

Initial Findings: Rhode Island's Community Health Teams Address Complex Physical, Behavioral, and Social Needs of Patient Populations

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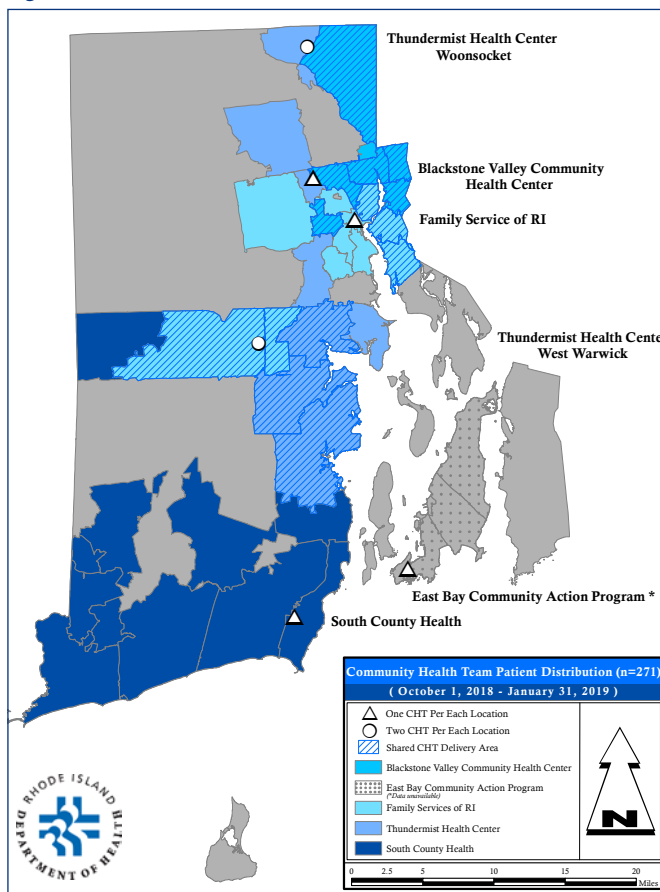
Rhode Island (RI) has continued facilitating health system transformation and promoting physical and behavioral healthcare integration.¹ In June 2017, the RI State Innovation Model (SIM) and the RI Department of Behavioral Health, Developmental Disabilities, and Hospitals (BHDDH) awarded funds to the Care Transformation Collaborative of RI (CTC-RI) to implement Community Health Teams (CHTs) and Screening, Brief Intervention, Referral and Treatment (SBIRT) locally.² The CHT/SBIRT model works with primary care providers (PCPs) – and insurers – to best support patients by facilitating access to community-based services to address complex social, environmental, medical, and behavioral health needs. With the goal of creating a comprehensive health system for patients, CHTs assist PCPs to:

- Identify and triage rising risk, high-risk, and high-cost patients;
- Normalize assessing patients' physical, behavioral, and social needs using standardized screens;
- Develop and coordinate patient-centered care plans;
- Provide outpatient behavioral health services and/or coordinate substance use treatment referrals;
- Facilitate community supports to address socioeconomic and environmental barriers to care; and
- Re-establish patient engagement with PCP and other services upon stabilization.

CTC-RI oversees a network of eight, payer-agnostic CHTs. In the last quarter of 2018, CHTs were referred patients with following insurance carrier breakdown from PCPs: commercial (29.3%), Medicare (14.7%), Medicaid (52.5%), Uninsured (3.5%). CHTs are comprised of at least one behavioral health clinician and two community health workers trained in SBIRT. Pharmacist, nutritionist, and legal consultations are available as needed. Formally integrating SBIRT into CHTs increases whole-person care – particularly for vulnerable populations often lost to follow-up. CHTs normalize screening for and treating patients' behavioral health and social needs, ultimately delivering more integrated care responsive to emerging needs (e.g., opioid epidemic, costly healthcare overutilization).

