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Adverse Childhood Experiences: Assessing The Impact On Health And School Engagement And The Mitigating Role Of Resilience

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ABSTRACT The ongoing longitudinal Adverse Childhood Experiences Study of adults has found significant associations between chronic conditions; quality of life and life expectancy in adulthood; and the trauma and stress associated with adverse childhood experiences, including physical or emotional abuse or neglect, deprivation, or exposure to violence. Less is known about the population-based epidemiology of adverse childhood experiences among US children. Using the 2011–12 National Survey of Children's Health, we assessed the prevalence of adverse childhood experiences and associations between them and factors affecting children's development and lifelong health. After we adjusted for confounding factors, we found lower rates of school engagement and higher rates of chronic disease among children with adverse childhood experiences. Our findings suggest that building resilience—defined in the survey as "staying calm and in control when faced with a challenge," for children ages 6–17—can ameliorate the negative impact of adverse childhood experiences. We found higher rates of school engagement among children with adverse childhood experiences who demonstrated resilience, as well as higher rates of resilience among children with such experiences who received care in a family-centered medical home. We recommend a coordinated effort to fill knowledge gaps and translate existing knowledge about adverse childhood experiences and resilience into national, state, and local policies, with a focus on addressing childhood trauma in health systems as they evolve during ongoing reform.

The Affordable Care Act (ACA) and associated health system transformation models—including the patient-centered medical home and accountable care organizations (ACOs)—promote a model of health and health care that focuses on "whole person" and "whole population" health and well-being.[1,2] These reform models have emerged against the backdrop of a growing interdisciplinary consensus—supported by a critical mass of social science, health services, epigenetic, neurodevelopmental, and biological research[3–14]—that it is paramount to view health development in childhood and across life through the lens of childhood trauma and stress associated with adverse childhood experiences.[2,15]

Adverse childhood experiences were first assessed through the Adverse Childhood Experiences Study, a longitudinal study of adults conducted by the Centers for Disease Control and Prevention (CDC) and Kaiser Permanente.[8,16]

These experiences include exposure to violence; emotional, physical, or sexual abuse; deprivation; neglect; family discord and divorce; parental substance abuse and mental health problems; parental death or incarceration; and social discrimination.

Studies have linked adverse childhood experiences with increased chronic disease and higher costs of care across a person's life course.[17–19] Such findings make addressing a history of childhood trauma relevant to the patient-centered medical home and ACO models of care. Some patient-centered medical homes and ACOs now recognize the economic and health costs of not addressing adverse childhood experiences and the opportunity to improve individual and population health using childhood trauma-informed approaches.[20]

The national Bright Futures guidelines, which list preventive care screenings and services that health insurance plans must cover under the ACA, further support a focus on childhood trauma.[21] These guidelines, sponsored by the federal Maternal and Child Health Bureau in partnership with the American Academy of Pediatrics, include guidelines for screening for behavioral and psychosocial risks, including many adverse childhood experiences. The guidelines also promote resilience (defined in the survey as "staying calm and in control when faced with a challenge," for children ages 6–17) and the provision of care using a family-centered medical home model that seeks to identify and address the social determinants of health, such as childhood trauma.[21–23]

Addressing adverse childhood experiences is now among the priorities of several other federal agencies, including the Substance Abuse and Mental Health Services Administration,[24] the Centers for Medicaid and Medicare Services,[25] and the Administration on Children and Families.[26] State governments,[20] private foundations and nongovernmental organizations,[27,28] local health departments,[29] hospitals,[30] and primary care providers[29,31] are also prioritizing addressing adverse childhood experiences. This is in addition to the long-standing focus on such experiences within the child welfare and educational sectors.[32,33]

The prevalence of adverse childhood experiences among adults is now evaluated by numerous states through their Behavioral Risk Factor Surveillance System surveys.[33] For children, limited data on adverse childhood experiences are available from the National Child Abuse and Neglect Data System, which counts reported cases of child abuse and neglect. According to the system's data, 12.5 percent of all US children have had a documented episode of child abuse or neglect reported by age eighteen.[34]

In 2013, prevalence data for all US children became available from the 2011–12 National Survey of Children's Health (NSCH), conducted under the leadership of the Maternal and Child Health Bureau.[35] These data include child-level information on adverse childhood experiences similar to those included in the CDC and Kaiser Permanente adult study. They are the first national and state child-level data on adverse childhood experiences.[36]

This study adds to previous reports based on the NSCH and other more narrow US studies on childhood trauma [30,33,37,38] by further evaluating the population-based epidemiology of adverse childhood experiences among all US children. Specifically, we evaluated associations between the experiences and childhood chronic conditions, health risks, and school success factors such as school engagement and grade repetition.

