



Support, Connect, and Nurture (SCAN): Addressing the Impact of ACEs in the Pediatric Medical Home

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Executive Summary

Adverse childhood experiences (ACEs) can have a profound impact on children's development, increasing risk for chronic disease and mental illness. The Support, Connect, and Nurture (SCAN) project was developed to address the impact of ACEs on the health and well-being of children and families in Pueblo, Colorado. Located at Southern Colorado Family Medicine Residency Clinic (SCFM) and in partnership with Catholic Charities Diocese of Pueblo, the SCAN intervention included the following components: (a) providing families with a clinic-based Family Development Specialist, (b) connecting families with evidence-based, community parenting programs and other support resources, and (c) providing routine office visits enhanced through educated healthcare and administrative staff. Adult patients received education about risks associated with ACEs, protective factors that can help reduce ACEs' impact, and resources available in the community that may help support their family, such as parenting and nutrition programs. The program provides services to women receiving prenatal care and parents of children age birth to 17.

Chapin Hall conducted a study of the SCAN intervention over 3.5 years. The study included 899 adult patients and 23 health clinic staff who participated in the intervention from October 2015 through March 2019. The study assessed the experiences of patients and clinic staff, predominantly medical residents. At the patient-level, the extent of ACEs, resiliency and resource needs were assessed, and telephone interviews were conducted to understand more about participants' experiences. Health visit data from electronic health records (EHR) were also used to examine patients' health care utilization, specifically the use of the emergency department, and follow-through with scheduled health care visits before and after receiving SCAN (visit compliance). Clinic medical residents completed a pre-post training survey, and participated in a group interview during the last year of the study.

SCAN patients reported an average of 2.5 ACEs, with 30% reporting 4 or more ACEs. The most commonly reported ACEs, endorsed by over 30% of respondents, were parental divorce or separation, substance abuse in the household, and emotional abuse. ACEs were correlated with the frequency of recent depressive symptoms. SCAN patients who reported 4 or more ACEs were 2.4 times more likely to report recent depressive symptoms compared with those who reported 0 ACEs. Resiliency was measured as well, and individuals who experienced a greater number of ACEs tended to have lower resiliency. However, resiliency moderated, or buffered, the relationship between ACEs and depression: ACEs are a stronger predictor of depression among adults who reported low levels of resiliency. This suggests there is an important interplay among the factors of childhood adversity, adult coping, and mental health that could be clinically useful, but the direction of the findings is unknown through the current study. That is, it could be that adults who are experiencing depression are more likely to report low resiliency. Conversely, low resiliency could be a factor that contributes to experiencing depression. Regardless, identifying

adults with high ACEs, depressive symptoms and low resiliency to provide targeted treatment is one direction for future research.

SCAN patients were asked to rate their overall health as poor, fair, good, very good, or excellent. Participants with 4 or more ACEs were 2.9 times more likely to report poor or fair health compared with those with 0 ACEs. In addition, ACE scores were also associated with tobacco use, body weight, less frequent exercise, and less healthy diet. Similar to depression, resiliency was positively associated with self-rated physical health, reduced tobacco use, ideal body weight, exercise frequency, and healthy diet. Resiliency was also associated with reports of alcohol use; patients with higher levels of resiliency reported less alcohol use.

A primary goal of the SCAN program is to identify family resource needs and connect families to resources to help address these needs. All SCAN patients with a child age 0–3 or who were receiving prenatal care received Bright Beginnings during the SCAN visit. This included diapers and other supplies, children’s books, and informational handouts. Beyond Bright Beginnings, 39% of SCAN patients accepted referrals to community services and programs, including food resources, housing resources, health and mental health services, evidence-based parenting programs (i.e., SafeCare, HIPPI, Parents as Teachers, and Nurturing Parenting), other parenting classes/programs, and other support services that included employment services, education, immigration, legal services, and child care. Among patients who accepted at least one referral, 43% of these were patients who accepted a referral to an evidence-based parenting program.

SCAN training was provided to all 23 incoming medical residents at SCFM from 2016–18. The training consisted of an overview of ACEs, the neurobiology of toxic stress, resiliency, trauma-informed approaches, and the SCAN program model. Residents completed pre-training and post-training surveys and showed significant improvements in the following: familiarity with the ACEs research and the link between ACEs and health, extent of training in ACEs and trauma-informed care, talking to patients about ACEs and health, talking to parents about ACEs and parenting, and confidence in incorporating discussion of childhood trauma history with patients as necessary. Furthermore, 11 residents participated in a group interview to discuss experiences implementing the SCAN program in the clinic. Results showed that SCAN is beneficial to clinicians in very important ways. First, SCAN helps clinicians meet the goals of a medical home that is team-based, comprehensive, and designed around family needs and partnership. Having SCAN integrated into clinic services was reported to demonstrate each of these goals. Residents also reported that SCAN alleviates physician stress, which can help prevent burnout. SCAN impact was reported to transcend to other patients. As clinicians and the FDS work together to address patients’ resource needs and open up conversations about trauma and resiliency, clinicians are better equipped to recognize and address needs among other patients. Having the FDS present in the clinic also results in consultations about patients beyond SCAN, and when the FDS is not present, clinicians reported decreased ability to address family resource needs.

Telephone interviews were conducted with 56 SCAN patients throughout program implementation to learn about their experiences with the healthcare visit overall and the portion of the visit involving SCAN, particularly receiving the ACEs questionnaire. Participants reported

high satisfaction with both their overall healthcare visit and the portion of the visit that included the SCAN Family Development Specialist (FDS). Participants were then asked additional open-ended questions to share specific recollections and reflections on their experiences.

Most participants interviewed recalled the SCAN visit and ACE assessment (87%). About half of these participants reported thinking about this portion of the visit after leaving the clinic (53%). Fewer participants indicated talking with someone about the assessment after the visit (29%) with the most frequent conversations occurring with a spouse, partner, or other family member. Looking for additional information about ACEs was fairly uncommon; just 12% indicated they had done this. Most SCAN patients (91%) said they would recommend that others like them receive the SCAN service, particularly the portion of the visit that involved the ACE questionnaire. Participants discussed the benefits of the program in terms of the resources offered, support, and opportunity to reflect.

Assessment of SCAN patients healthcare utilization from 2015-2019 showed that among 899 SCAN patients seen by the FDS, 71% had at least one emergency department (ED) visit during this time period, and that monthly, ED visit rates significantly decreased before and after SCAN from 1.08 to 0.84 ED visits per year on average. Results were different concerning visit compliance. Using electronic health record data of all scheduled health visits to SCFM from 2015-2019 among SCAN patients, no show rates were slightly higher after SCAN service receipt compared with prior to SCAN services. The average monthly no show rate was 0.11 prior to SCAN and 0.15 after SCAN.

Introduction

Childhood abuse, neglect, and household dysfunction, known as adverse childhood experiences (ACEs), can have a profound impact on children's development and neurobiology. These experiences, in the absence of a positive, buffering relationship with an adult (Shonkoff & Garner, 2012), can increase children's risk for chronic disease and mental illness. A seminal study, the ACE Study, conducted by Kaiser Permanente's Health Appraisal Clinic in San Diego, CA, documented a pattern between ten ACEs and some of the leading causes of premature death and disability among adults in the U.S. (Felitti et al., 1998). A subsequent study conducted by Bayview Child Health Center in the pediatric population of a high-poverty community in San Francisco discovered that children with four or more ACEs were twice as likely as children who had no ACEs to be overweight or obese (Burke et al., 2011). A meta-analysis reviewing all published studies of ACEs and health outcomes using a general population sample through 2016 found that exposure to multiple ACEs affected all 23 of the health outcomes examined (Hughes et al., 2017). Intervening to reduce children's exposure to ACEs could go a long way to improving the health and well-being of our nation's population.

The Support, Connect, and Nurture (SCAN) project was developed to address the impact of ACEs on children and families in Pueblo, Colorado. SCAN is a collaborative effort between St. Mary-Corwin Medical Center's Southern Colorado Family Medicine Residency Clinic (SCFM/Clinic), Catholic Charities of the Diocese of Pueblo Family Resource Center, and Chapin Hall at the University of Chicago. The SCAN team has introduced assessments for caregiver ACEs, caregiver resiliency, and family resource needs in pediatric and obstetric health care to identify children and parents at risk for long-term health conditions related to ACEs. The goal is to provide parents and expectant parents support, education, and resources during routine health care to help prevent children's exposure to ACEs.

Program Model

The key goals of SCAN are patient education and influencing help-seeking behavior related to social determinants of health. Adult patients receive education concerning risks associated with ACEs, protective factors that can help reduce ACEs' impact, and resources available in the community that may help support their family, such as parenting and nutrition programs. Patients also receive education and guidance concerning child health issues that may require emergency department care compared with child health issues that can be addressed in the family medicine clinic, thereby avoiding unnecessary use of the emergency department.

The three SCAN intervention components connect families with: (a) a clinic-based Family Development Specialist (FDS), (b) evidence-based, community parenting programs and other resources, and (c) routine office visits enhanced through educated healthcare and administrative staff (see Figure 1).

Figure 1. Program Model Overview

Program Model		
<p>Family Development Specialist</p> <ul style="list-style-type: none"> Educate patients about ACEs, resiliency & the connection to health Assess adult patient ACEs Reduce barriers to care so that parents receive parenting programs Establish trusting relationships Assess family resource needs and link to services 	<p>Evidence-based Parenting Program</p> <ul style="list-style-type: none"> Provide outreach to SCAN families Provide SafeCare maltreatment prevention program Conduct ongoing child and family assessment Monitor and report data back to health clinic about services received 	<p>Supportive Health Care Environment</p> <ul style="list-style-type: none"> Trained staff at all levels: ACEs, neurobiology of toxic stress, trauma-informed primary care, and prevention services Skills-based Level II training for clinical staff (nurses, residents, assistants and faculty) Provide short, focused engagement with patients concerning ACEs

Patients receive education and assessment concerning ACEs, toxic stress, resiliency and the connection to health through meeting with the FDS during the clinic visit. The FDS ideally meets with patients prior to their meeting with the physician; however, this is not always possible due to physician work flow so it is important for the FDS to be flexible in the timing of their meeting with patients. Services are provided by the FDS using the Strengthening Families Protective Factors Framework (Center for the Study on Social Policy, 2018). Resident physicians and faculty also incorporate the FDS into regularly scheduled morning or afternoon “huddles” that are part of each day to support integration of the FDS into clinic flow for the day. Patients, depending on individually assessed needs, are referred to evidence-based parenting programs which are provided primarily by Catholic Charities, a Colorado Family Resource Center (FRC) and provider of many support services for individuals and families in the Pueblo community.

The SCAN team received funding through the Caring for Colorado Foundation in 2015 to pilot SCAN for expectant parents in its high-risk obstetrics clinic and parents of birth to 5-year-olds attending well-child care visits at the clinic. The pilot had several objectives:

- test the usefulness of an ACEs assessment to identify both risks and resiliency factors within a community health setting;
- increase the number of parents who receive evidence-based parenting education to reduce further risk of ACEs; and
- educate and support medical residents and clinicians at the high-risk obstetrics clinic and clinic residency program to understand ACEs, conduct assessments, and engage with parents.

The continuation of SCAN from 2016-2019 through Catholic Health Initiatives (CHI) built on the pilot's positive results. Specifically, the project increased the number of families who were assessed and received preventive services related to ACEs, engaged the broader community in public health approaches related to ACEs to decrease Pueblo residents' chronic health issues, and educated and supported medical residents and clinicians to build ACE assessment and interventions into their practices and comprehensive care. The intended outcomes for SCAN in years 2016–2019 were to:

1. increase the number of families receiving the SCAN assessment and intervention, using the Adverse Childhood Experience Screening tool, a Resiliency assessment, a checklist of service needs, and a global health self-rating;
2. refer and enroll parents in an evidence-based parent education program such as SafeCare®, Parents As Teachers (PAT), Home Instructional Program for Preschool Youngsters (HIPPY), or Nurturing Parenting;
3. improve parental knowledge of child health and safety and positive parenting practices;
4. strengthen provider relationships with patients through increased compliance with routine well-child visits;
5. decrease use of emergency services for nonurgent care and no-shows; and
6. increase the number of clinicians trained in understanding ACEs conducting assessments and engaging with families to address unique and specific needs.

Part of the SCAN grant between 2016 and 2019 was a prescription food program. This program aimed to increase fruit and vegetable consumption among SCAN program recipients to decrease the risks for obesity, hypertension, and diabetes. The food program is evaluated separately from the current evaluation.

Method

Description of Program Recipients

The study includes 899 adult patients and 23 clinical staff who participated in the intervention from October 1, 2015 through March 31, 2019 (42 months). Family assessment data (caregiver ACEs, resiliency, and resource needs) were collected in paper form by the FDS and entered into a secure, web-based database by identification number only. This changed in early April 2019 when the assessments were incorporated into the SCFM electronic health record.