The eight CHTs are operated by five community-based implementation partners in Aquidneck Island, Blackstone Valley, Providence, South County, West Warwick, and Woon-

Figure 1.



socket (Figure 1). This place-based (i.e., where patients live) approach to CHTs was intentionally aligned with Health Equity Zones.³ By using new patient ZIP codes reported by CHTs, Figure 1 represents recent geographical distribution of CHT intakes by partner site over a four-month period. Note that this figure shows only new intakes over four months, not all CHT patients served to date.

Physical and behavioral health comorbidities are well-documented in RI's *State Health Improvement Plan*,⁴ including an extensive focus on depression, chronic disease, severe mental illness, tobacco use, and opioid use disorder. With growing focus on practice transformation and value-based care, addressing the complex care needs of patient populations is increasingly urgent.⁵ RI has invested in the CHT/

SBIRT model to assist PCPs with improving patients' physical, behavioral, and social health. CHTs include both teams co-located with PCPs – operating in community and clinic settings – as well as teams established as community extensions of participating PCPs. Model evaluation is underway with the University of RI (URI) and early CHT/SBIRT evaluation data are presented here.

METHODS

CHT-affiliated PCPs referred patients using broad eligibility criteria,⁶ inclusive of adults (age 18 and older) who:

- Have multiple chronic conditions and/or special healthcare needs;
- Have a behavioral health comorbidity – including substance use;
- Are not regularly accessing primary care and/or essential healthcare due to cost; and/or
- Had many inpatient/emergency visits.

Full data collection began in October 2018 and will continue through June 2019. CHT eligibility was affirmed at intake by certified community health and/or behavioral health providers using health risk assessments. CHTs were assessing health risk previously, with most teams using the Cambridge Health Alliance-adapted Referral Triage Tool (RTT) and one partner using an impactability algorithm with comparable items. Health risk scores, many times in combination with a new patient meet-and-greet meeting, are used to further triage PCP referrals beyond the broad eligibility criteria noted previously.

CHTs used different social determinants of health (SDOH) measures, all of which mapped to common domains. All CHTs screen for depression using PHQ-2/9,⁷ with many CHTs also using GAD-2/7⁸ for anxiety. All CHTs screen for substance use using DAST, AUDIT⁹, and/or CAGEAID. For all measures, higher scores reflect higher severity of conditions/risks and cutoff scores have been used to differentiate between patients falling within ranges that represent acceptable versus more severe levels of conditions/risks.^{7,8,9} All CHTs met at least monthly lead project staff to discuss and standardize social and behavioral health (including SBIRT) screening, conduct de-identified case reviews, and share best practices. Basecamp – a shared project management platform – was maintained by CTC-RI to house tools, share information, and disseminate resources across the CHT network.

Multiple data sources are presented, including four months of available intake data and two small convenience samples of pre-/post- behavioral and health risk data. SBIRT data reflective of 16 months are also presented. Activity measures for all CHTs and quality data from one CHT partner are included. CHTs tracked key indicators to evaluate:

- Type/quantity of CHT/SBIRT activities/services provided;

- Number/description of high-risk patients served;
- Health risk, SDOH, behavioral health, quality of life, and wellbeing status of patients; and
- Intake to discharge changes across available samples/measures.

Using ArcGIS – v10.6.1, new CHT patient intakes (representing data from October 1 – January 30, 2019) provided by seven teams were mapped. Using IBM SPSS – v22, paired sample t-tests evaluated changes over time and Chi-square analyses evaluated group comparisons. Process activity measures were identified during State contract negotiations and are reported to Federal evaluators. Clinical quality measures reflected Uniform Data System (UDS)¹⁰ performance measures for health centers. SBIRT measures were reported from Government Performance and Results Act (GPRA) Client-Outcome Surveys.¹¹

RESULTS

In **Table 1**, results reported from two quarters demonstrate various CHT value-add activities. Eight CHTs served 2,202 unique patients, providing 5,658 face-to-face visits between July 1–December 31, 2018. A total of 461 patients were new patients from PCPs who were not previously established with CHT care in quarters prior. Data from previous quarters were not presented because all eight CHTs were not reporting the entire suite of measures in a standardized way. Given that patients seen by CHTs are predominantly high-risk and likely have been disengaged in primary care, screening for influenza vaccination and tobacco use were prioritized. A total of 723 patients seen by CHTs were screened and informed about influenza vaccine and 689 patients seen by

