

# Adverse Childhood Experiences: Perceptions, Practices, and Possibilities

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## ABSTRACT

**Background:** Adverse childhood experiences are negative life events occurring in childhood that can have long-term health effects. Many health professionals do not receive formal education surrounding childhood trauma, and few providers screen for adverse childhood experiences.

**Objective:** This scoping review examines how current literature describes the perceptions, attitudes, and practices of health professionals and trainees regarding childhood trauma, identifies educational opportunities aiming to increase awareness for child trauma, and discusses screening for adverse childhood experiences.

**Methods:** PubMed, PsycInfo, and Google Scholar were used to find articles. Key search terms included “adverse childhood experiences” or “ACEs,” combined with terms such as “screening implementation,” “Education, Professional” (Medical Subject Headings [MeSH]), “Education, Medical, Graduate” (MeSH), “Curriculum” (MeSH), “Health Knowledge, Attitudes, and Practices” (MeSH), and “Attitude” (MeSH).

**Results:** A large proportion of providers and trainees are unaware of the effects of adverse childhood experiences. Training opportunities can increase knowledge about adverse childhood experiences and promote trauma-informed care practices. However, the long-term effects of these trainings remain largely unexplored. Barriers such as a lack of time, resources, comfort, or consensus regarding how to ethically screen impede broader efforts to implement systematic screenings for adverse childhood experiences.

**Conclusions:** Adverse childhood experiences are a public health concern. However, health professionals and trainees are undereducated about their pervasive effects. Further research is needed on how to better educate health professionals about adverse childhood experiences and trauma-informed care. Adverse childhood experiences screenings could promote the early identification of childhood trauma, yet the ethics and effectiveness of screening must be further studied.

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## INTRODUCTION

Adverse childhood experiences (ACE) are defined by the Centers for Disease Control and Prevention (CDC) as an array of harmful exposures occurring from birth to age 17 that may negatively impact one’s physical and mental well-being, as well as one’s future social and economic opportunities.<sup>1</sup> In 1998, the landmark ACE study by Felitti et al<sup>2</sup> was published, outlining 10 ACEs relating to the categories of abuse, neglect, and household dysfunction: physical, sexual, and emotional abuse; physical and emotional neglect; and family member incarceration, mental illness, substance abuse, divorce, and intimate partner violence. While there has been previous literature about topics relating to ACEs, such as “childhood trauma,” “early life adversity,” and “toxic stress,” the landmark ACE study was the first of its kind to use the language of “adverse childhood experiences.” In this study, researchers found that more than half of respondents reported at least 1 ACE, and they found a graded relationship between the number of categories of childhood exposure and future adult risk behaviors and disease.<sup>2</sup>

Increased ACE exposure was linked to increased risks for chronic conditions, including heart disease, diabetes, obesity, stroke, and cancer. In addition, this study concluded that ACEs increased one’s risk for mental health conditions, such as depression and suicidality. Subsequent research has revealed that children who experience ACEs have decreased graduation and employment

