The Implementation of Screening for Adverse Childhood Experiences in Pediatric Primary Care

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Objective To assess the implementation of screening, screening rates, and prevalence of adverse childhood experiences (ACEs) in a large integrated healthcare system.

Study design Kaiser Permanente Southern California is a large integrated healthcare system with 15 medical centers/hospitals and 233 medical office buildings that serve approximately 1.5 million children. Screening for ACEs began in July 2018 at 1 medical center (Downey, Bellflower medical office) for 3- and 5-year-old well-child visits (yearly physical examination). It quickly expanded to 3 other medical centers (6 clinics in total) and now also includes the 10- and 13-year-old well-child visits.

Results Since July 2018 we have screened 3241 3-year-olds (53% of the target population), 2761 5-year-olds (53%), 545 10-year-olds (37%), and 509 13-year-olds (13%). Of the 3-year-olds who were screened, 15% had an ACEs score of 1 or higher. Of the 5-year-olds that were screened, 17.5% had an ACEs score of 1 or higher. Of the 10-year-olds, 30.5% had an ACEs score of 1 or higher and of the 13-year-olds, 33.8% had an ACEs score of 1 or higher.

Conclusions Although we have encountered some challenges, particularly with follow-up for those screening positive for ACEs, screening was feasible. The data show an increasing trend of ACEs in 3- to 13-year-old children, highlighting the need for early education about ACEs to mitigate the effects of toxic stress. *(J Pediatr 2020;222:174-9)*.

Adverse childhood experiences (ACEs) are increasingly being recognized as critical for our understanding of physical and mental health.[1-4] One study, a collaboration between Kaiser Permanente and the Centers for Disease Control and Prevention, highlighted the importance of ACEs and their long-term health effects.[5] Exposure to toxic stress in childhood during crucial periods of brain development leads to disrupted neurodevelopment, emotional and cognitive impairment, and ultimately chronic disease, disability, and early death.[5-7] In 2012, the American Academy of Pediatrics recognized the critical role of pediatricians in preventing, screening for, and healing toxic stress.[8]

ACEs typically include experiences of family or household dysfunction such as parental mental illness, parental substance use, parental incarceration, witnessing intimate partner violence, and divorce, as well as maltreatment experience of abuse and neglect.[5] One study found that 64% of 17 337 adults reported at least 1 ACE and 12.5% reported experiencing 4 or more ACEs.[9] Similar prevalence rates were found in a nationally representative sample from the Behavioral Risk Factor Surveillance Survey, with 61% of adults reporting at least 1 childhood adversity and 14% reporting 4 or more adversities.[10] Data from the National Study of Child Health show that, among children 0-17 years of age, 42.7% experienced 1 or more ACEs and 10.3% experienced 3 or more.[1]

Multiple studies support the link between early adversity and physiological dysregulation and with subsequent physical and mental health issues.[11-13] There have been relatively few studies describing the feasibility and implementation of screening, or expected prevalence rates in pediatric primary care. One study, conducted in 4 community medical clinics serving approximately 20 000 adult and pediatric patients annually demonstrated the feasibility and acceptability of screening for ACEs in a pediatric setting.[14] Overall, 92% of patients (151 parents reporting on infants 4-12 months of age) were screened and 18.6% of infants had experienced at least 1 ACE. Screening for ACEs was also implemented at 3 urban academic pediatric primary care clinics.[15] The authors reported a screening rate of 56%, and of the 2569 families who completed the questionnaire only 6% reported 1 or more ACE. Overall, these pediatric studies as well as others conducted with adults found high acceptance among patients and providers as well as high completion rates.[16-18]

The purpose of the current study was to describe the implementation and workflow of screening for ACEs in pediatric primary care at Kaiser Permanente Southern California, which serves approximately 1.5 million children. We also

ACE	Adverse childhood experience
EHR	Electronic health record

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sought to report the prevalence of ACEs among this population to provide accurate estimates of expected prevalence for pediatricians seeking to implement screening for ACEs. Understanding of the expected prevalence rates will allow providers to plan for the additional resources that may be needed the address the number of children screening positive.

Methods

Kaiser Permanente Southern California is a large, integrated healthcare system with 15 medical centers/hospitals and 233 medical office buildings that serve outpatient encounters. As of September 2019, there were more than 4.6 million members, including approximately 1.5 million children. Medical offices cover the majority of Southern California from Kern County to San Diego County, from the coastal counties to inland Imperial County.

