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Pre-Implementation Organizational Environment Associated with Pediatric Integrated Care Readiness in Primary Care

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### Journal

Evidence-Based Practice in Child and Adolescent Mental Health, 7(1)

### ISSN

2379-4925

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### Publication Date

2022-01-02

### DOI

10.1080/23794925.2021.1875344

Peer reviewed



# Evidence-Based Practice in Child and Adolescent Mental Health

ISSN: (Print) (Online) Journal homepage: <https://www.tandfonline.com/loi/uebh20>

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To cite this article: Nicole A. Stadnick , Martina G. Penalosa , Cassandra Martinez , Lauren Brookman-Fraze , Daniel P. Gizzo , Timothy Sahms , Cynthia L. Kuelbs & Gregory A. Aarons (2021): Pre-Implementation Organizational Environment Associated with Pediatric Integrated Care Readiness in Primary Care, Evidence-Based Practice in Child and Adolescent Mental Health

To link to this article: <https://doi.org/10.1080/23794925.2021.1875344>



Published online: 05 Feb 2021.



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## Pre-Implementation Organizational Environment Associated with Pediatric Integrated Care Readiness in Primary Care

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### ABSTRACT

To characterize pre-implementation organizational factors associated with Access To Tailored Autism Integrated Care (ATTAIN), an integrated care model for children with autism and identified or suspected co-occurring mental health needs. Pediatric primary care providers (n = 36) completed surveys as part of a pilot study testing ATTAIN feasibility. Measures assessed: background characteristics; implementation climate; organizational readiness; evidence-based practice (EBP) attitudes; knowledge, confidence and comfort caring for children with autism. Compared to providers from a network of primary care practices and an integrated healthcare system, providers from a Federally Qualified Health Center (FQHC) reported less positive perceptions of climate supportive of EBP implementation and, specifically, selection for openness and rewards for EBPs. Implementation climate was associated with autism knowledge, comfort with mental health referral and follow up, and organizational change efficacy. Findings advance understanding of pre-implementation organizational context factors important to assess for EBP implementation in diverse pediatric care settings.

Studies have shown that organizational context factors – such as implementation climate and culture – are critical influences on evidence-based practice (EBP) implementation in healthcare settings (e.g., Cruvinel et al., 2013). Limited research exists on contextual factors associated with EBP implementation specifically in pediatric primary care settings. The objective of this study is to examine the pre-implementation organizational context including healthcare organizational type, implementation climate, readiness for implementing change of a pediatric integrated care model in pediatric primary care settings.

To anchor the study design, measurement and analysis of this study, we used the Exploration, Preparation, Implementation, Sustainment (EPIS) framework (Moullin et al., 2019), a commonly used implementation science framework to guide planning and evaluation of implementation processes and barriers and facilitators to implementation and sustainment within a given context. The EPIS framework defines *outer context* (system-level), *inner context*

(organizational, provider, patient characteristics), *bridging factors* (those that span the outer and inner contexts) and *innovation factors* (the fit of the intervention within a setting) that may prevent or enable uptake and sustainment. Consistent with the EPIS framework, identifying strengths or deficits in organizational context during the Exploration phase can aid development and use of implementation strategies during the EPIS Preparation and Implementation phases (Moullin et al., 2019). We refer the readers to the larger study protocol that details the specific operationalization of the EPIS framework at each implementation stage ([REMOVED FOR MASKED REVIEW], Figure 1). For this study, we concentrated on measurement of EPIS inner context and innovation factors related to implementation climate, readiness for change, provider attitudes toward evidence-based practices and provider knowledge, and confidence and comfort with aspects of integrated care in their pediatric context.