**Table 1.** Overview of Short-Term ACE-Specific Educational Opportunities

Study/Year	Population	Design	Intervention	Outcome
Olsen, Warring <sup>12</sup> 2018	ADN students	Mixed-methods approach using quasi-experimental pretest-posttest design; thematic analysis of focus group data measured IPE effect on ACE knowledge	Experimental: 18 students participated in 4-hour IPE seminar featuring ice-breaker, documentary, guided discussion, and inter-professional panel  Control: 17 students received usual instructional activity (viewing documentary on childhood trauma) followed by discussion	Qualitative analysis focused on impact of IPE on ACEs knowledge  4 themes emerged: knowledge of ACEs increased as a result of learning activity; trust and idealized care is essential; desire to know more about ACEs; and need for community education, funding, and resources
Pearce et al <sup>23</sup> 2019	Health, social care	Qualitative interviews conducted from participants at 4 pilot sites; data analyzed using thematic analysis	7 health and social care practitioners underwent both the 2-day, REACh in-person training with regular follow-up sessions with REACh trainers and participated in an interview	Emerging themes: positive change in knowledge and practice; emotional impact of disclosures; confidence in asking about ACEs and responding appropriately; understanding impact of ACEs on clients; understanding how and when to ask about ACEs
Pletcher et al <sup>22</sup> 2019	Medical students	Post-workshop, multiple choice assessment tested for ACE knowledge; online evaluation of workshop conducted 9-10 months later	During 2016-2019, 535 1st-year medical students participated in a 3-hour workshop followed by facilitated case discussion in small groups exploring ACE survey tool and resilience questionnaire	Average grade on post-session quiz was 95% in 2018 (range 60%-100%); average in 2019 was 96% (range 58%-100%) (SD = 0.92)  Evaluations: A majority felt that learning objectives for ACE workshop were met to a considerable/very high degree. Students largely felt their knowledge improved and that additional training would be beneficial
Randall et al <sup>13</sup> 2020	PT, OT students	Pretest-posttest survey of training; quantitative and qualitative data analyzed	26 PT and OT students completed PATH, a 4-hour, simulation-based training featuring lecture, presentation of PATH model, standardized patient encounters and simulations, and debrief	Results showed increased scores from pre- to posttests for PT and OT students regarding self-efficacy ( $P=0.005$ ), hope ( $P=0.001$ ), and knowledge of ACE and TIC ( $P<0.001$ )  Qualitative analysis: Students appreciated participating in training model, learned from their experiences, noted they would like more instruction on how to work effectively with patients who have ACE history
Schmitz et al <sup>10</sup> 2019	Pediatric residents	Pretest-posttest survey of module using 5-point Likert scale	91 residents completed a 25-minute module about ACEs, TIC, toxic stress, and resiliency during their child advocacy and protection rotation; 29 residents completed presurvey, 11 residents also completed post-survey sent out 1-3 months after their rotation	Presurvey results demonstrated residents were not confident discussing ACEs, TIC, or resiliency (median = 2). Despite perceived importance of having these discussions with families (median = 5), they rarely occurred in clinic (median = 1 or 2)  Matched pre/post data showed significant increases in knowledge, confidence, discussion frequency
Stefanski, Mason <sup>25</sup> 2017	Pediatric residents	2-part curriculum followed by written feedback regarding curriculum	18 2nd- and 3rd-year pediatric residents participated in a pilot 2-part curriculum with online module and 1-day workshop	Feedback themes: Surprise at high prevalence of ACEs; positive attitudes toward interactive activities and resources; current need to provide resources to families and have more frequent conversations with families regarding ACEs  The most common practice change residents reported was more systematically screening patients for ACEs; follow-up survey needed to track long-term changes
Strait, Bolman <sup>21</sup> 2017	Graduate health students	Pretest-posttest survey of workshop	967 graduate students from 9 health professions programs at 2 campuses participated in three 2-hour IPE workshops on ACEs and TIC: lectures, discussion, and simulation	Results showed increases in students "extremely likely" to administer and assess ACE questionnaire (13.6% of respondents pre-curriculum vs 42.0% post-curriculum)  Confidence levels in helping a patient with trauma history increased. Those reporting feeling "somewhat confident" increased from 37.3% on pre-curricular survey to 67.5% on post-curricular survey  Participants who voluntarily assessed their ACE score had increased familiarity with clinical and scientific findings of ACE study ( $P<0.001$ ) and familiarity with TIC ( $P<0.02$ )
Wen et al <sup>14</sup> 2014	Primary care residents	Qualitative online survey conducted 2-5 months after training	59 residents from family medicine and internal medicine residency programs participated in PATH, a simulation-based training 4-hour program	Of 32 respondents, a majority agreed that PATH training enhanced understanding of ACEs (64.5%), reflected realistic encounters (68.8%), and helped apply concepts and principles in practice (65.6%)  Most noted that faculty feedback from simulation was helpful (77.4%) and planned to implement skills learned through simulation in clinical practice (62.5%)

Abbreviations: ACE, adverse childhood experience; ADN, associate degree in nursing; BSN, bachelor of science in nursing; IPE, interprofessional education; OT, occupational therapy; PATH, Professional ACE-informed Training for Health Professionals; PT, physical therapy; REACh, Routine Enquiry into Adversity in Childhood; TIC, trauma-informed care.

rates, inhibiting their economic opportunity and creating profound costs for society at large.<sup>1</sup>

Current survey data of adults in the United States suggest ACEs are common today. In fact, over 60% of adults surveyed have experienced at least 1 ACE, with nearly 25% having experienced 3 or more.<sup>1</sup> It is important to note the inequitable burden of ACEs, especially among low-income families and children of racial or ethnic minority groups.<sup>3</sup> Screening is one way to provide early identification of individuals who may have experienced ACEs. However, ACEs are not routinely screened for in pediatric clinics.<sup>4</sup> The purpose of this literature review is to (1) examine the knowledge, attitudes, and perceived barriers of medical students, residents, and clinicians regarding ACE education or screening, (2) identify educational opportunities implemented to increase ACE awareness and to change attitudes and behaviors toward ACE screening, (3) provide an overview of studies that have implemented ACE screening for pediatric populations within clinic settings, and (4) explore benefits and cautions associated with ACE screening.