Procedure

Screening began in July 2018 at 1 medical center (Downey, Bellflower medical office) for 3- and 5-year-old well-child visits and expanded to 3 other medical centers (6 clinics in total: Antelope Valley with 2 offices participating, Orange County with 2 offices participating, and West Los Angeles) and now also includes the 10- and 13-year-old well-child visits. The workflow and screening questionnaire as well as study measures were developed with help from the National Pediatric Practice Community on ACEs (https://nppcaces.org/). The 3-, 5-, 10-, and 13-year-old visits were chosen because they are relatively short and do not include many other procedures (such as vaccinations); thus, this screening would not increase physician burden if counseling was needed for positive ACEs score. Before implementation, we conducted training and guidance on the effects of ACEs, how providers can talk to patients comfortably, and what to do in the case of positive ACEs scores. We offered our providers a sample for how to talk to patients about ACEs and resilience and we also offered an optional on-line training via George Washington University to strengthen their ability and comfort level with the subject matter.

For screening, at each participating clinic a paper ACEs questionnaire is given to the parent or patient at check-in. Parents fill out the questionnaire for their child at the 3-, 5-, and 10-year-old visits and 13-year-olds fill it out for themselves. The physician also reviews the answers with the 13-year-old during the confidential portion of the examination when the parent is asked to step outside the room. The form asks them to indicate how many of the questions are true for their child (or themselves if 13) without identifying the specific questions (screening tool, **Figure 1**; available at www.jpeds.com). The Medical Assistant reviews the score and documents it in the electronic health record (EHR) adding an alert for the physician to review if there is a score of 1 or higher (**Figure 2**). The children and their families are provided education, resources and support depending on the number of ACEs identified and the presence or absence of any concerning symptoms. Specifically, if a child has a score of 1-3 and presents with no behavioral symptoms (eg, behavior problem, poor chronic disease control, sleep problems, appetite issues), the parent is counseled about ACEs and offered the number to psychiatry in case of future concerns. An informational handout about ACEs and resilience is also printed and given to the family. If the child has a score of 1-3 and presents with symptoms, they are referred to a social worker via our EHR and psychiatry via self-booked appointments if deemed necessary. For a score of 4 or more, the child is referred to a social worker and possibly psychiatry. Again, an informational handout about ACEs and resilience is also printed and given to the family. Because screening was implemented as part of clinical care, institutional review board approval was not required. The Kaiser Permanente Institutional Review Board approved the retrieval of data from the EHRs for the current analyses.

Measures

The screening for ACEs tool was based on the original KP-Centers for Disease Control and Prevention questionnaire with wording adapted from the Center for Youth Wellness ACE-Q questionnaire (https://centerforyouthwellness.org/cyw-aceq/). The screening tool lists 10 adversities: divorce, incarceration, parental mental illness, parental substance abuse, witnessing intimate partner violence, emotional abuse, sexual abuse, physical neglect, physical abuse, and emotional neglect (**Figure 1**). The parent (for the 3-, 5-, and 10-year well-child visits) and the 13-year-olds were asked to indicate the total score for the number of adversities they experienced up to that point. This was based on data indicating parents seem to be more likely to disclose ACEs when a degree of privacy is given by using an aggregate-level response.[16]

Child age, sex, and race/ethnicity were obtained from the EHR. Race/ethnicity was coded as Asian, black, Hispanic, white, multiple, Native American/Alaskan, Pacific Islander, other, or unknown.

Data Analyses

Analyses were primarily descriptive, with the number and percent of those screened, those with 1 or more ACEs, and those with an ACEs score (0-10) tabulated by age group (3-, 5-, 10-, and 13-year-olds). Crosstabs and χ^2 tests were used to examine significant differences in the proportions between the age groups for those with 0 vs 1 or more ACEs. Using logistic regression, we also examined the main effect of race/ethnicity for the 4 primary racial/ethnic groups in our data, Hispanic, black, white, and Asian controlling for age and sex. Last, we used ANCOVA to test the mean differences in ACEs total score by the 4 racial/ethnic groups controlling for age and sex.