We also assessed the potential mitigating effects of resilience[39] and receiving care in a family-centered medical home. The identification of social determinants of health, such as adverse childhood experiences, and the promotion of resilience and other positive health capacities important to attenuating impacts of childhood trauma are core principles for the delivery of high-quality children's health care at family-centered medical homes.[21,22]

We hypothesized that children who had adverse childhood experiences would have worse health outcomes and more school problems, compared to children who did not have such experiences. We also hypothesized that learning and exhibiting resilience, as well as having access to a high-quality medical home, might mitigate these outcomes.

Study Data And Methods

POPULATION AND DATA We used data from the 2011–12 NSCH.[35] The NSCH surveyed a representative sample of children ages 0–17 (95,677 children, with approximately 1,800 per state). Child-level household surveys were conducted with parents or guardians under the leadership of the Maternal and Child Health Bureau and implemented through the National Center for Health Statistics. Data were weighted to represent the population of noninstitutionalized children ages 0–17 nationally and in each state.

The Child and Adolescent Health Measurement Initiative (CAHMI), a national initiative based in the Johns Hopkins Bloomberg School of Public Health, prepared the data files and constructed variables in collaboration with the Maternal and Child Health Bureau and the National Center for Health Statistics. This work

was performed by the National Maternal and Child Health Data Resource Center, which is led by CAHMI.[39]

KEY MEASURES The 2011–12 NSCH list of adverse childhood experiences is based on that used in the adult study, with modifications overseen by a technical expert panel and evaluated through standard survey item testing through the National Center for Health Statistics.[40] The NSCH included nine adverse childhood experiences deemed valid for reporting by parents and guardians, which are listed in online Appendix Exhibit A4.[41]

To evaluate key associations, variables were constructed to assess whether a child had special health care needs; experienced specific types of chronic conditions such as asthma, attention deficit hyperactivity disorder (ADHD), and obesity; demonstrated aspects of resilience (as noted above, defined in the survey as "staying calm and in control when faced with a challenge," for children ages 6–17); was engaged in school; had repeated a grade in school; and received care in a family-centered medical home, as measured in the NSCH.[42] The prevalence of these positive and negative health factors according to the number of respondents' adverse childhood experiences is reported in the online Appendix.[41] Because of their relevance to child health, aspects of parental health and family and community factors were also evaluated (for a list, see the Appendix).[41]

All items on the NSCH were developed under the direction of two technical expert working groups. The items were finalized after repeated rounds of cognitive testing as well as best practice language translation and pilot testing through the National Center for Health Statistics. All variables used in this study have been documented previously, and their properties and coding are presented in publicly available NSCH variable codebooks.[39]

ANALYTIC METHODS National and state-level prevalence on all of the nine adverse childhood experiences that we assessed were calculated across the range of child subgroups and health-related variables. We used multivariate and multilevel regression models to examine associations among adverse childhood experiences; child and family demographic characteristics; health and school factors; child resilience; and other parental health, family, and community factors. We also examined whether or not children had a primary care medical home, using a robust, multidomain, and widely used measure of medical home that reflects the definition of *medical home* set forth by the American Academy of Pediatrics and endorsed by the National Quality Forum.[42]

Addressing a history of childhood trauma is relevant to the patient-centered medical home and ACO models of care.

