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Short communication

Clinician actions in response to Adverse Childhood Experience (ACE) screening

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ABSTRACT

Background and Objective: Adverse Childhood Experiences(ACEs) have a powerful influence on mental health, physical health, and life expectancy. Screening for ACEs and the clinician response to ACEs are critical to addressing the health and well-being of children; however, little is known about the actions clinicians take in response to ACE screening. Therefore, we aimed to examine clinician responses to ACE screening at five California pediatric clinics in a large public health care system.

Methods: Patient demographics, indicators of social and behavioral determinants of health (e.g., housing insecurity), the number of ACEs endorsed on a screening instrument, and the actions clinicians took in response to each ACE screen were collected. Data was collected from May to October 2021. These data were used to examine the association between number of ACEs reported and clinician response, controlling for patient demographics and their social and behavioral determinants of health using multiple logistic regression.

Results: Five participating pediatric clinics conducted 2,652 ACE screens in six-months. Clinicians documented an action twice as often when ACEs were present, after controlling for patient demographics and their social and behavioral determinants of health (odds ratio(OR) = 2.2, 95 % confidence interval(CI): 1.5–3.3, p-value < 0.0001). Clinicians were three times more likely to record referrals to mental health clinicians, social workers, and community organizations relative to anticipatory guidance when the number of ACEs increased from one to three to four or more (OR=3.2, 95 %CI: 1.6–6.5, $\underline{p} < 0.0001$).

Conclusion: Findings provide early information that ACE screening results are associated with patient care.

1. Introduction

Adverse Childhood Experiences (ACEs) refer to exposures to traumatic events during childhood, including emotional or physical neglect, emotional, physical, or sexual abuse, and household dysfunction such as family discord, divorce, intimate partner violence, substance abuse, mental health issues, and the death or incarceration of a parent (Felitti et al., 1998). ACEs are common; as many as two out of three adults have experienced an ACE and one out of six have experienced four or more ACEs (Swedo et al., 2023). ACEs can trigger "toxic stress," in which the body experiences a prolonged stress response that can negatively affect a child's developing brain and body (Shonkoff & Garner, 2012). Indeed, ACEs are associated with elevated rates of physical and mental health conditions—including developmental delays, depression, asthma, cancers, and heart disease (Merrick et al., 2018; Nelson et al., 2020; Oh et al., 2018; Waehrer et al., 2020).

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There have been growing efforts to integrate ACE screening into a more holistic patient assessment in order to mitigate the effects of toxic stress and improve health outcomes and health equity. For instance, California's ACEs Aware initiative is the first statewide initiative to promote screening for childhood trauma and response to the impacts of toxic stress throughout its 13-million-member Medicaid system (Bhushan et al., 2020).

As part of an evaluation of California's initiative, prior qualitative analyses showed that ACE screening is feasible, acceptable, and potentially beneficial from both clinician/staff and patient/caregiver perspectives (Alvarado et al., 2023; Estrada-Darley et al., 2023). Along similar lines, studies of social determinant of health screenings in pediatric settings found that they resulted in increased referrals to community resources (e.g. housing, legal aid, food), and that clinicians find information from screening helpful in addressing patients' needs (Friedman et al., 2021; Massar et al., 2022; Selvaraj et al., 2019). However, it is unknown whether clinician actions correlate with the number of ACEs reported during patient screening, and how specific clinician actions (e.g., anticipatory guidance, referrals) vary by the number of ACEs reported. In sum, we do not yet have a full understanding of how ACE screening results may be associated with the care patients receive.

To address these gaps, we examined clinician responses to ACE screening at five California pediatric clinics in a large public health care system.

2. Methods

Five clinics were included in this study: three general pediatric clinics and two pediatric "Hub" clinics that primarily serve children involved with the Department of Children and Family Services (DCFS), which is equivalent to child protective services in other localities. The five clinics were all located in Los Angeles County. These clinics were participants in a 16-month ACE screening and response implementation learning collaborative as part of California's ACEs Aware initiative.

We analyzed extracts from pediatric patients' electronic health records (EHRs) covering a 6-month period, May through October 2021. The data contained patient demographics (e.g., age, sex, race/ethnicity) and counts of indicators of social and behavioral determinants of health (e.g., housing insecurity, food insecurity the count is the sum of yes responses to the individual items) included in the Pediatric ACEs and Related Life Events Screener (PEARLS; Center for Youth Wellness, & University of San Francisco School of Medicine 2020), the number of ACEs endorsed on the PEARLS, and actions clinicians took in response to each ACE screen.