Results

Since July 2018, we have screened 3241 3-year-olds, 2761 5-year-olds, 545 10-year-olds, and 509 13-year-olds at their

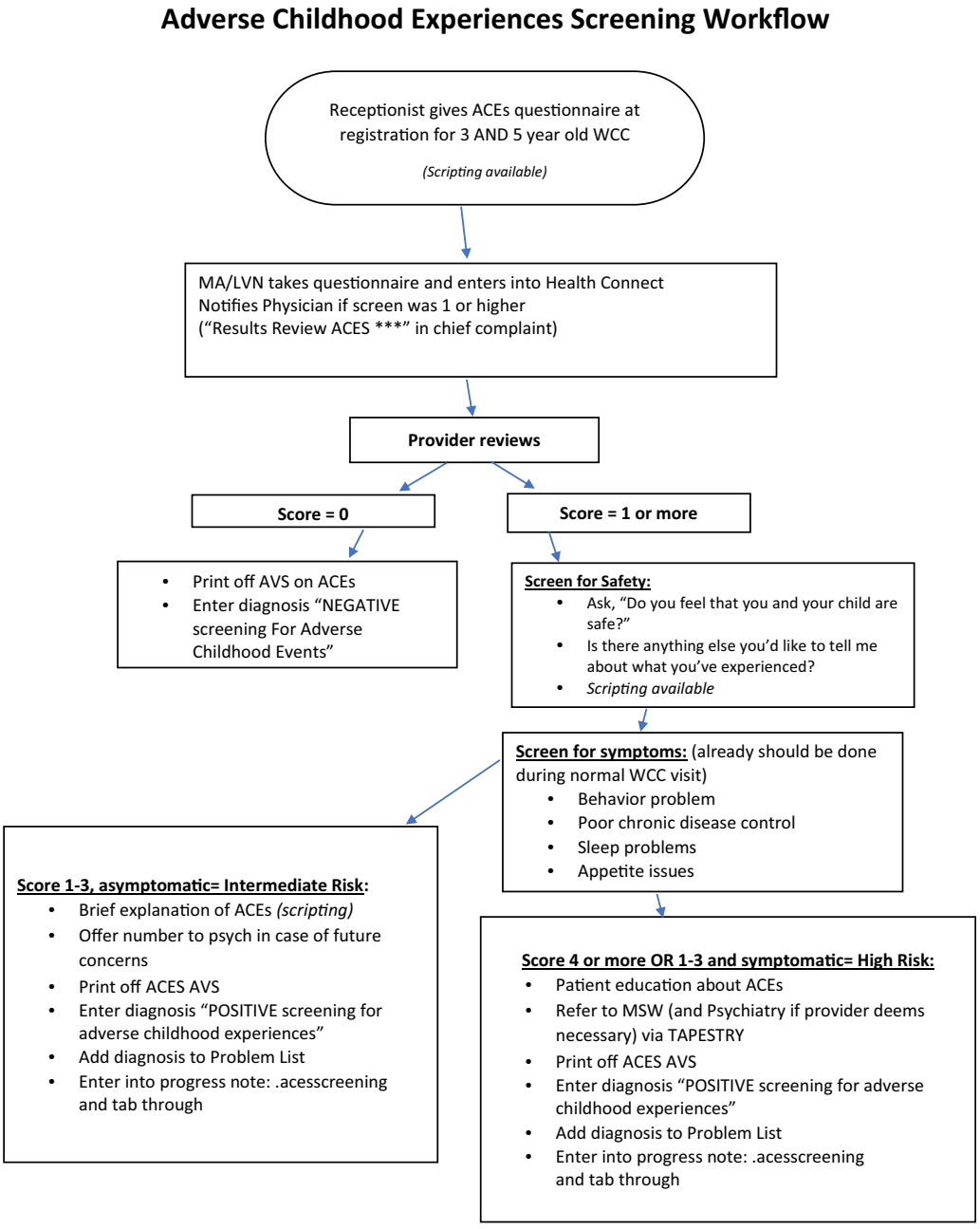

Figure 2. Workflow for screening for ACEs in Kaiser Permanente Southern California. *AVS*, after visit summary; *MA/LVN*, medical assistant/licensed vocational nurse; *MSW*, masters in social work; *WCC*,well-child care.

well-child visits. This is 53% of the target population for 3- and 5-year-olds, 37% of 10-year-olds, and 32% of 13-year-olds.