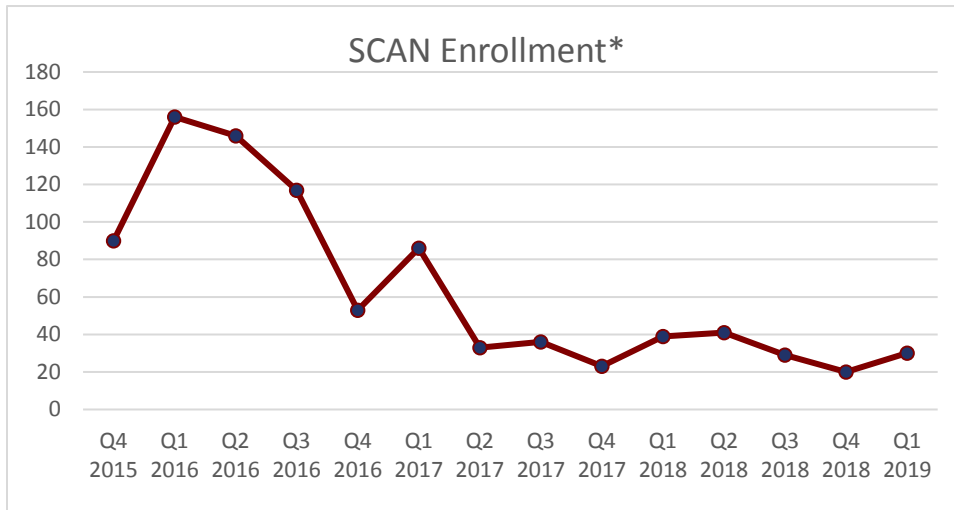
Two patient groups received the SCAN intervention: patients receiving complex (high-risk) medical care during pregnancy (OB/GYN) and patients receiving health care for their child at the family medicine clinic. About three-quarters (76.2%) of SCAN patients were from the SCFM health clinic and about one-quarter (23.8%) were from the high-risk OB/GYN clinic.

Enrollment trends over time

Between October 2015 and March 2019, 899 patients received SCAN services. These services included meeting with a FDS during clinic visits, receiving physician services supplemented by trauma-informed practices related to ACEs, and assessment of their level of ACEs, resiliency, and resource needs. SCAN patients receive a “warm handoff” to community-based services, including evidence-based parenting programs, adolescent support services, and assistance with concrete needs such as housing, nutrition resources, and clothing. Follow-up services are provided during healthcare visits after the SCAN assessment and by outreach through phone calls by the SCAN FDS or other FDS staff employed by Catholic Charities.

Program enrollment was consistently high during the first year of the program (October 2015–October 2016), with 90 patients enrolled in October through December 2015 and over 100 patients per month enrolled from January through September 2016 (see Figure 2). After September 2016, enrollment numbers declined and averaged 37 new patients per month in 2017–18. There are three explanations for this decline. First, during a staff transition between the third and fourth quarters in 2016 there was a gap in service. Second, the SCFM OB/GYN high-risk clinic moved to another local hospital system in November 2017. While SCFM clinicians still provide OB/GYN services, the location is no longer at St. Mary-Corwin Medical Center and the number of SCFM OB/GYN patients declined. Finally, the SCAN service is based on an initial assessment and visit in the clinic, after which follow-up services may be referred and accessed by the family. Over time, many families visiting the clinic would have already been linked with the FDS and received the SCAN assessment.

Figure 2. New SCAN Patients per Quarter, October 2015 to March 2019 (N = 899)

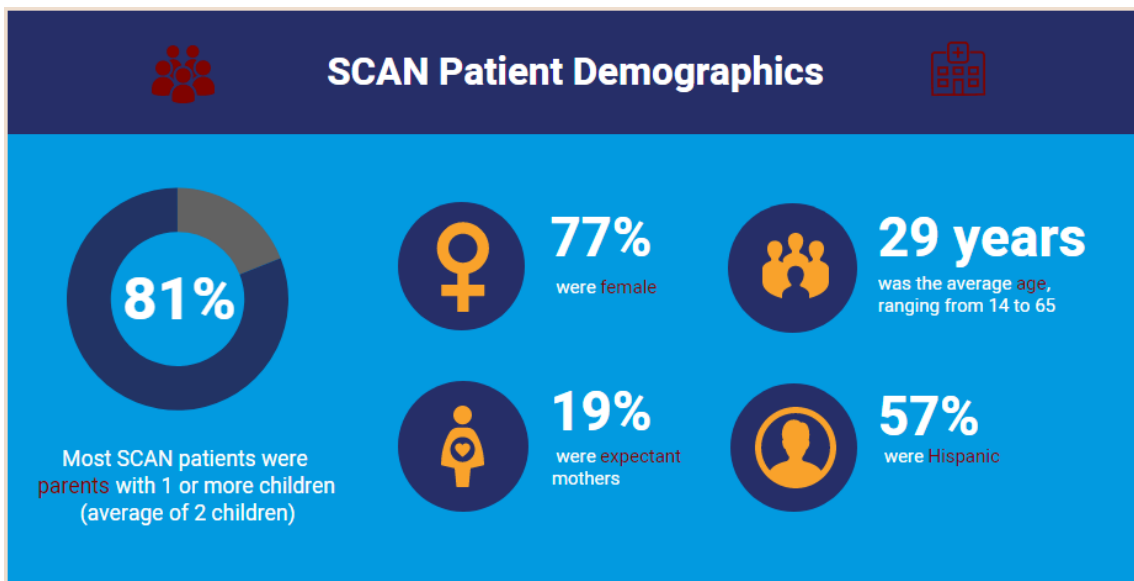


*Decreasing enrollment occurred due to transition of the High-risk OB clinic (HROB) in November 2017.

Demographic characteristics of individuals and families served

Most SCAN patients (76.7%) are female, and most 81% were parents with at least 1 child (average of 2 children in the home) at the time of SCAN assessment. The remaining 19% were expectant parents of their first child. Twenty-seven percent of patients identified themselves as single parents. Patients ranged in age from 14 to 65 years old, and the mean age was 29 (*SD* = 9.3). Just over half of the sample was Hispanic (56.8%), and 84.5% identified their race as white. See Figure 3 for demographics and Appendix A. The racial and ethnic breakdown of the sample is representative of the population of Pueblo, CO (U.S. Census Bureau, 2017).

Figure 3. Demographics of SCAN Patients



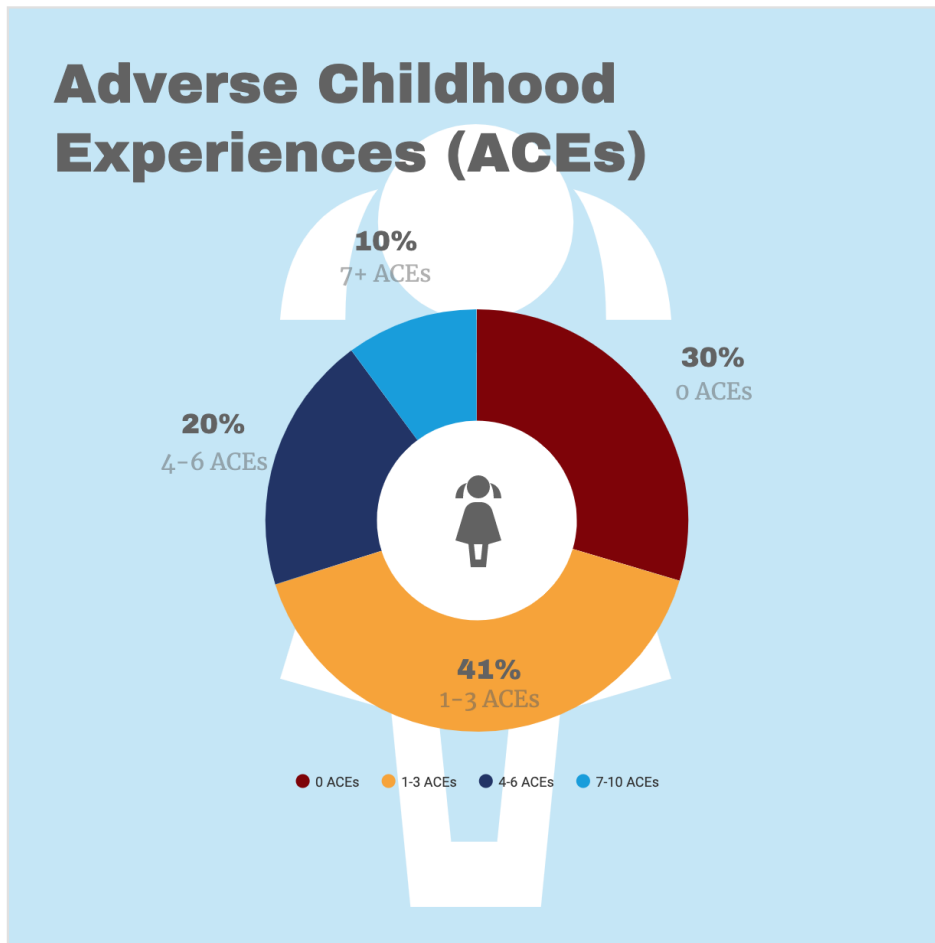
Findings

Adult Patients' Reports of Adverse Childhood Experiences and Resiliency

Understanding any abuse, neglect, and negative household situations experienced by their patients during childhood is important for health care providers, as these experiences increase risk for chronic diseases and mental illness (Felitti et al., 1998). SCAN was designed on the premise that a provider's awareness about a patient's history of ACEs allows them to connect the patient with services and programs that may provide needed support. The ACE questionnaire was administered to the SCAN patients during the clinic visits. Scores can range from 0 to 10, as the ACE questionnaire contains 10 dichotomous (yes/no) questions. The instrument was developed by researchers from the Centers for Disease Control and Kaiser Permanente. It has been used with adult healthcare patients and in many other settings, including juvenile justice and mental health. The ACE questionnaire consists of two categories: child abuse (ACE items 1–5) and household challenges (items 6–10).

The SCAN patients' mean ACE score was 2.5 ($SD = 2.6$), with scores ranging from 0 to 10 ($N = 899$). Thirty percent of the group (29.6%, $n = 266$) reported 0 ACEs, 40.5% ($n = 364$) reported 1 to 3 ACEs, 19.8% ($n = 178$) reported 4 to 6 ACEs, and the remaining 10.1% ($n = 91$) reported 7 or more ACEs. Figure 4 displays the sample's ACE scores. Compared with the CDC's ACE Study (Felitti et al., 1998), the prevalence of the ACE scores in this sample was not dissimilar, except that 29.9% of the SCAN patients experienced 4 or more ACEs, while 12.5% of patients reported 4 or more in the CDC's ACE Study.

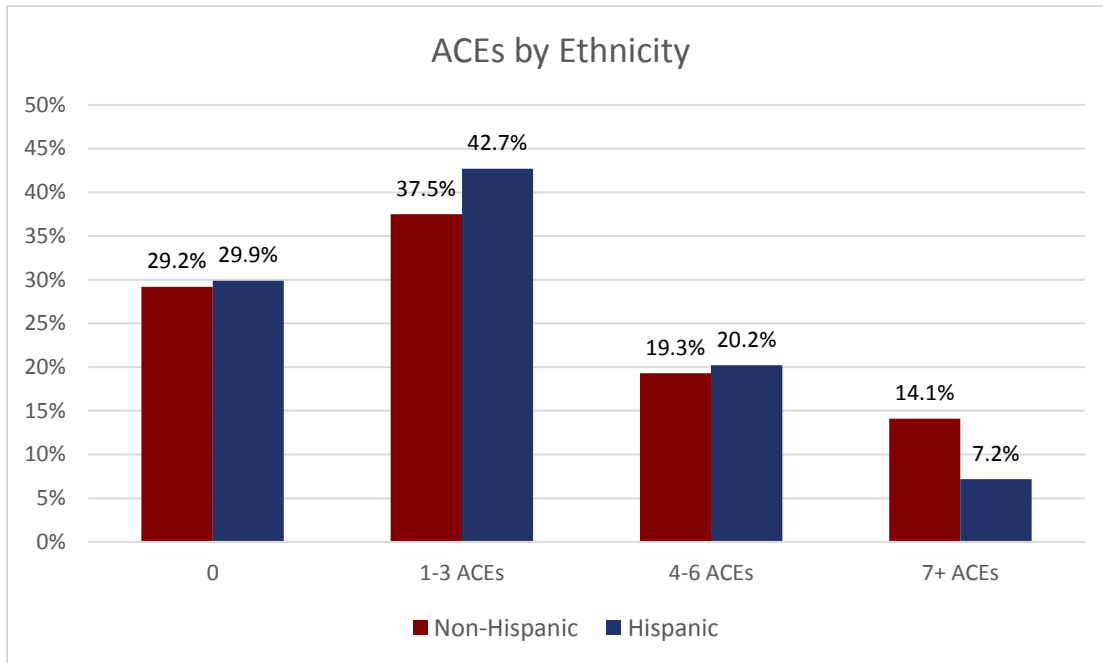
Figure 4. SCAN Patients' ACE Scores (N = 899)



Relationship between ACEs and sample demographics

When analyzed with demographic variables, ACE scores were not associated with patient age, number of children, single parent status, race, gender, or relationship to the child. ACE scores did, however, differ by ethnicity. SCAN patients with Hispanic ethnicity scored significantly lower on the ACE assessment ($M = 2.32, SD = 2.39$) compared with non-Hispanic patients ($M = 2.68, SD = 2.74, t(889) = 2.07, p = .039$). In addition, Hispanic SCAN patients were less likely than non-Hispanic patients to report 7 or greater ACEs ($\chi^2 = 11.90, p = .008$; see Figure 5).