Table 1. Recent Activity Across Eight CHTs

Measure	Value	Reporting Period
Number of patients served*	2,202	07/01/2018–12/31/2018
Number of patients seen in the community (i.e., unique face-to-face visits)	5,658	
Number of new referrals from primary care practices	461	
Number of patients asked if influenza vaccine received within the past year	723	10/01/2018–12/31/2018
Number of patient referrals to pharmacy and/or nutrition and/or medical-legal consultation services	12	
Number of patients who screened positive for tobacco use	689	
Number of provider trainings delivered to PCPs about practice transformation, value-based care, and CHT benefits	14	06/01/17–12/31/2018

*Number from two quarters of data does not reflect unique patients as patients are deduplicated for annual reporting only

CHTs were screened and yielded a positive result for tobacco use. Pharmacy, nutrition, and/or medical-legal consultation services were newly added as features of the CHT network and data reflect limited utilization due to delayed referral as new workflows were established, limited capacity and funding for medical-legal case reviews, and other-related reasons. CHTs also delivered 14 PCP-focused trainings over a longer timeframe to develop referral relationships and foster engagement.

Between October 1 to January 31, 2019, seven CHTs representing four partners reported descriptive data for all new patients. **Table 2** shows CHT patients were: 60.1% female, 34.7% non-English speaking, and 38.4% racially/ethnically diverse. Ninety percent of patients identified at least one SDOH need, with a median number of two SDOH needs, and 12.9–38.4% identifying specific SDOH concerns. For health risk assessments, an average of 55.6% scored above the highest-risk cutoff.^{7,8} For depression (43.9%) and for anxiety (45.6%) scored above clinical cutoff,⁹ indicating a strong likelihood of these conditions that requires clinical follow-up. For substance use, 9.2% scored above clinical criteria, again indicating a strong likelihood of this condition that requires clinical follow-up. The number of poor

functioning days out of the past 30 due to physical/mental health problems averaged 17.4. Using the Life Evaluation Index,¹² patients were categorized into three groups – with 95.5% either struggling/suffering.

A convenience sample of patients with both pre-/post-RTT data and averaging seven months of CHT care was collected by three CHTs. This sample was 66.0% female and averaged 61 years old. **Figure 2** shows scores declined significantly upon pre/post analysis (paired sample t-test, $t(65)=11.84$, $p<.0001$), reflecting a 43.0% decline in health risk in CHT patients over time (i.e., from CHT intake to discharge).

Another CHT-patient convenience sample was collected by one CHT with pre-/post- data for PHQ-9⁷ and/or GAD-7⁸ and averaging 10-months of CHT care. **Figure 3** shows significant GAD-7 (28.0%) and PHQ-9 (31.0%) score reductions using paired sample t-tests (GAD-7 $t(73)=5.79$, $p<.0001$; PHQ-9 $t(70)=6.53$, $p<.0001$), reflecting significant declines depression and anxiety levels within CHT patients over time (i.e., from CHT intake to discharge).

A total of 2,222 SBIRT screenings for substance use were conducted by CHTs over 16 months. **Table 3** shows 17.4% of patients required brief intervention, 1.5% required brief treatment, and 3.6% required referral-to-treatment. Ten

Table 2. CHT Intake Data (N=271 Patients*)