## METHODS

The primary database used for this scoping review was PubMed. All selected articles were written in English. There were no restrictions on the publication dates of articles. However, since the study of ACEs is a relatively new field, most articles were published within the last 5 years. Articles were found using the search terms “adverse childhood experiences” or “ACEs,” in combination with terms, including “screening implementation,” “Education, Professional” (Medical Subject Headings [MeSH]), “Education, Medical, Graduate” (MeSH), “Curriculum” (MeSH), “Health Knowledge, Attitudes, and Practices” (MeSH), and “Attitude” (MeSH). PsycInfo and Google Scholar were used as supplementary databases to find any pertinent articles or gray literature not found in PubMed. A medical librarian provided consultation prior to the article screening process. One investigator conducted all searches and article screenings. Unclear articles were discussed with another investigator. Articles were organized based on research findings and central themes.

## RESULTS

### Knowledge, Attitudes, and Perceived Barriers toward ACEs Screening

Even though the original ACE study was published over 20 years ago and current literature outlines the long-term effects of ACEs on health, various studies demonstrate disparities in familiarity with ACEs among health care trainees and professionals. For example, a study in Michigan revealed that over 80% of participants had never heard of the ACE questionnaire.<sup>5</sup> Research shows that knowledge of ACEs, perceived importance of ACEs, and attitudes toward ACEs influence whether or not health care professionals screen for ACEs in their practice.<sup>4,6</sup> A previous study

found that the frequency of ACE screening was associated with factors such as one’s medical specialty and one’s knowledge about the impact of ACEs on physical health.<sup>7</sup> In addition to a lack of knowledge, health care professionals frequently experience conflicting attitudes toward ACE screening. Many clinicians have a basic understanding of the effects of ACEs and believe it is their role to screen for ACEs.<sup>8</sup> However, health professionals often report feelings of inadequacy or fear in regard to discussing ACEs and, as a result, may avoid the topic with patients.<sup>6</sup> Likewise, though clinicians often desire to screen for ACEs, very few do so regularly due to numerous barriers.<sup>4,5</sup> In addition to a lack of knowledge or confidence, commonly reported barriers include a lack of time,<sup>5-9</sup> referral resources,<sup>6,7</sup> proper screening tools and guidelines,<sup>4</sup> adequate reimbursement for screening,<sup>9</sup> and larger organizational support.<sup>6</sup>

### ACE Educational Opportunities

Across health disciplines, there are clear gaps in knowledge regarding ACEs and barriers that prevent health professionals from incorporating ACE awareness into a trauma-informed practice. In order to address these challenges, numerous studies have implemented educational opportunities to assess their effects on changing student and provider thoughts, attitudes, and practices regarding ACEs. Some opportunities were short-term ACE-focused training, using either online or in-person platforms. Other short-term ACE trainings were incorporated into larger training sessions focused on trauma-informed care (TIC). Finally, there has been some initiative to integrate ACE education longitudinally into health care-related curriculums.

When searching the literature, ACE-specific educational opportunities were presented in various short-term formats (Table 1). Knowing that health professionals already have busy schedules that do not always allow for in-person training, online modules are 1 strategy to disseminate ACE education to a wide audience. One study demonstrated that a simple, 25-minute online module was effective at increasing participants’ knowledge, confidence, and discussion frequency of ACEs.<sup>10</sup> However, most ACE educational opportunities were provided through in-person experiences, as participants enjoyed learning in interactive, small-group sessions.<sup>11</sup> An interprofessional education seminar may be another useful format to help facilitate discussion and collaboration among professionals of various backgrounds about ACEs and their impact on well-being.<sup>12</sup> In order to boost student engagement, various health professional programs have implemented simulations into their ACE trainings.<sup>13,14</sup> Simulations can be an effective strategy because they give participants the opportunity to learn how to have conversations with patients about ACEs and their effects on long-term health goals, as well as engage in collaborative decision-making about treatment plans. This may help mitigate feelings of inadequacy or fears when discussing trauma.