Only 7 patients were recorded in the EHR as not answering the questionnaire, indicating a completion rate of more than 99% for those given the questionnaire. Of those who were documented as refused, 4 were 3 years old, 2 were 5 years old, and 1 was 10 years old. They were all Hispanic and 6 were female. There was no indication in the health record as to why they did not answer the questionnaire. Although the screening rates of all patients with a well-child visit during that time period were substantially lower (32%-53%), the data indicate that, if screening questionnaires are given out, the patients are very likely to complete them.

Screening rates varied across medical center locations (**Table I**; available at www.jpeds.com). For the 3- and 5-year-old well-child visits, screening rates were 47.8% (Orange County), 57.4% (Antelope Valley), 60.7% (West Los Angeles), and 73.3% (Bellflower). For the 10- and 13-year-old well-child visits screening rates were 28.1% (West Los Angeles), 41.9% (Orange County), and 44.9% (Bellflower).

Table II. Number of children screened for ACEs across 4 age groups

Age groups (y)	Screened	≥1 ACEs	Percent of those screened who had ≥1 ACEs
3	3241	486	15.0*
5	2761	483	17.5*
10	545	166	30.5†
13	509	172	33.8†
Total	7056	1307	18.5

Age groups with different symbols (* vs †) are significantly different at $P < .05$. The 3- and 5-year-old screenings began July 2018; the 10- and 13-year-old screenings began April 2019.

Prevalence Based on Diagnosis Code

As shown in Table II, of the 3-year-olds who were screened, 15% had an ACEs score of 1 or higher. Of the 5-year-olds that were screened, 17.5% had an ACEs score of 1 or higher. Of the 10-year-olds, 30.5% had an ACEs score of 1 or higher and of the 13-year-olds, 33.8% had an ACEs score of 1 or higher. Analyses showed that the prevalence rates for ACEs of 1 or more was significantly higher for the 10- and 13-year-olds than for the 3- and 5-year-olds ($\chi^2 = 158.73$, $df = 3$, $P < .01$).

Prevalence Based on Sum Scores

Not all children who were screened had their ACEs score documented in the EHR, resulting in an ACEs score for approximately 84% of those who were screened. Those with missing questionnaire data were only given a diagnosis code for either positive (ACE score ≥1) or negative screening for ACEs (ACE score of 0). As shown in Table III (available at www.jpeds.com), 9.3% of 3-year-olds and 10.5% of 5-year-olds had 1 ACE compared with 18.9% of 10-year-olds and 19.6% of 13-year-olds. Similarly, a higher percent of 10- and 13-year-olds had 2 ACEs (5.7% and 6.3%, respectively) compared with the 3- and 5-year-olds (1.8% and 2.6%, respectively). For all age groups, the majority of children with ACEs scores had 1-3 ACEs, with very few reporting more than 4 ACEs. Age and ACEs score were significantly correlated ($r = 0.15$; $P < .01$), indicating that older children had higher ACEs scores.

Effects of Race/Ethnicity

When using white youth as the reference group, the logistic regression showed that black youth had significantly higher odds of screening positive than white youth (OR, 2.0095% CI, 1.59-2.51), whereas Asian youth had lower odds (OR, 0.33; 95% CI, 0.22-0.48). Using Hispanic as the reference group, black youth had higher odds of screening positive (OR, 1.7795% CI, 1.49-2.10) and Asian has lower odds (OR, 0.29; 95% CI, 0.20-0.41).

Regarding the mean scores on the ACEs questionnaire, there was a significant main effect of race/ethnicity of (5297, 3) = 29.84 ($P < .01$). Post hoc comparisons showed that black youth had higher mean scores than all other groups (black adjusted mean, 0.53; SE, 0.03; $P < .01$; Asian adjusted mean, 0.07; SE, 0.04; Hispanic adjusted mean, 0.30; SE, 0.01; white adjusted mean, 0.33; SE, 0.03) and Asian youth had significantly lower mean scores than all other groups ($P < .01$). White and Hispanic youth were not different.

Discussion

The present study demonstrates that screening for ACEs in a large, integrated healthcare system is possible and can identify a large number of children with adversity.