Demographics		SDOH Needs	
Characteristic	Mean/Percent	Issue	Percent
Age in Years Range: (18-96)	54.1 (SD=16.9)	Any SDOH Issue Indicated	90.0%
Gender		Housing Issue	37.6%
Male	38.3%	Transportation	33.6%
Female	60.1%	Food Insecurity	27.7%
Other	1.5%	Financial	38.4%
English Not First Language	34.7%	Caregiver Support	12.9%
		Interpersonal Violence	13.7%
Race/Ethnicity		Wellbeing	
Black	8.5%	Suffering	21.3%
Hispanic	12.5%	Struggling	74.2%
White	61.6%	Thriving	4.6%
Multi-Racial/Other**	29.9%		
Psychosocial and Health Risk Cutoffs***			
Health Risk	55.6%	Depression	43.9%
Quality of Life in Number of Poor Functioning Days	17.4 (SD=11.2)	Anxiety	45.6%
		Substance Use	9.2%

* Sample size varies for each measure due to missing data

** Multi-racial/other combines 2+ race and "other race"

***Health Risk reflects Referral Triage Tool Scores ≥ 15 or Impactability Algorithm Scores ≥ 4

Depression reflects PHQ-9 Scores $\geq 10^7$

Anxiety reflects GAD-7 Scores $\geq 10^8$

Substance Use reflects DAST-10 Scores ≥ 3 or AUDIT Scores $\geq 16^9$

Figure 2. CHT Patient Health Risks Score Reduction

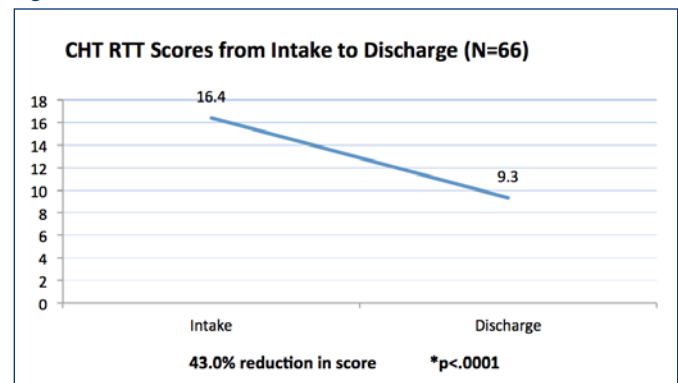
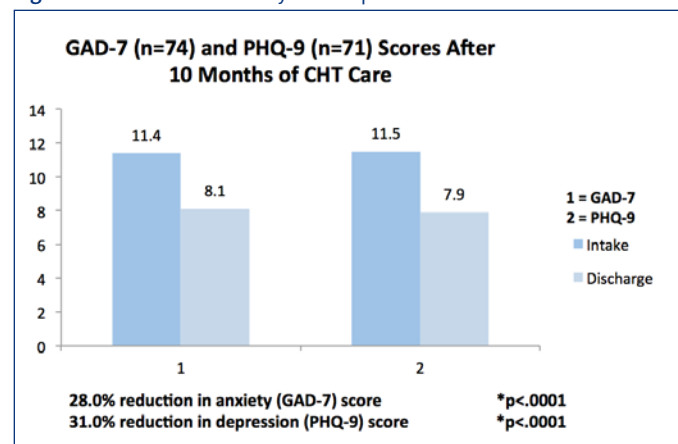


Figure 3. CHT Patient Anxiety and Depression Level Reductions



percent of patients who screened positive for risky substance use were randomly selected for six-month re-assessment. Among those re-screened (N=51), paired sample t-tests examined substance use changes over time. Significant

reductions in past 30-day alcohol use ($t(50)=3.25$, $p<.01$) and illicit drug use ($t(50)=2.60$, $p<.01$) were found, reflecting declining substance use by CHT patients over time (i.e., from initial screen to six-month rescreen).