In other cases, ACE educational opportunities were incor-

**Table 2.** Overview of Short-Term ACEs and TIC Combined Educational Opportunities

Study/Year	Population	Design	Intervention	Outcome
Cannon et al <sup>16</sup> 2020	Undergrad/graduate students	Pretest-posttest survey of curriculum; quantitative/qualitative data analyzed	TIC intervention provided in a 75- to 160-minute lecture/discussion with voluntary surveys conducted immediately before and after lecture; 128 students completed both surveys	Content improved nursing students' knowledge ( $P < 0.001$ ), attitudes ( $P < 0.001$ ) and skills related to providing TIC ( $P < 0.001$ ). TIC curriculum was acceptable for undergraduate and graduate students and was transferable to non-nursing students
Dueweke et al <sup>11</sup> 2019	Pediatric residents	Pretest-posttest survey of training; chart review to assess screening changes; follow-up interviews for qualitative analysis	33 residents completed 2-hour, in-person training; 9 residents selected for follow-up interviews regarding training	Residents reported increases in favorable attitudes ( $P = 0.065$ ) and perceived competence ( $P < 0.001$ ) and decreases in perceived barriers ( $P = 0.001$ to $0.521$ ) to implementing TIC  Chart reviews revealed increase in completed trauma screens ( $P < 0.001$ ) but no difference in referrals for mental health services ( $P = 0.200$ )
Elisseou et al <sup>17</sup> 2019	Medical students/faculty	Pretest-posttest survey of curriculum using 5-point Likert scale	148 1st-year medical students and 40 faculty engaged in a 3-hour, in-person course featuring group lecture with standardized patient and small group clinical skills practice	5-point scales evaluated students' knowledge gained from session and overall satisfaction. Satisfaction with session was rated 4.08 (SD = 0.81); students indicated that session was highly effective in defining trauma-informed physical examination (4.29, SD = 0.70)
Goldstein et al <sup>18</sup> 2018	Medical students	Qualitative assessment of training using 5 open-ended questions delivered after training	20 students completed three 2-hour, in-person workshops featuring lectures, discussion, and simulation practice	From students' perspectives, the course increased their ability to recognize various clinical manifestations of ACE exposure in adult patients. Students learned how to ask about and respond to ACE disclosures and identify necessary resources to responsibly implement TIC in medical settings
Niimura et al <sup>19</sup> 2019	Mental health pros	Pretest-posttest design with 3-month follow-up assessment	65 mental health professionals completed a 4.5-hour, in-person training featuring lecture and group discussion; 56 participants completed 3-month follow-up assessment	Mean score of the Attitude Related Trauma-Informed Care scale scores increased from 5.1 during pretraining to 5.5 immediately after training (mean difference: 0.4; 95% CI, 0.3–0.5) and 5.4 after 3 months (mean difference: 0.3; 95% CI, 0.2–0.4)  48% of participants claimed to have implemented TIC practices in daily clinical settings at 3-month follow-up.
Shamaskin-Garraway et al <sup>20</sup> 2020	Primary care clinicians	Pretest-posttest survey of curriculum	21 primary care clinicians participated in five 1-hour interprofessional sessions featuring lectures, group reflections, and skills practice	Results showed increased self-reported knowledge ( $P < 0.001$ ), trauma-informed attitudes ( $P < 0.001$ ), and self-reported trauma-informed practice ( $P < 0.001$ )  Qualitative feedback: Role play and interactive exercises were helpful; training aided in delivery of patient-centered care

Abbreviations: IPE, interprofessional education; TIC, trauma-informed care. prof, professionals.

porated into TIC trainings (Table 2). The National Child Traumatic Stress Network defines a traumatic experience as “a frightening, dangerous, or violent event that poses a threat to a child’s life or bodily integrity.”<sup>15</sup> These experiences can initiate strong emotional and physical reactions that can have enduring negative effects throughout a child’s lifespan if not addressed. While ACEs are not equivalent to trauma, many are considered traumatic. As such, conversations about ACEs recently have been incorporated into interventions centered around TIC. Most of these TIC sessions were either incorporated into a class lecture<sup>16,17</sup> or formatted into a short-term training.<sup>11,18–20</sup> One TIC training by Goldstein et al<sup>18</sup> was short-term, yet comprehensive. This curriculum connected education on ACEs with ways to integrate that knowledge into a trauma-informed practice. Each participant also completed their own ACE and resilience questionnaires. Research has shown that voluntarily assessing one’s own ACEs score is associated with increased

knowledge and awareness of ACEs and TIC practices.<sup>21</sup> Another innovative educational strategy is teaching medical students how to perform a trauma-informed physical examination, in addition to providing traditional background information on different forms of trauma and their effects on health.<sup>17</sup>

