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Adverse Childhood Experiences Among U.S. Adults: National and State Estimates by Adversity Type, 2019–2020

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Abstract

Introduction: Although adverse childhood experiences (ACEs) are associated with lifelong health harms, current surveillance data on exposures to childhood adversity among adults are either unavailable or incomplete for many states. In this study, recent data from a nationally representative survey were used to obtain the current and complete estimates of ACEs at the national and state levels.

Methods: Current, complete, by-state estimates of adverse childhood experiences were obtained by applying small area estimation technique to individual-level data on adults aged ≥18 years from 2019–2020 Behavioral Risk Factor Surveillance System survey. The standardized questions about childhood adversity included in the 2019–2020 survey allowed for obtaining estimates of ACE consistent across states. All missing responses to childhood adversity questions (states did not offer such questions or offered them to only some respondents; respondents skipped questions) were predicted through multilevel mixed-effects logistic small area estimation regressions. The analyses were conducted between October 2022 and May 2023.

Results: An estimated 62.8% of U.S. adults had past exposure to ACEs (range: 54.9% in Connecticut; 72.5% in Maine). Emotional abuse (34.5%) was the most common; household member incarceration (10.6%) was the least common. Sexual abuse varied markedly between females (22.2%) and males (5.4%). Exposure to most types of adverse childhood experiences

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SUPPLEMENTAL MATERIAL

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was lowest for adults who were non-Hispanic White, had the highest level of education (college degree) or income (annual income ≥$50,000), or had access to a personal healthcare provider.

Conclusions: Current complete estimates of ACEs demonstrate high countrywide exposures and stark sociodemographic inequalities in the burden, highlighting opportunities to prevent adverse childhood experiences by focusing social, educational, medical, and public health interventions on populations disproportionately impacted.

INTRODUCTION

Adverse childhood experiences (ACEs)–potentially traumatic events that occur during childhood (ages 0–17 years)–can result in lifelong adverse health and socioeconomic effects.[1] People who experience ACEs are at increased risk of using substances or becoming involved in crime.[2–5] Elevated burden of chronic stress from ACEs exposure may potentially limit access to life opportunities (e.g., education, stable employment) among children[4,6] and increase the risk of premature mortality among adults.[1,7] Importantly, ACEs are preventable. Creating safe and equitable environments and providing trauma-informed care for those who lived through childhood adversity may help them achieve their full health and economic potential.[1,6,8] Understanding differences in ACEs exposure by sociodemographic group and geography can help decision makers focus public health interventions on populations disproportionately impacted to effectively prevent ACEs and mitigate their consequences among those at greatest risk for ACEs.

Up-to-date estimates of adults' ACEs exposures comparable across all U.S. states are currently unavailable. Early studies focused on 23–34 states that included ACEs questions in their Behavioral Risk Factor Surveillance System (BRFSS) surveys,[9–11] implying that those results might not be generalizable to all U.S. adults. A recent study by Swedo et al.[12] was the first to estimate ACEs prevalence for all 50 states. However, for some states, Swedo and colleagues[12] reported estimates from more than a decade ago or analyzed jurisdiction-added questions for which states could modify the language, whereas in other states, up to 33% of respondents skipped ACEs questions.[10] Thus, differences in ACEs prevalence across states documented by Swedo et al.[12] could have been an artifact of outdated information, respondents' ability to comprehend modified questions, or nonrandom responses. By contrast, this study uses advanced statistical methods and standardized ACEs questions from 2019–2020 BRFSS survey to obtain the current, complete, and comparable ACEs estimates for all U.S. states.

METHODS

Study Sample

The main source for this cross-sectional analysis was individual-level data from the 2019–2020 BRFSS–annual, random-digit–dialed telephone survey conducted by all 50 states that collects self-reported information from U.S. adults aged ≥18 years who live in a private residence and have working cellular/landline phones.[13] BRFSS is the largest telephone-based survey of health behaviors and factors in the world, with 418,268 and 401,958 interviews completed in 2019 and 2020, respectively (median survey response rates of

49.4% and 47.9% in 2019 and 2020, respectively). Because 2019–2020 BRFSS is a publicly available database that eliminates all patient identifiers, this study did not require IRB approval. For this analysis, the 2019–2020 data were used for several reasons. First, starting from 2019, all states that opted to include ACEs module used standardized ACEs questions that allowed for obtaining ACEs estimates consistent across states. Second, in contrast to the latest 2021 BRFSS, where the response rates for some states and territories were as low as 23.5%,[14] response rates in 2019–2020 remained within the 35%–70% range, typical for this survey.[13,15]

Measures

Individual-level self-reported data on ACEs exposures and covariates were extracted from the survey. Following previous studies, 11 ACEs questions were collapsed into 8 standard types, with BRFSS ACEs questions[16] and coding of qualifying responses to each ACEs question[12,17] described elsewhere. The list of 29 individual-level covariates included respondents' sociodemographic characteristics, access to care, and health outcomes associated with ACEs[10,18,19] (Appendix Table 1, available online).

Individual-level data were supplemented with those ACEs-related state-level covariates that were not available in BRFSS. This study used 5 additional sources[20–24] that included data on maternal health, mental health, risk behaviors listed as contributing causes of death, prevalence of illicit drug use, infectious diseases, and poverty rates (Appendix Table 1, available online). A flag for each Bureau of Economic Analysis region allowed to group states on the basis of their socioeconomic characteristics.[25]

Statistical Analysis

In 2019–2020, 37 U.S. states and the District of Columbia included standardized ACEs questions, although 8 of those states included ACEs questions in 1 of the survey splits (17%–34% random sample of survey respondents[13,15]) (Appendix Table 2, available online). Among those who received questions, ≤33% of respondents skipped at least 1 (≥1) ACEs question, and ≤27% skipped all questions (Appendix Table 2, available online). All available individual-level responses were used to obtain the weighted direct survey estimates (Stata, Version 17.0, svy: mean) of exposure to each ACEs type by sociodemographic group and state and the 95% CIs.