We found a prevalence rate of 18% for 1 or more ACEs across all age groups, with higher rates for the 10- and 13-year-olds than the 3- and 5-year-olds. Prevalence rates of ACEs in pediatric populations have varied, with estimates ranging from to 6% to 67% of the sample reporting 1 or more ACE across studies.[1,14,15,19,20] This wide variation in prevalence rates across pediatric studies may reflect population-specific differences in exposure to adversities, differences in the implementation of screening, age of the sample, or challenges with patient honesty which may be affected by how the parent is given the questionnaire as well as their trust of the provider.[18,21,22]

We also examined the ACEs score when documented in the EHR. As with the ACEs diagnosis codes, the score indicated the majority of children had experienced 1 ACE and more 10- and 13-year-olds had 1 ACE than 3- and 5-year-olds. This finding is not unexpected; older children have had more time to accumulate ACEs. In addition, 10- and 13-year-olds are self-reporting ACEs, whereas the parent reported for the 3- and 5-year-old children. Parents may be more likely to under-report ACEs, particularly if they perceive they will have negative consequences, such as a referral to child welfare. The prevalence rate for those with 1 or more ACE was lower when using the ACEs score than the diagnosis code because a number of children screened positive, but their score was not put into their health record.

We found that black youth were at greatest risk of screening positive for ACEs and had higher mean scores than all other racial/ethnic groups. This finding is consistent with other studies.[23,24] However, our findings diverge in that we found Hispanic and white youth to have a similar risk for ACEs. One study using an expanded ACEs questionnaire showed differences in mean ACEs score between white and Hispanic children, but not when using the conventional 10-item ACEs questionnaire.[25] In addition, Asian youth are not often included when examining racial difference in ACEs and we found their risk to be lowest. Some data suggest that Asian/Pacific Islander college students have higher ACEs than white students, whereas other do not.[25,26] Differences between these findings are likely an artifact of the difference in age and setting of the studies.

Although we did see differences in screening rates by medical center, our data show that a systematic roll-out of screening for ACEs is feasible in large healthcare systems. We did observe differences in screening rates at our six pilot

sites which is likely due to the method of screening in different clinics. For example, the clinic with the highest screening rate for 3- and 5-year-olds (West Los Angeles) was also the only clinic to have the medical assistant or licensed vocational nurse administer the screening in person with the patient and/or parents. Differences in screening rates between medical clinics is also likely affected by variation in provider buy-in. Other clinics that have investment from leadership also have been more successful. When providers were more hesitant or uncomfortable, we worked with them and provided scripting to them to help facilitate their patient discussions. We also conducted case reviews of ACEs results and discussed how the patients presented and how we talked to the families.

We addressed multiple challenges and have synthesized several important recommendations based on our experiences. Overall, this pilot ran smoothly and was not a large burden to the staff or providers participating. This was due in large part to a robust involvement of the staff and providers having valuable input in development of the project. We used the provider input to help decide what ages to screen, how to use the back-office staff, and what tools to use in our EHR. We also found it helpful to create a skeleton workflow and training set that was easily transferrable across medical centers.

We also recommend getting early buy-in and support from leadership and stakeholders in an organization. The workflow took several months and at least 5 iterations before settling on the final version. We kept it flexible, which made it much easier to transfer to different clinics while maintaining the same backbone and purpose.

We also found that training and guidance on the effects of ACEs, how providers can talk to patients comfortably, and continued training and refreshers to be of high importance. In our experience, the success of the patient screening and interaction, as well as the patient valuing their treatment options, relies heavily on how the initial screening and information are presented to them. We also found that there needs to be more accessible training options for physicians and providers.

One challenge is to ensure adequate follow-up for patients who screen positive. Patients with a score of 1-3 and asymptomatic (eg, no behavior or school problems) were given a patient handout that has available on-line resources for the family to follow up if interested. Patients with a score of 1-3 who were symptomatic or a score of 4 or more ACEs regardless of symptomatology were referred to either our local social medicine team or told to self-book into our behavioral health department for counseling. We are currently developing ways for our patients to receive not only trauma-focused cognitive behavioral therapy, but also resilience training, parenting assistance, and other trauma-informed care modalities. Using community resources for these services makes having a full closed-loop system a challenge, which may be a limitation for follow-up. By triaging all patients through our social medicine department, we hope to better track referrals and outcomes.