Short-term ACEs education offers several benefits. Studies have shown that after an ACE training experience, participants felt more confident in their knowledge of ACEs and their effects on health.<sup>22–24</sup> ACE education also can lead to greater implementation of systematic ACE screening practices.<sup>25</sup> Even if systematic screening practices were not implemented, participants commonly stated that ACE training increased their confidence when asking about ACEs and when responding to patients who disclosed a history of trauma.<sup>18,22,23</sup> Short-term TIC trainings also led to perceived increases in knowledge, attitudes, and skills among participants in regard to recognizing the signs of trauma and establishing practices that are sensitive to patients with histo-

ries of trauma.<sup>11,16-20</sup> One study found that TIC trainings helped participants view TIC as a “standard precaution,” assuming that all patients may have experienced some sort of trauma in their lifetime.<sup>16</sup> Another study noted that 3 months following a TIC training, half of the participants continued to implement TIC practices using TIC principles to assess patient behavior and to communicate more effectively.<sup>19</sup>

### **Barriers for Education**

One existing barrier has been integrating ACE knowledge into clinical settings to potentiate trauma-informed and multidisciplinary practices.<sup>22</sup> Another study utilized pre- and post-training surveys to explore the effectiveness of a TIC training and found that the training was associated with positive changes to residents’ attitudes regarding the importance of TIC, increased comfort when interacting with families who may have experienced trauma, and increased documentation of trauma screening practices. However, the training did not significantly impact the number of patient referrals made for psychological/psychiatric services.<sup>11</sup> This could be due to noted barriers, including a lack of affordable referral resources, time, and institutional support for implementing coordinated TIC models.<sup>18,24</sup> In addition, many participants reported an interest and a need for additional training to further increase their confidence in practicing and advocating for TIC models in health care systems.<sup>13,16-18,22,24</sup> Some suggestions for enhancing ACE and TIC trainings include adding additional interactive components, hearing perspectives of trauma survivors, and reviewing more practical examples of how to incorporate TIC principles into one’s clinical practice.<sup>16</sup>

Another consideration is that ACE screening tools are often introduced into academic medical settings by residents and faculty who are passionate about this emerging field. While this enthusiasm is catalyzing important screening efforts, ACE education must consider provider turnover, including residents, nursing staff, and medical students. To address the increased interest in learning about ACEs, some programs are beginning to integrate ACE education into health professional curriculums. One bachelor of science in nursing program has created an outline for integrating ACE knowledge into specific nursing classes over the 5-semester program.<sup>26</sup> Though this program is still in the evaluation phase, it may serve as an outline for how other programs can thread ACE education into existing health professional curriculums.

Finally, when considering implementing ACE or TIC educational opportunities, the curriculum itself should be created in a trauma-informed way—noting that participants themselves may have experienced trauma. Previous research has shown that if participants’ histories are not considered, training of this nature may trigger retraumatization in participants, leading to secondary traumatic stress symptoms.<sup>27</sup> Trainings could aim to avoid this by allowing students to excuse themselves at any point during the

training or by providing counseling or other support services during and/or after training sessions. Another limitation of ACE or TIC educational opportunities is that while they effectively gauge short-term changes in participants’ knowledge and attitudes, it is more challenging to know if these trainings have long-term effects on their knowledge, attitudes, and practices in health care settings.

### **ACE Screening Implementation**

Numerous screening tools have been developed to assess for ACEs among children and families. A study by Bethell et al<sup>28</sup> identified 14 ACE assessment tools appropriate for screening children or adult populations, only 5 of which were designed for clinic settings. These screenings are not intended to diagnose patients but instead to initiate conversations with families about the importance of building safe, nurturing relationships and promoting resilience. In addition, a recent study by Oh et al<sup>29</sup> identified 32 tools to measure childhood adversity, 14 of which were recommended for clinic settings based on time, cost, and training requirements. Of those 14 recommended screeners, 4 outlined the validity and reliability of each screener. However, no specificity and sensitivity measures were reported.