Figure 5. ACEs for Hispanic (n = 512) and Non-Hispanic (n = 383) SCAN patients



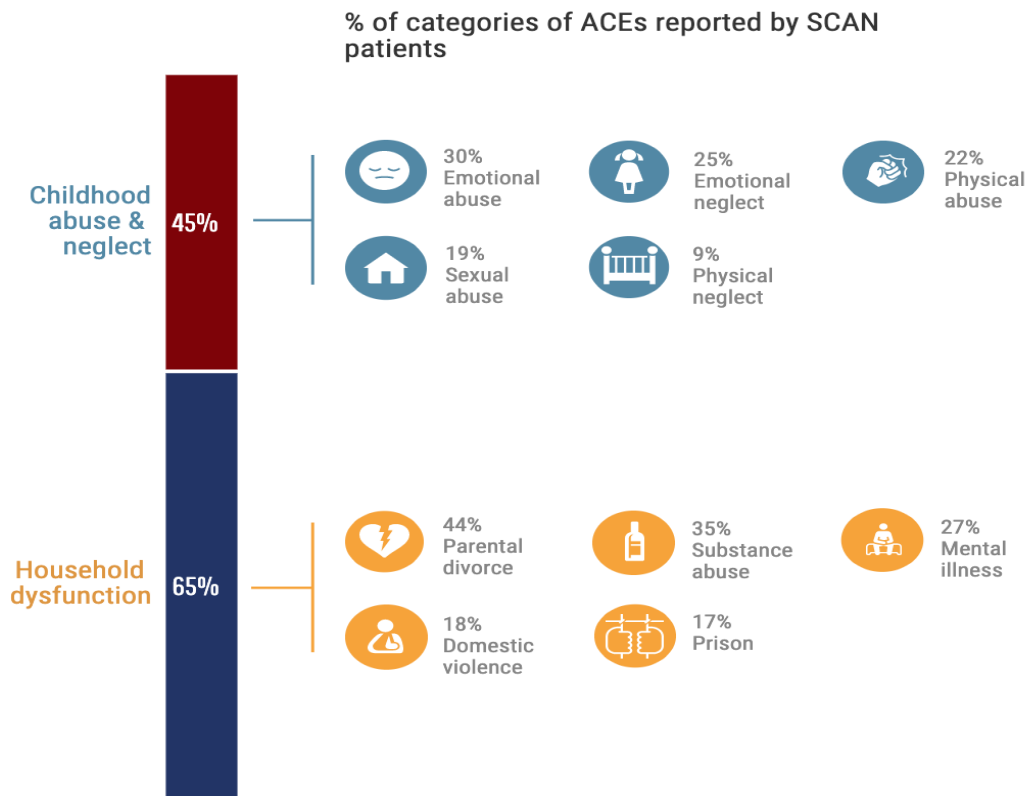
Common types of ACEs reported

The most commonly reported ACEs by SCAN patients were parental divorce or separation ($n = 392$), substance abuse in the household ($n = 316$), and emotional abuse ($n = 271$), with over 30% of respondents endorsing these items (see Figure 6). The most common experiences reported in the present study sample are similar to the prevalence of ACEs in general population, particularly substance abuse in the household and parental separation or divorce (Felitti et al., 1998; Mersky & Janczewski, 2018). However, Felitti and colleagues (1998) found that physical abuse was the most prevalent ACE (28.3%), and Mersky and Janczewski (2018) found that parental mental health problems was the third most common ACE (42.6%). The most common ACEs were different for Hispanic participants than non-Hispanic participants in the study by Mersky and Janczewski (2018): the most common ACEs reported by Hispanic participants were physical abuse (42.9%), substance abuse in the household (41.1%), and domestic violence (38.9%), yet the three most common ACEs reported in the present study sample were the same for the non-Hispanic and Hispanic participants.

For the two overarching categories on the ACE questionnaire (child abuse and household challenges), Hispanic participants' mean scores on child abuse items ($M = 0.97$, $SD = 1.33$) were lower than non-Hispanic participants' scores, ($M = 1.17$, $SD = 1.55$, $t(884) = 2.09$, $p = .037$). Scores on the household challenges items were not significantly different between Hispanic and non-Hispanic patients.

Figure 6. Percentage of SCAN Patients Who Experienced Each ACE

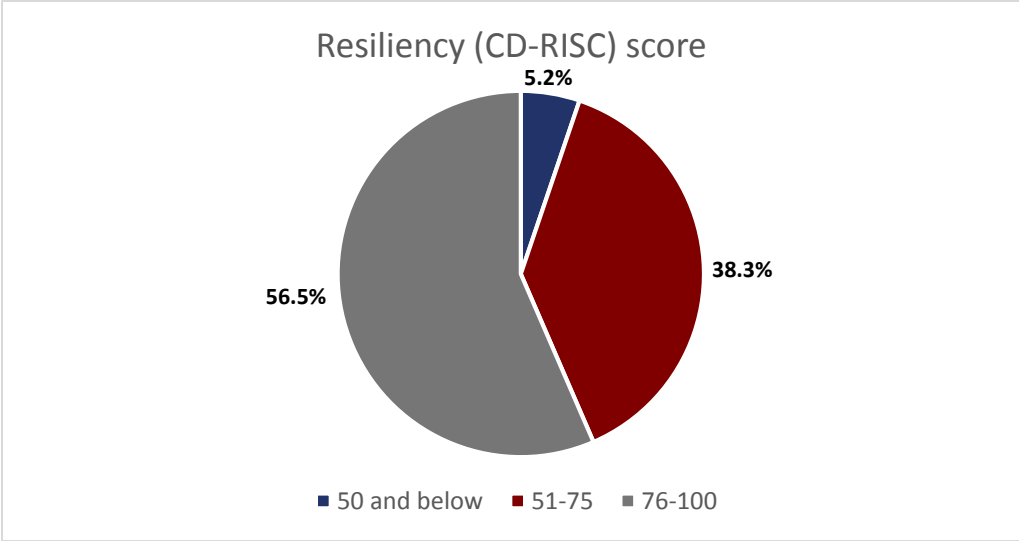
Adverse Childhood Experiences (ACEs) by category



Resiliency and relation to participant sample demographics

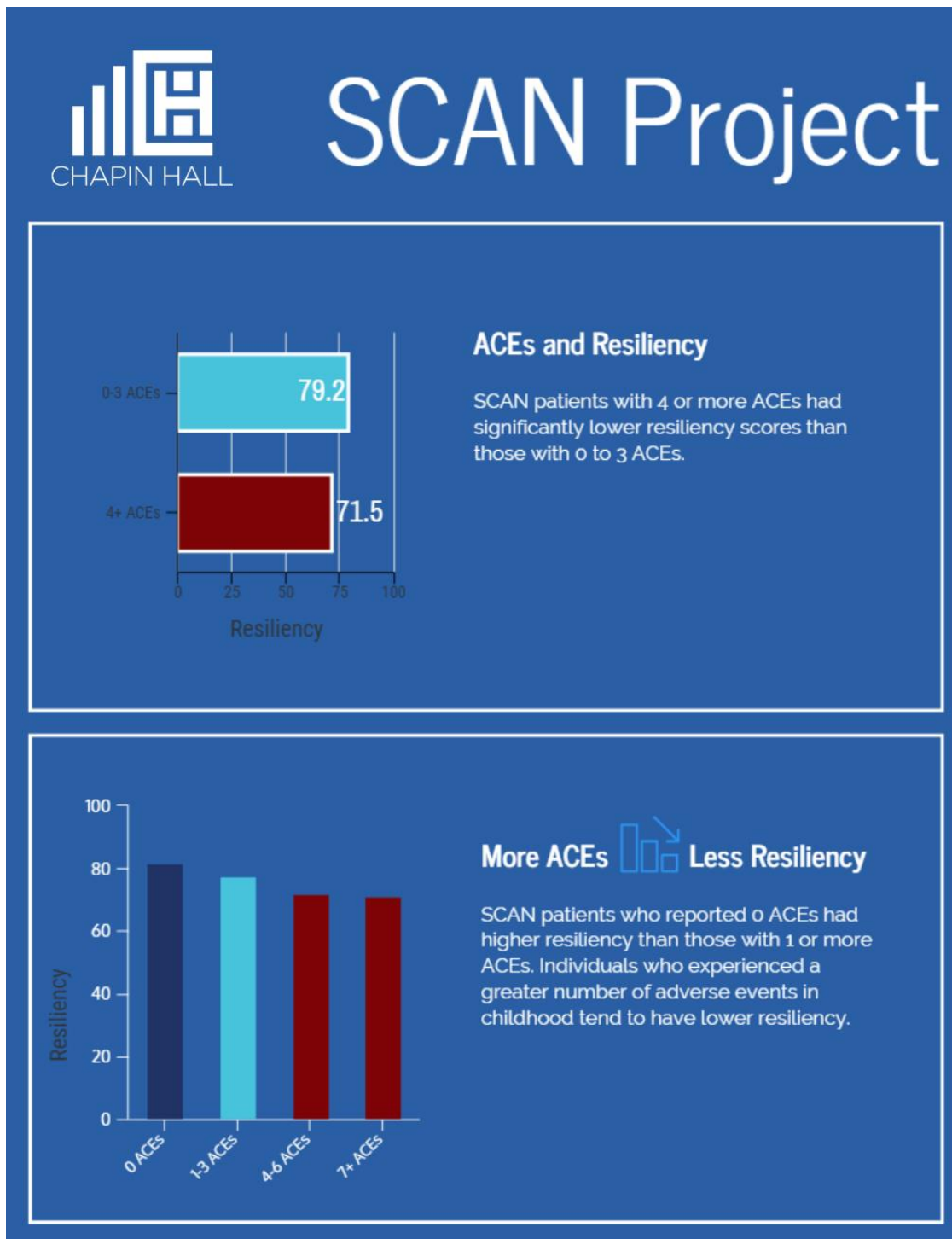
Because resiliency has been found to buffer the impact of ACEs on health (Poole, Dobson, & Pusch, 2017; Youssef et al., 2017), the SCAN assessment measures patients' resiliency as well as ACEs. The SCAN assessment uses the Connor-Davidson Resilience Scale (CD-RISC-25), a 25-item validated measure of resiliency for adults (Connor & Davidson, 2003). Resilience items are rated on a 5-point scale and include domains such as coping and social support. The mean score on the CD-RISC for SCAN patients was 76.9 ($SD = 15.1$), with scores ranging from 8 to 100 (see Figure 7). In the original validation study, Connor and Davidson reported a mean score of 71.8 ($SD = 18.4$, $N = 139$) for primary care patients, which is significantly lower than the mean score of the SCAN patients, ($t(1036) = 3.59$, $p < .001$).

Figure 7. SCAN Patients' Resiliency Scores



Resiliency scores were not associated with race, ethnicity, age, gender, single parent status, relationship to child, or number of children. However, resiliency scores were significantly negatively correlated with ACE scores ($r = -.25, p < .001$). Participants with ACE scores of 4+ had significantly lower resiliency scores ($M = 71.49, SD = 15.22, n = 269$) than those with ACE scores of 0–3 ($M = 79.21, SD = 14.49, n = 629, t(896) = 7.20, p < .001$). Thus, individuals who experienced a greater number of adverse events in childhood tend to have lower resiliency, as is shown in Figure 8.

Figure 8. SCAN Patients' Resiliency Scores by Number of ACEs



ACEs, resiliency, and health

In addition to the ACE questionnaire and the resiliency measure (CD-RISC), the SCAN assessment included items about the patient's health and demographic items, as Felitti et al.

(1998) and many subsequent studies found that ACEs predicted depression, poor health, and substance abuse (see Hughes et al., 2017). Health items assessed exercise, weight, diet, tobacco use, alcohol use, depression, and general health. Demographic items included age, gender, race, ethnicity, number and ages of children in the household, relationship to child, and single parenthood.

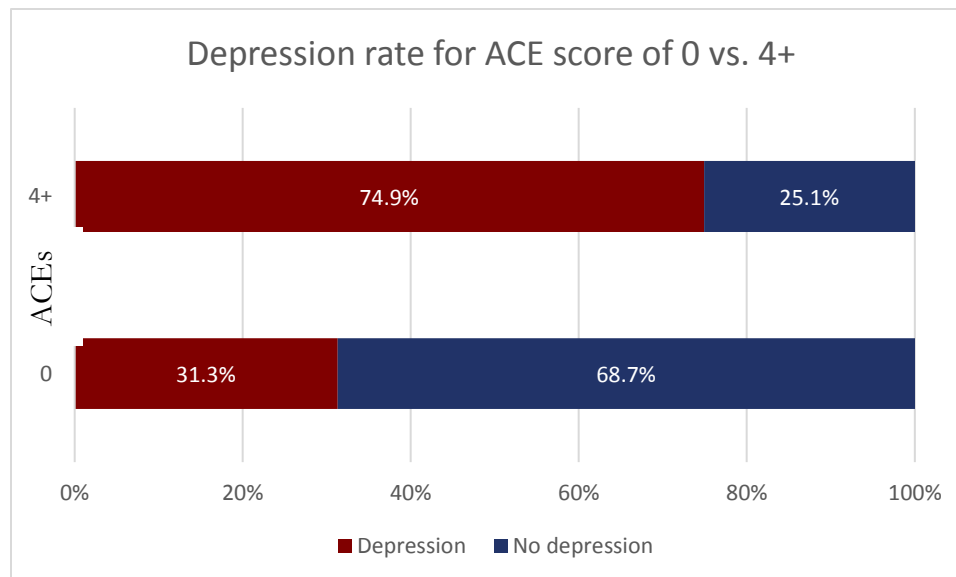
Depression

SCAN patients were asked to respond the following item: “I have felt depressed in the past 2 weeks.” The response options were never, sometimes, frequently, or all the time. Just over half of the full sample (51.1%, $n = 459$) reported any recent depressive symptoms, which is over twice the rate found in a recent meta-analysis of primary care patients (21.2%; Wang et al., 2017), although measures of depression varied among studies.

In the SCAN patients, ACEs predicted depression; the number of ACEs were significantly correlated with frequency of depressive symptoms in the past 2 weeks ($r = .41, p < .001$). SCAN patients who reported 4 or more ACEs ($n = 267$) were 2.4 times more likely to report recent depressive symptoms than those who reported 0 ACEs ($n = 265, \chi^2 = 101.48, p < .001$; see Figure 9). SCAN patients who reported 3 or more ACEs ($n = 345$) were 2.2 times more likely to report recent depressive symptoms than those who reported 0 ACEs ($\chi^2 = 90.76, p < .001$, see Figure 10).