All missing ACEs responses (i.e., a state did not offer ACEs questions or offered them in 1 of the survey splits; respondent skipped the question) were predicted through the small area estimation (SAE) indirect domain approach.[26] SAE can produce precise outcome estimates by combining data from the surveyed individuals/areas with the predicted values from all individuals/similar-sized areas, whether surveyed or not.[26,27] To avoid biases in SAE estimates, this study used data from 2019–2020, survey years that included standardized wording of ACEs questions and ensured time proximity of data collection for all model covariates.[27]

Several SAE predictive models were performed for each outcome (i.e., ACEs type), including multilevel mixed-effects logistic (MMEL) regressions,[28–30] logistic regressions (LRs), and jackknifed MMEL/LR that left out 1 state at a time (Stata, Version 17.0, melogit

or logit, respectively). MMELs were well suited to analyze highly structured BRFSS survey data, with individual respondents nested within primary sampling units/strata.[29,31] LRs were used when the MMEL residual intraclass correlation (Stata, Version 17.0, estat icc) did not exceed 0.5%, demonstrating that ≤0.5% of the total variance in the outcome was accounted for by nesting/clustering alone.[31,32] MMEL/LR improved the consistency of SAE estimates using nearly 250,000 unweighted observations that exploited similarities in observed ACEs-related characteristics across all surveyed respondents to obtain ACEs predictions. In addition, both models benefited from differences in ACEs nonresponse patterns across states (Appendix Table 2, available online) to mitigate a possible impact of nonresponse bias on SAE estimates. Jackknifed resampling methods—used as sensitivity analyses—leave out 1 state at a time to further reduce the possible impact of the state-specific nonresponse bias by resampling models with different ACEs nonresponse patterns.[33–35]

A separate set of SAE models was fitted to predict the probability of exposure to each ACEs type in those states/splits where ACEs data were available. For each ACEs type, a model with the best predictive performance was selected by comparing the nonmissing direct estimates from BRFSS with predicted SAE estimates using standard statistics (sensitivity/specificity, positive/negative predicted values, percentage predicted to observed answers, and Pearson correlation coefficient [PCC]). Because BRFSS was designed to generate reliable state-level estimates, consistency of predicted/direct estimates at the state level was expected if SAE models were valid.[31] Models with the best predictive performance were used to obtain the predicted exposures to each ACEs type in states/splits where ACEs data were not available. Survey-weighted proportions (Stata, Version 17.0, svy: mean) and 95% CIs of adults exposed to each ACE type were estimated from a combination of direct estimates (if reported in the survey) and predicted SAE estimates (if direct estimates were missing). The analyses were conducted between October 2022 and May 2023. Additional details on SAE model specification/predictions are provided in Appendix Methods (available online).

RESULTS

All SAE models demonstrated high predictive performance, with PCC between predicted and directly estimated ACEs exposures ranging from 0.74 to 0.93 at the state level and from 0.83 to 0.98 at the Bureau of Economic Analysis region level (Appendix Tables 3 and 4, available online). For every ACEs type, predicted ACEs estimates plotted against direct estimates clustered around a 45-degree line (Figure 1), demonstrating high goodness of fit for those survey respondents who answered ACEs questions. For each ACEs type, the final model explained >99.7% of cluster-level variance in the outcome, allowing those models to be used for predicting ACEs exposures for all BRFSS respondents (Appendix Table 4, available online).

Nationwide, an estimated 62.8% (95% CI=62.6, 63.0) (Table 1) of adults experienced ≥1 ACE during childhood, ranging from 54.9% (95% CI=53.9, 56.0) in Connecticut to 72.5% (95% CI=71.6, 73.3) in Maine. A quarter to a third of U.S. adults experienced emotional abuse (34.5%; range: 20.7% in Connecticut, 51.4% in Vermont), parental separation (29.4%; range: 4.8% in Vermont, 37.9% in Alaska), household member substance abuse (26.3%; range: 19.9% in New Jersey, 34.8% in Oregon), or physical abuse (25.2%; range: 15.4%

in Arkansas, 32.3% in Nevada). Up to a fifth of U.S. adults had a household member with mental illness (18.7%; range: 12.8% in New Jersey, 31.5% in Colorado), witnessed intimate partner violence (18.1%; range: 9.5 in Vermont, 24.5 in Alaska), experienced sexual abuse (14.1%; range: 7.1% in Arkansas, 20.3% in Maine), or experienced household member incarceration (10.6%; range: 5.2% in Vermont, 15.7% in District of Columbia).

Table 2 and Appendix Table 5 (available online) captured variation in ACEs exposures by location and demographic characteristics. Across ACEs types, differences between the metropolitan statistical areas and nonmetropolitan statistical areas and between males and females were minimal, except for having a household member with mental illness or substance abuse or for experiencing sexual abuse, where the differences between males and females exceeded 5 percentage points. By contrast, ACEs exposures consistently decreased with age, with the highest exposure to each ACEs type estimated for younger adults (aged 18–34 years). Among racial/ethnic minority groups (Hispanic adults, other race/ethnicity categories combined), ACEs exposures were higher than among White non-Hispanic adults for the majority of ACEs types, except for emotional abuse, household member having substance abuse, and household member having mental illness.

ACE exposures varied substantially by socioeconomic characteristics, including income, education, and access to medical care (Figure 2 and Appendix Table 6, available online). Overall, ACEs exposures demonstrated a strong dose–response decrease with income and education, except for emotional abuse, which increased with income and education. Importantly, for the majority of ACEs types, estimated ACEs exposures were lower among adults who had access to a personal healthcare provider than among adults who did not.

As evident from sensitivity analyses (Appendix Table 7 and Appendix Figure 1, available online), resampling jackknifed methods did not change the key results of this analysis. PCC between the baseline estimates (obtained through LR/MMEL) and jackknifed estimates (obtained through jackknifed MMEL/LR) ranged from 0.99 to 1 at the individual level, and PCC was equal to 1 for all ACEs types at the state level (Appendix Table 7, available online). Furthermore, baseline estimates plotted against jackknifed estimates tightly clustered around a 45-degree line (Appendix Figure 1, available online), demonstrating the stability of model estimates and corroborating key findings of this analysis.

DISCUSSION

This study provides the most recent, complete, and comparable national and by-state estimates of exposure to childhood adversity among U.S. adults by specific ACEs type. An estimated majority of adults—63% nationwide, ranging from 54.9% in Connecticut to 72.5% in Maine—experienced ≥1 ACE under the age of 18 years, demonstrating a pressing need for public health interventions to prevent ACEs and to mitigate their impact across the country. Emotional abuse (35% of U.S. adults) and parental separation (29%) were the most frequently experienced ACEs. Sexual abuse disproportionally affected females (22%) compared with males (5%). Consistent with previous literature,[9,11,12] this study estimated higher ACEs among younger individuals than among older individuals. This phenomenon may have several explanations, such as changes in ACEs exposures or reporting over

time,[11,36,37] early death among individuals with higher ACEs,[11,38] or decreasing accuracy in ACEs reporting with the time passed since exposure—a phenomenon well documented in longitudinal follow-up of adults with history of child maltreatment.[39–41]

Similar to previous literature,[9,11,12] this study demonstrated an inverse relationship between ACEs and socioeconomic factors (e.g., income, education), providing further evidence of limited opportunities later in life associated with childhood adversity. A higher estimated burden of ACEs among adults without access to a personal healthcare provider highlights potential missed opportunities to mitigate ACEs harms at an individual level; because adults with ACEs exposures have a higher risk of negative physical/mental health outcomes, it is important to ensure that these individuals have access to care. Overall, this study highlights the importance of broader evidence-based strategies to prevent ACEs, such as increasing economic support for families through policies that strengthen household financial security (e.g., tax credits, livable wages) and family-friendly work policies (e.g., paid leave, flexible/consistent work schedules), or ensure strong start for children (e.g., increased access to home visiting programs, affordable/quality child care, preschool enrichment programs with family involvement) to prevent the perpetuation of ACEs cycle in future generations.[1,42]