Clinician actions included: anticipatory guidance (i.e., education and counseling), mental health referral, developmental/behavioral services referral, community-based organization referral, social work referral. Clinicians could also indicate that patients were already receiving services, or that they declined services. We used these data to evaluate the association between the number of ACEs and the clinician's response. We included patients declining services as a response by the clinician because it indicated that a response was provided even it was not accepted. We tested for the statistical significance of the association using multiple-variable logistic regression to control for other factors that could explain the association, such as screening date, the clinic where the screening and visit occurred, patient demographics, and counts of the number of social and behavioral determinants of health. We clustered standard errors at the clinic level. We used SAS to conduct our statistical analyses (SAS/STAT, Version 9.4). We reported the unadjusted percentages in the figures below to show the patterns of the associations in the simplest terms. We present the findings from our statistical models to reveal the significance of those associations after controlling for potential confounders. This study was approved by the RAND Human Subjects Protection Committee.

3. Results

The five pediatric clinics conducted a total of 2,652 ACEs screens over the six-month period focused on in this analysis. Patients/caregivers reported no ACEs for 56 percent of screens, one to three ACEs for 31 percent, and four or more ACEs for 13 percent of screens. Clinicians documented an action for 58 percent of all screens, ranging from 35 percent for screens with no ACEs to 86 percent for screens with four or more ACEs (Fig. 1). Clinicians documented an action more often as the number of ACEs increased. After controlling for screening date, clinic, patient demographics, and social and behavioral determinants of health, clinicians were twice as likely to document an action when any ACEs were present (odds ratio (OR) = 2.2, 95 % confidence interval (CI): 1.5 to 3.3, $p < 0.0001$). There was no significant difference in the likelihood to document an action when there were four or more ACEs relative to one to three.

When ACEs were present, the type of action changed (Fig. 2), with referrals to mental health clinicians, social workers, and community organizations becoming three times more common relative to anticipatory guidance after controlling for screening date, clinic, patient demographics, and social and behavioral determinants of health (OR=3.2, 95 % CI: 1.6 to 6.5, $\underline{p} < 0.0001$). There was no significant difference in the pattern of recorded actions as the number of ACEs increased from one to three to four or more after controlling for screening date, clinic, patient demographics, and social and behavioral determinants of health.

4. Discussion

We examined clinician responses to ACE screening at five pediatric clinics in a large public health care system. Findings reveal that as the number of ACEs increased, clinicians' likelihood of taking action also increased. In addition, the types of actions they took changed as the number of ACEs increased, with increased referrals to mental health, social work, and community-based resources for patients with ACEs. These findings suggest that screening for ACEs influenced patient care. While responsiveness of clinicians to screening results is consistent with prior studies (Friedman et al., 2021; Massar et al., 2022; Selvaraj et al., 2019), to our knowledge this is the first study to examine the relationship between a broad measure of 10 ACEs and clinician actions.

There are limitations to our data. First, responses of clinicians were documented in medical records and we could not independently verify that they indeed took place as described, so it is possible that they documented behaviors that were socially desirable. Second, there were no data on whether patients were successfully linked with the referred services. Documentation of responses in the EHR began with the implementation of ACE screening, so we also cannot compare clinician actions during our study period to actions prior to the implementation of screening. There may be additional impacts of screening on patient-clinician relationships, and other actions taken, that were not captured in the EHR.

Nonetheless, our findings provide early evidence that ACE screening results are associated with patient care, clinician actions and referral patterns to external social and behavioral resources.

5. Public health significance

ACEs are a major public health concern, as they are associated with many illnesses and behaviors that adversely impact health, such as depression, smoking, chronic lung disease, heaving drinking, and asthma (Merrick et al., 2018; Waehrer et al., 2020; Yu et al., 2022) and are associated with health disparities (LaBrenz et al., 2020). As such, it is important to understand whether ACE screening initiatives result in changes in care that could affect these outcomes. The findings of this study demonstrate that ACE screening influences the actions of safety net clinicians, in alignment with the principles of trauma-informed care in public health. By incorporating trauma-informed approaches,