Table 3. CHT-Screened SBIRT Results

Measure	Value	
Total SBIRT screens performed by CHT staff	2,222	
CHT SBIRT screens by race/ethnicity		
African American/Black	14.9%	
White	81.4%	
Other	3.7%	
Hispanic/Latino	17.5%	
CHT SBIRT screening result type		
Screen-Only	77.5%	
Brief Intervention	17.4%	
Brief Treatment	1.5%	
Referral-to-Treatment	3.6%	
CHT SBIRT Follow-Up Substance Use Results (N=51)	Baseline Mean	Follow-up Mean
Number of past 30 days where patient used alcohol	11.8	6.8
Number past 30 days where patient used illicit drugs	11.8	7.9

Additional SBIRT information available at https://www.ctc-ri.org/sites/default/files/uploads/SBIRT%20infographic_final.pdf

Table 4. Quality Measure Rate Comparison – CHT versus Clinic Population

	CHT Population*	Clinic Population**	
UDS Measure	<i>Percent (n/N)</i>	<i>Percent (n/N)</i>	<i>Chi-Squared (1)</i>
Controlling High Blood Pressure	82.9% (610/736)	80.0% (4,532/5,659)	3.24
Diabetes Care – Poor Control	26.2% (109/416)	20.3% (474/2,339)	7.36**
BMI Assessment	94.8% (1,674/1,766)	88.5% (18,104/20,458)	65.91****
Tobacco Use – Screening/Cessation	99.7% (1,721/1,726)	98.8% (16,879/17,091)	11.49***
Breast Cancer Screening	63.4% (244/385)	57.8% (1,963/3,396)	4.46+
Cervical Cancer Screening	77.6% (660/851)	70.5% (6,504/9,220)	19.11****
Colorectal Cancer Screening	62.4% (457/732)	56.7% (3,847/6,784)	8.77**

+ $p<.05$; ++ $p<.01$; +++ $p<.001$; **** $p<.0001$

* CHT population includes patients with face-to-face visit with CHT behavioral health clinician or community health worker in past 12 months

** Whole population includes all primary care patients (excluding CHT-attributed patients) across all locations in past 12 months

Table 4 compares quality measure rates over 12 months (January 1–December 31, 2018) from one partner with CHTs in two geographic regions, revealing differences between CHT-attributed and entire clinic populations on several measures. CHT patients were more likely to meet BMI, tobacco use (and when positive, offered cessation services), and breast/cervical/colorectal cancer measures when compared to the clinic population. No difference in blood pressure control was observed. Diabetes control was the only indicator where the CHT-attributed population performed significantly worse, potentially reflecting challenges of high-risk patient comorbidities and SDOH needs (e.g., food insecurity).¹³ The Chi-squared tests show cross-sectional differences between these two independent groups but cannot show causation.

DISCUSSION

A coordinated statewide approach to CHT/SBIRT delivery has shown some valuable signals across behavioral and clinical health measures. Activity data indicated that CHTs serve a large volume of RI tobacco users, potentially due to the comorbidities with behavioral health conditions,⁴ further supporting the integration of substance use screening, brief intervention, and treatment. After averaging 6–10 months in CHT care, different patient samples showed 28–43% reductions in health risk, depression, anxiety, and substance use. These changes were both clinically and statistically meaningful.

CHTs successfully collaborated with clinical partners to identify and support high-risk patients with 55.6% meeting the highest health risk cutoff scores. Some patients who may not score within the highest health risk cutoff are still included within CHT care, representing various vulnerable populations including: rising-risk patients, cancer patients, homeless and undocumented communities, dementia clients, and the elderly. These data support CHTs' ability to identify and engage patient populations needing complex medical, behavioral health, and social supports.

For example, one CHT served a 50-year-old African male who immigrated to RI. The patient continually experienced chronic headaches and vertigo for three years, causing him to lose his job – exhausting unemployment and temporary disability insurance, stop driving, and search far and wide for healthcare that relieved his symptoms. During 2016–2017, the patient had 14 emergency department visits and over seven unique specialty providers with multiple visits each (e.g., ear, nose, and throat clinicians, radiologist, audiologist). The patient was very frustrated with the unaddressed headaches, having seen

multiple providers across three states (including an attempt to see the Mayo Clinic but his insurance was not accepted), and he refused to see a psychiatrist for his depression and post-traumatic stress disorder. The patient had limited proficiency with English and had no formal education beyond fourth grade. The patient walked to destinations, surfed couches due to homelessness, remained spiritual, and continued to stress over being unable to send monetary resources to family back in Africa (causing interpersonal conflicts). The patient had an initial RTT health risk score of 22.