This is one of the few studies that estimated national ACEs burden among adults and the first study to obtain the current and complete estimates by ACEs type comparable across states. Early studies obtained ACEs estimates among adults for only 23–34 states,[9–11] implying that those results might not have been generalizable to other states. A recent study by Swedo and colleagues[12] provided the first national ACEs estimates. However, that study was limited by incomplete ACEs data in BRFSS survey (i.e., some states last offered ACEs questions in 2011 or altered the composition of the module, or up to 33% of BRFSS respondents skipped ACEs questions). Therefore, differences in estimates across states from Swedo et al.[12] might have been an artifact of outdated information, altered ACEs module, or state-specific bias due to local nonresponse patterns. By contrast, this study pioneered the use of SAE to mitigate the nonresponse bias and to obtain complete ACEs estimates for all survey respondents, including those who did not receive or answer ACEs questions in 2019–2020. Furthermore, because the 2019–2020 BRFSS used standardized ACEs questions, ACEs estimates obtained in this analysis were comparable across states.

Compared with results from Swedo and colleagues,[12] results from this study were considerably different for states that previously altered ACEs questions, states with high ACEs nonresponse rates, or states that included ACEs questions a decade ago. For instance, for New Hampshire, this study estimated 61.3% of adults having exposures to ≥1 ACEs (vs 47.4% from Swedo et al.[12]) because the state BRFSS questionnaire omitted the most frequent ACEs types—emotional abuse and parental separation.[12] For Nevada (33.1% of BRFSS respondents skipped at least 1 ACEs question), this study estimated that 68.1% of adults experienced ≥1 ACEs compared with 61.5% from Swedo and colleagues,[12] implying that respondents who skipped the questions were more likely to experience ACEs than respondents who answered those questions. Possible nondisclosure of ACEs experiences is consistent with victimization recall (or incident nonreporting as a protective mechanism to cope with victim's emotional trauma),[41,43] with the probability of nondisclosure increasing from 20% if the offender was a stranger to 80% if the offender was a relative.[41] Finally, for

Washington, this study (based on 2019–2020 data) estimated 72.3% of adults exposed to ≥1 ACEs compared with 66.9% from Swedo et al.[12] (based on 2011 data), possibly reflecting changes in overall survey response rates,[44,45] low response rate to ACEs questions in 2011 (not reported in Swedo and colleagues[12]), or true variation in ACEs burden.

This study highlights several opportunities to improve surveys that collect ACEs data. First, surveys targeting adults (e.g., BRFSS) would benefit from including expanded ACEs questions (e.g., those measuring community violence, perceived racial discrimination, or gender identity discrimination), which were already added in Youth Risk Behavior Survey or the National Survey of Children's Health. Second, findings from this study underscore the need for high-quality data on minority populations. Even after using advanced statistical methods to predict missing ACEs responses, this study was unable to obtain reliable ACEs estimates for adults from racial, ethnic, sexual orientation, and gender identity minorities. For instance, reliable estimates were obtained only for Hispanic and White non-Hispanic adults, who accounted for 9% and 76% of all 2019–2020 BRFSS participants, respectively.[13,15] Because all other racial/ethnic groups combined, including non-Hispanic African American, Native American, Asian, and multiracial adults, accounted for only 15%[13,15] of BRFSS respondents, high variability of model predictions did not allow for obtaining reliable estimates for each of those groups separately. Similarly, ACEs estimates for gay, bisexual, or transgender adults could not be obtained because gender/sexual orientation identifiers were missing for 74%[13,15] of BRFSS respondents. Underrepresentation of people from racial, ethnic, sexual orientation, and gender identity minorities in survey populations is a fundamental problem for many surveys. Efforts to increase representation for these groups may include qualitative/quantitative data collection methods appropriate for hard-to-reach populations.[46–52]

Limitations

This study has several limitations. First, BRFSS relies on self-reported data that may be subject to recall bias.[11,39–41,53–55] Second, BRFSS does not comprehensively capture all ACEs aspects (e.g., exposure to community violence, peer violence, or discrimination).[56] Third, the 2019–2020 BRFSS did not include questions on positive childhood experiences[56] that may protect against childhood adversity.[1] Fourth, BRFSS data—collected for private residences—exclude populations who might be more likely to experience ACEs (e.g., those incarcerated or homeless). Fifth, this study could not obtain reliable ACEs estimates for some racial/ethnic minorities or for sexual orientation/gender identity minorities because these groups remain underrepresented in BRFSS survey. Sixth, although this study followed rigorous internal model validation protocols,[31,35,57–59] it could not validate estimates externally owing to the absence of any recent state-level ACEs data on U.S. adults from sources other than BRFSS. Finally, SAE could not address the survey nonparticipation bias because BRFSS did not include ACEs predictors for those eligible respondents who were never available for an interview.[13]

CONCLUSIONS

This study fills a substantial gap in surveillance data by providing the most recent, complete, and comparable estimates of exposure to childhood adversity by ACEs type among U.S. adults. Standardized ACEs questions from 2019–2020 BRFSS surveys allowed for obtaining the current ACEs estimates comparable across states. SAE technique applied to the data from a total of 6 sources allowed for mitigating the survey nonresponse bias and estimating ACEs exposures for each U.S. state (including states that skipped ACEs questions in their 2019–2020 BRFSS surveys) and each survey respondent (including those who did not receive or who skipped ACEs questions). Moreover, by combining the data from all 6 sources to ensure high predictive performance of SAE models, this study demonstrated that limited socioeconomic opportunities among adults in conjunction with adverse health outcomes in adulthood (e.g., illicit drug use, mental health problems, diagnoses of chronic or infectious diseases, maternal health problems) allow to reliably identify individuals with past exposure to childhood adversities regardless of the ACE type. These findings indirectly confirm the profound long-term health and socioeconomic harms of ACEs.[1]