In recent decades, integrated care has emerged as a promising and pragmatic approach to improve

access to specialty care and patient outcomes (Mathers et al., 2004; Moran & CMS finalizes code for collaborative care, 2016). Empirical support for pediatric mental health integration is sparse but promising (Asarnow et al., 2015; Germán et al., 2017; Grimes et al., 2018; Walter et al., 2019; Yu et al., 2017). For children with autism spectrum disorder (ASD) who experience high rates of co-occurring psychiatric conditions that necessitate care from multiple providers, integrated care can promote timelier screening, service linkage and outcomes. Pediatric primary care is a principal point of routine healthcare. Clinical guidelines have been developed to address medical (not mental health) comorbidities for children with ASD (e.g., Furuta et al., 2012; Malow et al., 2012). To date, no studies have tested the use of integrated mental healthcare models for children with ASD within real-world pediatric primary care settings. We developed Access to Tailored Autism Integrated Care (ATTAIN), a pediatric integrated care model to promote timely identification of mental health needs and subsequent linkage to mental healthcare tailored for children with ASD and to fit the organizations' infrastructures and workflows (Stadnick et al., 2019). ATTAIN was co-designed in partnership with the ATTAIN Advisory Group and a needs assessment with caregivers, primary care providers and leaders. From our formative mixed methods needs assessment, results reinforced the needs for a tailored approach to link children with ASD to mental health services and intentionally incorporating organizational capacity considerations when adapting for implementation an integrated mental healthcare model for children with ASD (Stadnick et al., 2020).

To accelerate the uptake and plans for sustaining pediatric integrated care models like ATTAIN, it is imperative to understand the influence of organizational factors on implementation in pediatric primary care settings. To this end, this study sought to 1) examine differences in organizational context by healthcare organization during the early Implementation phase of ATTAIN and 2) identify factors associated with organizational differences in ATTAIN pre-implementation in pediatric primary care. Given the nascent focus on pediatric primary care implementation, we did not specify *a priori* hypotheses but sought to explore the associations between organizational context differences and pre-

implementation readiness in pediatric primary care settings.

## Methods

### Participants and setting

Participants included 36 primary care providers (PCPs) from three healthcare organizations: 1) a federally qualified health center (FQHC) serving ethnically and linguistically diverse communities along the U.S./Mexico border ( $n = 7$ ); 2) the largest network of pediatric primary care practices serving families with private insurance and Medicaid in two Southern California counties ( $n = 14$ ); 3) a large integrated healthcare system serving seven counties in Southern California ( $n = 15$ ). Seven pediatric primary care clinics were selected based on the recommendation of each organization's departmental and administrative leadership and with consideration of geographic variation to represent different communities in San Diego County (e.g., North County San Diego, Central San Diego, South San Diego, US/Mexico border communities). None of the clinics had an existing embedded or co-located behavioral health integrated care model for pediatric patients, generally, or for special populations like children with ASD and potential co-occurring mental health needs. Participating PCPs self-identified as 58% female and 28% Hispanic/Latinx. Years of experience working at their current organization included less than one year (14%), 1–3 years (14%), 3–10 years (31%), and greater than 10 years (42%). PCPs self-reported that pediatric patients with ASD comprised less than 10% of their patients (69.4%) and 10–25% of their patients (27.8%). Greater details about PCPs are included in Table 1.

### Procedures

In collaboration with organizational leadership, seven clinics were selected based on clinic location, patient demographics and workforce capacity. All agreed to participate in the ATTAIN pilot study (100% clinic participation rate). The research team was invited to attend a regularly scheduled meeting for one hour at each clinic to provide ATTAIN training to PCPs and staff led by the Principal Investigator and two research

**Table 1.** Demographic and professional characteristics of participating primary care providers.

Demographic or professional characteristic	n	%
Gender		
Female	21	58
Male	15	42
Hispanic/Latinx (Yes)	10	28
Highest educational level		
Master's degree	4	11
Doctoral/medical degree	32	89
Primary organization		
Organization 1	7	19
Organization 2	14	39
Organization 3	15	42
Years at organization		
<1 year	5	14
1–3 years	5	14
3–10 years	11	31
>10 years	15	42
ASD caseload		
<10%	25	69
10–25%	10	28

staff. Training content included an overview of the ATTAIn model's purpose and development followed by an in-depth description of the rationale for and execution of each ATTAIn step. Participants received a physical and electronic copy of training and study materials and completed a brief 15-min survey at the end of the ATTAIn training. The majority of providers completed the survey using a physical copy at the end of the in-person training. Providers who were unable to complete the survey at the end of the training completed the survey using an online version. A catered lunch was provided during the training. Due to organizational regulations, no other participant incentive was available. All procedures were approved by the Institutional Review Board or equivalent at the [MASKED] and partnering organizations. The trainings took place between November and December 2019.