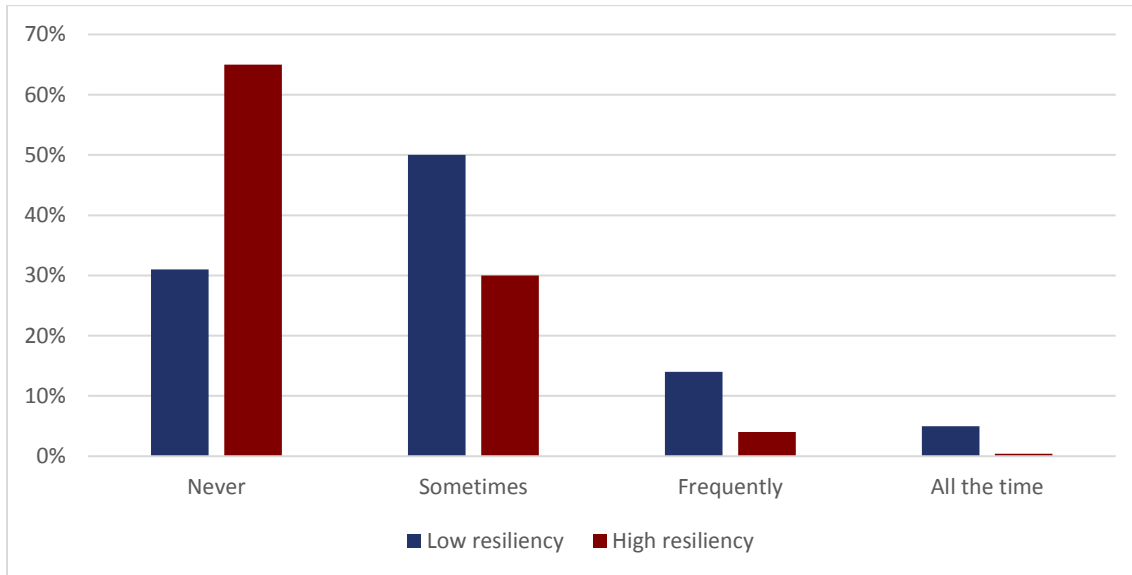
Both categories of ACEs—child abuse and household challenges—independently predicted the risk of depression ($F(2, 883) = 95.37, p < .001$), together explaining 17.6% of the variance in depression scores.

Figure 9. Depression Rate for SCAN Patients with 0 ACEs and 4 or More ACEs



Resiliency had an inverse relationship with depression ($r = -.41, p < .001$). As presented in Figure 10, SCAN patients with lower resiliency tended to experience depressive symptoms more frequently. SCAN patients with high resiliency were more than twice as likely as those with low resiliency to respond that they never felt depressed during the past 2 weeks. Similarly, none of the SCAN patients with high resiliency responded that they feel depressed “all the time” during the past 2 weeks.

Figure 10. Frequency of Depressive Symptoms by Resiliency Level

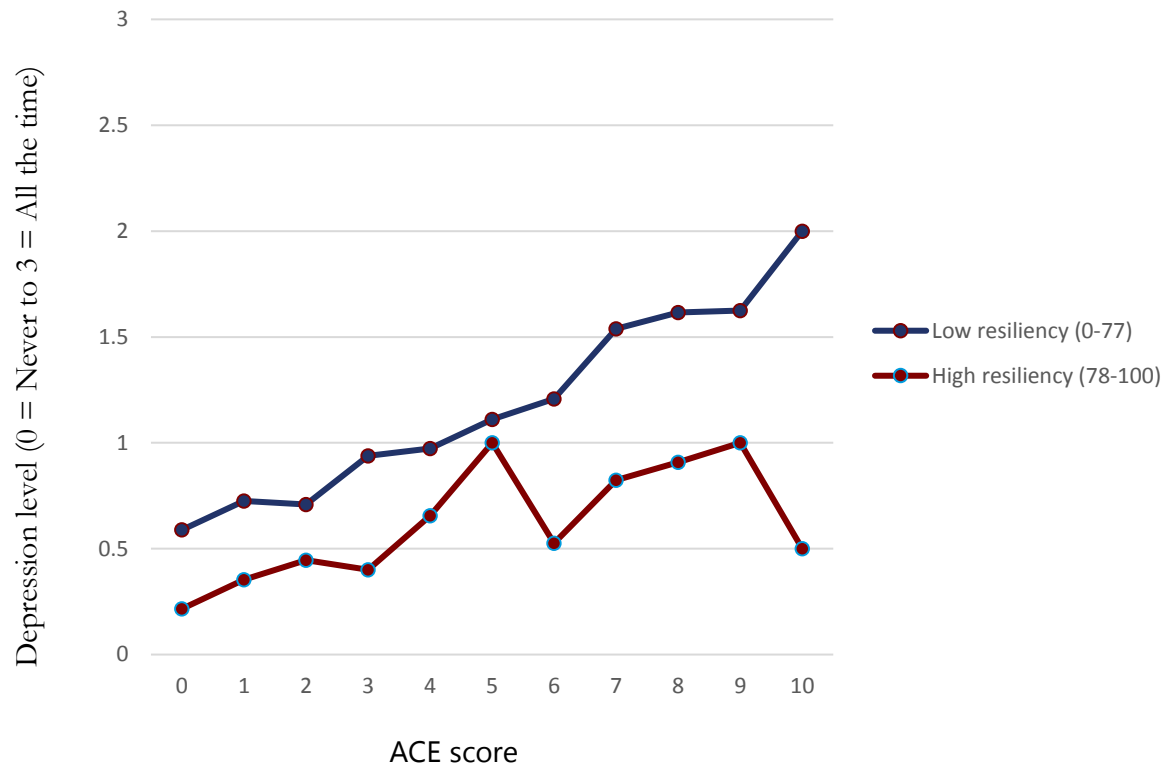


We tested resiliency as a moderator of the relationship between ACE score and depression.¹ We conducted a hierarchical regression model with ACE score and resiliency (high resiliency, $n = 469$; low resiliency, $n = 430$) as independent variables predicting depression in the first step and added the interaction term in the second step. Adding the interaction term in step two explained an additional 0.4% of variation in depression, which was significant ($F(3,891) = 4.51, p = .03$). In the final model, the interaction term was a significant predictor of depression ($\beta = -.086, p = .03$).² Thus, resiliency moderates, or buffers, the relationship between ACE score and depression: ACE score is a stronger predictor of depression for those with low resiliency (see Figure 11).

¹ We created an interaction term of resiliency (dichotomous variable based on median split on the CD-RISC 25 using the median score of 78 (0-77 vs 78+)) and ACE score (centered).

² ACE score, $\beta = .41, p < .001$, and resiliency, $\beta = -.27, p < .001$, each significantly predicted depression in the model.

Figure 11. ACE Score is a Stronger Predictor of Depression for SCAN Patients with Low Resiliency

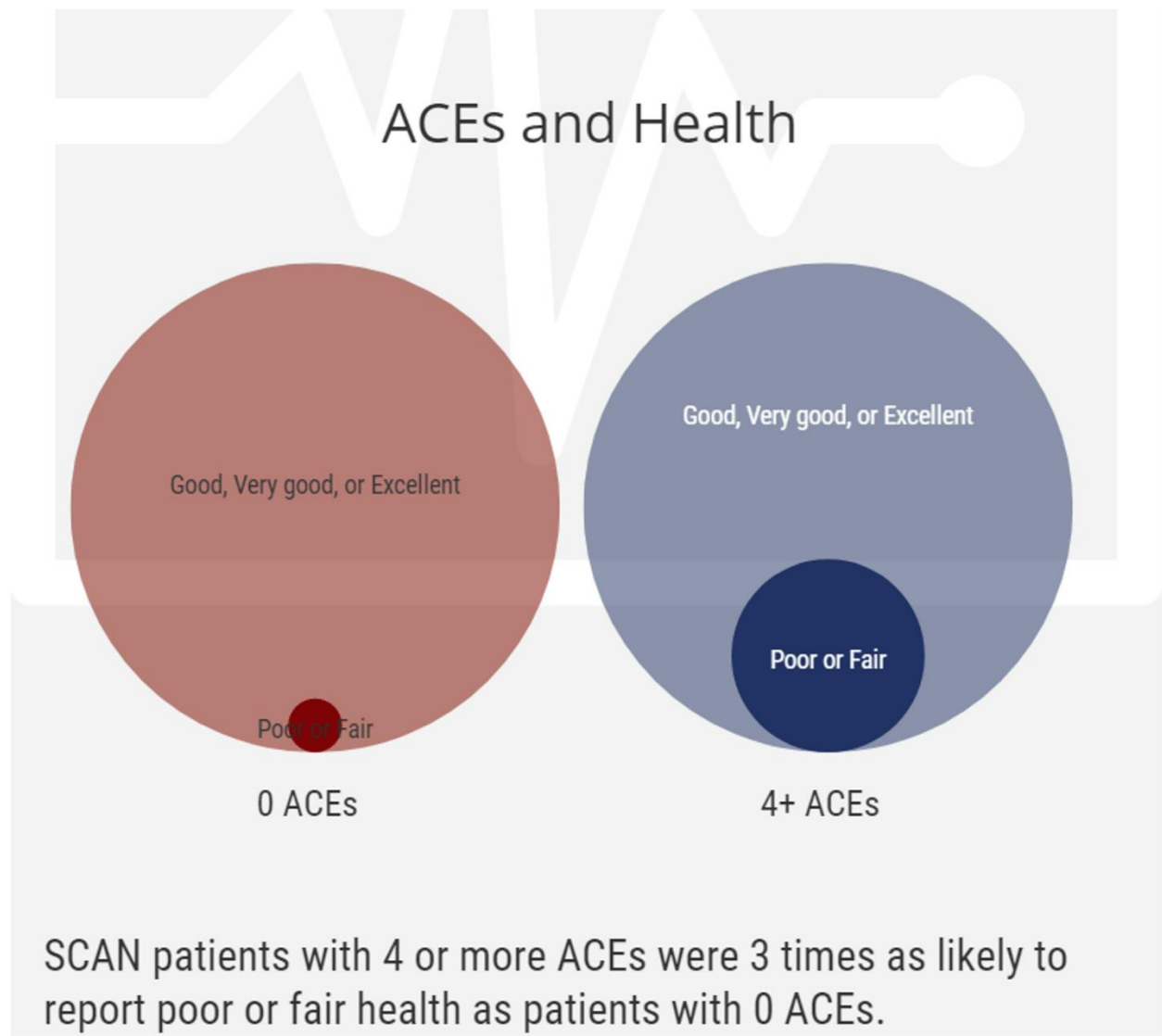


Physical health

SCAN patients were asked about their health, including tobacco use, secondhand smoke, weight, exercise, diet, general health. ACE scores were significantly correlated with use of tobacco products by the patient ($r = .13, p < .001$), and someone else in the household ($r = .17, p < .001$). In addition, ACE scores were negatively correlated with self-reported ideal body weight ($r = -.01, p < .01$), frequency of exercise ($r = -.11, p < .01$), and healthy diet ($r = -.11, p = .001$).

SCAN patients were asked to rate their overall health as poor, fair, good, very good, or excellent. Participants with 4 or more ACEs were 2.9 times as likely to report poor or fair health (28.3%) than those with 0 ACEs (9.9%; $\chi^2 = 28.94, p < .001, n = 528$; see Figure 12).

Figure 12. ACEs and Health



Child abuse and household challenges both independently predicted the risk of poorer overall health ($F(2, 878) = 29.40, p < .001$).³ Household challenges in childhood predicted increased likelihood of tobacco use as an adult,⁴ while child abuse did not ($F(2, 876) = 8.54, p < .001$).

While ACEs predicted poorer health, resiliency predicted better health outcomes. Resiliency was positively correlated with self-rated general health ($r = .31, p < .001$), ideal body weight ($r = .19, p < .001$), exercise frequency ($r = .28, p < .001$), and healthy diet ($r = .29, p < .001$). Resiliency was negatively correlated tobacco use (self: $r = -.07, p = .029$; household: $r = -.08, p = .014$), and alcohol use ($r = -.07, p = .038$). To test whether resiliency moderated the impact of ACEs on health, we created a health index score based on the following indicators: overall health, ideal

³ ACE child abuse, $\beta = -.19, p < .001$, and ACE household challenges, $\beta = -.09, p = .03$, predicted overall health.

⁴ ACE household challenges, $\beta = .11, p = .012$, ACE child abuse, $\beta = .05, p = .28$.

weight, exercise, healthy diet, and tobacco use (self and household, reverse scored). The indicators were standardized and then summed to create a health index score. Both ACEs and resiliency significantly predicted health index score, ($F(3, 863) = 56.97, p < .001$), yet resiliency did not moderate the impact of ACEs on health outcomes as it did for depression.⁵ From these self-reported resiliency and health data, resiliency seems to be an important factor in predicting health outcomes.

Service Referrals

The SCAN assessment includes a list of resources to which the FDS refers families, such as parenting programs, housing or rental assistance, and nutritional supports. These are yes/no items completed by the FDS. Importantly, all SCAN patients with a child ages 0–3, and expectant patients, are offered “Bright Beginnings,” including diapers and other supplies, children’s books, and informational handouts as part of the SCAN program. Bright Beginnings is considered a “gateway service” to other services where the FDS establishes a relationship with the family and assesses their resource needs.