These findings highlight opportunities for decision makers to use data on estimated ACEs burden to implement evidence-based ACEs prevention and mitigation strategies benefitting all populations, especially those disproportionately harmed. A Centers for Disease Control and Prevention–developed resource, “Adverse childhood experiences (ACEs) prevention resource for action: A compilation of the best available evidence,”[1] outlines strategies with the greatest potential for impact. Expansion of SAE methodology to estimate the exposure to multiple ACEs or to assess ACEs burden at the county level may improve resource allocation and facilitate targeted prevention strategies for populations who experienced multiple ACEs or for groups at higher risk in specific localities.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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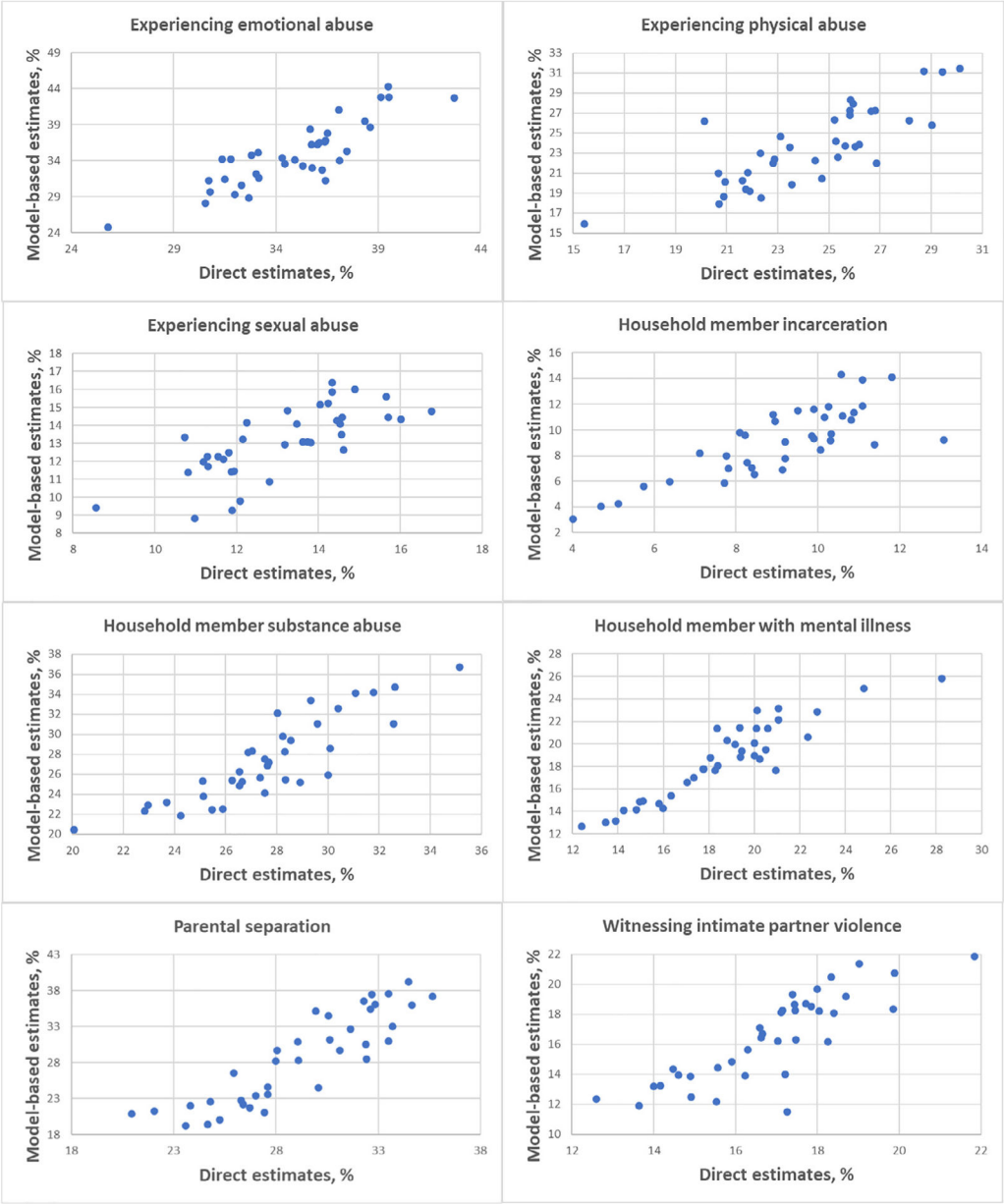

Figure 1.

Direct estimates from the BRFSS versus model-based small area estimates, 37 States, 2019–2020.

All estimates on this figure are based on those BRFSS respondents who in 2019–2020 received and answered ACEs questions. Direct estimates reflect the actual answers reported in the 2019–2020 survey. Predicted estimates were obtained through multilevel mixed-effects logistic regressions or logistic SAE regressions. For every ACEs type, the predicted ACEs estimates plotted against the direct estimates clustered around a 45-degree line, demonstrating high goodness of fit for those survey respondents who received and answered ACEs questions.

ACE, adverse childhood experience; BRFSS, Behavioral Risk Factor Surveillance System; SAE, small area estimation.