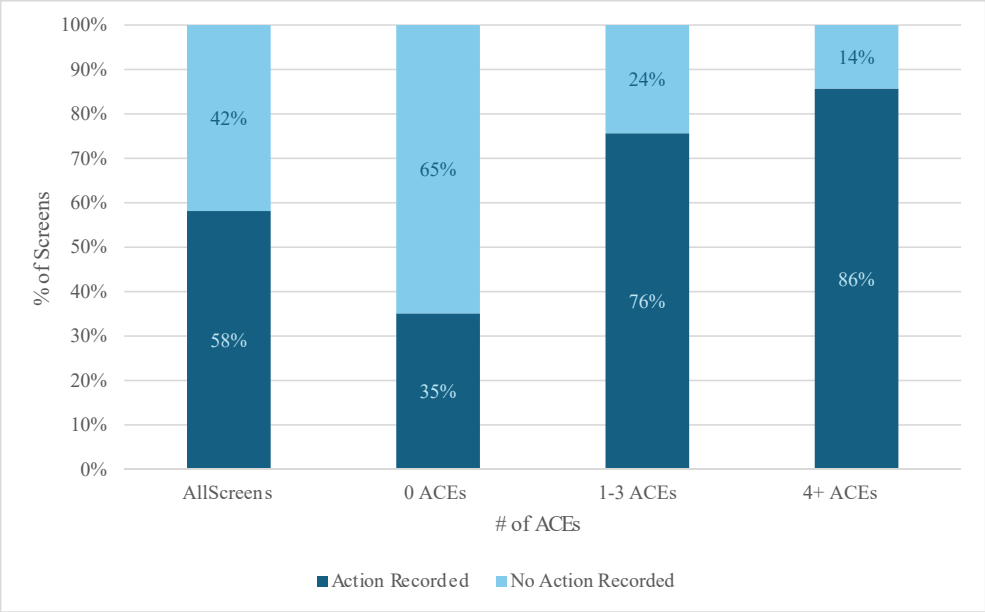

Fig. 1. Clinicians documented an action more often as the number of Adverse Childhood Experiences (ACEs) increased; California pediatric clinics, 2021.

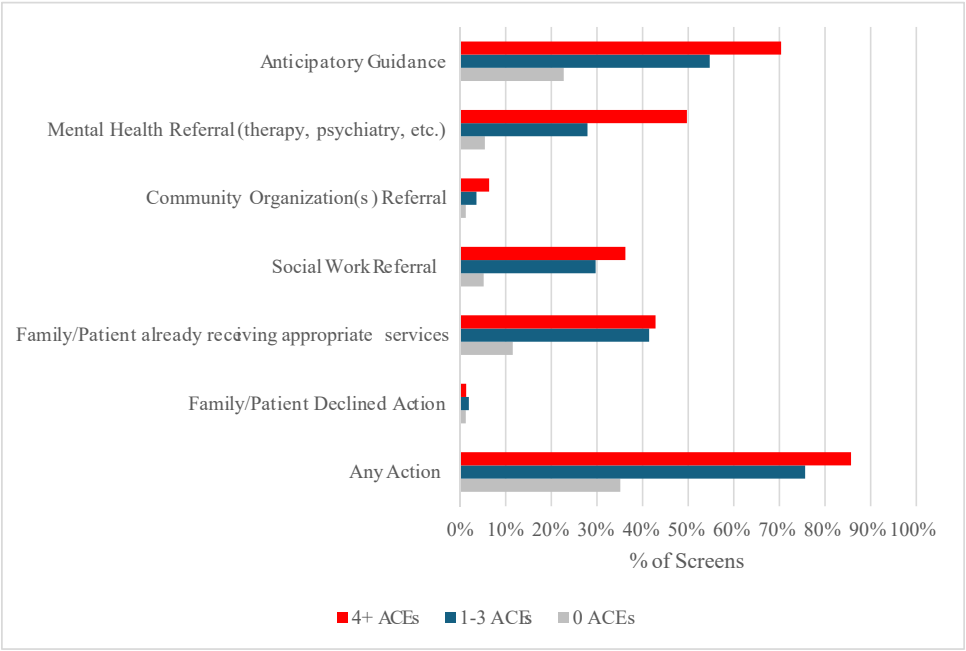

Fig. 2. The distribution of clinicians' documented actions changed when Adverse Childhood Experiences (ACEs) were present; California pediatric clinics, 2021.

healthcare clinicians can reduce health disparities and improve patient outcomes. Therefore, this study's results have significant implications for the implementation of trauma-informed care in public health.

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CRediT authorship contribution statement

J. Scott Ashwood: Writing – review & editing, Writing – original draft, Conceptualization. **Nipher Malika:** Writing – review & editing, Writing – original draft, Conceptualization. **Stephanie Williamson:** Data curation. **Charles Engel:** Supervision, Conceptualization. **Edward Machtinger:** Writing – review & editing, Supervision, Funding acquisition. **Nina Thompson:** Writing – review & editing, Supervision. **Amy Shekarchi:** Writing – review & editing, Supervision, Data curation. **Shannon Thyne:** Writing – review & editing, Supervision, Conceptualization. **Brigid McCaw:** Writing – review & editing, Conceptualization. **Marguerita Lightfoot:** Writing – review & editing, Conceptualization. **Anda Kuo:** Writing – review & editing, Conceptualization. **Eric Fein:** Writing – review & editing, Data curation. **Darcy**

Benedict: Writing – review & editing, Data curation. **Lisa Gantz:** Writing – review & editing, Data curation. **Raymond Perry:** Writing – review & editing, Data curation. **Nancy Yap:** Writing – review & editing, Data curation. **Nicole Eberhart:** Writing – review & editing, Writing – original draft, Supervision, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors do not have permission to share data.