Nested *t*-tests compared state and national differences in the prevalence of adverse childhood experiences. A multilevel logistic regression model was fitted to examine the association between individual child, family, and health care characteristics and the prevalence of adverse childhood experiences. The model allowed for variations across states in these associations and, after accounting for the individual child-level demographic and health factors included as level 1 independent variables (age, sex, race/ethnicity, household income, and special health care needs status), assessed the state variation in the prevalence of the experiences that remained.[43] For additional details on the methods, see Appendix Exhibit A3.[41]

Logistic regression models were run to calculate adjusted odds ratios that indicated whether certain subgroups of children were more or less likely to have adverse childhood experiences and whether or not the experiences predicted the likelihood that children would have the chronic conditions, risks, resilience, school success, and other factors evaluated in our study. All models controlled for child-level characteristics. These were the child's age, sex, race/ethnicity, and household income and whether the child qualified as a child with special health care needs, using the CSHCN Screener,[37] or had been evaluated as having a chronic condition requiring an above-average type or amount of services.

We used SPSS, version 19. Unless otherwise noted, all adjusted odds ratios that we report were significant based on their 95 percent confidence intervals.

LIMITATIONS A primary limitation of this study is the cross-sectional nature of the NSCH. Unfortunately, the United States does not have a longitudinal population-based study that includes information on adverse childhood experiences. Such data are needed to document the experiences' causal effects on the development of health problems and the mitigating effects of protective

factors, such as resilience or having a high-quality medical home. In the absence of a national longitudinal study that includes such data, follow-back surveys among cohorts of children included in the 2011–12 NSCH hold promise.

Study Results

PREVALENCE OF ADVERSE CHILDHOOD EXPERIENCES As previously reported,[30,33,37,38] 48 percent of US children have had at least one of the nine key adverse childhood experiences evaluated in the NSCH. This translates into an estimated 34,825,978 children nationwide. Older children and those living in homes with lower household incomes are more likely to have had one or more of the nine experiences, as shown in Appendix Exhibit A1.[41]

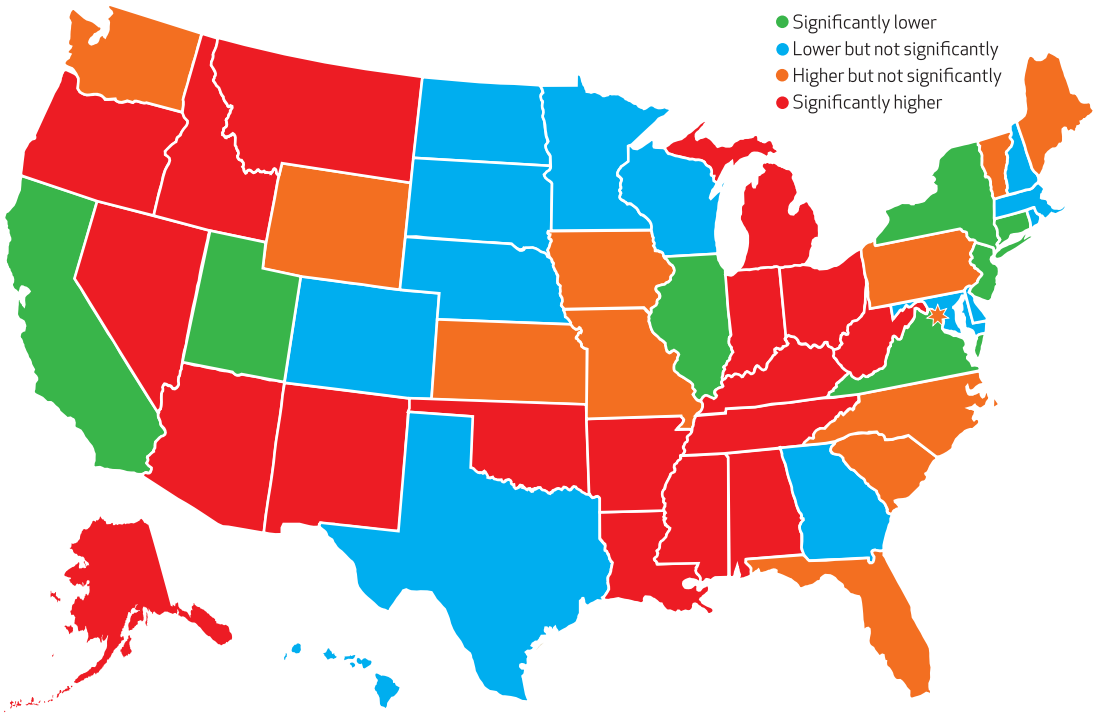
Nationwide, 22.6 percent of children ages 0–17 have had two or more of the nine adverse childhood experiences evaluated in the NSCH, with a nearly twofold difference in prevalence across states (Exhibits 1 and 2). Among US youth ages 12–17, 30.5 percent have had two or more of the experiences, ranging from a low of 23.0 percent in New Jersey to a high of 44.4 percent in Arizona (data not shown). Eighteen states had significantly higher prevalence rates of adverse childhood experiences than the national rate, which was 47.9 percent (Exhibit 1).

