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Healthy Environments and Response to Trauma in Schools (HEARTS): A Whole-School, Multi-level, Prevention and Intervention Program for Creating Trauma-Informed, Safe and Supportive Schools

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Abstract The University of California, San Francisco's Healthy Environments and Response to Trauma in Schools (HEARTS) Program promotes school success for trauma-impacted students through a whole-school approach utilizing the response to intervention multi-tiered framework. Tier 1 involves school-wide universal supports to change school cultures into learning environments that are more safe, supportive and trauma-informed. Tier 2 involves capacity building with school staff to facilitate the incorporation of a trauma-informed lens into the development of supports for at-risk students, school-wide concerns and disciplinary procedures. Tier 3 involves intensive interventions for students suffering from the impact of trauma. Program evaluation questions were: (1) Was there an increase in school personnel's knowledge about addressing trauma and in their use of trauma-sensitive practices? (2) Was there an improvement in students' school engagement? (3) Was there a decrease in behavioral problems associated with loss of students' instructional time due to disciplinary measures taken? (4) Was there a decrease in trauma-related symptoms in students who received HEARTS therapy? Results indicate preliminary support for the effectiveness of the HEARTS program for each of the evaluation questions examined, suggesting that a whole-school, multi-tiered approach providing support at the student, school personnel and system levels can help mitigate the effects of trauma and chronic stress. Key areas for further studies include (a) an examination of data across more HEARTS schools that includes comparison control schools and (b) disaggregating disciplinary data by race and ethnicity to determine whether disproportionality in the meting out of disciplinary actions is reduced.

Keywords Trauma · Complex trauma · School-based mental health · School to prison pipeline · Trauma-informed schools · Prevention

Introduction

San Francisco Unified School District (SFUSD) put forward a multi-year strategic plan in 2008 asserting that "every child deserves to be well-educated," with a particular focus on the need to address the achievement gap in which the race, ethnicity, language spoken at home and class of a student predicted academic proficiency (SFUSD, 2008). SFUSD's strategic plan reflects nationwide efforts to address the "school to prison pipeline," in which punitive and exclusionary disciplinary measures in schools have resulted in students of color and students with disabilities being disproportionately suspended and expelled from school and ending up in the juvenile justice and prison population (e.g., Losen, Martinez, & Gillespie, 2012). In 2009–2010, when Healthy Environments and

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Response to Trauma in Schools (HEARTS) first began implementation, African-American students in SFUSD were suspended at 6.5 times the rate of European American students (Losen et al., 2012).

Bringing a trauma lens to the "school to prison pipeline" conversation is crucial to effectively addressing this societal challenge. The trauma of community violence disproportionately affects highly stressed neighborhoods often inhabited by communities of color (Buka, Stichick, Birdthistle, & Earls, 2001; Kiser & Black, 2005). Chronic stress and trauma combined with the effects of implicit and explicit bias contribute to inequity and disproportionality in suspensions, expulsions and dropout, and can be particularly toxic (Soto-Vigil Koon, 2013). If not addressed, trauma-related difficulties can put students at greater risk for school dropout (Porche, Fortuna, Lin, & Alegria, 2011), and in turn, dropping out of school increases the risk of being imprisoned (Center for Labor Market Studies, 2009). Traditional approaches to addressing challenging behavior, including disciplinary procedures such as suspension, are not an effective long-term solution to creating lasting, meaningful change for students or for the school community (Public Counsel, 2015). Without an understanding of the effects of chronic stress and trauma, trauma-impacted students are at risk of being seen as children with "problem behaviors" rather than as children in need of help who have made adaptations in order to survive trauma. Over time they are at risk of dropping out or being pushed out of school via repeated suspensions and/or expulsion. One of the key changes needed within schools is a shift in perspective, in which when problematic behavior occurs, rather than asking "What is wrong with you?" we are asking "What has happened to you?" (Wisconsin Department of Health Services, 2013; Wolpow, Johnson, Hertel, & Kincaid, 2009). This shift is in keeping with national trauma-informed systems change efforts (SAMHSA, 2014). Asking these questions (even silently to ourselves) can influence how we interpret, feel about and respond to a situation. It can help to contextualize the behavior, foster compassion and connection, and highlight strengths people are bringing to bear despite the adversities they face.

UCSF Healthy Environments and Response to Trauma in Schools (HEARTS)

The mission of the UCSF HEARTS program is to collaborate with schools and school districts to promote school success for trauma-impacted children and youth by creating more trauma-informed, safe and supportive environments that foster resilience and wellness for all (children/youth and adults alike) in the school community. Specifically, the goals of HEARTS include: (1) increase student wellness, engagement and success in school, (2) build staff

and school system capacities to support trauma-impacted students by increasing knowledge and practice of trauma-informed classroom and school-wide strategies, (3) promote staff wellness through addressing burnout and secondary trauma and (4) integrate a cultural and equity lens with an understanding of the sequelae of trauma to reduce racial disparities in disciplinary actions such as suspensions and expulsions.