## Measures

### Demographics and professional background

Demographic assessment including questions about age, sex, race, educational attainment, provider type, years of healthcare experience, and clinical characteristics of patient caseloads.

### Implementation climate

The Implementation Climate Scale (ICS) is an 18-item scale that measures six dimensions of implementation climate: focus on EBPs, educational support for

EBPs, recognition for EBPs, rewards for EBPs, selection for EBPs and selection for openness (Ehrhart et al., 2014). Respondents are asked to rate the extent to which they agree with each statement from (0) “not at all” to (4) “to a very great extent.” Six subscale scores were used to assess the dimensions of implementation climate, and the ICS Total Score was calculated as a mean of the six subscale scores. In the current sample, internal consistency within each subscale was acceptable-to-excellent (alphas ranging from 0.72 Educational Support for EBPs to 0.92 for Selection for Openness) and excellent for the total score ( $\alpha = 0.93$ ).

### Organizational readiness for change

The Organizational Readiness for Implementing Change (ORIC) is a 9-item measure that was used to assess two dimensions of organizational readiness for change implementation: change commitment and change efficacy (Shea et al., 2014). Respondents indicated the extent to which they agreed with each item from (1) “disagree” to (5) “agree.” A mean score was calculated for each subscale. Internal consistency was strong for Change Commitment (4 items;  $\alpha = 0.87$ ) and Change Efficacy (5 items;  $\alpha = 0.95$ ).

### Evidence based practice attitudes

The Evidence-Based Practice Attitude Scale (EBPAS) is a 15-item scale that assesses attitudes toward adoption of evidence-based practices (EBPs) across four dimensions: intuitive *appeal* of EBP, likelihood of adopting EBPs if *required*, *openness* to new practices, and perceived *divergence* from usual practice (Aarons, 2004). Participants report the extent to which they agreed with each item, rated from (0) “not at all” to (4) “to a very great extent.” The subscale score for each dimension was created by computing a mean score for each subscale. The Total Score was calculated as a mean of the four subscale scores. Higher scores indicate more favorable attitudes toward adoption of EBPs. Acceptable-to-excellent internal consistency was demonstrated in the current sample, with alphas ranging from  $\alpha = 0.69$  (Divergence) to  $\alpha = 0.91$  (Requirements) on the subscales and  $\alpha = 0.81$  for the Total Score.

### ASD knowledge and confidence

This measure assessed perceptions of knowledge and confidence of delivering care to children with

ASD (Brookman-Fraze et al., 2019). Participants rated their level of knowledge (4 items) and confidence (2 items) regarding each topic on a 5-point Likert scale from (0) “not at all knowledgeable/confident” to (5) “extremely knowledgeable/confident.” Two subscale scores were computed derived from the average across the items within each subscale. Internal consistency was high in the current sample ( $\alpha = 0.92$ , Knowledge;  $\alpha = 0.96$ , Confidence).

### **Mental health screening, referral, and linkage practices comfort level**

Participants rated their level of comfort regarding three mental health screening and referral/linkage practices for pediatric patients with ASD on a 10-point Likert scale from (0) “not at all comfortable” to (10) “very comfortable.” These items were developed during our formative mixed methods needs assessment described in an earlier publication (Stadnick et al., 2020). Items included: “How would you rate your comfort in identifying non-ASD mental health problems (e.g., anxiety, depression, ADHD) for patients with ASD?”; “How would you rate your comfort in interpreting the results from screening instruments to identify non-ASD mental health problems (e.g., anxiety, depression, ADHD) for patients with ASD?”; “How would you rate your comfort in coordinating follow up to facilitate access to mental health care among your pediatric patients with ASD whom you have referred for mental health services?”

### **Data analytic plan**

To address the first study objective, between-group analyses of variance (ANOVA) were used to identify differences in the implementation context measures (ORIC, ICS, EBPA) by organization. To address the second study objective, bivariate correlations were conducted to determine explanatory variables to include in hierarchical linear regression models with implementation context measures that differed by organization included as outcome variables.