Across-state variations in the prevalence of children with one or more adverse childhood experiences remained significant after we adjusted for child-level characteristics using multilevel modeling. In fact, child-level characteristics explained only 33 percent of cross-state variation in the prevalence of adverse childhood experiences. The random effects median odds ratio of 1.21 (interclass correlation coefficient: 0.012) was significant, after individual-level child demographic characteristics and status as a child with special health care needs were adjusted for.

ASSOCIATIONS WITH CHILD HEALTH CONDITIONS AND RISKS As was expected based on previous research,[8,9] if children had existing chronic conditions and health risks, they were more likely to have had adverse childhood experiences (Exhibit 3). Conversely, children who had had such experiences were more likely than those who had not to have each of the health condi-

EXHIBIT 1

Prevalence Of Children Ages 0–17, By State, Who Experienced Two Or More Of The Nine Adverse Childhood Experiences Evaluated In The 2011–12 National Survey Of Children's Health



SOURCE Authors' analysis of data from the 2011–12 National Survey of Children's Health. **NOTES** The map shows prevalence in each state compared to the US average. In the key, lower indicates better performance. Nationwide, 22.6 percent of children experienced two or more of the nine adverse childhood experiences. The state with the lowest percentage of such children (16.3 percent) was New Jersey; the state with the highest percentage (32.9 percent) was Oklahoma. Statistical significance indicates $p < 0.05$.

EXHIBIT 2

Prevalence Of Nine Adverse Childhood Experiences (ACEs) Among US Children Ages 0–17, By Selected Characteristics, 2011–12

			Characteristic[a]				
ACEs	**National prevalence**	**Prevalence range across states**	**Child has chronic condition and special need**	**Child shows resilience[b]**	**Child repeated a grade[b]**	**Child has a high-quality medical home**	**Mother's health is excellent or very good**
No ACE reported	52.1%	42.5% (AZ)–59.4% (CT)	14.6% (0.44)	71.7% (1.62)	5.6% (0.59)	61.4% (1.43)	68.3% (2.52)
At least 1 ACE reported	47.9	40.6 (CT)–57.5 (AZ)[c]	20.3 (0.63)	62.9 (1.25)	9.1 (0.75)	50.4 (1.17)	48.6 (1.47)
2 or more ACEs reported[d]	22.6	16.3 (NJ)–32.9 (OK)	31.6[e]	54.6[e]	15.0[e]	43.5[e]	35.8[e]
Individual ACEs							
Experienced extreme economic hardship	25.7	20.1 (MD)–34.3 (AZ)	26.0	54.6	14.1	41.5	36.6
Parents divorced or separated	20.1	15.2 (DC)–29.5 (OK)	28.8	59.1	12.5	50.8	46.5
Lived with someone with an alcohol or drug problem	10.7	6.4 (NY)–18.5 (MT)	31.7	55.1	14.7	45.8	38.4
Witnessed or was victim of neighborhood violence	8.6	5.2 (NJ)–16.6 (DC)	37.1	50.5	18.5	38.4	32.8
Lived with someone who was mentally ill or suicidal	8.6	5.4 (CA)–14.1 (MT)	37.6[f]	54.6	13.2	48.6	31.6[f]
Witnessed domestic violence	7.3	5.0 (CT)–11.1 (OK)	34.0	50.5[f]	17.9	41.8	33.2
Parent served time in jail	6.9	3.2 (NJ)–13.2 (KY)	33.5	51.5	19.5[f]	42.2	37.7
Treated or judged unfairly due to race/ethnicity	4.1	1.8 (VT)–6.5 (AZ)	30.1	56.1	9.8	37.8[f]	41.6
Death of parent	3.1	1.4 (CT)–7.1 (DC)	30.0	53.9	18.0	43.5	39.7