Development and Implementation of UCSF HEARTS

We began planning UCSF HEARTS in 2008, collaborating with SFUSD on developing details of the program, including how to dovetail our efforts onto the district's existing values, goals and initiatives. School sites were invited by SFUSD to apply for HEARTS implementation at their schools and were chosen based on need, principal buy-in and good-enough infrastructure. Need was determined to be present if schools served students from under-resourced, trauma-impacted neighborhoods, and also had a significant gap on achievement test scores between African-American and Latino students and other students. Principal buy-in meant the principal believed that social emotional skills and wellness were crucial to academic achievement, and that addressing trauma would help promote school success. Good-enough infrastructure was defined as a reasonably functioning Coordinated Care Team that met regularly and included key staff and administrators at the school.

We began the implementation phase of UCSF HEARTS in the fall of 2009 in two elementary schools and one kindergarten through 8th-grade school. Between academic years 2009–10 and 2013–14, HEARTS was implemented in four schools in the southeast sector of San Francisco. These schools largely serve African-American, Latino, and Asian and Pacific Islander children and youth from low-income families who live in neighborhoods where there is an elevated concentration of urban poverty, as well as poor health indicators and community trauma often associated with such poverty (Kiser & Black, 2005).

Our whole-school approach was grounded in the Trauma and Learning Policy Initiative's flexible framework (Cole et al., 2005) (see this issue's introductory paper). In addition, we initially mapped the services provided by HEARTS along the public health triangle continuum, with the bottom of the triangle representing efforts at primary prevention, the middle representing secondary intervention and the top representing tertiary intervention. During our implementation at SFUSD, the district launched a district-wide rollout of Behavioral Response to Intervention (RtI) (a.k.a. Multi-Tiered Systems of Supports), which utilizes the same triangular approach. Thus, we began describing our services along the RtI tiered

continuum, with Tier 1 indicating the bottom of the triangle comprising universal supports for all students, Tier 2 indicating the middle of the triangle comprised of selected interventions for students for whom the universal supports are not sufficient and Tier 3 indicating targeted and intensive supports for students for whom both Tier 1 and Tier 2 supports are not sufficient. For each of the tiers, UCSF HEARTS focuses on three levels of support to create

trauma-informed schools: students, adults in the caregiving system and the school system as a whole. See Fig. 1 for our multi-level framework of tiered supports with examples of supports provided. At the HEARTS schools (sites where a HEARTS clinician worked on-site at the school 3 days per week), HEARTS was implemented at all three tiers of the HEARTS framework. Across all tiers, we drew upon the Attachment, Self-regulation and Competency (ARC)

LEVEL	TIER 3: Targeted/Intensive Supports (Tertiary Intervention)
Students	School-based, trauma-specific individual, group, and family therapy services for students with trauma-related mental health difficulties; includes intensive collateral work with students' teachers, as well as consultation around Individualized Education Program (IEP) assessment and plans when IEP is warranted
Adults (staff and caregivers)	Brief crisis support for trauma-impacted school staff, and referral for more intensive services if needed
	Engaging and supporting parents/caregivers as part of their children's psychotherapy
System	Consultation around central district office personnel efforts to improve the district-wide Educationally Related Mental Health Services (ERMHS) process
	TIER 2: Selected Supports (Secondary Intervention)
Students	Psychoeducational skill-building interventions for at-risk students
Adults (staff and caregivers)	Wellness (non-treatment) support for school staff that addresses stress, burnout, and secondary trauma (e.g., teacher wellness groups)
	Participating in Coordinated Care Team meetings that address the needs of at-risk students and coordinate integrated responses, as well as; respond to school-wide concerns
System	Consultation to school or district efforts to re-examine and revise discipline policies and procedures, and alternatives to suspension
	TIER 1: Universal Supports (Primary Prevention)
Students	Classroom training for students on coping with stress
Adults (staff and caregivers)	Training and consultation for all school staff (e.g., teachers, administrators, support staff, paraprofessionals, and school medical and mental health staff) around (a) trauma-sensitive practices, and (b) addressing stress, burnout, and secondary trauma
	Psychoeducation and skill-building workshops for parents/caregivers on coping with stress
System	Providing a trauma-informed lens to school staff in their implementation of school-wide supports and interventions (e.g., Positive Behavioral Interventions and Supports, Restorative Justice/Practices, social emotional learning curricula)

Fig. 1 Examples of HEARTS tiered supports at three levels of intervention

framework's theory and research (Blaustein & Kinniburgh, 2010). ARC utilizes evidence-based components to address trauma in three core domains: (a) attachment (e.g., building caregiver affect management and attunement skills, building family routines and rituals), (b) self-regulation (which ARC defines as affect/emotion identification, expression and modulation) and (c) competency (e.g., executive functioning, self-development and identity). Given that ARC's core domains are all associated with school performance (see CASEL, 2012 for a review), ARC has lent itself well to addressing trauma in schools. Furthermore, in order to contribute to a collective impact on mitigating the effects of trauma in San Francisco, the HEARTS director participated in the San Francisco Department of Public Health (SFDPH) Trauma-Informed Systems (TIS) Initiative workgroup, helping to create a curriculum and implementation plan (Epstein, Speziale, Gerber, & Loomis, 2014). Through this cross-fertilization, HEARTS has modified the SFDPH TIS principles for the education system and adopted the following core guiding principles: (1) understand trauma and stress, (2) establish safety and predictability, (3) foster compassionate and dependable relationships, (4) promote resilience and social emotional learning, (5) practice cultural humility and responsiveness and (6) facilitate empowerment and collaboration. These principles are reflected in HEARTS interventions and supports across all three tiers (see Table 1 for brief rationale for and description of principles).