Referrals to Community Resources

Beyond Bright Beginnings, 39% of SCAN patients ($n = 350$) accepted referrals to services and programs. The types of services and programs to which the SCAN patients were referred are displayed in Table 1. “Food resources” includes nutrition classes, Prescription Food Program, access/application to SNAP, and directly providing meals or food (food resources, Cooking Matters, WIC). “Housing resources” includes emergency funds for housing or utilities, such as utility/rent assistance, LEAP, Arc voucher, Home Stability, emergency housing assistance (Posada of Pueblo), and TANF information. Health and mental health services includes Health Solutions (formerly Spanish Peaks) and other health and mental health referrals (e.g., co-occurring therapy).

Patients were often referred to parenting programs. Two hundred referrals were made to evidence-based parenting programs (i.e., SafeCare, HIPPI, Parents as Teachers, and Nurturing Parenting), which represents 149 families (42.6% of the families who accepted referrals). SCAN patients were referred to other parenting programs and classes as well, including Becoming a Mom, Love and Logic, co-parenting class, play group, and other parenting classes ($n = 43$ families, 120 referrals). Patients were also referred to the family support specialist (FSS) at Catholic Charities, Diocese of Pueblo (CCDP). Other programs and services include employment services (e.g., ReHire), education, immigration, legal services, and child care.

⁵ ACE score, $\beta = -.17, p < .001$, and resiliency, $\beta = .29, p < .001$, each significantly predicted the health index score in the model, $R^2 = .165$ (adjusted .163), but the interaction term was not significant, $\beta = .001, p = .99$.

Table 1. Referrals to Services among SCAN Patients

Program/Service referred by FDS	Total number of referrals	Total number of families referred⁶	% of total families (N = 899)
Food resources	216	139	15.5
Housing resources	47	37	4.1
Health/mental health services	103	48	5.3
EB parenting programs [^]	200	149	16.6
Other parenting programs	120	43	4.8
FSS/CCDP	34	25	2.8
Other	49	45	5.0
Total	766	350	38.9

[^]Evidence-based parenting programs

Evidence-based parenting programs: Referrals and enrollment

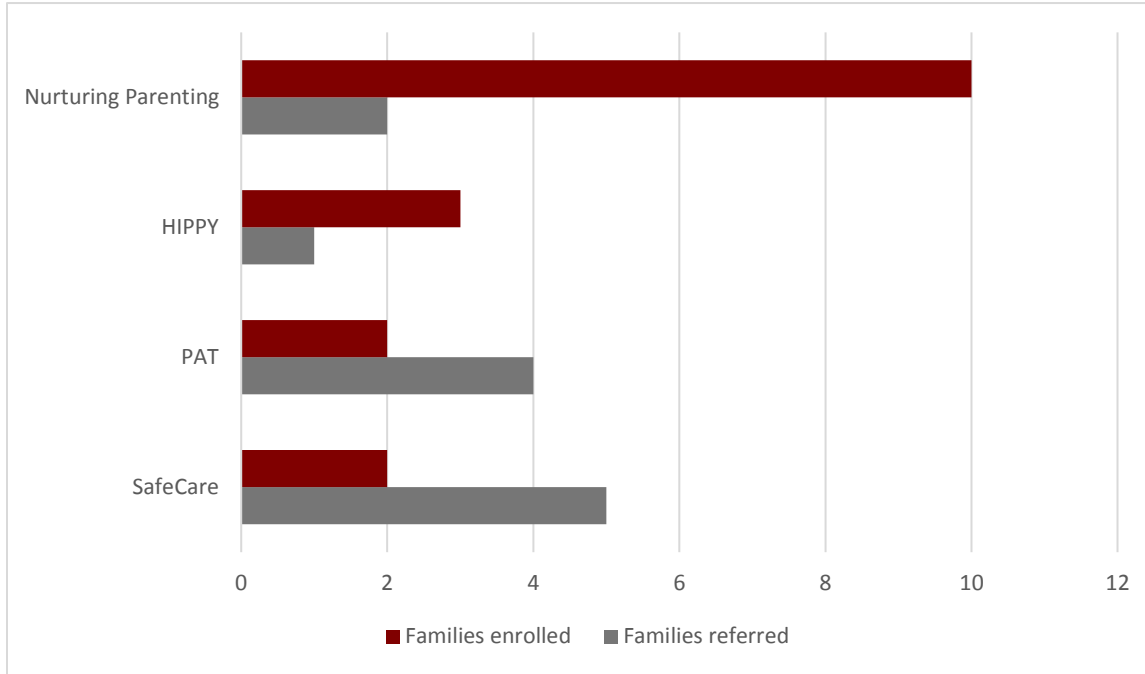
The 200 referrals made to evidence-based parenting programs included SafeCare ($n = 85$), HIPPY ($n = 33$), Parents as Teachers ($n = 48$), and Nurturing Parenting ($n = 34$). SafeCare is a behavioral parenting program for families with children ages birth to 5 years old that has been found to reduce child maltreatment reports in randomized trials (Chaffin, Hecht, Bard, Silovsky, & Beasley, 2012) and improve parenting skills (Carta, Lefever, Bigelow, Borkowski, & Warren, 2013). Families with children ages 2 to 5 years old are eligible for HIPPY, which has demonstrated positive academic outcomes (Baker, Piotrkowski, & Brooks-Gunn, 1999; Bradley & Gilkey, 2002). Several research studies have found positive child outcomes for families with children prenatal through age 5 years old who have participated in Parents as Teachers. These outcomes include academic achievement, language ability, social development, and cognitive abilities (Drotar, Robinson, Jeavons, & Kirchner, 2009; Wagner, Spiker, & Linn, 2002); positive parenting outcomes, including parenting knowledge, behavior, and attitudes (Owen & Mulvihill, 1994; Pfannenstiel & Seltzer, 1989; Wagner & Clayton, 1999); and reducing child maltreatment (Bugental et al., 2002; Wagner, 2001). Nurturing Parenting has been shown to increase parental empathy and healthy expectations of children and decrease use of corporal punishment (Tichy & Brotherson, 2017).

Enrollment in programs/services by SCAN patients has been documented since July 2018. Twelve SCAN patients were referred to at least one evidence-based parenting program between July 1, 2018 and March 31, 2019 (some patients were referred to more than one parenting program) and 17 patients enrolled in these programs during this period. Because the referral numbers reflect only referrals made at the initial visit with the FDS, families who are referred to other services or provided general information about services and programs at Catholic

⁶ 152 families were referred to multiple programs/services; these *Ns* are duplicated.

Charities could have enrolled in these parenting programs, resulting in a higher enrollment rate than referral rate (see Figure 13).

Figure 13. SCAN Patient Referral and Enrollment Rates



Note: Unduplicated totals. Each SCAN patient referred to evidence-based parenting program(s) is represented once in this figure, including families referred to more than 1 evidence-based parenting program.

According to the CCDP database, seven SCAN patients enrolled in services with Home Stability, one enrolled in a Love and Logic parenting class, and one enrolled in a Cooking Matters nutrition course between July 1, 2018 and March 31, 2019. Uptake of services and programs offered to families through referrals is generally relatively low. Previous research has found that about one-third of invited families enroll in prevention programs (Baker, Arnold, & Meagher, 2011). An estimated 58–80% of families offered home visiting services enroll, while the remainder either actively or passively refuse (McCurdy et al., 2006). Only between 10 and 34% of parents enroll in parent training interventions for pre-K and elementary school age children (Breitenstein, Gross, & Christophersen, 2014). Compared to the typical rate of enrollment for parenting programs, the rate of uptake for SCAN families is very high.

Clinical Staff Skills

Medical resident experiences

The SCFM residency program hosts a cohort of eight medical residents each summer; SCAN training is provided to all incoming residents. The training is 1 to 1.5 hours and includes an overview of ACEs, the neurobiology of toxic stress, resiliency, trauma-informed approaches, and the SCAN program model. Each training includes a didactic that demonstrates the family

development specialist's interaction with patients, and a role-play exercise for residents to practice communicating with patients after the FDS visit.

During each SCAN training from 2016–18, incoming residents were administered a pre-training survey ($n = 23$). The survey is designed to assess the extent of residents' familiarity with training topics, confidence in and relevancy of discussing ACEs with patients, and the frequency of incorporating ACEs into patient visits and differential diagnoses prior to receiving the SCAN training. Residents completed the survey again in 2019 as a post-training survey. Survey items are rated on a 5-point scale, with higher scores indicating higher frequency, behavior, or competency related to each item.

Entering residency

Despite the evidence that ACEs are linked with physical, developmental, and mental health, residents reported low familiarity with the ACEs study at entry to the residency program. Residents reported, on average that they were "a little bit" familiar with the ACEs study at residency entry, and had received "a little" training about ACEs, the link with health, and trauma-informed primary care (see Table 2). In comparison at posttest, residents reported being, on average, moderately to very familiar with the ACEs study and having received some to quite a bit of ACEs training, and trauma-informed primary care training. This represents a significant difference using bivariate pre-post analyses ($p < .001$).

Table 2. Results of Resident Pre and Post Training Surveys

Item	Mean score pre and post training	
	Pre (<i>n</i> = 23)	Post (<i>n</i> = 12)
a) Familiarity with the ACEs study	1.24	2.83***
b) Extent of training about ACEs and the link with health	1.09	3.00***
c) Extent of training in trauma-informed primary care	1.04	2.50***
d) Extent of training in recognizing child maltreatment	1.95	2.50
How often do you:		
e) Talk with patients about ACEs or trauma and the link with health	0.96	2.33***
f) Talk with patients about parenting	0.91	2.42***
g) Your perceptions of the relevancy of ACEs to lifelong health	3.52	3.58
h) Your confidence in discussing history of childhood trauma/abuse/maltreatment with patients	1.87	2.75**
i) Frequency of incorporating ACEs or trauma history into clinical practice	1.28	2.17*
j) Frequency of considering ACEs or trauma in differential diagnosis	1.74	2.46^

^*p* < .10, **p* < .05, ***p* < .01, ****p* < .001

Items a-d were rated on a scale of 0-4: None, A little, Some, Quite a bit, A lot.

Most surprisingly, residents also reported a low level of training on recognizing child maltreatment (*M* = 1.95) at residency entry. While this increased somewhat at posttest, the results were not significant. Residents agreed with the relevancy of ACEs to lifelong health, at both residency entry and posttest, with means close to 4.0 (extremely agree) at both time points. Residents reported discussing ACEs/trauma with patients more frequently (1.28 to 2.17) and also giving consideration to a history of trauma in differential diagnoses (although this was a statistical trend).

In summary, residents showed significant increases in seven of ten items discussed including familiarity with the ACEs study, extent of training (e.g. ACEs and the link with health, trauma-informed primary care), discussions with patients (e.g. about ACEs, trauma, or parenting), and incorporating ACEs or trauma history into clinical practice. There were no significant differences in pre-post surveys concerning the degree of training reported in recognizing child maltreatment (*M* = 1.95 pre and *M* = 2.50 post) or resident perceptions of the relevancy of ACEs to lifelong health (*M* = 3.52 pre and *M* = 3.58 post).

Results of the Resident Group Interview

In June 2019, 11 residents participated in a group interview that centered on learning more about their experiences implementing the SCAN program. Questions gathered feedback from residents about: (a) perceptions of primary parenting stressors for Pueblo families and what helps alleviate such stressors; (b) components of the SCAN program that are working well and where the challenges lie; and (c) the impact of the program on their physician experiences. The interview was 60 minutes and was audio-recorded. The audiotape was transcribed and the transcription was coded and analyzed for themes within each question.

Resident Perceptions of Parenting Stressors

Residents discussed the challenges facing parents in the Pueblo community as being centered on a lack of educational opportunity and school quality, availability and affordability of recreational activities for children, food scarcity, and challenges to physical health, such as low health literacy, adequate nutrition, and early exposure to substance abuse (see Figure 14).

Figure 14. Parenting Stressors Described by SCFM Medical Residents



Educational opportunity. Residents reported that parents may not have access to high-quality schools, or may not have adequate information about opportunities in career and education for themselves and their children. The educational disparity is generational and impacts patients' experience in health care and with their physical health. For example, parents may not know what is and what is not healthy food. Residents expressed the need for improved dissemination of information about educational and career opportunities. They said that the library is one avenue to increase information sharing—SCFM parents frequently use this resource. Residents reported that information about resources could be better coordinated. One resident said:

I think one of the biggest things is getting the information to people that there's all these great careers, there's all this stuff out there but people don't know about it or there's nobody in charge of disseminating information and coordinating it.

Child activities. Residents reflected that many parents visiting the clinic are unable to afford the cost of “out-of-school time” activities that other children have access to, resulting in disparity in these opportunities within the Pueblo community. Sports, for example, can cost several hundred dollars, which many families cannot afford. This results in more unstructured time for some families, particularly during the summer. Summer activities are also more widely available for younger and elementary-age children compared with middle-school children and adolescents.

Access to healthy food. Residents described community food deserts as presenting a challenge to accessing nutritional food for many parents. Some families live several miles away from a grocery store in areas where public transportation is difficult or unavailable, so a convenience store is closer and easier to access. Combined with low health literacy regarding nutrition among families, this contributes to poor-nutrition food choices for some parents and their children. Residents reported, however, that most parenting stress related to healthy food access is systemic; one resident said, “There is a lack of [infra]structure to [support having] better food”.

Health. Residents were clear that while the socio-economic challenges faced by parents in Pueblo are notable, this doesn’t prevent them from being good parents. Parents are resilient and many parents are good parents, despite dealing with many other issues apart from parenting. Residents described the extent of disease burden and early exposure to substance abuse as two challenges to the physical health of parents and their children.

Alleviating Parenting Stress

Residents were asked what helps alleviate parenting stress among Pueblo parents. Residents praised the benefits of having additional resources in the clinic through SCAN, and another embedded early childhood program, Healthy Steps, in order to address families’ needs. Described further below, this centers on having capacity—whether in the healthcare clinic or larger community—to dedicate individuals/organizations who know about and can coordinate services. Residents expressed the need for a streamlined resource for information and coordination, rather than having each resource managed separately. Residents also said the community needed an effective communication strategy that ensures parents know about available resources.