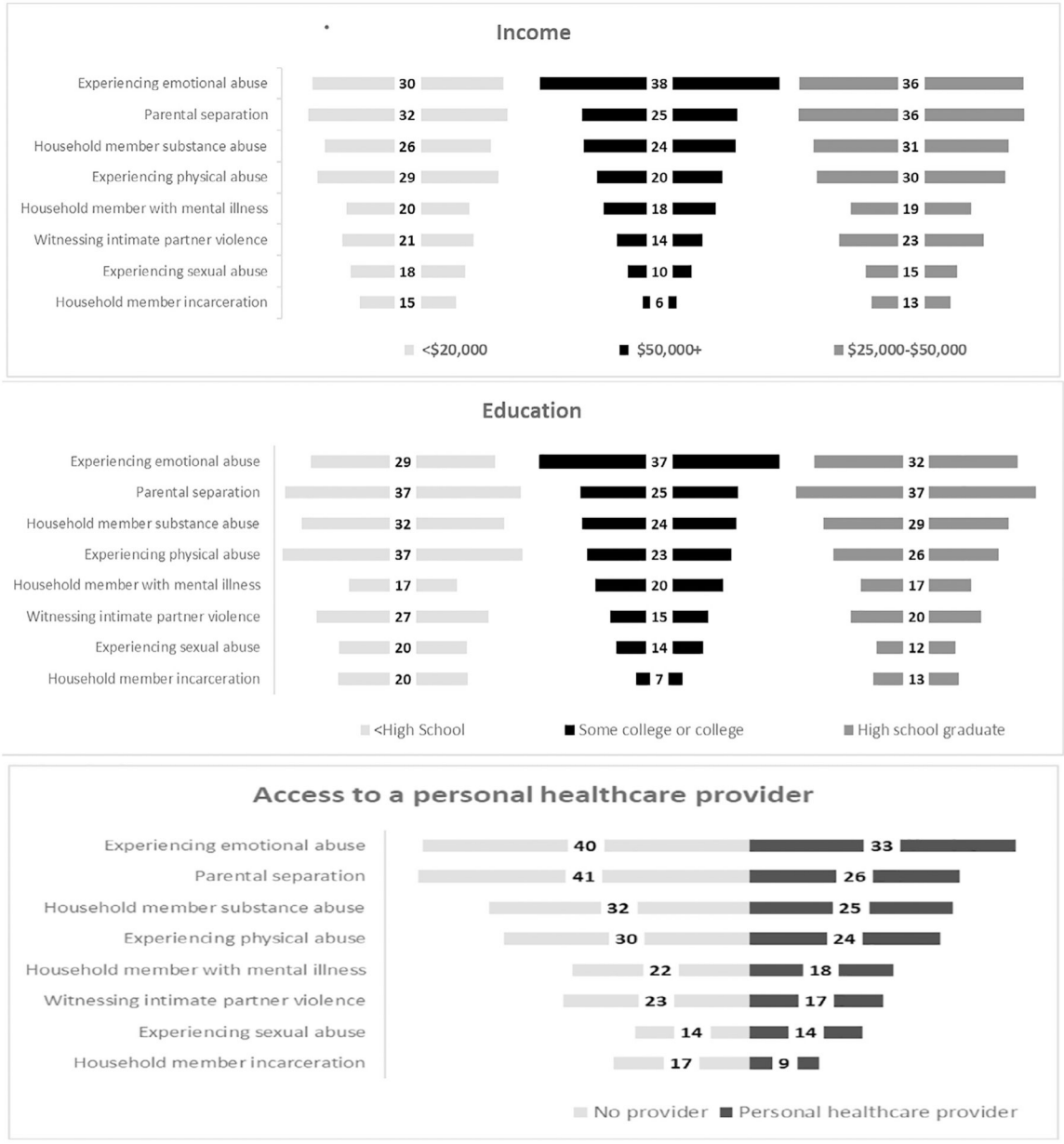

Figure 2.

Estimated percentage of adults with ACEs exposures by socioeconomic characteristic, U.S., 2019–2020. ACE, adverse childhood experience.

Table 1.

Estimated Percentage of Adults With ACEs Exposures by State, U.S., 2019–2020

Geography	ACEs type, % (95% CI)[a]								
	Household member incarceration	Experiencing sexual abuse	Witnessing intimate partner violence	Household member with mental illness	Experiencing physical abuse	Household member substance abuse	Parental separation	Experiencing emotional abuse	Exposure to at least 1 ACE
National estimates	10.6 (10.4, 10.8)	14.1 (13.9, 14.2)	18.1 (17.9, 18.3)	18.7 (18.5, 18.9)	25.2 (24.9, 25.4)	26.3 (26.1, 26.5)	29.4 (29.2, 29.7)	34.5 (34.3, 34.8)	62.8 (62.6, 63.0)
State[b]									
Alabama	12.4 (11.5, 13.3)	14.6 (13.7, 15.4)	18.3 (17.3, 19.2)	18.8 (17.9, 19.8)	20.6 (19.6, 21.5)	28.6 (27.5, 29.7)	33.1 (31.9, 34.2)	31 (29.9, 32.1)	61.6 (60.5, 62.7)
Alaska	15.4 (13.9, 16.9)	15.5 (14.0, 16.9)	24.5 (22.8, 26.3)	19.7 (18.1, 21.2)	16.3 (14.8, 17.9)	31.3 (29.5, 33.1)	37.9 (35.9, 39.8)	37.5 (35.6, 39.4)	58.8 (56.9, 60.6)
Arizona	13.2 (12.4, 14.1)	16.5 (15.7, 17.4)	21.6 (20.6, 22.6)	29.2 (28.1, 30.2)	29.1 (28.1, 30.2)	27.6 (26.5, 28.6)	36.1 (34.8, 37.1)	36.1 (35.0, 37.2)	64.8 (63.8, 65.9)
Arkansas	11.0 (10.0, 12.0)	7.1 (6.4, 7.9)	17.1 (15.9, 18.1)	17.3 (16.2, 18.4)	15.4 (14.4, 16.5)	25.8 (24.6, 27.1)	25.2 (23.9, 26.5)	24.6 (23.4, 25.9)	59.6 (58.3, 60.9)
California	12.2 (11.4, 13)	16.9 (16.0, 17.8)	18.4 (17.5, 19.3)	20.2 (19.3, 21.1)	29.7 (28.7, 30.8)	27.1 (26.1, 28.1)	34.7 (33.6, 35.8)	35.5 (34.4, 36.5)	64.1 (63.1, 65.0)
Colorado	12.0 (11.5, 12.6)	16.4 (15.8, 17.1)	17.9 (17.3, 18.6)	31.5 (30.7, 32.3)	23.5 (22.8, 24.2)	33.1 (32.2, 33.9)	28.5 (27.7, 29.3)	45.3 (44.4, 46.1)	69.4 (68.7, 70.2)
Connecticut	7.9 (7.3, 8.5)	7.7 (7.1, 8.4)	10.1 (9.4, 10.9)	14.5 (13.7, 15.3)	16.9 (13.7, 20.1)	20.7 (19.9, 21.6)	25.7 (24.7, 26.7)	20.7 (19.8, 21.6)	54.9 (53.9, 56.0)
Delaware	14.6 (13.4, 15.8)	9.6 (8.7, 10.5)	20.6 (19.3, 21.9)	16.4 (15.2, 17.6)	30.1 (28.1, 32.3)	27.3 (25.9, 28.7)	23.6 (22.2, 24.9)	35.1 (33.6, 36.5)	60.1 (58.6, 61.6)
District of Columbia	15.7 (14.4, 17.1)	11.1 (9.9, 12.0)	15.9 (14.6, 17.2)	23.1 (21.5, 24.5)	24.2 (22.7, 25.7)	23.8 (22.3, 25.2)	29.9 (28.2, 31.5)	42.4 (40.7, 44.1)	64.5 (63.0, 66.1)
Florida	10.8 (9.9, 11.6)	14.1 (13.1, 14.9)	18.8 (17.8, 19.7)	14.5 (13.6, 15.3)	24.4 (23.3, 25.4)	25.8 (24.7, 26.8)	31.2 (30.1, 32.4)	29.8 (28.7, 30.9)	60.4 (59.2, 61.6)
Georgia	9.9 (9.1, 10.8)	13.5 (12.6, 14.4)	18.2 (17.2, 19.2)	14.5 (13.7, 15.4)	19.6 (18.6, 20.6)	23.9 (22.8, 25.1)	30.4 (29.2, 31.6)	29.1 (27.8, 30.1)	61.6 (60.4, 62.8)
Hawaii	14.4 (13.6, 15.2)	12.8 (12.1, 13.5)	19.4 (18.6, 20.3)	14.8 (14.1, 15.6)	27.2 (26.2, 28.1)	25.1 (24.1, 25.9)	26.8 (25.8, 27.7)	34.7 (33.7, 35.7)	60.6 (59.6, 61.7)
Idaho	14.8 (13.7, 15.8)	15.8 (14.8, 16.8)	15.5 (14.4, 16.5)	25.4 (24.2, 26.7)	23.1 (21.9, 24.3)	26.6 (25.4, 27.9)	34.2 (32.9, 35.6)	37.1 (35.7, 38.4)	65.4 (64.1, 66.6)
Illinois	8.6 (7.7, 9.5)	12.1 (11.1, 13.1)	21.2 (20.0, 22.4)	17.4 (16.4, 18.4)	30.7 (29.5, 32.1)	25.2 (24.1, 26.4)	34.4 (33.1, 35.7)	46.9 (45.6, 48.3)	71.2 (70.0, 72.4)