As an example of Tier 1 universal supports provided by HEARTS, we began at each school with half-day trainings with all school staff that established common language and understanding around the effects of complex trauma on learning-readiness and teaching-readiness, behavior, interactions, relationships, systems and communities, as well as an overview of strategies for addressing these effects that could be implemented regardless of one's role in the school system. We focused on the neurobiology and physiology of chronic stress and trauma in a way that was simple and applicable to educators, and that utilized metaphors to make the concepts more understandable and memorable. For example, we highlighted how trauma affects functioning of the "learning brain" and the "survival brain" (see Ford, 2009, for a review). In order to be in a learning-ready state, students need to have their "learning brain" engaged. However, if a student feels unsafe or under threat, the "survival brain" takes over and the student is pushed into a state that is no longer learning-ready. We used the metaphor of a horse and rider (van der Kolk, 2014, citing MacLean). In this metaphor, the "rider" is the "learning/thinking brain," which sits high enough to have perspective, and is able to think rationally, make prioritized decisions and learn new information. The "horse" is the "survival/emotional brain," which acts in a rapid, powerful manner on protective instincts

based in visceral feeling and emotions. When integrated, the "rider" and "horse" can do productive work. But when triggered by a trauma reminder, the "rider falls off the horse," and the "learning/thinking brain" is largely derailed. In these moments, administering behaviorally based consequences such as the loss of a star on a star chart or pre-frontal cortex-dependent tasks such as "think sheets" (in which students must reflect upon and write about their inappropriate behavior) are not likely to be effective in changing triggered behavior, and may inadvertently escalate the behavior. Instead, we encouraged educators to respond to these behaviors by addressing the triggered students' underlying safety needs, helping them get the students' (as well as their own) "rider" back on their "horse" before all else.

In HEARTS schools, initial trainings were then augmented and deepened through a series of follow-up trainings and collaborative consultation. For example, we focused on understanding and addressing burnout and secondary trauma in school staff via self-care and organizational strategies. Learning about how working with trauma-impacted students was affecting their own health, behavior, interactions and work helped to bolster staff's coping resources and foster their wellness, as well as engaged staff in wanting to learn more about how to help trauma-impacted students in their classrooms. Our mental health consultation approach is based on that put forth by Johnston and Brinamen (2006). On-site consultation helped school staff to turn the theoretical into the practical by providing in vivo capacity building, modeling and support for the staff in the moment that the interventions were needed.

As an example of Tier 2 interventions, HEARTS clinicians became embedded in the school's Coordinated Care Team providing a trauma-informed lens to school staff's development of behavioral support plans for at-risk students, as well as to the school's development of disciplinary policies that were less punitive and more supportive. To quote one of our HEARTS school administrators, without HEARTS, "we wouldn't have been aware of the impacts of trauma even though we were dealing with them constantly. [Before HEARTS,] we were writing tighter and more rigid behavior plans and procedures…We would not have been able to offer people different ways of managing behavior. [The HEARTS approach is] more of an idea of understanding behavior in order to support the things you want and address the things you don't want."

As an example of a HEARTS Tier 3 interventions, HEARTS clinicians provided on-site, trauma-specific, culturally congruent therapy for trauma-impacted students based on ARC (see above for ARC description) (Blaustein & Kinniburgh, 2010). Therapy involved not only skill building and trauma processing with individual students, but also working collaboratively with parents/caregivers and other family members, a crucial component of

Table 1 UCSF HEARTS core guiding principles for creating trauma-informed schools (modified from San Francisco Department of Public Health Trauma-Informed Systems Initiative)

Principle	Trauma-informed lens rationale	Description of principle
Understand trauma and stress	Without understanding trauma, we are more likely to misinterpret trauma-related behaviors as willful, "sick," or "crazy," which can lead to ineffective, stigmatizing and/or punitive reactions to trauma-impacted people	Understanding how trauma and stress can affect individuals, relationships, organizations, health and work can help to reframe otherwise confusing or aggravating behavior. This can in turn assist us to recognize trauma's effects more accurately, which can then lead to more compassionate, strength-based and effective responses to trauma-impacted people that promote healing, instead of reactions that inadvertently re-traumatize and cause harm
Establish safety and predictability	Trauma unpredictably violates our physical, social and emotional safety, resulting in a sense of threat and a need to focus resources on managing risks	Establishing physical, social and emotional safety, as well as predictability in the environment, can assist us to focus resources on healthy development, wellness, learning and teaching
Foster compassionate and dependable relationships	Trauma can leave us feeling isolated or betrayed, which may make it difficult to trust others and receive support	By fostering relationships that are compassionate and attuned, as well as dependable and trustworthy, we reestablish trusting connections with others that foster healing and well-being
Promote resilience and social emotional learning	Trauma can derail the development of healthy skills in regulating emotions, cognitions and behaviors, as well as healthy interpersonal skills, which can then compound trauma's negative effects	Promoting wellness practices and building social emotional learning competencies of self-management, self-awareness, social awareness, relationship skills and responsible decision making (CASEL, 2012) can help us to be resilient and more successful in achieving our goals in school and at work, and to develop to our fullest potential
Practice cultural humility and responsiveness	We come from diverse cultural groups that may experience different traumas and stressors, react to these adversities differently, and experience differences in how others respond to our traumatic experiences	When we are open to understanding the root causes of these differences and respond to them sensitively and with cultural humility, we make each other feel understood and equity is enhanced
Facilitate empowerment and collaboration	Trauma involves a loss of power and control that can make us feel helpless and hopeless	When we are given meaningful opportunities to have voice and choice and our strengths are acknowledged and built upon, we feel empowered to advance growth and well-being for ourselves and others, and we can work together to forward the cause of social justice