The CHT engaged with the patient by coordinating his care, providing health coaching – including how to focus on the items within the patient's control, teaching the patient how to use Logisticare transportation, guiding the patient through the social security and disability income (SSDI) process – including legal referral, and assisting the patient with completing subsidized housing applications. The CHT eventually coached the patient to partial behavioral health hospitalization, overcoming the psychiatric barrier. The CHT's community health worker continually assisted in reviewing mail and documents, reminding the patient of PCP appointments, helping patient maintain adherence to PCP recommendations, and encouraged the patient to consider GED classes.

In late 2018, the patient's RTT health risk score decreased from 22 to 11. During 2018, only two emergency department visits occurred – none of which were for prior chief complaint of headache/dizziness. The patient recently began to drive again, enrolled in GED courses, received SSDI, obtained priority standing for public housing, and recently paid for daughter's school tuition back home to ease strain with family members. CHT confirmed the patient has been following PCP recommendation – including acupuncture treatment – and noted the patient reported improvement in previous symptoms. The patient now regularly attends scheduled PCP visits, checks in with the CHT's community health worker, and participates in the local immigrant community. Lastly, the patient has had significant improvement in mood and outlook from a behavioral health perspective.

In addition to physical and behavioral health challenges, most CHT patients (95.0%) were suffering/struggling, as the case presented above demonstrates, and were experiencing at least one SDOH need (90.0%). Housing, transportation, and food insecurity were the top three reported social determinants of health in CHT patients. CHT benefits include improving health equity by: addressing social needs, delivering integrated physical/behavioral healthcare, and managing complex care in community settings. CHTs can improve high-risk patient population outcomes by offering services that bridge system gaps¹⁴ and sustain patients' engagement with healthcare. Specific opportunities for CHTs to improve patient care have been seen through extensive care coordination with PCPs, by treating unmet, unaddressed behavioral healthcare needs, and by understanding and referring

to local resources that address social needs within a given patient's community. Given a focus on vulnerable populations, CHTs may also be valuable assets for PCPs as patients transition from various 'high-risk' settings, such as emergency departments or the Department of Corrections, into the community.

CHTs offer PCPs opportunity to provide integrated care, successfully increasing outpatient behavioral health services – assisting those ineligible for models such as Integrated Health Homes. Providing mechanisms for clinicians to address SDOH and behavioral health needs exacerbating complex medical problems make CHTs a likely essential component of comprehensive, accountable care. Opportunities for improvement given the data presented include continuing to expand the utilization of pharmacy and nutrition support services to address quality measure challenges (e.g., diabetes control) of high-risk populations. Sustaining CHTs as safety-net resources for small PCPs and systems of care remains a priority.¹⁵

MOVING FORWARD

Long-term sustainability planning for a CHT network in RI includes: continued evaluation of the model itself – leveraging insights presented in this data brief; determination of remaining unmet patient need and underserved geographical catchment areas; development of value-based payment models to support the network and critical resources (i.e., community health workers); and further alignment with other initiatives such as Accountable Entities and Health Equity Zones to build stronger community-clinical linkages that help to achieve the Institute for Healthcare Improvement's triple aim. PCPs interested in the CHT/SBIRT model may request more information below.

CHT/SBIRT model sustainability remains a public-private entity discussion topic with SIM ending in June 2019. Continued data collection/analysis will continue through SIM completion. CHT follow-up data include measures previously reported and other indicators (e.g., patient experience, health literacy, health confidence, treatment regimen). The systematic collection of a full range of outcome data in addition to social determinant screening is needed to assess changes over time in response to CHT care. One report limitation is very small-sized convenience samples. Without a control/comparison group, regression to the mean remains a potential alternative explanation for health risk, behavioral health, and substance use declines observed. More systematic controlled data collection with a control/comparison group (including on discharge, quality, and cost) would allow evaluators to draw clearer causal conclusions about CHT-value and patient-level outcomes that will be necessary to inform policies and interventions.

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