Geography	ACEs type, % (95% CI)[a]								
	Household member incarceration	Experiencing sexual abuse	Witnessing intimate partner violence	Household member with mental illness	Experiencing physical abuse	Household member substance abuse	Parental separation	Experiencing emotional abuse	Exposure to at least 1 ACE
Indiana	10.5 (9.9, 11.2)	15.2 (14.6, 15.9)	17.6 (16.9, 18.3)	20.4 (19.6, 21.2)	28.1 (26.8, 29.4)	23.9 (23.1, 24.7)	31.1 (30.1, 32.0)	33.2 (32.3, 34.1)	61.4 (60.6, 62.3)
Iowa	8.7 (8.2, 9.3)	12.4 (11.8, 12.9)	16.4 (15.8, 17.1)	19.3 (18.6, 20.0)	22.4 (21.7, 23.1)	25.3 (24.6, 26.1)	24.8 (24.0, 25.5)	34.7 (33.9, 35.5)	59.6 (58.8, 60.4)
Kansas	10.4 (9.9, 10.9)	17.1 (16.4, 17.5)	16.7 (16.1, 17.3)	22.1 (21.4, 22.7)	26.6 (25.9, 27.2)	27.3 (26.6, 27.9)	28.1 (27.3, 28.6)	37.1 (36.3, 37.6)	64.4 (63.6, 65.1)
Kentucky	11.9 (10.9, 12.8)	15.1 (14.0, 16.0)	18.1 (17.1, 19.2)	22.2 (21.0, 23.3)	21.2 (20.1, 22.3)	29.4 (28.1, 30.6)	30.7 (29.4, 32.0)	32.9 (31.6, 34.1)	60.8 (59.5, 62.1)
Louisiana	11.1 (10.2, 12.1)	13.3 (12.4, 14.2)	18.4 (17.4, 19.4)	16.1 (15.1, 17.1)	17.7 (16.7, 18.7)	29.8 (28.6, 31.1)	32.8 (31.5, 34.2)	29.3 (28.1, 30.6)	60.1 (58.9, 61.4)
Maine	11.9 (11.1, 12.7)	20.3 (19.4, 21.2)	13.8 (12.9, 14.6)	24.3 (23.4, 25.3)	24.1 (23.1, 25.1)	34.2 (33.2, 35.3)	16.9 (16.0, 17.9)	42.1 (41.1, 43.2)	72.5 (71.6, 73.3)
Maryland	13 (12.4, 13.5)	11.4 (11.0, 11.9)	19.1 (18.5, 19.8)	15.7 (15.1, 16.2)	26.4 (24.8, 28.1)	26.6 (25.9, 27.3)	29.6 (28.8, 30.3)	30.6 (29.9, 31.4)	58.1 (57.2, 58.8)
Massachusetts	6.3 (5.8, 6.8)	13.6 (12.9, 14.3)	16.5 (15.8, 17.3)	19.3 (18.5, 20.1)	23.8 (21.8, 25.8)	23.8 (22.9, 24.6)	25.2 (24.3, 26.1)	33.1 (32.1, 34).0	59.1 (57.9, 60.0)
Michigan	11.1 (10.3, 11.8)	15.3 (14.6, 16.0)	17.5 (16.7, 18.3)	20.4 (19.6, 21.2)	27.1 (25.8, 28.4)	30.1 (29.1, 31.1)	31.3 (30.3, 32.2)	36.5 (35.5, 37.5)	68.1 (67.2, 69.0)
Minnesota	9.1 (8.6, 9.4)	11.2 (10.8, 11.6)	16.1 (15.6, 16.6)	21.5 (20.9, 22.0)	22.6 (22.1, 23.2)	33.3 (32.7, 34.1)	27.4 (26.7, 28.0)	34.5 (33.9, 35.2)	59.1 (58.4, 59.7)
Mississippi	10.6 (9.7, 11.4)	11.8 (11.0, 12.6)	15.9 (15.0, 16.9)	15.8 (14.9, 16.8)	15.5 (14.6, 16.5)	26.2 (25.1, 27.3)	32.3 (31.1, 33.5)	26.1 (24.9, 27.2)	59.2 (58.0, 60.4)
Missouri	11.5 (10.7, 12.2)	14.3 (13.6, 15.1)	17.7 (16.8, 18.5)	22.9 (21.9, 23.8)	22.7 (21.8, 23.6)	30.1 (29.1, 31.1)	34.2 (33.1, 35.2)	35.1 (33.9, 36.0)	65.2 (64.3, 66.2)
Montana	13.4 (12.6, 14.2)	16.2 (15.4, 17.0)	18.6 (17.7, 19.5)	25.7 (24.8, 26.7)	25.1 (24.2, 26.1)	34.4 (33.3, 35.4)	35.8 (34.7, 36.8)	40.8 (39.8, 41.9)	68.1 (67.1, 69.0)
Nebraska	7.3 (6.8, 7.8)	12.3 (11.8, 12.9)	14.1 (13.4, 14.6)	18.3 (17.7, 19.0)	18.6 (18.1, 19.3)	21.1 (20.3, 21.7)	25.1 (24.2, 25.8)	28.9 (28.1, 29.7)	62.7 (62.0, 63.5)
Nevada	12.2 (10.9, 13.5)	18.4 (17.0, 19.9)	24.2 (22.5, 25.9)	25.9 (24.2, 27.5)	32.3 (30.5, 34.1)	31.9 (30.2, 33.7)	36.4 (34.6, 38.2)	41.5 (39.6, 43.3)	68.1 (66.3, 69.9)
New Hampshire	13.2 (12.2, 14.1)	12.9 (12.0, 13.7)	12.1 (11.2, 13.0)	21.4 (20.3, 22.5)	16.5 (15.5, 17.4)	30.7 (29.4, 31.9)	18.6 (17.5, 19.8)	34.8 (33.6, 36.1)	61.3 (60.1, 62.5)
New Jersey	8.8 (8.2, 9.5)	8.4 (7.8, 9.0)	17.7 (16.9, 18.6)	12.8 (12.1, 13.5)	30.7 (28.8, 32.7)	19.9 (19.1, 20.8)	21.4 (20.5, 22.3)	33.9 (32.9, 34.9)	56.7 (55.5, 57.9)
New Mexico	10.1 (9.1, 10.9)	17.8 (16.7, 18.8)	21.7 (20.6, 22.9)	26.6 (25.4, 27.8)	27.5 (26.3, 28.7)	33.6 (32.4, 34.9)	28.4 (27.2, 29.7)	32.7 (31.4, 33.9)	66.1 (64.9, 67.4)