effective treatment (Blaustein & Kinniburgh, 2010). In addition to strengthening the capacity of parents/caregivers to provide attuned, consistent parenting to help their children heal, therapy took into account that often students' parents and other relatives have also experienced complex trauma and the suffering that comes with these experiences (Kiser & Black, 2005). We also worked closely with our clients' teachers, as well as with other school staff involved with the client. This allowed us to integrate staff's knowledge into our clinical formulations and promote staff's integration of effective, trauma-informed interventions and practices into their daily interactions with the client.

In summary, HEARTS collaborates with school personnel and systems to increase understanding about the ways that trauma and chronic stress affect school communities and to use this understanding to respond more effectively to these adverse effects in order to promote school success, healing and resilience for trauma-impacted individuals as well as all members of the school community. Figure 2 depicts a logic model that highlights key elements of the conceptual framework underlying HEARTS, outlines main activities of our school-site-based work and describes outputs, outcomes and long-term impacts sought by HEARTS. We focused our program evaluation efforts on exploring the degree to which our collaboration with HEARTS schools was able to achieve the desired outcomes described in the logic model.

Program Evaluation

We examined program evaluation data to answer the following questions: (1) Was there an increase in HEARTS school personnel's knowledge about addressing trauma and in their use of trauma-sensitive practices? (2) Was there an improvement in students' school engagement? (3) Was
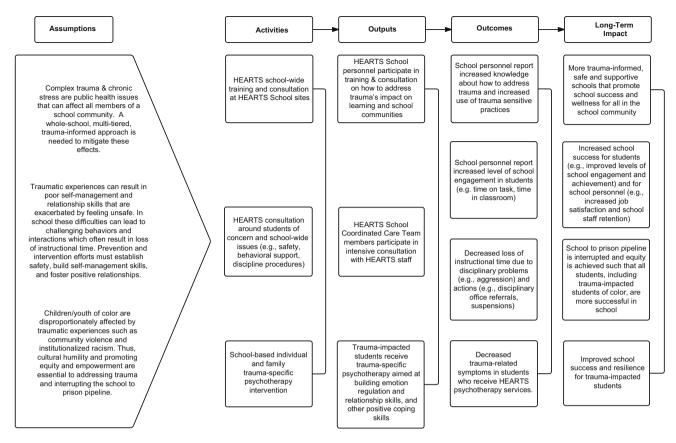
Fig. 2 UCSF HEARTS logic model

there a decrease in behavioral problems associated with the loss of students' instructional time due to disciplinary measures taken? (4) Was there a decrease in trauma-related symptoms in students who received HEARTS therapy?

Method

Participants

Our overarching sample is comprised of students at the four HEARTS schools. Because our ability to remain in a school was dependent upon our level of funding as well as the priorities of school administrators, HEARTS was implemented in each school for a different number of years: School A for five consecutive years, School B for 4 years (with a 1-year gap between the 3rd and 4th years), School C for 2 years and School D for 1.5 years. Schools A, B and D are elementary schools (kindergarten through 5th grade), and School C is kindergarten through 8th grade. There were a total of 1243 students across the four schools during the first year of HEARTS implementation (academic year 2009–2010) (School A = 291 students, School B = 253 students, School C = 417 students, School

D = 282 students). Demographic data for students across all four schools in 2009–2010 were as follows: 47 % girls, 53 % boys; 38 % African-American, 34 % Hispanic or Latino of Any Race, 4 % Asian, 8 % Pacific Islander, 4 % Filipino, 2 % White, 4 % two or more Races, 1 % American Indian or Alaska Native, 4 % race/ethnicity not reported; 76 % students qualifying for free or reduced lunch.

School personnel participants comprised a subsample that provided school staff data. The HEARTS Program Evaluation Survey was distributed to all school staff who participated in HEARTS training and/or consultation for each of the 5 years of implementation. These personnel included teachers, administrators and members of the Coordinated Care Teams (e.g., school social workers, attendance counselors, special education professionals). Out of an estimated 280 surveys distributed, we received 175 (response rate approximately 62 %).

Student participants who received on-site HEARTS therapy make up a subsample of the overarching sample of students. HEARTS provided on-site, trauma-specific therapy to a total of 88 student clients. As part of an ongoing prospective chart review study at CAS, parents/guardians of all therapy clients are presented with research consent

forms and asked for permission to include their child's data in our study. Of the 67 HEARTS therapy clients whose parents/guardians signed the research consent forms, 46 had both initial and closing Child and Adolescent Needs and Strengths (CANS) scales available for data analysis. The demographics of these 46 study participants are as follows: mean age = 8.48, SD = 1.74, (minimum age = 5.43, maximum age = 11.90); 30 % girls, 70 % boys; 61 % African-American, 33 % Latino, 6 % multi-ethnic.