References

Alvarado, G., McBain, R., Chen, P., Estrada-Darley, I., Engel, C., Malika, N., Machtinger, E., McCaw, B., Thyne, S., Thompson, N., Shekarchi, A., Lightfoot, M., Kuo, A., Benedict, D., Gantz, L., Perry, R., Kannan, I., Yap, N., Eberhart, N., 2023. Clinician and Staff Perspectives on Implementing Adverse Childhood Experience (ACE) Screening in Los Angeles County Pediatric Clinics. Ann Fam Med 21 (5), 416–423. https://doi.org/10.1370/afm.3014.

Bhushan, D., Kotz, K., McCall, J., Wirtz, S., Gilgoff, R., Dube, S., Powers, C., Olson-Morgan, J., Galeste, M., & Patterson, K. (2020). Office of the California Surgeon General. Roadmap for resilience: The California Surgeon General's report on adverse childhood experiences, toxic stress, and health. Retrieved December 29, 2020. In.

Center for Youth Wellness, & University of San Francisco School of Medicine. (2020). *Pediatric ACEs and Related Life Events Screener (PEARLS)*. Retrieved March 1 from https://www.acesaware.org/wp-content/uploads/2019/12/PEARLS-Tool-Child-Parent-Caregiver-Report-De-Identified-English.pdf.

Estrada-Darley, I., Chen, P., McBain, R., Alvarado, G., Engel, C., Malika, N., Kim, D., Machtinger, E., McCaw, B., Thyne, S., Thompson, N., Shekarchi, A., Lightfoot, M., Kuo, A., Benedict, D., Gantz, L., Perry, R., Yap, N., Eberhart, N., 2023. Patient and Caregiver Perspectives on Implementation of ACE Screening in Pediatric Care Settings: A Qualitative Evaluation. J Pediatr Health Care 37 (6), 616–625. https://doi.org/10.1016/j.pedhc.2023.06.005.

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. Am. J. Prev. Med. 14 (4), 245–258.

Friedman, S., Caddle, S., Motelow, J.E., Meyer, D., Lane, M., 2021. Improving screening for social determinants of health in a pediatric resident clinic: a quality improvement initiative. Pediatric Quality & Safety 6 (4).

LaBrenz, C.A., O'Gara, J.L., Panisch, L.S., Baiden, P., Larkin, H., 2020. Adverse childhood experiences and mental and physical health disparities: the moderating effect of race and implications for social work. Soc. Work Health Care 59 (8), 588–614.

Massar, R.E., Berry, C.A., Paul, M.M., 2022. Social needs screening and referral in pediatric primary care clinics: a multiple case study. BMC Health Serv. Res. 22 (1), 1369.

Merrick, M.T., Ford, D.C., Ports, K.A., Guinn, A.S., 2018. Prevalence of adverse childhood experiences from the 2011–2014 behavioral risk factor surveillance system in 23 states. JAMA Pediatr. 172 (11), 1038–1044.

Nelson, C.A., Bhutta, Z.A., Harris, N.B., Danese, A., Samara, M., 2020. Adversity in childhood is linked to mental and physical health throughout life. BMJ 371.

Oh, D.L., Jerman, P., Silvério Marques, S., Koita, K., Purewal Boparai, S.K., Burke Harris, N., Bucci, M., 2018. Systematic review of pediatric health outcomes associated with childhood adversity. BMC Pediatr. 18, 1–19.

Selvaraj, K., Ruiz, M.J., Aschkenasy, J., Chang, J.D., Heard, A., Minier, M., Osta, A.D., Pavelack, M., Samelson, M., Schwartz, A., 2019. Screening for toxic stress risk factors at well-child visits: the addressing social key questions for health study. J. Pediatr. 205 (244–249), e244.

Shonkoff, J.P., Garner, A.S., 2012. The lifelong effects of early childhood adversity and toxic stress. Pediatrics 129 (1), e232–e246. https://doi.org/10.1542/peds.2011-2663.

Swedo, E. A., Aslam, M. V., Dahlberg, L. L., Niolon, P. H., Guinn, A. S., Simon, T. R., & Mercy, J. A. (2023). Prevalence of Adverse Childhood Experiences Among U.S. Adults - Behavioral Risk Factor Surveillance System, 2011-2020. *MMWR Morb Mortal Wkly Rep*, *72*(26), 707-715. 10.15585/mmwr.mm7226a2.

Waehrer, G.M., Miller, T.R., Silverio Marques, S.C., Oh, D.L., Burke Harris, N., 2020. Disease burden of adverse childhood experiences across 14 states. PLoS One 15 (1), e0226134.

Yu, J., Patel, R.A., Haynie, D.L., Vidal-Ribas, P., Govender, T., Sundaram, R., Gilman, S. E., 2022. Adverse childhood experiences and premature mortality through mid-adulthood: A five-decade prospective study. The Lancet Regional Health-Americas 15.