The development of an array of ACE screenings demonstrates the concern for how child trauma affects development and future health outcomes. Despite growing interest in incorporating ACE screening into primary care practices, clinic settings have been slow to investigate ACE screening feasibility and acceptability. This could be due to the numerous decisions that must be made, including which patients to screen, which questionnaire to use, and how to conduct ACE screening within the context of a clinic visit. Clinics that have piloted ACE screenings demonstrate this range of variability. For example, some clinics screened expecting parents for their ACEs, in order to discuss the role of toxic stress on child development and the role of positive parenting in promoting healthy child development and preventing the continuation of intergenerational trauma.<sup>30,31</sup> Other studies screened for ACEs in child and adolescent patient populations to talk not only about how trauma affects one’s health, but also to discuss the role of protective factors in promoting youth resilience.<sup>32-40</sup> Finally, a few studies screened adults on their past childhood experiences to gain better insight on how child trauma may have affected their current health status.<sup>34,41,42</sup> In addition, some studies implemented a paper or electronic version of an ACE questionnaire; others preferred verbal inquiry.<sup>39</sup>

The focus of this literature review was to identify ACE screening implementation studies specifically in pediatric populations (Table 3). When looking at this subset of studies, most researchers implemented ACE screening in the format of a questionnaire. The original ACE study was used often as the foundation for these types of questionnaires. Other screenings expand upon these original ACEs by adding other community

**Table 3.** Overview of ACE Screening Implementation for Pediatric Populations

Study/Year	Clinic	Patient Population	Intervention	Outcome
Choi et al <sup>32</sup> 2019	Urban, FQHC	Children ages 3-16, screen completed by caregiver if child ≤12 years	TESI for Primary-Care ACE Screening (24 questions for youth, 27 questions for caregiver)	261 children screened. Adapting TESI as a primary care screener had face validity because mapping demonstrated geographic overlap between participant-reported ACEs and objective violent-crime data. Screen identified 3 ACE subgroups. Children in highest group had higher odds of a clinically significant Pediatric Symptom Checklist score (OR = 3.83) and clinical-level attention problems (OR=3.58), even after accounting for child resilience and parent depression.
DiGangi, Negriff <sup>33</sup> 2020	6 pediatric primary care clinics in urban settings	Children ages 3, 5, 10, and 13, completed by caregiver if child <13 years	Original ACE screen with wording from CYW screen	Since July 2018, 3241 three year olds (53% of target population), 2761 five year olds (53%), 545 ten year olds (37%), and 509 thirteen year olds (13%) were screened. 15% of 3 year olds screened had ACE score ≥1; 17.5% of 5 year olds had ACE score ≥1; 30.5% of 10 year olds had ACE score ≥1; 33.8% of 13 year olds had ACE score ≥1. Screening was feasible, but challenges include providing follow-up care to those who screen positive.
Eismann et al <sup>43</sup> 2019	3 primary care clinics in mixed urban, suburban, and rural settings	Children ages 0-5, screen completed by caregiver	SEEK Parent Questionnaire: screens psychosocial risk factors	All clinics successfully implemented SEEK. Screening completion rates ranged from 75% to 93% and brief intervention rates ranged from 61% to 81%. Major parental stress (14%) and food insecurity (11%) were most commonly noted.  Qualitative interviews revealed that providers found SEEK worthwhile for improving knowledge and ability to address psychosocial concerns and provide whole person care. Barriers included limited time/resources, incomplete resource knowledge, and lack of follow-up.
Kia-Keating et al <sup>35</sup> 2019	Urban, community medical clinic	Infants ages 3-11 months and their parents	Adaptation of CYW ACE Questionnaire	Feasibility data indicated that 92% of eligible patients were screened for infant and parent ACEs. Of families who screened positive, 77% accepted prevention services.  Qualitative interviews with providers affirmed screening acceptability.
Koita et al <sup>36</sup> 2018	Urban, pediatric care clinic	Children under age 12, screen completed by caregiver	Pediatric ACE and other Determinants of Health Questionnaire (17 questions)	Screen piloted with 28 caregivers. Cognitive interviews conducted among caregivers and 16 health providers and clinic staff resulted in wording changes and addition of examples in items to increase face validity. Questionnaire acceptability was high. Preference for administration methods was split between tablet and paper formats. The final screener had high face validity and acceptability for use within primary care settings. Final screener is being validated, which will allow for broader implementation.
Marie-Mitchell et al <sup>39</sup> 2019	Urban, pediatric resident clinic	Children 0-11 years	WCA: expanded ACE questionnaire	Implementation of WCA occurred over course of 6 improvement cycles that involved obtaining and responding to stakeholder feedback, streamlining paperwork and workflow, and providing physician education. 1100 charts from well-child visits were reviewed. Use of WCA increased identification of multiple ACEs vs no screening and revealed reports of multiple ACEs increased with age. WCA provides acceptable, feasible way to screen for ACEs in pediatric settings.
Marie-Mitchell, O'Connor <sup>38</sup> 2013	Urban, FQHC	Children ages 4-5, screen completed by caregiver	6- or 7-item ACE screen	102 children screened. Adjusted odds of behavior problems were higher for children with higher vs lower 7-item Child ACE score (aOR 3.12; 95% CI, 1.34–7.22), as were odds of developmental delay (aOR 3.66; 95% CI, 1.10–12.17), and injury visits (aOR 5.65; 95% CI, 1.13–28.24), but lower for obesity (aOR 0.32; 95% CI, 0.11–0.92).  Both tools were brief and results were readily accessible in medical chart. Thus, screening for child ACEs can be feasible in pediatric practice.
Marsicek et al <sup>37</sup> 2019	Urban, pediatric resident continuity clinic	Children ages 9 mos through adolescence, screen completed by or in presence of caregiver	CYW screening: 10 original ACE questions and 7 or 9 other questions about additional adversities depending on child's age	1,206 patients screened. Screening for ACEs increased from 0% to 60%. Standardized ACE screening can be implemented in a general pediatric clinic. Barriers include increasing comfort when discussing ACEs with families and increasing resources for children who have experienced ACEs.
Selvaraj et al <sup>40</sup> 2019	4 academic pediatric primary care clinics in urban settings	Children ages 2 weeks to 17 years, completed by caregiver	ASK Tool: 13-question assessment for 6 unmet social needs, 6 ACEs, and resilience	2569 families completed screen: 49% reported ≥1 stressor; 6% had ≥1 ACE; 47% had ≥1 unmet social need. At 1 site, community referral rates increased from 2.0% to 13.3% ( $P<0.0001$ ) after screening implementation. Screening implementation was feasible and acceptable to families.