Materials and Procedure

Program Evaluation Questions 1 and 2

We utilized the HEARTS Program Evaluation Survey to capture staff's perception of changes in their knowledge, skills and use of trauma-sensitive practices, as well as their perception of changes in their students' school engagement. This survey was administered to participants at each HEARTS school at the end of every full school year of implementation. The nine survey items that address our program evaluation questions for the current paper utilized a retrospective pre–post method where both "before" and "after" information was collected at the same time (Klatt & Taylor-Powell, 2005). Research indicates that response shift can mask program effectiveness. The retrospective pre–post method reduces or eliminates response shift bias, and its results are more congruent with interview data collected from program participants and leaders than traditional pre–post design evaluations (Howard et al., 1979; Howard, 1980; Howard, Millham, Slaten, & O'Donnell, 1981). Further, the retrospective pre–post design was intended to reduce respondent burden, since responding to both pre and post at the same time is more efficient and less intrusive for learners (Klatt & Taylor-Powell, 2005). These items were as follows: (a) knowledge about trauma and its effects on children, (b) understanding how to help traumatized children learn in school, (c) knowledge about trauma-sensitive practices, (d) knowledge about burnout and vicarious traumatization, (e) use of trauma-sensitive practices, (f) students' ability to learn, (g) students' time on task in the classroom, (h) students' time spend in the classroom and (i) students' school attendance. Staff were asked to rate each of these items "before HEARTS" and "as a result of HEARTS" on a 5-point scale from Poor to Excellent. See Tables 2 and 3 for specific wording of each of the questions.

Program Evaluation Question 3

SFUSD personnel consistently expressed a hope that our program would increase instructional time by decreasing the amount of time lost due to disciplinary issues. Consequently, we examined change in the number of disciplinary office referrals and suspensions over time. In order to address the program evaluation question regarding loss of instructional time due to disciplinary actions, we analyzed School A's disciplinary referral and suspension data. School A was the only HEARTS school that consistently collected these data. This school utilized a school staff person to collect information regarding disciplinary referrals and suspensions and to enter the reason for referral and type of behavior resulting in the referral (e.g., physical aggression, and defiance) into a Microsoft Excel Spreadsheet. We extracted total frequencies of office referral incidents and suspensions for the academic year prior to HEARTS implementation (2008–09), the first year of HEARTS implementation (2009–10) and the final (fifth) year of HEARTS implementation (2013–14).

Program Evaluation Question 4

In an effort to capture effects related to the provision of trauma-specific psychotherapy by HEARTS clinicians, we gathered Child and Adolescent Needs and Strengths (CANS) scale data on HEARTS clients. As part of normal clinical service delivery, Child and Adolescent Services (CAS) clinicians completed a CANS for all CAS treatment clients following their initial intake, at intervals and at the close of treatment. The CANS is a widely used measure focusing on items that directly impact treatment planning. The rating scale has four levels that translate into need for clinical action as follows: "0" = there is no reason to believe a need for action exists on this item, "1" = a need for "watchful waiting" to determine whether action is needed and/or need for prevention planning, "2" = a need for clinical action because the need is problematic enough to interfere in the child or family's life and "3" = a need requiring immediate or intensive effort to address because the need is dangerous or disabling. Average inter-rater reliability of the measure has been found to be between 0.73 and 0.85 (Praed Foundation, 1999). The CANS is widely used in child-serving systems nationally and has been demonstrated to be psychometrically sound, to correlate with other validated measures and to be a reliable measure of clinical and psychosocial needs and strengths of children and youth in clinical settings (Anderson, Lyons, Giles, Price, & Estes, 2002; Dilley, Weiner, Lyons & Martinovich, 2003; Praed Foundation, 1999). The CANS utilized with HEARTS clients contains a trauma module (Trauma Comprehensive Version) designed to assess exposure to potentially traumatic childhood experiences, as well as symptoms related to these experiences, including the following items: (a) adjustment to trauma, (b) affect regulation, (c) intrusions, (d) attachment, (e) dissociation.

Table 2 Responses to Program Evaluation Surveys on knowledge and use of trauma-sensitive practices

	Mean	N	Paired differences					t	df	Sig. (2-tailed)	Effect size Cohen's d
			Mean	SD	SE mean	95 % Confidence interval of the difference					
						Lower	Upper				
Pair 1											
My knowledge about trauma and its effects on children		175	1.45	0.88	0.07	1.32	1.58	21.86	174	.000	1.72
Before the HEARTS program	2.53										
Currently, as a result of the HEARTS program	3.97										
Pair 2											
My understanding about how to help traumatized children learn in school		175	1.43	0.94	0.07	1.29	1.57	20.16	174	.000	1.56
Before the HEARTS program	2.35										
Currently, as a result of the HEARTS program	3.78										
Pair 3											
My knowledge about trauma-sensitive practices		173	1.53	0.92	0.07	1.39	1.66	21.85	172	.000	1.67
Before the HEARTS program	2.22										
Currently, as a result of the HEARTS program	3.75										
Pair 4											
My knowledge about burnout and vicarious traumatization		173	1.47	1.04	0.08	1.32	1.63	18.69	172	.000	1.43
Before the HEARTS program	2.28										
Currently, as a result of the HEARTS program	3.75										
Pair 5											
My use of trauma-sensitive practices		163	1.19	0.95	0.07	1.05	1.34	16.09	162	.000	1.28
Before the HEARTS program	2.42										
Currently, as a result of the HEARTS program	3.61										

The score for each of these items was extracted from study participant's charts, and the difference between initial (pre-treatment) CANS and closing (end of treatment) CANS was examined. Note that a lower score on the CANS is considered improvement.