Geography	ACEs type, % (95% CI)[a]								
	Household member incarceration	Experiencing sexual abuse	Witnessing intimate partner violence	Household member with mental illness	Experiencing physical abuse	Household member substance abuse	Parental separation	Experiencing emotional abuse	Exposure to at least 1 ACE
New York	8.4 (8.0, 8.9)	10.9 (10.4, 11.3)	20.5 (19.9, 21.2)	14.5 (13.9, 15.0)	29.1 (27.4, 30.6)	21.6 (21.1, 22.2)	23.2 (22.5, 23.8)	28.8 (28.1, 29.5)	56.3 (55.5, 57.2)
North Carolina	9.9 (9.2, 10.7)	13.1 (12.2, 13.9)	18.9 (18.0, 19.9)	16.9 (16.0, 17.8)	21 (20.1, 21.9)	26.6 (25.5, 27.7)	29.1 (27.9, 30.2)	31.4 (30.3, 32.5)	63.2 (62.1, 64.3)
North Dakota	8.9 (8.0, 9.9)	11.5 (10.5, 12.4)	14.8 (13.8, 15.9)	18.8 (17.6, 20.0)	21.3 (20.1, 22.5)	27.2 (25.9, 28.5)	24.2 (22.8, 25.5)	33.8 (32.4, 35.1)	58.7 (57.3, 60.0)
Ohio	9.6 (9.0, 10.1)	12.7 (12.2, 13.3)	17.1 (16.4, 17.7)	18.5 (17.8, 19.2)	29.8 (28.3, 31.3)	25.1 (24.3, 25.8)	27.1 (26.3, 27.9)	36.8 (36.0, 37.7)	62.5 (61.7, 63.4)
Oklahoma	13.7 (12.9, 14.4)	15.7 (15.0, 16.4)	20.5 (19.7, 21.4)	21.3 (20.5, 22.2)	24.1 (23.2, 24.9)	29.1 (28.2, 30.1)	33.8 (32.8, 34.7)	30.9 (30.1, 31.9)	61.9 (60.8, 63.0)
Oregon	6.5 (5.8, 7.1)	17.3 (16.4, 18.1)	17.9 (17.0, 18.7)	22.4 (21.5, 23.3)	25.7 (24.8, 26.7)	34.8 (33.8, 35.9)	26.6 (25.6, 27.5)	50.3 (49.2, 51.4)	71.7 (70.7, 72.7)
Pennsylvania	10.8 (10.0, 11.5)	12.6 (11.8, 13.4)	16.1 (15.3, 17.0)	19.6 (18.6, 20.5)	26.9 (25.3, 28.4)	27.3 (26.2, 28.3)	27.3 (26.2, 28.4)	34.7 (33.6, 35.9)	62.1 (60.8, 63.1)
Rhode Island	8.5 (7.6, 9.3)	12.9 (11.9, 13.8)	15.5 (14.5, 16.6)	18.9 (17.7, 20.0)	25.5 (24.2, 26.9)	26.2 (25.1, 27.5)	28.1 (26.7, 29.3)	33.6 (32.2, 34.9)	60.5 (59.2, 61.9)
South Carolina	11.4 (10.5, 12.2)	14.8 (13.8, 15.7)	18.4 (17.4, 19.4)	18.9 (17.9, 20.0)	22.5 (21.4, 23.5)	28.8 (27.6, 30.1)	28.6 (27.4, 29.8)	31.7 (30.5, 32.9)	64.6 (63.4, 65.7)
South Dakota	10.1 (8.7, 11.2)	12.1 (10.9, 13.3)	14.1 (12.7, 15.4)	16.4 (15.0, 17.8)	21.3 (19.7, 22.8)	24.8 (23.2, 26.5)	23.7 (22.0, 25.4)	33.9 (32.2, 35.7)	62.1 (60.3, 63.7)
Tennessee	12.7 (11.6, 13.7)	15.5 (14.5, 16.4)	19.8 (18.7, 20.9)	18.9 (17.9, 19.9)	26.2 (25.1, 27.4)	30.4 (29.2, 31.7)	33.1 (31.8, 34.4)	33.4 (32.1, 34.6)	65.3 (64.1, 66.5)
Texas	11.8 (11.0, 12.7)	14.7 (13.8, 15.6)	16.8 (15.8, 17.8)	15.6 (14.7, 16.4)	28.3 (26.4, 30.1)	22.9 (21.9, 23.9)	28.1 (27.0, 29.2)	35.8 (34.7, 37.0)	62.7 (61.5, 63.9)
Utah	8.5 (8.0, 9.0)	15.8 (15.2, 16.4)	15.2 (14.6, 15.9)	32.1 (31.2, 32.8)	30.3 (29.1, 31.5)	23.4 (22.7, 24.2)	23.5 (22.8, 24.3)	42.1 (41.2, 42.9)	69.9 (69.2, 70.7)
Vermont	5.2 (4.5, 5.9)	19.4 (18.3, 20.5)	9.5 (8.5, 10.4)	25.3 (24.1, 26.5)	27.1 (25.8, 28.3)	32.1 (30.7, 33.2)	4.8 (4.1, 5.6)	51.4 (50.1, 52.7)	65.9 (64.7, 67.1)
Virginia	8.6 (8.0, 9.2)	11.5 (10.9, 12.1)	15.9 (15.1, 16.6)	15.1 (14.4, 15.8)	20.6 (19.8, 21.4)	24.1 (23.2, 24.9)	25.1 (24.2, 25.9)	30.1 (29.1, 30.9)	60.5 (59.5, 61.5)
Washington	9.1 (8.6, 9.6)	18.9 (18.2, 19.5)	17.9 (17.2, 18.5)	22.1 (21.4, 22.8)	26.1 (25.3, 26.7)	29.9 (29.2, 30.7)	27.9 (27.2, 28.7)	49.8 (49.0, 50.6)	72.3 (71.7, 73.0)
West Virginia	7.7 (7.0, 8.4)	13.2 (12.4, 14.0)	19.1 (18.2, 20.1)	20.9 (19.9, 21.9)	17.4 (16.5, 18.4)	28.2 (27.1, 29.3)	24.4 (23.3, 25.5)	29.8 (28.7, 30.9)	57.9 (56.8, 59.1)
Wisconsin	8.7 (7.8, 9.6)	12.4 (11.5, 13.3)	16.9 (15.8, 17.9)	18.8 (17.7, 19.9)	27.3 (25.9, 28.7)	26.3 (25.1, 27.5)	24.3 (23.1, 25.5)	39.6 (38.2, 40.9)	61.9 (60.6, 63.2)

Geography	ACEs type, % (95% CI)[a]								
	Household member incarceration	Experiencing sexual abuse	Witnessing intimate partner violence	Household member with mental illness	Experiencing physical abuse	Household member substance abuse	Parental separation	Experiencing emotional abuse	Exposure to at least 1 ACE
Wyoming	12.9 (11.7, 14.0)	15.9 (14.7, 17.0)	15.1 (13.8, 16.2)	20.7 (19.4, 22.0)	27.7 (26.3, 29.1)	26.9 (25.6, 28.3)	33.1 (31.7, 34.6)	34.5 (33.1, 36.0)	65.6 (64.3, 67.0)

ACE, adverse childhood experience; BRFSS, Behavioral Risk Factor Surveillance System; SAE, small area estimation.