SOURCE Authors' analysis of data from the 2011–12 National Survey of Children's Health (NSCH). **NOTES** *Resilience* is defined in the NSCH as "staying calm and in control when faced with a challenge." Adjusted odds ratios (adjusted for age, sex, household income, and race/ethnicity and special health care needs status) are from logistic regression. All are significant based on their 95 percent confidence intervals. [a]Adjusted odds ratio is in parentheses. [b]Ages 6–17. [c]Significant across-state variation remains (ICC: 0.012; median odds ratio: 1.21), after adjustment for child-level characteristics across states using multilevel modeling. [d]The distribution of ACEs among children ages 0–17 is as follows: 0: 52.1 percent; 1: 25.3 percent; 2: 10.6 percent; 3–4: 8.60 percent; 5 or more: 3.40 percent. [e]Reference category. [f]ACE for which the health risk was highest or protective factor was lowest.

tions and risks evaluated. Children who had had two or more of the nine adverse childhood experiences evaluated were also more likely than those who had only one such experience to have each of the health problems evaluated. This mirrored the dose-response effect of adverse childhood experiences observed in the CDC's adult-focused longitudinal study of the experiences.[6]

For example, children with two or more of the adverse childhood experiences examined were significantly more likely to qualify as children with special health care needs, compared to children with none of the experiences (31.6 percent versus 14.6 percent; Exhibit 3). Children without adverse childhood experiences had 0.44 lower odds of qualifying as having special health care needs, compared to children with two or more adverse childhood experiences.

ASSOCIATIONS WITH CHILD RESILIENCE AND FAMILY AND NEIGHBORHOOD FACTORS Children with adverse childhood experiences were less likely than those without such experiences to demonstrate resilience, live in a protective home environment, and have mothers who were healthy and parents who were not unusually aggravated with them (Exhibit 2 and Appendix Exhibit A2).[41] They were also less likely to live in safe and supportive neighborhoods. A notable dose-response effect existed in nearly all cases: Children with only one adverse childhood experience versus two or more were more likely to have positive health factors and less likely to have negative health factors.

It is important to note that many children who have positive health factors have also had adverse childhood experiences. For example, 33.1 percent of children who had a protective home environment nonetheless had had adverse childhood experiences (data not shown). Similarly, 48.4 percent of children who demonstrated

EXHIBIT 3

Prevalence Of Adverse Childhood Experiences (ACEs) Among Children Age 0–17, By Eleven Child Health And Health Risk Factors, And Prevalence Of Health And Risk Factors, By Number Of ACEs, 2011–12

Category of children	Study population (%)	Prevalence of ACEs (%)		Prevalence of health problems and risks				
				0 ACEs		1 ACE		2 or more ACEs
		1 ACE	2 or more ACEs	Percent	AOR	Percent	AOR	
All	100.0	25.3	22.6	52.1	—[a]	25.3	—[a]	21.6
In fair or poor overall health	3.2	31.8	39.3	1.7	0.75[b]	3.9	1.05	5.5[c]
With special health care needs	19.8	25.9	36.0	14.6	0.44	20.3	0.63	31.6[c]
With special health care needs and EBD	7.2	23.7	51.9	3.4	0.35[b]	6.8	0.52[b]	16.6[c]
At high or moderate risk for developmental, behavioral, or social delays	26.2	26.9	18.8	22.5	0.68[b]	29.1	0.76[b]	37.4[c]
With asthma	8.8	27.3	33.4	6.7	0.63[b]	9.5	0.79[b]	13.1[c]
With ADHD	7.9	24.8	45.2	4.8	0.37[b]	7.7	0.57[b]	14.6[c]
With autism spectrum disorder	1.8	27.1	34.4	1.4	0.55[b]	1.9	0.77[b]	2.5[c]
Who are overweight or obese	31.3	25.5	37.1	26.5	0.79[b]	31.5	0.85[b]	38.6[c]
With a behavior problem	3.2	23.6	61.4	1.0	0.26[b]	3.0	0.56[b]	8.0[c]
Who bully[d]	2.2	23.0	55.4	1.0	0.44[b]	1.9	0.60[b]	4.4[c]