Results

Program Evaluation Question 1

To test the hypothesis that there was an increase in HEARTS school personnel's knowledge about addressing trauma and use of trauma-sensitive practices, a within-subjects paired T test was run using the Statistical Package for the Social Sciences (SPSS 21.0, 2014) to examine each of the five survey items that measured staff perception of change in their own knowledge and practices that occurred

following involvement in HEARTS. Table 2 presents these results. Findings indicated significant changes for all of the five knowledge and practice items: (a) knowledge about trauma and its effects on children = 57 % increase ($t = 21.86$, $p < .001$), (b) understanding about how to help traumatized children learn in school = 61 % increase ($t = 20.16$, $p < .001$), (c) knowledge about trauma-sensitive practices = 68 % increase ($t = 21.85$, $p < .001$), (d) knowledge about burnout and vicarious traumatization = 65 % increase ($t = 18.69$, $p < .001$) and (e) use of trauma-sensitive practices = 49 % increase ($t = 16.09$, $p < .001$).

Program Evaluation Question 2

To explore the hypothesis that there was an improvement in students' school engagement, a within-subjects paired T test was used to examine each of the four items that

measured staff perception of change in their students' level of school engagement that occurred following involvement in HEARTS. Table 3 presents these results. Findings indicated significant changes for each of the student engagement items: (a) students' ability to learn = 28 % increase (t = 11.06, $p < .001$), (b) students' time on task in the classroom = 27 % increase (t = 10.57, $p < .001$), (c) students' time spent in the classroom = 36 % increase (t = 12.43, $p < .001$), (d) students' school attendance = 34 % increase (t = 6.67, $p < .001$).

Program Evaluation Question 3

To test the hypothesis that there was a decrease in behavioral problems associated with the loss of students' instructional time due to disciplinary measures taken, we examined the change in number of incidents of disciplinary office referrals, physically aggressive student incidents and out-of-school suspensions between the year before HEARTS was implemented at School A (2008–09) and the 1st year of HEARTS implementation (2009–10), and between 2008–09 and the 5th and final year of HEARTS implementation (2013–14). A Chi-square analysis was run on these results, presented in Table 4.

Analyses indicated that there was a 32 % decrease in total incidents and a 43 % decrease in incidents involving physical aggression after only 1 year of HEARTS implementation compared to the year prior to implementation. After 5 years of HEARTS implementation, there was an 87 % decrease in total incidents and an 86 % decrease in incidents involving physical aggression (compared to the year prior to HEARTS implementation). There was not a significant decrease in out-of-school suspensions after 1 year of HEARTS implementation, but there was a 95 % decrease in out-of-school suspensions after 5 years of HEARTS implementation compared to the year prior to HEARTS implementation.

Table 3 Program evaluation survey responses on school staff perception of student engagement in school

	Mean	N	Paired differences					t	df	Sig (2-tailed)	Effect size Cohen's d
			Mean	SD	SE of mean	95 % Confidence interval of the difference					
						Lower	Upper				
Pair 6											
My students' ability to learn		155	0.78	0.88	0.07	0.64	0.92	11.06	154	.000	0.89
Before the HEARTS program	2.76										
Currently, as a result of the HEARTS program	3.55										
Pair 7											
My students' time on task in the classroom		154	0.72	0.85	0.07	0.59	0.86	10.57	153	.000	0.86
Before the HEARTS program	2.68										
Currently, as a result of the HEARTS program	3.40										
Pair 8											
My students' time spent in the classroom		156	0.96	0.96	0.08	0.80	1.11	12.43	155	.000	1.00
Before the HEARTS program	2.69										
Currently, as a result of the HEARTS program	3.64										
Pair 9											
My students' school attendance		150	0.47	0.86	0.07	0.33	0.60	6.67	149	.000	0.54
Before the HEARTS program	2.77										
Currently, as a result of the HEARTS program	3.24										

Table 4 Changes in disciplinary office referrals and suspensions for School A

	Academic year			Year to year change (X_1^2)			
	Before HEARTS 2008–09	1st year HEARTS 2009–10	Last year HEARTS 2013–14	2008–09 to 2009–10	Effect size Cohen's d	2008–09 to 2013–14	Effect size Cohen's d
# Incidents	674	455	87	42.48***	0.40	452.78***	2.42
# Incidents involving physical aggression	407	234	58	46.69***	0.56	261.94***	2.27
# Out-of-school suspensions	56	54	3	0.04	0.04	47.61***	4.09

*** $p < .001$

Program Evaluation Question 4

To explore the hypothesis that there was a decrease in HEARTS clients' trauma-related symptoms, a within-subjects paired T test was run to compare pre-treatment and post-treatment CANS scores on the five trauma module items; (a) adjustment to trauma, (b) affect regulation, (c) intrusions, (d) attachment and (e) dissociation. Table 5 presents these results.