Specific SCAN Program Strengths

Increases capacity to address Social Determinants of Health. There are high resource needs among families served at the clinic, and having the SCAN FDS and Healthy Steps specialist adds to the clinic’s capacity to partner with families to be informed about community resources and steps to accessing such resources. One medical resident expressed how busy a typical day can be, “I mean, there are some mornings we’ll have like 60 visits in the morning or something between all of us.”

Addressing family needs for community resources is particularly challenging in a residency clinic where many residents are not from the local area. Residents expressed that having the SCAN

FDS integrated into the patient flow and having communication between the resident and the FDS during visits improves the residents' familiarity with community resources, information that is transferrable to other patients at the clinic. As one resident said, "Most of us are not from Pueblo. And so, it's a good educational opportunity for us as well for that communication between FDS and resident just to happen."

Strengthens family trust. Residents described benefits for both the family and the physician of SCAN's team approach. Families benefit from knowing that concerns that are brought up will have "a second ear" through their conversation with the FDS; the team approach provides reassurance that their concerns or resource needs will be addressed. One resident said:

I think that it helps to let a family know we have a team approach. It's more than just me, it's more than just...there's a whole system that's trying to help them and support them if they need it. It makes the families feel more secure.

Resident physicians benefit both psychologically and instrumentally. Residents know that patients who receive SCAN will have resources shared with them to address social determinants of health, which eases stress and anxiety (described next). Physicians also know that the detail needed to link families with services outside the clinic will be addressed with the additional resources provided through SCAN.

Eases physician stress. Residents characterized their day as extremely busy and said they are "flying from room to room." Residents said having the FDS part of the healthcare visit eases the number and nature of responsibilities of a practicing physician. Residents reported that the SCAN program makes their job easier, not only because of the instrumental support, but also because it lessens burden about unmet needs, and allows physicians to center on medical issues. One resident said:

There are so many social determinants to health that it makes it difficult to actually—I mean we're not really trained and equipped all that well to be able to deal with these things in a medical appointment that, for instance, is a well-child that actually turns into something way more complex than that. And we just don't have the time to deal with it. So, it's really nice, I mean they keep, the SCAN program keeps good track of the patients that they're following and they're always, they're there and ready when that patient arrives. So, it takes the stress off knowing that they're there and I can focus on the medical. We'll hear what they have to say and then I know I have someone else to come in and help me out with that.

SCAN Program Challenges

Coverage and care consistency. Residents reported that there is an inherent lack of consistency of care when patients are receiving health care in a residency setting. This lack of consistency challenges the residents' ability to follow patients' experiences and needs related to social determinants of health, since residents lack deep knowledge of community resources and are typically not originally from the community or even from the state.

Residents expressed the impact that the periodic absence of the SCAN FDS has on their capacity to meet family needs. For example, if the SCAN and Healthy Steps staff are out of the office at the same time, it impacts the clinic's ability to address family resource needs. Residents face a high demand for their time; physicians and patients notice when the SCAN FDS is not available. Several physicians comments on this. One said, "[Patients] ask for [the SCAN FDS] all the time. They're more useful than we are half the time." Patients sometimes say, "I haven't seen [the FDS]. Is she going to be coming in today?"

Family impact. Residents indicated that integrating the SCAN program into health visits lengthens the amount of time the family healthcare visit takes. When there are multiple children receiving services, sometimes both the family and physician find it challenging to manage the additional visit time. Residents were clear, however, that while SCAN sometimes lengthens the visit time, in general, most people don't mind and it is not a barrier to the success of the program.

Resident-FDS Communication. Residents expressed the importance of communication between the SCAN FDS and physician regarding results of the SCAN assessment. Residents acknowledged that, in some situations, there is very little time to share such results. They said the clinic should explore avenues to make this more feasible. Residents expressed that the communication can be very short and centered on pressing, urgent, or notable items that arose during the SCAN FDS visit. One resident noted that it could be as simple as "everything is good...or we're working on this." Another resident said:

No, at least and I don't know how it is for everybody else but at least from my perspective, I don't think there's as much of the communication as we necessarily wanted between the Family Development Specialist and the provider as far as like....were there any concerns and sorts of things?

Residents indicated this is attributable to lack of time on both the part of the FDS and resident, but also felt that more consistency in this communication would be achievable and useful.

Sensitive issues. Residents discussed a few instances in which SCAN participants expressed hesitancy or discomfort with inquiries about their past in the SCAN assessment and ACEs questionnaire, and questioned how this related to their health care. Residents expressed that they were comfortable explaining more about the program to patients to help ease anxiety. One resident said, "And then I had seen one other patient one time that was worried that people were saying she wasn't a good parent and I just explained to her then and she was fine with it."

Impact of SCAN on Resident Physicians

Residents were asked about the impact that SCAN has had on their experiences as a physician. Residents explained that SCAN opens doors in terms of patients discussing issues that they wouldn't normally discuss while having a healthcare visit, and that this sometimes can be easily resolved by the FDS. Residents also said that within physicians' multiple priorities, having the SCAN program elevated the issue of toxic stress and social determinants of health to physicians'

radar, whereas prior to SCAN these issues may have been overlooked. Two residents explained this in the following excerpts:

Because they go in and they get all their ASQs and they get a lot of stuff and by that time the parents have already said, "I am having problems with this." Or, "I'm just curious about this." And it's either a social thing or just some developing thing that doesn't necessarily need a lot of attention in the office but there's a simple resource that can be provided or something like that, and they're able to field all of that. . .

I mean, I think it is a good awareness tool for physicians because it's not necessarily something that is, I mean, now it might be different than prior. . . but I don't think it's something that's necessarily routinely taught in medical school and so maybe, we're not – it's something that people now think about as being important.

Emergency Department and Health Clinic Visits

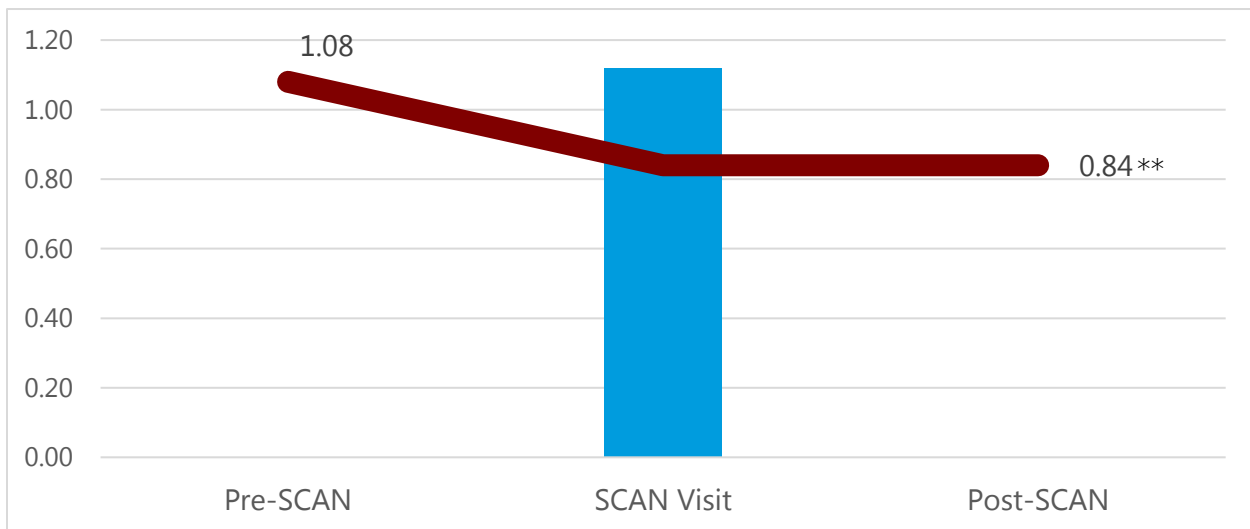
Emergency department visits

By engaging families in conversation about social determinants of health (including ACEs), developing a consistent relationship with a Family Development Specialist (FDS), and encouraging consistent preventive well-child health care, SCAN aims to decrease the use of emergency department (ED) services as a routine place of care. To analyze this, we examined SCAN patients' ED visit use using electronic health record (EHR) data.

For these analyses, all visits to St. Mary-Corwin ED facilities were obtained from Centura Health administrative records for the time period January 1, 2015 through May 30, 2019. Descriptive analyses using means and bivariate (paired t-tests) were conducted to view monthly ED visit rates before and after meeting with the SCAN FDS.

Among 899 SCAN patients seen by the FDS, 639 had at least one ED visit in the time period assessed (71%). Among these patients, the total number of visits ranged from 1 to 23. Paired t-tests were conducted to examine differences in the average number of monthly visits before and after the SCAN FDS visit. Analyses were conducted among all patients with at least one visit and at least 9 months of both pre-SCAN and post-SCAN data ($n = 598$). Results showed that monthly, ED visit rates significantly decreased pre to post from 0.09 visits per month to 0.07 visits per month ($t(597) = 3.02, p = .003$). Although the average number of total ED visits did not decrease from pre-SCAN ($M = 1.65, SD = 2.14$) to post-SCAN ($M = 2.26, SD = 2.66$), we had fewer months of data pre-SCAN (20.40 months) compared to post-SCAN (32.52 months). The monthly rate of ED visits converted to an annual rate is 1.08 ED visits per year before SCAN and 0.84 ED visits per year after SCAN (see Figure 15).

Figure 15. Average Annual Rate of Emergency Department Visits before and after SCAN Visit (n = 598)



** $p < .01$

Health clinic visits

The SCAN FDS aims to strengthen patients' experiences of healthcare by providing additional support and resources related to the specialized needs of parents and their children. The SCAN FDS also provides patient education about young child health and development as well as appropriate use of the ED compared with primary care. Through these three elements (trauma-informed clinical services, resource support through the FDS, and patient education on ED use), SCAN should lead to obtaining routine, preventive health care for children and contribute to continuity of care and benefits to both patients and the healthcare practice.

Information from electronic health records were extracted for all SCAN patients served through April 30, 2019. This includes dates of all scheduled and completed healthcare visits. Evaluators analyzed these data to assess "no show rates" before and after SCAN.

Healthcare visit compliance—"no shows"—were analyzed similarly to ED visits, with average rate comparisons conducted among patients before and after SCAN. Results showed low no-show rates overall, averaging 0.15 among 772 SCAN patients (see Table 3). No show rates were higher after SCAN compared with before SCAN. Average no show rates were 0.11 prior to SCAN and 0.15 after SCAN ($p < .001$). Analyses were conducted to further understand no show rates before and after SCAN. The gap between pre and post-SCAN rates was most prominent among patients with fewer scheduled visits. Among patients with 2 scheduled visits, for example, no show rates were 0.09 prior to SCAN and 0.19 after SCAN, while among patients with 7 to 10 scheduled visits during the time frame, no show rates were .14 prior to SCAN and .17 after SCAN. Among patients with 11 or more scheduled visits, rates were identical (0.13 both prior to and after SCAN ($n=341$)).

Table 3. Health Clinic Visit Compliance before and after SCAN Visit

# of Scheduled Visits	No Show Rate (# of No Shows/# of Scheduled Visits)	
	Pre SCAN (<i>n</i> = 691)	Post SCAN (<i>n</i> = 734)
1	0.04 (158)	0.10 (96)
2	0.09 (110)	0.19 (83)
3	0.12 (80)	0.14 (52)
4-6	0.13 (149)	0.16 (137)
7-10	0.14 (103)	0.17 (116)
11+	0.13 (91)	0.13 (250)
Total Rate	0.11	0.15*

Cost implications

Of the 639 SCAN patients with at least one ED visit, discharge data were available for 446 patients, and 95% (*n* = 424) of these patients were discharged to home/self-care. The rate of ED visits decreased from 1.08 visits per year to 0.84 visit per year after SCAN. While emergency department visits costs vary widely, research from the Health Care Cost Institute from 2008-2017 showed that the average cost of an ED visit among individuals under age 65 was \$1,389 (Hargraves & Kennedy, 2019). Taking this into account, the ED visit costs decreased from an estimated \$958,577 to \$745,560, an annual cost savings of \$213,017.

SCAN Participant Perspectives

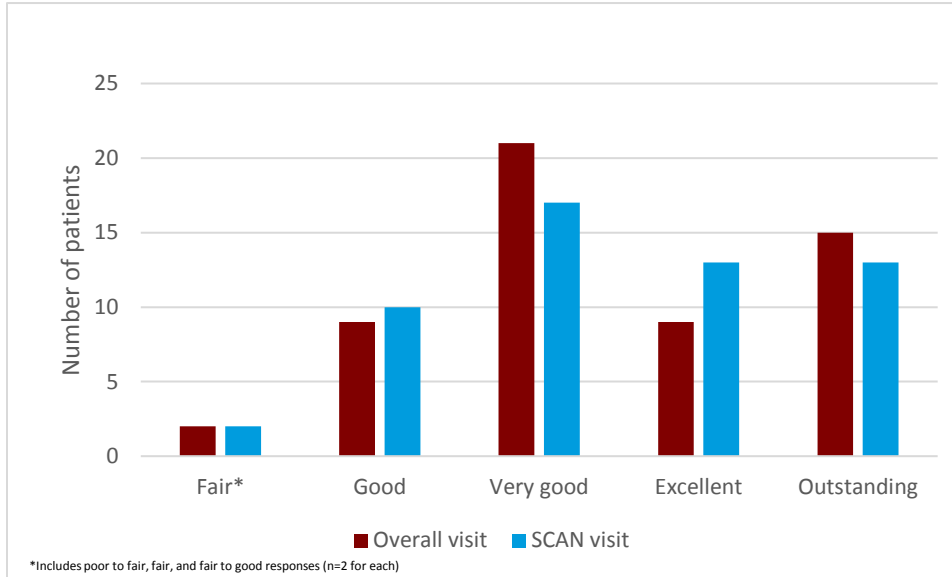
Telephone interviews were conducted with SCAN patients throughout program implementation. The 10-minute telephone interview was designed to learn about caregiver experiences with the healthcare visit, the portion of the visit involving SCAN, and perspectives about receiving the ACEs questionnaire in particular. Interview participants were also asked whether they would recommend the service to others. The interview included 11 Likert-style and 3 open-ended questions and was administered by either a SCFM nurse or Chapin Hall research team member. In total, 56 SCAN participants completed the interview and received a \$10 gift card.