SOURCE Authors' analysis of data from the 2011–12 National Survey of Children's Health. **NOTES** AOR is adjusted odds ratio (adjusted for age, sex, household income, and race/ethnicity). EBD is emotional, behavioral, or developmental problems. ADHD is attention deficit hyperactivity disorder. [a]Not applicable. [b]Significant across-state variation remains ($p < 0.05$), after adjustment for child-level characteristics across states using multilevel modeling. [c]Reference category. [d]Usually or always bullies or is cruel to others.

resilience had had adverse childhood experiences, as had 49.2 percent of children who were usually or always engaged in school.

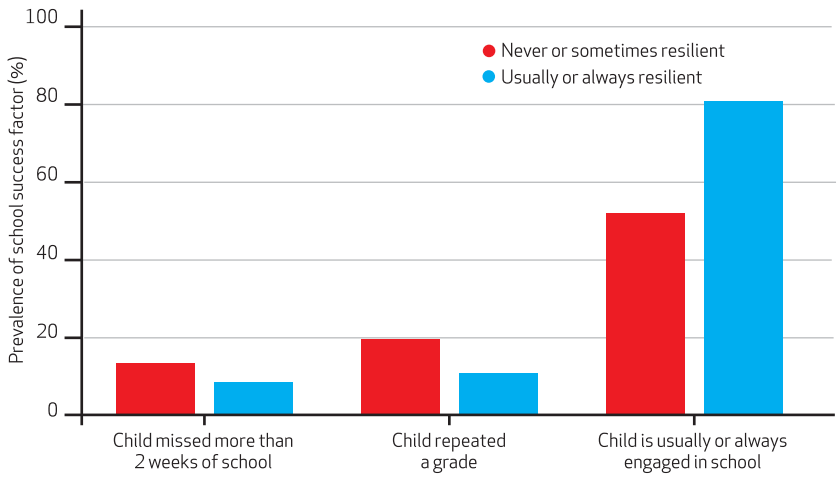
ASSOCIATIONS WITH SCHOOL SUCCESS FACTORS Children with two or more adverse childhood experiences were 2.67 times more likely to repeat a grade in school, compared to children without any of the experiences. This effect remained after we adjusted for children's demographic characteristics and health status factors (Exhibit 2). Similarly, children without adverse childhood experiences had 2.59 greater odds of usually or always being engaged in school, compared with their peers who had had two or more of the experiences (Appendix Exhibit A2).[41]

Resilience mitigated the impact of adverse childhood experiences on grade repetition and school engagement. Among children with special health care needs who had had two or more of the experiences, those who had learned and showed aspects of resilience were 1.55 times more likely to be engaged in school and nearly half as likely to have repeated a grade in school, compared to those not exhibiting resilience (Exhibit 4).

ASSOCIATIONS WITH RECEIVING CARE IN A FAMILY-CENTERED MEDICAL HOME Children with two or more adverse childhood experiences were 1.41 times less likely than those who did not have any to have parents who reported that their child received health care that met "family-centered medical home" criteria (43.5 percent versus 61.4 percent; Exhibit 2). These criteria include being family centered, having providers who know the child and child's health history well, receiving needed help coordinating the child's care, and ensuring that the child receives needed referrals for services outside of his or her primary provider setting. The effect of having a family-centered medical home remained after confounding factors such as household income

EXHIBIT 4

Prevalence Of School Success Factors Among Children With Special Health Care Needs Who Had Two Or More Adverse Childhood Experiences, By Resilience, 2011–12