[a]Estimates in this table are reported for all 50 states and the District of Columbia. For those BRFSS respondents who actually answered the question, this table reported the direct BRFSS estimates. For those respondents who did not receive or answer the question, it reported predicted estimates obtained through multilevel mixed-effects logistic regressions or logistic SAE regressions. All estimates are weighted.

[b]Alabama, Arizona, District of Columbia, Delaware, Florida, Georgia, Hawaii, Idaho, Indiana, Iowa, Kentucky, Michigan, Mississippi, Missouri, Montana, Nevada, New Mexico, North Dakota, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, West Virginia, Wisconsin, and Wyoming: <33% of ACEs estimates were predicted because states offered ACEs questions to all BRFSS respondents, and up to 33% of respondents skipped at least 1 ACEs question.

Note: For California, Kansas, Massachusetts, Maryland, New Jersey, New York, Ohio, and Oklahoma, >70% of ACEs estimates were predicted because states offered ACEs questions only to a fraction of BRFSS respondents. For Alaska, Arkansas, Colorado, Connecticut, Illinois, Louisiana, Maine, Minnesota, Nebraska, New Hampshire, North Carolina, Oregon, Vermont, and Washington, all ACEs estimates were predicted because states did not include ACEs questions in their 2019–2020 BRFSS surveys.

Table 2.

Estimated Percentage of U.S. Adults With ACEs Exposures by Location and Demographic Group, 2019–2020

Location and demographic group	ACEs type, % (95% CI)[a]								
	Household member incarceration	Experiencing sexual abuse	Witnessing intimate partner violence	Household member with mental illness	Experiencing physical abuse	Household member substance abuse	Parental separation	Experiencing emotional abuse	Exposure to at least 1 ACE
National estimates	10.6 (10.4, 10.8)	14.1 (13.9, 14.2)	18.1 (17.9, 18.3)	18.7 (18.5, 18.9)	25.2 (24.9, 25.4)	26.3 (26.1, 26.5)	29.4 (29.2, 29.7)	34.5 (34.3, 34.8)	62.8 (62.6, 63.0)
Metropolitan statistical area									
Yes	10.7 (10.5, 10.9)	14.1 (13.9, 14.3)	18.3 (18, 18.5)	19.0 (18.8, 19.2)	25.7 (25.4, 25.9)	26.2 (26, 26.5)	29.9 (29.6, 30.2)	35.2 (35, 35.5)	63.3 (63.0, 63.5)
No	10.0 (9.8, 10.3)	13.8 (13.5, 14.1)	17.1 (16.8, 17.4)	17.2 (16.9, 17.6)	22.2 (21.9, 22.6)	26.7 (26.3, 27.1)	26.5 (26.1, 26.9)	30.6 (30.2, 31)	60.2 (59.8, 60.6)
Sex									
Male	11.5 (11.3, 11.8)	5.4 (5.2, 5.6)	16.2 (15.9, 16.5)	14.6 (14.3, 14.8)	25.8 (25.4, 26.1)	23.2 (22.9, 23.5)	29.4 (29, 29.7)	34.7 (34.3, 35)	63.1 (62.8, 63.4)
Female	9.7 (9.5, 9.9)	22.2 (21.9, 22.5)	19.9 (19.6, 20.2)	22.6 (22.3, 22.9)	24.6 (24.3, 24.9)	29.2 (28.9, 29.5)	29.4 (29.1, 29.8)	34.4 (34.1, 34.8)	62.5 (62.2, 62.9)
Race/ethnicity									
White, non-Hispanic	6.7 (6.6, 6.8)	12.9 (12.7, 13.1)	13.7 (13.6, 13.9)	20.6 (20.4, 20.8)	22.1 (21.9, 22.3)	27.4 (27.1, 27.6)	24.7 (24.4, 24.9)	36.4 (36.2, 36.7)	60.9 (60.6, 61.1)
Hispanic	14.5 (13.8, 15.1)	15.6 (15, 16.2)	26.6 (25.9, 27.3)	19.1 (18.4, 19.7)	35.3 (34.5, 36.1)	25.6 (24.9, 26.3)	37.3 (36.5, 38.1)	33.1 (32.3, 33.8)	67.9 (67.1, 68.8)
Other race/ethnicity categories	19.3 (18.8, 19.8)	16.2 (15.8, 16.7)	24.4 (23.9, 24.9)	12.6 (12.2, 12.9)	26.2 (25.7, 26.8)	23.5 (23.0, 24.0)	37.4 (36.8, 38.0)	30.0 (29.5, 30.6)	61.1 (60.4, 61.7)
Age, years									
18–34	17.4 (17, 17.8)	14.6 (14.2, 14.9)	22.3 (21.9, 22.7)	29.3 (28.9, 29.8)	27.5 (27, 27.9)	32.0 (31.5, 32.4)	46.0 (45.5, 46.6)	46.6 (46.1, 47.1)	74.2 (73.8, 74.7)
35–54	11.3 (11, 11.6)	16.0 (15.7, 16.3)	20.7 (20.3, 21.1)	20.3 (19.9, 20.6)	27.8 (27.4, 28.2)	28.6 (28.2, 29)	34.7 (34.3, 35.1)	37.4 (37, 37.8)	65.7 (65.3, 66.1)
≥55	5.1 (4.9, 5.3)	12.1 (11.8, 12.4)	12.9 (12.7, 13.2)	9.8 (9.6, 10)	21.4 (21.1, 21.7)	20.3 (20.0, 20.6)	13.2 (12.9, 13.5)	23.6 (23.3, 23.9)	51.5 (51.2, 51.8)

[a]Estimates in this table include BRFSS respondents who did and did not answer ACEs questions in 2019–2020. For those BRFSS respondents who actually answered the question, this study reported the direct BRFSS estimates. For those respondents who did not receive or skipped the question, it reported predicted estimates obtained through multilevel mixed-effects logistic regressions or logistic SAE regressions. All estimates are weighted.

ACE, adverse childhood experience; BRFSS, Behavioral Risk Factor Surveillance System; SAE, small area estimation.