### **Results**

Of the implementation context measures, organizational differences were identified on the ICS total score ( $F(1, 33) = 5.37, p < .05$ ), ICS Rewards subscale, ( $F(1, 33) = 10.32, p < .01$ ) and ICS Openness subscale,

$F(1, 33) = 4.72, p < .05$ ). Specifically, compared to providers in Organizations 2 and 3, providers from Organization 1 (FQHC) reported less positive perceptions of their organization’s overall climate supportive of EBP implementation (ICS Total  $M = 2.06, SD = .36$ ); use of rewards for staff using EBPs (ICS Rewards  $M = .38, SD = .56$ ) and selection of staff open toward using EBPs (ICS Openness  $M = 2.57, SD = .46$ ).

To further examine the differences in the ICS, bivariate correlations followed by regression analyses were conducted. Based on the significant correlations, hierarchical regression models were performed, with the ICS Total, ICS Rewards and ICS Openness as the outcome variables. In each model, organization was entered as step 1. In step 2, variables that were significantly correlated with the ICS Total (ORIC Change Commitment, ORIC Change Efficacy, and comfort with mental health referral follow-up), ICS Rewards (ASD knowledge; gender) and ICS Openness (gender; ORIC Change Commitment, ORIC Change Efficacy) were entered. Full model details are reported in Table 2.

For the ICS Total, the final model was statistically significant and accounted for .07 change in variance ( $\Delta R^2$ ), ( $F(1,32) = 5.65, p < .03$ ). Organization ( $B = .49, p < .001$ ), Change Efficacy – that is, provider perceptions of their organization’s capacity to effectively change – ( $B = .35, p < .01$ ), and provider self-reported comfort in mental healthcare referral follow up for their patients with ASD ( $B = .27, p < .03$ ) were statistically significant explanatory variables.

For ICS Rewards, the final model was statistically significant and accounted for .08 change in variance ( $\Delta R^2$ ), ( $F(1,33) = 6.22, p < .02$ ). Organization ( $B = 0.67, p < .001$ ) and self-reported provider Knowledge of ASD ( $B = 0.29, p < .05$ ) were statistically significant explanatory variables.

Finally, for ICS Openness, the final model was statistically significant and accounted for .11 change in variance ( $\Delta R^2$ ), ( $F(1,33) = 6.76, p < .02$ ). Organization ( $B = .46, p < .01$ ) and Change Efficacy – that is, provider perceptions of their organization’s capacity to effectively change – ( $B = .36, p < .02$ ) were statistically significant explanatory variables.

### **Conclusions**

Findings indicated that organizations preparing to implement pediatric integrated care differed in

**Table 2.** Hierarchical regression analysis of implementation climate organizational differences.

Variable	Model 1			Model 2			Model 3		
	<i>B</i>	<i>SE</i> $\beta$	$\beta$	<i>B</i>	<i>SE</i> $\beta$	$\beta$	<i>B</i>	<i>SE</i> $\beta$	$\beta$
ICS Total									
Organization	0.58	0.12	0.64***	0.46	0.11	0.51***	0.45	0.11	0.49***
Change Efficacy	–	–	–	0.38	0.12	0.39**	0.34	0.12	0.35**
Comfort in Mental Health Referral Follow Up	–	–	–	0.27	–	–	0.08	0.03	0.27*
Change Commitment	–	–	–	–0.04	–	–	–0.14	–	–
<i>R</i> <sup>2</sup>		0.41			0.54			0.61	
$\Delta R^2$		0.41			0.13			0.07	
Adjusted <i>R</i> <sup>2</sup>		0.39			0.51			0.57	
<i>F</i> for change in <i>R</i> <sup>2</sup>		23.12***			9.43**			5.65*	
ICS Rewards									
Organization	1.17	0.21	0.70***	1.13	0.19	0.67***	–	–	–
ASD Knowledge	–	–	–	0.55	0.22	0.29*	–	–	–
Gender	–	–	–	–0.19	–	–	–	–	–
<i>R</i> <sup>2</sup>		0.48			0.57			–	
$\Delta R^2$		0.48			0.08			–	
Adjusted <i>R</i> <sup>2</sup>		0.47			0.54			–	
<i>F</i> for change in <i>R</i> <sup>2</sup>		31.93***			6.22*			–	
ICS Openness									
Organization	0.57	0.14	0.58***	0.45	0.13	0.46**	–	–	–
Change Efficacy	–	–	–	0.38	0.15	0.36*	–	–	–
Change Commitment	–	–	–	0.04	–	–	–	–	–
Gender	–	–	–	–0.12	–	–	–	–	–
<i>R</i> <sup>2</sup>		0.33			0.45			–	
$\Delta R^2$		0.33			0.11			–	
Adjusted <i>R</i> <sup>2</sup>		0.32			0.41			–	
<i>F</i> for change in <i>R</i> <sup>2</sup>		17.07***			6.76*			–	