SOURCE Authors' analysis of data from the 2011–12 National Survey of Children's Health (NCSH). **NOTES** *Resilience* is defined in the NSCH as "staying calm and in control when faced with a challenge." All differences are significant ($p < 0.05$). For missing more than two weeks of school in the past year, the adjusted odds ratio (AOR; adjusted for age, sex, household income, and race/ethnicity) was 1.24 ($p = 0.02$). For repeating a grade, the AOR was 1.66 ($p < 0.001$). For being engaged in school, it was 0.26 ($p < 0.001$).

and the race/ethnicity or health status of the child were adjusted for (Appendix Exhibit A3).[41]

When we looked at specific components of a medical home, we found that children with two or more adverse childhood experiences were 1.90 times more likely than those without any to have problems getting needed referrals and 1.73 times more likely to experience problems getting needed care coordination. These results also remained significant after child demographic characteristics and health status factors were adjusted for (Appendix Exhibit A2).[41]

Anticipated improvements in health have, in part, motivated the national movement to establish patient-centered medical home models of care. In this study we observed such positive effects. Importantly—considering our findings that linked resilience to greater school engagement for children with adverse childhood experiences—we found that when children who had had such experiences did not have health care that met family-centered medical home criteria, they were also less likely to exhibit key aspects of resilience. Specifically, among children with one or more adverse childhood experiences, those who did not have a family-centered medical home were significantly less likely than those who did to exhibit resilience (adjusted odds ratio: 0.69; data not shown).

Moreover, after we adjusted for confounding factors, we found that children who had had adverse childhood experiences and who received health care that met family-centered medical home criteria had 0.52 lower odds of having parents who reported that they were usually or always aggravated with their child (data not shown).

Discussion

Similar to the results of localized studies with less representative data,[13,19] findings from this national representative sample of all US children confirm a high prevalence of adverse childhood experiences, significant relationships between them and both positive and negative health factors, and the fact that the impact of adverse childhood experiences begins early in childhood. Even with the use of the small set of items related to adverse childhood experiences in the NSCH, which do not include information about the severity, frequency, scope, and specific impact of the experiences on children, associations between the experiences and health are readily apparent in childhood—which is when the health system has ample opportunity to intervene and prevent the long-term medical complications described in the adult-focused Adverse Childhood Experiences Study.

Our findings confirm the fact that the impact of adverse childhood experiences begins early in childhood.

Our findings demonstrate the need for further research and exploration of hypotheses regarding the potential causal role that exposure to adverse childhood experiences may play in the development or exacerbation of certain childhood diseases, such as asthma, ADHD, and obesity, as well as in the risk for developmental, behavioral, and social delays during childhood. Our findings also demonstrate the need for continued research on how to optimize the effectiveness of the family-centered medical home model to address social determinants of health, such as adverse childhood experiences.

The findings are consistent with conclusions from previous studies about mediating the impact of adverse childhood experiences through mechanisms such as parental coping and well-being and the promotion of both child resilience and safe, stable, and nurturing environments in the home, school, and community.[12,20,28,37,39,42] Neuroscience suggests that mediating the impact of adverse childhood experiences involves not only education and emotional and practical support, but also the introduction and application of neurological repair methods, such as mindfulness training.[44] Such methods are being implemented in numerous school settings across the country.[25] Given the high prevalence of adverse childhood experiences among both adults and children in the United States and the potentially cross-cutting benefits of promoting resilience for all people, a population-based, public health approach to understanding adverse childhood experiences and promoting resilience and neurological repair after trauma should be considered, in addition to high-risk-group interventions.

It is essential that the United States continue to collect population-based data on adverse childhood experiences and resilience. It should also enrich these data by combining longitudinal cohorts of children that will further elucidate causality and the multidimensional dynamics

Paying special attention to children at risk of adverse childhood experiences may yield both immediate and long-term benefits.

associated with the occurrence and impact of adverse childhood experiences and the role of mitigating factors, including resilience, and the promotion of such protective factors as the family-centered medical home. Qualitative studies that examine cases in which adverse childhood experiences are prevalent but hypothesized negative outcomes are not observed may also be beneficial in developing understanding of and methods to prevent negative impacts of adverse childhood experiences across life.