We recognize that there are limitations and challenges with the generalization of the screening workflow model reported in the present study. Our methods for screening are suited for a large-scale, integrated healthcare system but could be adapted for smaller community clinics. We also acknowledge that the prevalence rates in our population may vary from other health systems. Despite the member population being racially/ethnically diverse, there may be other population characteristics that may affect the experience and reporting of ACEs. One of the advantages of the reach of Kaiser Permanente Southern California is that we can investigate potential factors that lead to differences in prevalence rates, which will provide more nuanced data on expected prevalence of ACEs in pediatric populations.

As an important part of a whole child wellness approach, we have shown that screening for ACEs can be accomplished within the established framework of our pediatric well-child visits. The availability, quality, and effectiveness of trauma-informed interventions designed to build resiliency and heal the effects of toxic stress must also be evaluated through real-time surveying of referred patients as well as short-term and long-term tracking of health outcomes. Given that evidence exists for effective preventive interventions in pediatric settings, the importance of identifying youth who many benefit from early intervention is critical to prevent or mitigate the effects of childhood adversity.[27] Based on our experience, it is clear that to provide the necessary resources to these children we need more appropriate community partners, in-house trauma-specific treatments, and a closed-loop system to -up on patient outcomes. ■

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Table I. Number of children screened for ACEs by medical clinic

Clinics	Screened	≥1 ACEs	Percent of those screened who had ≥1 ACEs
Antelope Valley			
3 y	1181	182	15.4
5 y	960	168	17.5
10 y	1	1	NA
13 y	1	1	NA
Downey			
3 y	1452	193	13.3
5 y	1262	216	17.1
10 y	386	115	29.8
13 y	320	122	38.1
Orange County			
3 y	410	54	13.1
5 y	380	60	15.8
10 y	125	33	26.4
13 y	161	37	23
West Los Angeles			
3 y	198	57	28.8
5 y	159	39	24.5
10 y	33	17	51.5
13 y	27	12	44.4

NA, not applicable.

Table III. Percent of those with each ACEs score

Age groups	No. with ACEs score	0 ACEs	1 ACE	2 ACEs	3 ACEs	4 ACEs	5 ACEs	6 ACEs	7 ACEs	8 ACEs	9 ACEs	10 ACEs
3 y	2608	84.7	9.3	1.8	0.6	0.3	0.2	0.1	0	0	0	0
5 y	2273	82	10.5	2.6	1	0.5	0.1	0.1	0	0	0	(n = 1)
10 y	527	70.2	18.9	5.7	2.6	0.6	0.2	0.6	0	0.4	0	0
13 y	489	66.7	19.6	6.3	3.7	1.2	0.4	0.6	0	0.2	0	0
Total	5897	80.9	13.4	3.3	1.4	0.5	0.2	0.2	0	0.1	0	(n = 1)

Number with ACEs score is lower than total screened because some were coded with diagnosis code for screening for ACEs and no sum score was entered.

To be completed by Parent/Caregiver

Many children experience stressful life events that can affect their health and wellbeing. The results from this questionnaire will assist your child's doctor in assessing their health and determining guidance.

Please read the statements below. Count the number of statements that apply to your child and write the total number in the box provided.

Please DO NOT mark or indicate which specific statements apply to your child.

1) Of the statements in Section 1, HOW MANY apply to your child? Write the total number in the box. ☐

Section 1. At any point since your child was born…

- Your child's parents or guardians were separated or divorced.
- Your child lived with a household member who served time in jail or prison.
- Your child lived with a household member who was depressed, mentally ill or attempted suicide.
- Your child saw or heard household members hurt or threaten to hurt each other.
- A household member swore at, insulted, humiliated, or put down your child in a way that scared your child OR a household member acted in a way that made your child afraid that she/he might be physically hurt.
- Someone touched your child's private parts or asked your child to touch their private parts in a sexual way.
- More than once, your child went without food, clothing, a place to live, or had no one to protect her/him.
- Someone pushed, grabbed, slapped or threw something at your child OR your child was hit so hard that your child was injured or had marks.
- Your child lived with someone who had a problem with drinking or using drugs.
- Your child often felt unsupported, unloved and/or unprotected.

Figure 1. Screening for ACEs tool.