Healthcare visit satisfaction

Participants reported high satisfaction with both their overall healthcare visit and the portion of the visit that included the SCAN FDS. The mean (average) scores for the overall health clinic visit and the portion of the visit including SCAN were nearly identical: 5.43 on the 7-point scale for the visit overall and 5.44 for the portion of the visit including SCAN. Many participants reported that their healthcare experience including SCAN was very good (*n* = 21), excellent (*n* = 13), or

outstanding ($n = 13$; see Figure 16). Only two participants among 56 interviewed reported very low ratings of their overall visit and the SCAN visit ($n = 1$ for each).

Figure 16. Patient Reports of Overall Health Visit and SCAN Visit Satisfaction ($n = 56$)



Participant reflections on the ACE Questionnaire

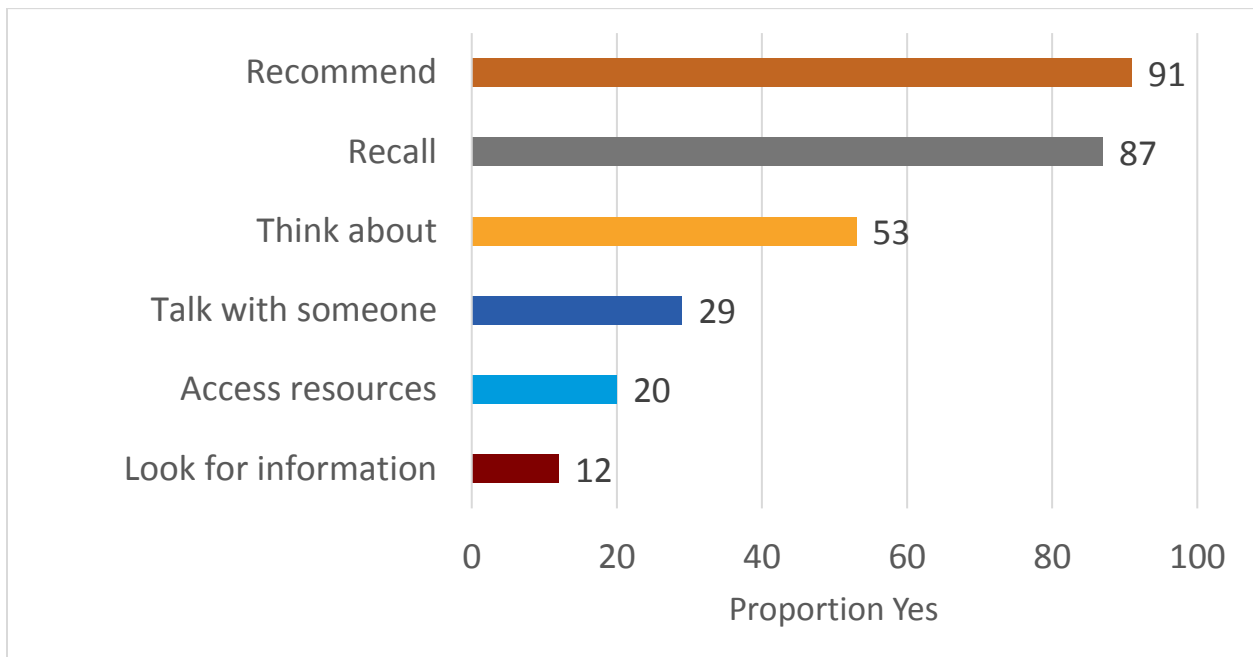
A fundamental goal of SCAN is to increase patients' access to resources that may help alleviate family stress and reduce children's risk of ACEs. However, research shows that follow up with referred resources is challenging for many families (Ingoldsby, 2010) and that individuals make health care decisions partially influenced by the qualities of the message or communication (Nansel, Weaver, Donlin, Jacobsen, Kreuter, & Simons-Morton, 2002). Since the SCAN visit includes patient education about ACEs, resiliency, and the link with health, the evaluation aimed to learn more about how patients experienced this program component. Specifically, participants were asked four questions that are fundamental to (but not the only) indicators of effective health messaging in terms of influencing "a next step" or health behavior. The items asked about:

- recall of the part of the health visit that involved the ACE questionnaire;
- whether the participant thought about this part of the health visit after leaving the clinic;
- talking with others about this part of the health visit after leaving the clinic such as a spouse/partner or friend; and
- looking for further information specifically about ACEs, such as by searching online.

Participants were then asked additional open-ended questions to share specific recollections and reflections on their experiences.

As shown in Figure 17, most participants interviewed recalled the SCAN visit and ACE assessment (87%). About half of these participants reported thinking about this portion of the visit after leaving the clinic (53%). Fewer participants indicated talking with someone about the assessment after the visit (29%) with the most frequent conversations occurring with a spouse, partner, or other family member. Looking for additional information about ACEs was fairly uncommon; just 12% indicated they had done this.

Figure 17. Participant Reports of ACE Questionnaire Recall, Reflection, Support, and Information Seeking after the SCAN Visit (n = 56)



Open-ended follow-up questions applied to three of the Likert-scale items. These responses were coded and analyzed for themes. The first follow-up question asked participants who recalled the ACE questionnaire to indicate what they recalled specifically. Themes that emerged from the data centered in four areas: patient reflection, feeling satisfied, feeling discomfort, and resource appreciation. A large number of participants also indicated that while they recalled this portion of the visit, nothing stood out specifically or that they had vague recollection. Each of these themes is presented in Table 4.

Table 4. Participant Reactions to Receiving the ACE Questionnaire

Theme	Example Quotes
Participants reported that receiving the ACE questionnaire caused them to reflect.	"It made me think. Because there was a lot of trauma as a child. We don't realize that we add it to our child. And it opened my eyes a lot."
Participants expressed satisfaction with the encounter and appreciated the approach of the FDS and clinic staff.	"I remember that it was very pleasant and everyone was very nice." "I was. . . maxed out in the bad way and the lady was very encouraging."
Participants recalled and appreciated the resources that were offered.	"I remember taking the test and giving us diapers, a book and all the information on resources." "She gave me resources that are available and explained the programs to me. It was very helpful."
Two participants reported feeling discomfort.	"That questionnaire was pretty uncomfortable as for the adverse childhood stuff."
Participants didn't recall anything specific or had vague recollections of the ACE questionnaire.	"No, just that it asked questions, you know, something about your past as a child." "[I] remember going over the questions but not in great detail." "I don't really remember, I remember filling it out but vaguely. "

Participant reflections after leaving the clinic

Participants who indicated that they thought about the SCAN visit and particularly the ACEs questionnaire after leaving the clinic were asked to specify what they thought about further. Responses centered on being appreciative of the information and resources, their decision-making related to accessing resources, and appreciating the support overall. These themes are presented in Table 5.

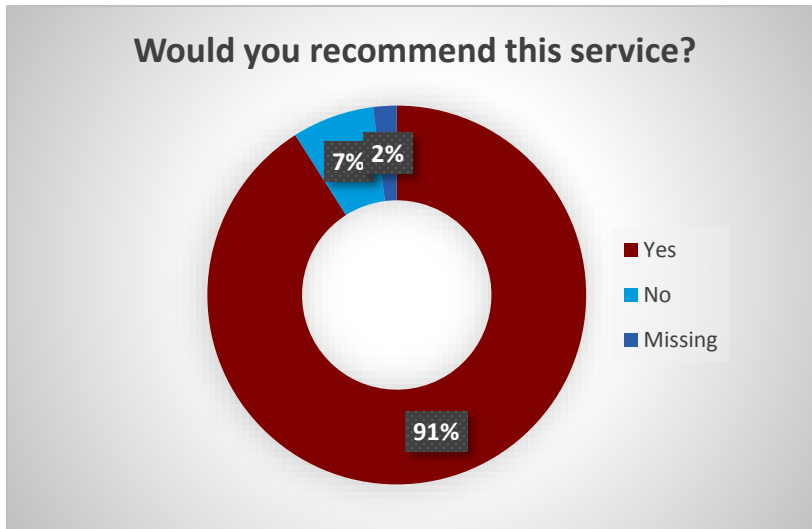
Table 5. Participant Postvisit Reflections

Theme	Example Quotes
Participants positively reflected on the experience of receiving information and resources.	"It gave me an idea of all the helpful resources available." "I was thankful for the information and resources I got."
Participants processed the visit in relation to their own or others' experiences.	"I really enjoyed that someone came in to check things out and let me know that there is help out there. I am pregnant and my partner is not involved because he's immature and not ready. I have my mom, but it was still good to know that there is extra help out there."
Participants thought about whether they would make the decision to access resources.	"I thought on when I would have time to set myself up with parenting classes through Catholic Charities." "I thought...if I should utilize the services that were offered."
Participants acknowledged that they or others need or needed the support.	"I thought that the questions were very good to show people that there is help for them." "I was thankful someone came to talk with me."

Participant recommendations regarding the ACE Questionnaire

Participants were asked if they would recommend that others like them receive the SCAN service, particularly the portion of the visit that involved the ACE questionnaire. A large majority of participants reported that they would recommend this service to others (91%; see Figure 18).

Figure 18. Views on Others Receiving the SCAN Service



Participants were asked to provide additional detail about why they would or would not recommend this service to others. Participants discussed the benefits of the program in terms of the resources offered, support, and opportunity to reflect. While 7% of participants indicated that they would not recommend the service, there were no responses to the open-ended item that spoke specifically to this (see Table 6).

Table 6. Reasons Participants Would Recommend the SCAN Service

Theme	Example Quotes
Information and resources	"I think it's helpful to know more about how to take care [of] your baby as a first time parent, because not everybody has the resources. Not everyone has family and friends to help out. The more resources to help, the better off."
Support	"It's a support system that parents need, especially new parents." "It's good help when you are needing and they are there to support you." "Because some people don't have a support system like I do, especially people like me, who are single, and pregnant, and maybe they don't have a mom to their sides like I do. A dad, or someone. So it's important to have someone in a situation like this because I can totally imagine going through this alone and it's horrible. I definitely appreciate that there is help out there for me."
Reflection	"I think that being aware of your background helps you be a better parent, so you gotta recognize the past so you can move forward into the future." "You don't realize that those questions would really affect you when you're growing up and to find the help as an adult."

Discussion

Adverse Childhood Experiences (ACEs) are a real concern among adults seeking prenatal health care and pediatric services for their children at SCFM. SCAN patients with 4 or more ACEs were 2.4 times more likely to report recent depressive symptoms than those who reported 0 ACEs. SCAN patients were more than twice as likely to experience 4 or more ACEs than the CDC's ACE Study (Felitti et al., 1998): 30% of the SCAN patients compared to 13% in the CDC's ACE Study had an ACE score of 4 or more. Thus, the patients seeking care at SCFM may experience greater childhood adversity than the general population, placing them at greater risk for poor health outcomes.

One potential intervention point is to address resiliency to mitigate the impacts of ACEs. High resiliency moderated the impact of ACEs on self-reported depression, and resiliency was related to lower rates of substance use (tobacco and alcohol), greater satisfaction with weight, healthier eating, more exercise, and greater overall health. For adults, there are a number of evidence-based resiliency programs designed to build resilience following childhood trauma (Chmitorz et al., 2018) that could be integrated into programming between health care and community-based programs.

SCAN participants consistently showed a reduction in emergency department use after having received SCAN services. While we cannot say that the reduction is due to SCAN because this is not a controlled study, there are several dynamics that may explain the finding. First, SCAN (and some referred programs such as SafeCare) includes patient education about child health concerns that may be necessary to be treated at the emergency department, and those that can likely be treated in primary care. This could have a direct impact on patient choices about where to take their child for care. It could also be that as patients develop a relationship with the FDS, they feel a greater sense of connection to the clinic and this results in some patients having more consistent visits to the clinic. Patients expressed value in receiving the support of the FDS and resources that were offered through SCAN. Finally, less use of the emergency department may be related to decreased need for emergency department services. As patients access resources through SCAN such as housing, food or nutrition assistance, they and their child's health may improve or they may be less prone to injury.

SCAN has been beneficial to clinicians in very important ways. First, SCAN helps clinicians meet the goals of a medical home that is team-based, comprehensive, and designed around the needs of patients and partnership with parents. Having SCAN integrated into clinic services was reported by residents to fully demonstrate each of these goals.

SCAN was described as alleviating physician stress, which can prevent burnout, a major issue in health care affecting the workforce, physician health, and patient care (West, Dyrbye, & Shanafelt, 2018). Over half of physicians in the U.S. (51%) report symptoms of burnout, which is nearly double the rate of workers in other professions after controlling for hours worked and

demographic variables (Peckham & Grisham, 2017). Having the extra support of the FDS in the clinic helps physicians meet resource needs that have been obvious needs during the course of care, but for which physicians have not been equipped to address. This impact transcends to other patients. As physicians and the FDS work together to address patients' resource needs and open up conversations about trauma and resiliency, physicians are more apt to recognize and address needs among other patients.