We conclude that there is sufficient evidence on the prevalence and cross-cutting impact of adverse childhood experiences—as well as on promising ways to prevent or ameliorate the negative impact of childhood trauma—to support a coordinated, collective effort to rapidly advance needed new research on assessing and addressing adverse childhood experiences and to synthesize and translate existing research into concrete national, state, and local policies and practices. In keeping with the call by Clyde Hertzman for an "era of experimentation,"[5(p128)] we recommend the formulation of a collaboratively endorsed research and policy agenda designed to be enduring, so that priorities and lessons learned are updated and integrated over time.

Integrating information about adverse childhood experiences and resilience into the delivery and real-time evaluation of health services may require routinely including patient-reported information on adverse childhood experiences and relevant health assets such as resilience in electronic medical records.[45] This would allow for the integration of information reported by patients, parents, and children with clinical diagnostic and treatment information. Such integration would reveal important opportunities for promoting health and clarify the impact of approaches to address adverse childhood experiences on overall health outcomes and healthy development.

It is important to note that screening children and parents for adverse childhood experiences across a population and in clinical practice would require further research to demonstrate its unique value in contrast to existing standard screening practices. It will also be important to further develop and evaluate information on the impact of responses to adverse childhood experiences to promote health and ameliorate hypothesized negative and lifelong effects.

Screening practices that are based not on specific adverse events (such as violence) but on evidence of any type of past or existing traumatic event and the presence of toxic or chronic stress—regardless of the specific adverse event experienced—could be useful. In other words, the screening practices would be based on consequences instead of events. Because of the large number of potentially relevant adverse childhood experiences that could be included in a screening tool, and the anticipated variations of impact across developmental age groups of children, such practices may be relevant when the goals for screening are to identify children experiencing toxic or chronic stress and to target efforts to promote resilience and health. When the goal is the specific identification of events, many events are best verified using other validated screening methods. The CSHCN Screener uses a consequence-based method and could be a model for screening for adverse childhood experiences.[46]

Screenings for adverse childhood experiences are not meant to replace diagnostic screening methods for conditions such as post-traumatic stress disorder, sexual abuse, or maternal depression. Instead, screening for adverse childhood experiences might be most useful in identifying the subset of the children with social determinants of poor health who may most need attention, as well as the subsets of children with special health care needs and children with physical and mental or behavioral health diagnoses who may benefit most from integrated health care approaches requiring medical, social, mental, and emotional attention.

Some integrated care models that address health in the context of social determinants of health, such as adverse childhood experiences, and a variety of so-called trauma-informed care models are emerging.[20,32,47] However, it is necessary to demonstrate and scale up these models to measure, assess, and address childhood trauma. This is particularly true of the most promising models related to building child resilience and improving family dynamics and community and school environments.[28,37,39]

Conclusion

This study enriches the rapidly expanding literature on social determinants of health, as well as the neurodevelopmental, epigenetics, biological, social psychological, and intervention literature by documenting, at the population level, the potential role of adverse childhood experiences in the healthy development and lifelong well-being of children in the United States.

As the nation continues to seek to improve its health care system and population health, paying special attention to children with or at risk of adverse childhood experiences may yield both immediate and long-term benefits. These include the promotion of health and well-being and the reduced impact and severity of chronic conditions in children and in the adults they will become. ■

Portions of the research and findings presented here were presented at the annual meeting of the Association for Adolescent and Child Psychiatry, San Diego, California, October 23, 2014; at the National ACEs Summit, convened by the Robert Wood Johnson Foundation, Philadelphia, Pennsylvania, May 14, 2013; and as posters at the annual meeting of the American Public Health Association, Boston, Massachusetts, November 5, 2013; the AcademyHealth Annual Research Meeting, San Diego, California, June 7, 2014; the annual meeting of the Pediatrics Academic Societies, Vancouver, British Columbia, May 2, 2014; and the annual meeting of the Association for Maternal and Child Health Programs, Washington, D.C., January 26, 2014. The authors thank the leadership of the Maternal and Child Health Bureau for making available the data used in this study. The authors acknowledge assistance from Narangeral Gombojav of the Child and Adolescent Health Measurement Initiative (CAHMI) in the running of the multilevel regression model reported here and from other CAHMI staff members in the collection of pertinent publications.

NOTES

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