Results indicated that significant improvements were found for all five of the items; (a) adjustment to trauma (t = 3.97, $p < .001$), (b) affect regulation (t = 4.95,

$p < .001$), (c) intrusions (t = 2.30, $p = .026$), (d) attachment (t = 4.15, $p < .001$), (e) dissociation (t = 2.20, $p = .033$). CANS test results were positively skewed due to a floor effect of a maximum change effect of 3.

Discussion

Our program evaluation provides preliminary support for the effectiveness of the HEARTS program for each of the evaluation questions examined. School personnel who responded to the Program Evaluation Survey reported

Table 5 Child and Adolescent Needs and Strengths (CANS) for students who received HEARTS psychotherapy

	Mean	Paired differences					t	df	Sig. (2-tailed)	Effect size Cohen's d
		Mean	SD	SE mean	95 % Confidence interval of the difference					
					Lower	Upper				
Pair 1										
Initial adjustment to trauma	1.96	0.46	0.78	0.12	0.22	0.69	3.97	45	.000	0.59
Final adjustment to trauma	1.50									
Pair 2										
Initial affect regulation	1.93	0.39	0.54	0.08	0.23	0.55	4.95	45	.000	0.74
Final affect regulation	1.54									
Pair 3										
Initial intrusions	0.61	0.28	0.83	0.12	0.04	0.53	2.30	45	.026	0.34
Final intrusions	0.33									
Pair 4										
Initial attachment	1.37	0.48	0.78	0.12	0.25	0.71	4.15	45	.000	0.61
Final attachment	0.89									
Pair 5										
Initial dissociation	0.39	0.15	0.47	0.07	0.01	0.29	2.20	45	.033	0.33
Final dissociation	0.24									

significant increases in their understanding of trauma and use of trauma-sensitive practices, as well as significant improvements in their students' ability to learn, time on task and school attendance "as a result of the HEARTS program." In addition, data for the school where HEARTS was implemented for the longest period of time indicated a significant drop in disciplinary office referrals, incidents involving physical aggression and out-of-school suspensions. Furthermore, results indicated a decrease in trauma-related symptoms for students who received HEARTS therapy. HEARTS clients improved in their adjustment to trauma (how they are able to function in daily living), affect regulation (ability to identify, express and modulate emotions), intrusions (thoughts related to the trauma that impact attention and behavior), attachment (ability to relate to others and develop healthy relationships) and dissociation.

A potential explanation for our positive results could be that HEARTS training and consultation efforts, aimed at addressing trauma and stress in students and adults alike, increased knowledge about the effects of stress and trauma. This knowledge may have helped to reframe "problem" behaviors and mitigate the effects of stress on educators that can result in emotional reactivity, leading to less punitive and escalating reactions. These effects, coupled with increased trauma-informed practices learned through HEARTS, may have led to more effective responses to challenging behaviors, which in turn may have decreased these behaviors and increased student engagement. Our findings are congruent with those of a program implementing ARC in a child-serving system, in which trauma-related symptoms of youth and serious disciplinary measures decreased (Hodgdon, Kinniburgh, Gabowitz, Blaustein, & Spinazzola, 2013). The impact of our work can be seen in one of our HEARTS school principals stating that HEARTS "has shifted the way we discipline students at the school…We are a lot more empathetic…we take more time to allow kids to cool off…to have those meltdowns and then come to back without being suspended or sent home…Getting at that Cradle to Prison pipeline that you're talking about, we're not reproducing the same model of 'oh, you're out of here,' ostracizing kids and sending them out for things that they may feel are out of their control."

Our results add to the literature arguing for the creation of more safe and positive school climates (Bucher & Manning, 2005; Hopson, Schiller, & Lawson, 2014), as well as for those advocating for the use of a trauma-informed approach to achieving such climates (Bloom, 1995; Cole et al., 2005). "A safe school is one in which the total school climate allows students, teachers, administrators, staff, and visitors to interact in a positive, nonthreatening manner that reflects the educational mission of the school while fostering positive relationships and personal growth…providing freedom from violence, fear, and intimidation" (Bucher & Manning, 2005, p. 56–57, citing Mabie, 2003). HEARTS principles around safety and predictability, compassionate and dependable relationships, and resilience and social emotional learning (e.g., building self-management skills) are all interrelated and can help to create a school climate that is more conducive to teaching and to learning.

Limitations

HEARTS was not implemented as a fixed protocol that would enable an experimental design study of effectiveness, but rather was developed using evidence-based components from complex trauma research, and was by design flexibly tailored to meet the needs of various school environments and communities. This approach is clearly what was needed given the complexity of the problems being addressed. Further, whole-school approaches congruent with that proposed by the Trauma and Learning Policy Initiative's flexible framework, aside from HEARTS, currently only include efforts in Massachusetts, Wisconsin and Washington state (Cole, Eisner, Gregory, & Ristuccia, 2013). Given the relative newness of these programs, research on their effectiveness is not yet available. Only CLEAR (Collaborative Learning for Educational Achievement and Resiliency) in Washington has data suggesting program effectiveness, although these results were not available in time to inform our school-site implementation or program evaluation. On a broader level, despite widespread support to make people-serving systems more trauma-informed (e.g., public health, juvenile justice), there has been a relative dearth in research on the effectiveness of trauma-informed system approaches upon which we could have based our program or our research efforts.