Abbreviations: ACE, adverse childhood experience; aOR, adjusted odds ratio; ASK Tool, Addressing Social Key Questions for Health Questionnaire; CYW, Center for Youth Wellness; FQHC, Federally Qualified Health Center; SEEK, Safe Environment for Every Kid; TESI, Traumatic Events Screening Inventory; WCA, Whole Child Assessment.

and environmental factors—such as poverty, food insecurity, and discrimination—that may cause adversity in a child’s life. Finally, some screening tools are distinct from the original ACE questionnaire; however, they inquire about similar themes relating to child trauma. For example, a study by Eismann et al<sup>43</sup> successfully implemented the Safe Environment for Every Kid (SEEK) model addressing psychosocial risk factors for maltreatment across primary care settings. This evidenced-based screening is designed for children ages 0-5 years, and it screens for 3 ACEs (parental depression, parental substance abuse, and intimate partner violence), as well as other risk factors. While the implementation of ACE screening varies with each study, they all demonstrated that this type of screening is acceptable and feasible for pediatric clinic settings. For example, 1 study successfully screened 92% of eligible patients.<sup>35</sup> Another study demonstrated that both providers and patients felt that ACE screening was acceptable.<sup>36</sup> Importantly, caregivers stressed that having a trusting relationship with their provider made conversations about childhood trauma more comfortable.

### **ACE Screening Cautions and Possibilities**

The American Academy of Pediatrics states that identifying children who are at high risk for toxic stress is the first step in providing them with the appropriate support they need to thrive. As such, the American Academy of Pediatrics recommends screening for toxic stress but does not recommend a specific screening tool.<sup>44</sup> In fact, there is controversy about whether or not screening for ACEs is feasible and ethical. First, there is a lack of consensus about which childhood events are considered ACEs. Some studies only screen for the 10 original ACEs from Felitti’s study, but other researchers are calling for the expansion of the idea of adversity to include community factors, such as racism, witnessing violence, bullying, and involvement in foster care.<sup>45</sup> Furthermore, ACE screeners typically report a cumulative score for the total number of ACEs a child has ever experienced. This is a relatively simplistic model that fails to assess for the frequency, intensity, or chronicity of different exposures.<sup>46</sup> Historically, an ACE score of 4 or greater has been identified as high risk; however, even children with a single traumatic exposure may need supplementary resources depending on the degree of trauma and existing support.<sup>47</sup> In addition, there are concerns that completing an ACE screening may cause discomfort or even retraumatize a child or caregiver. There is a growing body of evidence, however, demonstrating that patients are largely comfortable being asked these questions.<sup>48</sup> Finally, screening children for histories of trauma could increase the risk for the “expectancy effect,” in which adults look for negative behaviors as confirmation of the poor outcomes predicted by an ACE screening.<sup>47</sup> One way to combat this concern is to reiterate that ACE screening is not a diagnostic tool. Instead, it is intended to begin a conversation with families about how

