <0.60" [referent] versus "0.60 - <0.80" versus "0.80 - 1.00"; SA – "strongly disagree / disagree / neutral / agree" [referent] versus "strongly agree"; A/SA – "strongly disagree / disagree / neutral" [referent] versus "agree / strongly agree"; SD – "strongly agree / agree / neutral / disagree" [referent] versus "strongly disagree"; D/SD – "strongly agree / agree / neutral" [referent] versus "disagree / strongly disagree". ³p-value of IV, adjusted for correlated data within CHCs: ○0.10<p-value ≤0.15; ●0.05<p-value ≤0.10; *0.01<p-value ≤0.05; **0.001<p-value ≤0.01; ***0.0001<p-value <0.001. ^aRegression model includes both IV and PAR; reported p-value is for the IV effect, over and beyond that of the PAR

Table 4. Logistic Regression Analysis, Modeling the Perceived Likelihood of “Other Staff” Taking Part in the CRC Screening EBI

Independent Variable (IV)	Construct ¹	Coding ²	P-value ³		Odds Ratio (95% CI) ⁴
			IV	IV+PAR ⁴	
We have time in our schedule for this colorectal cancer screening program.	SF	A/SA	**	*	2.41 (1.15-5.06)
This program will take our attention away from other high priority clinical activities.	SF	D/SD	*	●	1.97 (0.95-4.09)
We have staff to take part in this colorectal cancer screening program.	RA	SA	*	●	4.47 (0.84-23.74)
We know how to make such a program work in our clinic.	TD	SA	*		
This program will work better than what we are doing now to get our patients screened for colorectal cancer	CV	A/SA	●	●	1.84 (0.90-3.75)

¹Regression model includes both IV and PAR; reported p-value is for the IV effect, over and beyond that of the PAR; ²SF: Situation Factors; RA: Resource Availability; TD: Task Demands; CV: Change Valence; ³IV responses recoded for comparison: SA – “strongly disagree/disagree/neutral/agree” [referent] versus “strongly agree”; A/SA – “strongly disagree/disagree/neutral” [referent] versus “agree/strongly agree”; D/SD – “strongly agree/agree/neutral” [referent] versus “disagree/strongly disagree”.
⁴p value of IV, adjusted for correlated data within CHCs: ○0.10 <p-value ≤ 0.15; ●0.05 <p-value ≤ 0.10; *0.01 <p-value ≤ 0.05; **0.001 <p-value ≤ 0.01

and resource availability, were associated with higher perceived likelihood of EBI implementation and trended toward statistical significance.

Discussion

Findings from our exploratory study suggest: 1) a higher Adaptive Reserve, as measured by the PAR score, is associated with greater perceived likelihood that clinic staff would participate in the EBI and 2) the PAR scores of CHCs serving culturally and linguistically diverse patient populations may be comparable to those of general primary care practices. These results are consistent with the NDP findings that practices with strong Adaptive Reserve and strong connections to their local environments were able to make the most far reaching changes (Nutting et al., 2010; Crabtree et al., 2011). A qualitative study of seven family medicine residency programs similarly found that practices with strong Adaptive Reserve had more success with their intervention and incorporated quality improvement into resident education and clinical care (Chase et al., 2011). Larger residency training practices that valued communication and implemented a clear strategy toward change and elements of Adaptive Reserve were associated with successful quality improvement implementation. Wagner et. al. have also underscored that meaningful practice change is unlikely unless an organization has Adaptive Reserve (Wagner et al., 2012).

Although our CHC partners serve a population that is disproportionately vulnerable with the majority living below the poverty level, lacking in health insurance, and having limited English proficiency, our sample of CHCs had a mean PAR score of 0.70 (s.d. 0.14) comparable to the NDP practices’ PAR score (mean baseline PAR score 0.69; s.d. 0.35). Of note, the NDP selected practices that were highly motivated and were expected to have the significant capability for change. After intensive facilitation from national experts over two years, the NDP practices’ mean PAR score increased to 0.74 (Miller et al., 2010; Nutting et al., 2010; Stange et al., 2010).

While CHCs are generally more resource-constrained and subject to unique stressors and burnout, many of them benefit from resilient traits, including a sense of purpose with a mission to serve vulnerable communities, and staff who self-select to work in these environments and who have specific skills suited for working with these communities (Hayashi et al., 2009). CHCs’ relationship

with the local environment also differs from many general primary care practices. As stated in Section 330 of the Public Health Service Act, CHCs must focus on the community health needs of local populations (National Association of Community Health Centers, 2011). With their host communities involved in their governance, CHCs were to be “of the people, by the people, for the people” (Adashi et al., 2010).

In addition to the established PAR scale, we explored other constructs based on our key informant interviews, literature reviews, and other experts. Of interest, after adjusting for PAR these items remained statistically significant: finding data collection tools useful in everyday work; finding meetings useful in everyday work; frequent and good communication about how different changes are going; using data to guide the clinic; and having time for the colorectal cancer screening program.

Our findings must be interpreted in consideration of several potential limitations. First, an exploratory study with a small sample size, our statistical analysis was minimally powered to determine associations, and this is reflected in the wide confidence interval of one estimate. Second, potential selection bias of clinic staff that are more likely to respond and be more engaged may have resulted with higher PAR scores. Third, the CHCs studied are geographically limited to Washington, Hawaii, California, and Massachusetts. These CHCs also serve predominantly Asian Americans, Native Hawaiians, and other Pacific Islander populations and may not be representative of other CHCs. Capacity building and capability for development may differ in clinics that serve other populations, particularly in rural settings. Fourth, we did not exclude qualitative interview participants from the survey as this was not an intervention study. Their exposure to the qualitative discussions may have led to more thoughtful survey responses. Fifth, one of the CHCs chose not offer incentives which may have influenced the lower response rate at that site. Sixth, this survey focused primarily on Adaptive Reserve, part of Capability for Development, which is one of the four Practice Change and Development domains that are interactive and interdependent. Finally, we studied the perceived likelihood of a behavior (i.e. intention) rather than actual behavior.

This study sought to understand implementation of changes at CHCs and to add to the current literature on relevant measures. With health care reform, the expansion

of primary care through CHCs will be dramatic. Findings from this study may inform implementation of the many foreseen and unforeseen changes necessitated by this expansion. Through an ongoing multi-center survey of CHC clinics in seven states, additional information and insights will augment the current literature, support or refute our exploratory findings, and provide additional validation data (Cancer Prevention and Control Research Network, 2013). Future research is needed to validate the association of PAR with actual behavior change; to determine national norms of Adaptive Reserve (at CHCs and general primary care practices); to examine the levels of Adaptive Reserve that are most conducive to implementing and sustaining change; to study the minimal clinically important difference of Adaptive Reserve; and importantly, to develop and evaluate interventions that enhance Adaptive Reserve.

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