While these results of the program are positive, there are a few challenges. The uptake of evidence-based parenting programs continues to be a challenge and could be alleviated by providing parenting programs more universally, reducing stigma and the challenges to enrolling and completing these programs after patients have left the clinic.

There is a lack of ability in clinic EHRs to track community-based resource referrals and receipt, and an easily accessible mechanism for physicians to know the extent of family stress, resiliency, and need for community resources. While this has been partially resolved at SCFM through the SCAN assessment being embedded into SCFM's electronic health record, residents reported that the assessment is difficult to find and consistently access. One strategy to address this is to increase communication between the physician and FDS during the clinic visit. Residents reported that this is as simple as a quick check-in with the FDS prior to meeting with the patient.

Results of this study confirm that there is a high level of need for socio-economic, parenting supports, and mental health resources among SCFM patients. Medical residents and SCAN participants alike expressed the benefits of having family resource needs identified during clinic visits and referrals made to community resources. Patients reported learning about resources that they were unaware of prior to SCAN. Residents indicated that once a program such as this is implemented in a clinic, the volume of need becomes even more apparent.

References

- Baker, C. N., Arnold, D. H., & Meagher, S. (2011). Enrollment and attendance in a parent training prevention program for conduct problems. *Prevention Science, 12*(2), 126–138.
- Baker, A. J., Piotrkowski, C. S., & Brooks-Gunn, J. (1999). The Home Instruction Program for Preschool Youngsters (HIPPY). *Future of Children, 9*, 116–133.
- Bradley, R. H., & Gilkey, B. (2002). The impact of the Home Instructional Program for Preschool Youngsters (HIPPY) on school performance in 3rd and 6th grades. *Early Education and Development, 13*(3), 301–312.
- Breitenstein, S. M., Gross, D., & Christophersen, R. (2014). Digital delivery methods of parenting training interventions: A systematic review. *Worldviews on Evidence-Based Nursing, 11*(3), 168–176.
- Burke, N. J., Hellman, J. L., Scott, B. G., Weems, C. F., & Carrion, V. G. (2011). The impact of adverse childhood experiences on an urban pediatric population. *Child Abuse & Neglect, 35*(6), 408–413.
- Bugental, D. B., Ellerson, P. C., Lin, E. K., Rainey, B., Kokotovic, A., & O'Hara, N. (2002). A cognitive approach to child abuse prevention. *Journal of Family Psychology, 16*(3), 243–258.
- Carta, J. J., Lefever, J. B., Bigelow, K., Borkowski, J., & Warren, S. F. (2013). Randomized trial of a cellular phone-enhanced home visitation parenting intervention. *Pediatrics, 132*(Suppl 2), S167–S173.
- Center for the Study of Social Policy (2018). *About Strengthening Families™ and the Protective Factors Framework*. Retrieved from <https://cssp.org/wp-content/uploads/2018/11/About-Strengthening-Families.pdf>
- Chaffin, M., Hecht, D., Bard, D., Silovsky, J. F., & Beasley, W. H. (2012). A statewide trial of the SafeCare home-based services model with parents in Child Protective Services. *Pediatrics, 129*(3), 509–515.
- Chmitorz, A., Kunzler, A., Helmreich, I., Tuscher, O., Kalisch, R., Kubiak, T., . . . Lieb, K. (2018). Intervention studies to foster resilience – A systematic review and proposal for a resilience framework in future intervention studies. *Clinical Psychology Review, 59*, 78–100.
- Connor, K. M., & Davidson, J. R. (2003). Development of a new resilience scale: The Connor-Davidson resilience scale (CD-RISC). *Depression and anxiety, 18*(2), 76–82.

- Drotar, D. Robinson, J., Jeavons, L., & Lester Kirchner, H. (2009). A randomized, controlled evaluation of early intervention: The Born to Learn curriculum. *Child: Care, health and development*, 35(5), 643–649.
- Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., . . . Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine*, 14(4), 245–258. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/9635069>
- Hargraves, J., & Kennedy, K. (2019). 10 years of emergency room spending for the commercially insured. Poster presented at the 2019 AcademyHealth Annual Research Meeting, Washington, DC.
- Hughes, K., Bellis, M. A., Hardcastle, K. A., Sethi, D., Butchart, A., Mikton, C., . . . Dunne, M. P. (2017). The effect of multiple adverse childhood experiences on health: A systematic review and meta-analysis. *The Lancet Public Health*, 2(8), e356–e366.
- Ingoldsby, E. M. (2010). Review of interventions to improve family engagement and retention in parent and child mental health programs. *Journal of Child and Family Studies*, 19(5), 629–645.
- McCurdy, K., Daro, D., Anisfeld, E., Katzev, A., Keim, A., LeCroy, C., . . . Park, J. K. (2006). Understanding maternal intentions to engage in home visiting programs. *Children and Youth Services Review*, 28(10), 1195–1212.
- Mersky, J. P., & Janczewski, C. E. (2018). Racial and ethnic differences in the prevalence of adverse childhood experiences: Findings from a low-income sample of US women. *Child Abuse & Neglect*, 76, 480–487.
- Nansel T. R., Weaver NL, Donlin M, Jacobsen H, Kreuter MW, Simons-Morton B. (2002). Baby, Be Safe: The effect of tailored communications for pediatric injury prevention provided in a primary care setting. *Patient Education and Counseling*, 46(3), 175–190.
- Owen, M. T., & Mulvihill, B. A. (1994) Benefits of a parent education and support program in the first three years. *Family Relations*, 43(2), 206–212.
- Peckham, C., & Grisham, S. (2017). Medscape lifestyle report 2017: Race and ethnicity, bias and burnout. Available at: <http://www.medscape.com/features/slideshow/lifestyle/2017/overview>.
- Pfannenstiel, J. C. & Seltzer, D. A. (1989). New parents as teachers: Evaluation of an early parent education program. *Early Childhood Research Quarterly*, 4(1), 1–18.
- Poole, J. C., Dobson, K. S., & Pusch, D. (2017). Childhood adversity and adult depression: the protective role of psychological resilience. *Child Abuse & Neglect*, 64, 89–100.

- Shonkoff, J. P., & Garner, A. S. (2012). The lifelong effects of early childhood adversity and toxic stress. *Pediatrics*, *129*, 232–246.
- Tichy, A., & Brotherson, S. (2017). *Nurturing Parenting Program helps parents and improves child well-being in North Dakota*. Valley City, ND: North Dakota Nurturing Parenting Programs. Retrieved from <https://www.nurturingparenting.com/images/cmsfiles/Impact-Statement2017-NPP-DRAFT.pdf>
- U.S. Census Bureau. (2017). *American Community Survey 5-year estimates for Pueblo city, Colorado*. Retrieved from <https://www.census.gov/quickfacts/pueblacitycolorado>.
- Wagner, M. (2001). *The multisite evaluation of the Parents as Teachers Home Visiting Program: Summary of findings for Winston-Salem, North Carolina*. Menlo Park, CA: SRI International.
- Wagner, M. M., & Clayton, S. L. (1999). The Parents as Teachers program: Results from two demonstrations. *Future of Children*, *9*, 91–115.
- Wagner, M., Spiker, D., & Linn, M. I. (2002). The effectiveness of the Parents as Teachers program with low-income parents and children. *Topics in Early Childhood Special Education*, *22*(2), 67-81.
- Wang, J., Wu, X., Lai, W., Long, E., Zhang, X., Li, W., . . . Wang, D. (2017). Prevalence of depression and depressive symptoms among outpatients: a systematic review and meta-analysis. *BMJ open*, *7*(8), e017173.
- West, C. P., Dyrbye, L. N., & Shanafelt, T. D. (2018). Physician burnout: Contributors, consequences and solutions. *Journal of Internal Medicine*, *283*(6), 516–529.
- Youssef, N. A., Belew, D., Hao, G., Wang, X., Treiber, F. A., Stefanek, M., . . . Su, S. (2017). Racial/ethnic differences in the association of childhood adversities with depression and the role of resilience. *Journal of Affective Disorders*, *208*, 577–581.

Appendix A. SCAN Evaluation Questions, Sources, and Analysis

Table A-1. SCAN Questions, Sources, and Analysis

Evaluation Question	Data source	Variables/Measure	Analysis
Patients & ACEs			
What is the extent of ACEs among expectant parents and parents of birth to 18 year-olds receiving SCFM health care? What is the level of resiliency?	SCAN database Administered once, at first SCAN service	10—item ACE measure (Felitti & Anda)	Descriptive (means & proportions) Cross-sectional
What community resources are patients referred to?		Connor-Davidson Resilience Scale	Descriptive (means & proportions) Cross-sectional
Is there a relationship between ACEs and patients' self-reported health (depression, smoking, weight, secondhand smoke, general health) upon healthcare at SCFM?		Physical health items, various sources	Bivariate and/or multivariate (inferential statistics)
Clinical staff skills/knowledge			
What are levels of familiarity, skills, and use of patient education related to ACEs and resilience among medical residents before and after training?	Pre-post training survey	Project-developed	Descriptive t-tests

<p>Is there a difference in emergency department use and receipt of well-child health care before and after SCAN services?</p> <ul style="list-style-type: none"> • What is the frequency of ED use before and after SCAN? • What % of children receive recommended well-child care? 	EHR	Dates of ED service Jan 1, 2015-present	Descriptive Paired t-tests
<ul style="list-style-type: none"> • Are patients more likely to attend scheduled health care visits after SCAN (compliance/no-show rate)? 	EHR	Dates of scheduled and completed visits Jan 1, 2015-present	Descriptive Paired t-tests
<p>What do patients report about visit satisfaction related to SCAN, resource receipt or barriers, and experience of ACEs assessment & patient-provider relationship in the health care setting?</p> <ul style="list-style-type: none"> • Do patients recall meeting with the Family Development Specialist? • What are patient responses to being asked about ACEs? • To what extent do patients seek additional information or support (e.g. relative, friend)? • Would patients recommend that others receive this service? How so or why not? 	<p>Patient telephone interviews</p> <p>Administered once, anonymous</p>	Project-developed items adapted from health communication tools & literature	Descriptive means and proportions Qualitative thematic analysis

Appendix B. SCAN Population and Demographic Characteristics

Table B-1. Total SCAN Population and Demographic Characteristics (N = 899)

Characteristic	<i>n</i>	%
Gender		
Male	207	22.9
Female	692	76.7
Race		
White	762	84.5
Black/African American	59	6.5
American Indian/ Alaskan Native	31	3.4
Asian	4	0.4
Native Hawaiian/Pacific Islander	43	4.8
Missing data	3	0.3
Ethnicity		
Hispanic	512	56.8
Non-Hispanic	383	42.5
Missing data	7	0.8
Relationship to child		
Parent/expectant parent	845	94.0
Foster/adoptive/stepparent	11	1.2
Grandparent	24	2.7
Aunt/Uncle/Other	10	1.1
Missing data	9	1.0
Age (in years, range 14–65) [^]	<i>M</i> = 29.5	<i>SD</i> = 9.3
Number of children (<i>n</i> , range 0–8) [^]	<i>M</i> = 1.6	<i>SD</i> = 1.3
Single parents	243	27.0

[^]*M* = Mean (average); *SD* = Standard deviation.

Appendix C. Measures

SCAN Questionnaire. Patients were administered the 51-item SCAN assessment that includes the 10-item ACEs tool,⁷ the Connor-Davidson Resiliency Scale (CDRS),⁸ and demographic items. Demographic, self-reported health items from the CDRS and the ACE measure are used in this study. ACE scores were calculated based on the number of items endorsed that indicate an ACE prior to age 18, resulting in a score of 0 to 10.

Patients self-reported on seven indicators of health: depression, alcohol use, tobacco use (self and other household members), weight, exercise, and healthy diet. Patients reported the frequency of feeling depressed in the previous two weeks: never, sometimes, frequently, or all of the time. Patients reported their health on a 5-point scale as “generally” poor, fair, good, very good, or excellent. Patients reported the extent to which the following statements were true on a 6-point scale ranging from “not at all true” to “mostly true”: “I am at my ideal body weight”; “I exercise 30 minutes or more most days”; “I eat a healthy diet most days”; “I use tobacco products”; “Someone else in my household uses tobacco products.” Finally patients indicate how many alcoholic drinks they have per day (open-ended).

Healthcare utilization. Two indicators of healthcare utilization were used: emergency department (ED) visits and compliance with scheduled clinic appointments. A variable was created to assess the number of ED visits among SCAN patients before and after program enrollment. Data were provided by Centura Health and are from the St. Mary-Corwin emergency department only, pulled by medical record number. The total number of ED admissions before and after SCAN intervention was divided by the total number of months “available” in each time period to create an average monthly rate of ED admissions pre- and post-SCAN.

Clinic visit utilization. A variable was created to assess the extent of attended (versus “no-show”) appointments before and after SCAN using clinic Electronic Health Records (EHR). A “no-show” was defined as an appointment that was cancelled less than 24 hours in advance or nonattendance at the scheduled visit. The total number of no-shows (January 1, 2015–April 30, 2019) for SCAN patients was divided by the total number of appointments scheduled, resulting in the no show rate. No show rates were compared for appointments before and after SCAN.

Clinician Survey. During each SCAN training from 2016–18, incoming residents were administered a pre-training survey ($n = 23$). The survey is designed to assess the extent of residents’ familiarity with training topics, confidence in and relevancy of discussing ACEs with patients, and the frequency of incorporating ACEs into patient visits and differential diagnoses prior to receiving the SCAN training. Residents completed the survey again in 2019 as a post-

⁷ ACEs tool

⁸ Connor Davidson

training survey. Survey items are rated on a 5-point scale, with higher scores indicating higher frequency, behavior, or competency related to each item.