Organization 3 (ref); Gender: 1-female, 2-male (ref); \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

context factors during the early Implementation phase. Specifically, FQHC providers reported less positive perceptions of EBP implementation climate, use of rewards for EBP delivery and recruiting staff open to implementing EBPs. Unique organizational factors of FQHCs have been shown to influence implementation of EBPs and may help explain the differences in implementation climate reported by FQHC providers. These factors include external mandates set by federal accrediting bodies, increasing demand for services in underserved communities, FQHC culture and climate characterized by high levels of rigidity and resistance and significant declines in provider and staff reported professional satisfaction, work environment and practice culture (Friedberg et al., 2017; Kramer et al., 2017). FQHCs are highly interested in translational research partnership participation but encounter challenges related to balancing care delivery with research activities and limited resources and capacity (Brandt et al., 2015). Thus, FQHCs may require directed and/or additional training, technical assistance, and funding to mitigate the burden of research engagement and implementation barriers. Given the cross-sectional nature of this study and the small size of the FQHC sample, we urge caution in the specific attributions that we can assert that may underlie the organizational differences identified.

Beyond organizational type, change efficacy, comfort with pediatric mental health referral and ASD knowledge were significantly associated with implementation climate differences across settings. Specifically, positive perceptions of organizational commitment and capacity to implement organizational change were associated with a more receptive EBP implementation climate, including selecting staff with a proclivity for implementing EBPs in their practice. Relevant to the integrated care focus of this implementation effort, providers who reported greater comfort with referring their patients for mental healthcare and follow up and knowledge in caring for children with ASD indicated a more receptive EBP implementation climate and greater organizational use of rewards for EBPs, respectively.

Study limitations include the cross-sectional design and small sample size of individual clinics and the total participant sample. While appropriate for the scope of a pilot study, both of these limitations constrain the interpretation and generalizability of findings. A related limitation is the small amount of change in variance observed by the measures included in the regression models. We prioritized parsimony when determining variables for inclusion given the small sample size and guided by the literature that has examined inner context implementation determinants. Other constructs that may be important to consider for future related

work that includes a larger sample size might include objective reports of organizational or clinic size (e.g., staffing ratios), team functioning (critical to integrated care) or perceptions of leadership involvement and support to facilitate change in practice. Balanced with these limitations are strategies we used to mitigate their impact. First, the inclusion of PCPs representing three distinct health-care organizations offered the opportunity to understand how organizational contexts may uniquely influence implementation of care changes through ATTAIn. To maximize the feasibility of data collection and minimize burden on clinic resources (e.g., taking time away from billable service time), we closely coordinated with organizational leadership to host the training and baseline data collection during regularly scheduled clinic-wide meetings or at times when the majority of clinic providers and staff were present. A few providers were unavailable for the group training and required a follow-up, individual training and online invitation to complete the baseline survey. Overall, PCP recruitment and training participation presented significant but surmountable scheduling challenges.

Our findings highlight pre-implementation inner context levers (e.g., implementation climate, provider knowledge and comfort) to consider for EBP implementation in pediatric primary care. Next steps of this research are to longitudinally assess the impact of inner context factors on pilot implementation of ATTAIn and movement from the Exploration to the Implementation phase of the EPIS framework.

## Acknowledgments

We would like to acknowledge David Lee, Joanna Sariñana, participating providers and clinical staff and the ATTAIn Advisory Group for their support with data collection, coordination and providing feedback on materials used in this study.

## Disclosure statement

No potential conflict of interest was reported by the authors.

## Funding

Funding for this work was supported by a grant from the National Institute of Mental Health (K23 MH110602: Stadnick, PI).

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