trauma can affect child development. This conversation ultimately should be strength-focused by emphasizing how to best prevent trauma or mitigate the effects of trauma through various protective factors.<sup>28</sup> Research has shown that protective factors, such as having a supportive family, trusting mentors, and safe places to learn, live, and play, are crucial in buffering the effects of trauma.<sup>3</sup> This conversation focused on strengths rather than deficits could be facilitated if ACE screenings were coupled with screenings that look for protective factors.

Regardless of how ACE screenings are designed, there are still concerns about whether or not screening for ACEs is ethical. Typically, screenings are conducted to help aid in early identification of risk factors to prevent the development of a disease. However, there is still little longitudinal evidence for whether or not screening children for ACEs leads to decreased risk for developing chronic conditions in the future.<sup>49</sup> Some researchers argue that screening for ACEs may be unethical if the community does not have the proper resources to meet the needs of children who have experienced them. One way ACE screening could be implemented more ethically and effectively—while also acknowledging that structural inequities disproportionately place racial and ethnic minority youth at higher risk for experiencing ACEs—is through the use of wellness navigators. In a study by Barnett et al,<sup>50</sup> wellness navigators ensured that ACE screenings were conducted and documented, assessed families for their needs, and helped families make referrals to appropriate community resources. These wellness navigators often more accurately reflected patients’ cultural and linguistic backgrounds, helping establish trust with patients and ultimately allowing the navigators to better provide holistic care for families.

### **DISCUSSION**

The CDC recognizes ACEs as a serious public health problem with enduring effects throughout one’s life.<sup>1</sup> As such, it is imperative that trainees and health professionals are aware of the detrimental effects of ACEs. This literature review reveals that, to date, many health care providers lack knowledge about the effects of child trauma on future health outcomes. This lack of knowledge may contribute to negative attitudes or apprehension about screening for ACEs or advocating for greater TIC practices. While an increasing body of evidence supports the use of educational training to help change student and provider perceptions, attitudes, and practices regarding ACEs, TIC, and resilience, most of these trainings are short-term and are designed without a control group. As such, it is challenging to conclude whether educational training leads to long-term behavioral changes. Moving forward, ACE education should be incorporated in a way that is sustainable and enduring, so that incoming residents, medical students, nurses, and other team members are able to provide TIC that ensures patient comfort and care continuity.

The effects of ACEs are pervasive, and they have lasting

effects on the well-being of children in our communities. As such, formal education about ACEs and TIC for health care professionals is a paramount first step in combatting this public health crisis. For communities that have resources to support struggling families, we recommend the implementation of ACE screening in health care settings. While we recognize the limitations of screening, it serves as a means for early identification of children who may be experiencing negative effects from early life experiences. In communities where resources are not available to support interventions for patients with positive ACE screens, health care providers should advocate for continued development and expansion for resources to support implementation of screening in the future. The potential harms associated with screening pale in comparison to the harms associated with continued ignorance of ACEs.

Future longitudinal research is needed to better understand if early screening and appropriate interventions lead to better health outcomes for youth who have experienced ACEs. It will be imperative to critically compare the utility and acceptability of different interventions aimed to prevent or mitigate the effects of ACEs. Finally, research will be needed to assess if early interventions to address ACEs are cost-effective by reducing future burdens on the health care system. This cumulative body of future research will equip health professionals with information on how to most effectively screen for ACEs, how to treat children who screen positive, and how to sustainably integrate ACE screening and overall TIC as standardized procedures within health care systems.

While we conducted a broad scoping review, a limitation is that we were not comprehensive in discussing all potential research articles pertaining to the 4 main purposes of this review. Furthermore, it does not take into account any ACE educational curricula or ACE screening protocols currently being developed, implemented, or evaluated. We also acknowledge the limitations of only having 1 investigator conduct the searches for this review, as this could potentially increase the risk for a biased selection of articles. However, as this is a scoping review to identify knowledge gaps and to clarify research concepts and not a systematic review, bias in the article selection was less significant. This review provides a foundational framework for efforts that have aimed to increase awareness of ACEs among medical trainees and health care professionals and serves to spark discourse about necessary steps that must be taken to create an equitable health care system committed to preventing ACEs and promoting healthy childhood development for all.

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