As such, there are a number of important limitations in our program evaluation. Regarding changes in knowledge and practices, as well as changes in student engagement, we used a retrospective pre–post design. Recall period, or how accurately respondents can remember over time, can vary and is an important factor in self-reports. Memories and ability to label them may be biased even within short time frames, and this bias may continue to increase with time (Nisbett & Wilson, 1977). As a self-report method, the retrospective pre–post design is susceptible to (1) social desirability in which participants answer in a way that they think the evaluator wants and (2) accuracy. Consequently, self-assessments can fluctuate greatly and may not provide a reliable measure of knowledge, skill, attitudes or behavior (Klatt & Taylor-Powell, 2005). Similarly, the CANS, which is the measure we utilized to examine symptom change in HEARTS psychotherapy clients, is a

clinician self-report measure and thus is subject to bias by providers who are in essence rating their own performance. Furthermore, decreases in disciplinary measures taken at School A and decreases in trauma symptoms for HEARTS therapy clients were based on within-school and within-participant pre–post comparisons, without the use of comparison schools or groups of clients. Clearly, observed changes over time could have been due to many concurrent factors other than HEARTS. Moreover, we were only able to gather disciplinary referral data from one of the HEARTS schools because this was the only one that systematically collected these data themselves, and HEARTS did not have the resources to collect these data at the other schools. In addition, we were unable to verify the exact response rate of school staff to our HEARTS Program Evaluation Surveys and thus were not able to determine whether there were any systematic differences between responders and non-responders that could account for the results obtained. Limitations such as these make it difficult to definitively know the effectiveness of HEARTS and to generalize our findings. However, our program evaluation can provide preliminary evidence for feasibility of HEARTS, and we believe this makes HEARTS appropriate for further study (Bowen et al., 2009).

Following implementation of HEARTS at additional school sites, future research should examine data across more HEARTS schools and should include control (non-HEARTS) schools matched for demographics and other relevant characteristics for comparison. It would also be helpful to directly measure students' and staff's perception of whether their school feels more safe and supportive after implementation of a whole-school approach for addressing trauma. Additionally, assessing HEARTS therapy client's behavior and school performance before and after HEARTS therapy through parent-report or teacher-report measures would provide a more reliable measure of possible improvement than the CANS. Further studies are also needed that can disaggregate disciplinary data and results by race and ethnicity to determine whether disproportionality in the meting out of disciplinary actions is reduced. Such research endeavors, while they would require an allocation of resources beyond what has been available to HEARTS thus far, would be helpful in better understanding the effectiveness of a whole-school approach to mitigating the effects of trauma.

District-Wide Reach and Future Directions for Creating Trauma-Informed Schools

While the current paper has focused on our work in HEARTS schools, we believe that a crucial component of HEARTS has been our district-wide work, in that a trauma-informed school district is ultimately needed to reach more

trauma-impacted students and to support implementation of trauma-informed practices at school sites. In addition to the school-site work, we also formed a close partnership with SFUSD central offices, particularly with the SFUSD Student, Family, and Community Support Department (SFCSD) who invited HEARTS to develop and deliver a Training of Trainers (TOT) series to SFCSD personnel, with the goal of building capacity for SFCSD personnel district-wide to bring trauma-informed practices to their school sites. SFCSD found this training series to be so valuable that SFCSD made it mandatory for all school social workers, high school wellness center coordinators and school nurses.

Furthermore, we have found it essential to integrate a trauma-informed lens into existing district initiatives, including School-Wide Positive Behavioral Interventions and Supports (PBIS) and Restorative Practices (RP), approaches that can promote safety and predictability, social emotional learning, and compassionate and dependable relationships (CASEL, 2012; Mirsky, 2011). A trauma-informed lens can provide some of rationale as to "why" a school community should invest time and energy into implementing practices such as PBIS and RP. In turn, these practices can serve as some of the "what" to do to create more safe and supportive, trauma-informed schools, particularly when an understanding of trauma is used to ensure that the practices take into account the ways in which trauma can interfere with the development of social emotional learning skills, and do not inadvertently escalate. In February 2014, the San Francisco Board of Education passed the SFUSD Safe and Supportive Schools Policy. This policy addresses disproportionality by eliminating suspensions based solely on "willful defiance" and replacing these suspension practices with an integration of (1) School-Wide Positive Behavior Interventions and Supports, (2) Restorative Practices, (3) trauma-sensitive practices and (4) practices that address implicit and explicit bias (SF School Board, 2014). The inclusion of a trauma-informed lens in this district policy is testimony to the degree to which trauma is embedded in the district's approaches to ameliorating the adverse effects of disproportionality.

We have expanded our work to Oakland Unified School District and Aurora Public Schools (APS) (Colorado), districts highly impacted by poverty, crime and trauma. Further, we have realized the need to hone and systematize our program into a more scalable model. To this end, we have developed a collaboration with the CLEAR Trauma Center in Washington State University. Our partnership has the goal of integrating the best practices of HEARTS and CLEAR to develop, pilot and evaluate a model for creating trauma-informed schools that is scalable and sustainable and can be implemented in any school district in

California. Through this collaboration, we hope to clearly articulate essential components and steps of a systematic model that can work in both urban and rural school districts, promoting wellness, resilience and school success for everyone in school communities across the state and beyond.

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