

Life Course Indicator: Prevalence of adverse childhood experiences among children

The Life Course Metrics Project

As MCH programs begin to develop new programming guided by a life course framework, measures are needed to determine the success of their approaches. In response to the need for standardized metrics for the life course approach, AMCHP launched a project designed to identify and promote a set of indicators that can be used to measure progress using the life course approach to improve maternal and child health. This project was funded with support from the [W.K. Kellogg Foundation](#).

Using an RFA process, AMCHP selected seven state teams, Florida, Iowa, Louisiana, Massachusetts, Michigan, Nebraska and North Carolina, to propose, screen, select and develop potential life course indicators across four domains: Capacity, Outcomes, Services, and Risk. The first round of indicators, proposed both by the teams and members of the public included 413 indicators for consideration. The teams distilled the 413 proposed indicators down to 104 indicators that were written up according to three data and five life course criteria for final selection.

In June of 2013, state teams selected 59 indicators for the final set. The indicators were put out for public comment in July 2013, and the final set was released in the Fall of 2013.

Basic Indicator Information

Name of indicator: Prevalence of Adverse Childhood Experiences among Children (LC-2)

Brief description: Prevalence of adverse childhood experiences among children

Indicator category: Childhood Experiences

Indicator domain: Risk/Outcome

Numerator: Weighted number of children whose parents responded to the NSCH that their children were exposed to adverse childhood experiences (nine questions related to ACEs)

Denominator: Total number of children

Potential modifiers: Child's gender, age group, race and ethnicity, special health care needs status, family structure, household income, insurance type, and insurance status

Data source: National Survey of Children's Health (NSCH)

Notes on calculation: This indicator should be calculated from ACE1, ACE3, ACE4, ACE5, ACE6, ACE7, ACE8, ACE9, and ACE10 on the NSCH.

1. (ACE1) Since [CHILD'S NAME] was born, how often has it been very hard to get by on your family's income – hard to cover the basics like food or housing? Would you say very often, somewhat often, often, rarely, or never?
2. (ACE3) Did [CHILD'S NAME] ever live with a parent or guardian who got divorced or separated after [CHILD'S NAME] was born?
3. (ACE4) Did [CHILD'S NAME] ever live with a parent or guardian who died?
4. (ACE5) Did [CHILD'S NAME] ever live with a parent or guardian who served time in jail or prison after [CHILD'S NAME] was born?
5. (ACE6) Did [CHILD'S NAME] ever see or hear any parents or adults in (his/her) home slap, hit, kick, punch, or beat each other up?
6. (ACE7) Was [CHILD'S NAME] ever the victim of violence or witness any violence in (his/her) neighborhood?

7. (ACE8) Did [CHILD'S NAME] ever live with anyone who was mentally ill or suicidal, or severely depressed for more than a couple of weeks?
8. (ACE9) Did [CHILD'S NAME] ever live with anyone who had a problem with alcohol or drugs?
9. (ACE10) Was [CHILD'S NAME] ever treated or judged unfairly because of (his/her) race or ethnic group? (National Survey for Children's Health 2011/2012)

For questions that assess how often an experience occurred (ACE1), the response of 'somewhat often' or 'very often' is coded as an adverse family experience. The other questions are dichotomous 'Yes/No' response options. Using the Data Resource Center methodology, this indicator should be group to generate three categories: a) zero adverse experiences, b) one adverse experience and c) two or more adverse experiences. Analysts who use the raw datasets should apply the appropriate survey weights to generate the final estimates.

Similar measures in other indicator sets: Maternal, Infant, and Early Childhood Home Visiting (MIECHV) Benchmark Area Reduction in Crime or Domestic Violence: Screening for domestic violence

Life Course Criteria

Introduction

Adverse childhood experiences (ACEs) are childhood experiences of emotional, physical, or sexual abuse, and household dysfunction. The short- and long-term outcomes of these childhood exposures include a multitude of health and social problems. Childhood maltreatment has been linked to a variety of changes in brain structure and function and stress – responsive neurobiological systems. Epidemiological studies have documented the impact of childhood maltreatment on health and emotional well-being (Anda et al 2006).

Overall, the prevalence of adverse childhood experiences among children is a life course measure because the indicator reflects current childhood experiences that impact health and have the potential to predict future individual and intergenerational health and social outcomes.

Implications for equity

Adverse childhood experiences (ACEs) include psychological, physical, or sexual abuse (witness or victim); living with household members who were substance abusers, mentally ill, suicidal or ever incarcerated; living in a household with poor economic resources, or with parents who got divorced or separated after the child was born; or child exposed to racial or ethnic discrimination. Inherent in this definition of ACEs are reflections of inequity as exposure to any of these events is experienced differently across different populations. ACEs related to incarceration and racial or ethnic discrimination are most intrinsically linked to inequity, as both are markers of larger institutionalized racism and are highly clustered within specific geographic and racial or ethnic populations (Lynch and Sabol 2004; Pettit and Western 2004).

As a composite, the ACEs indicator has implications for many social and psychosocial equity-related measures. Examples of social conditions that the ACEs indicator reflects include limitations in educational attainment/occupational opportunities, reductions in income/socioeconomic status, and increased risk of food insecurity. Children growing up in families with adverse experiences are at increased risk for cognitive and social development problems that may result in learning difficulties and barriers to higher education (Felitti et al 1998; Perry 1998; Anda et al 2006). Lower education levels may translate into fewer job opportunities and a reduced income potential into adulthood (Bremmer 2003). Children raised in certain types of adverse family environments may also be more vulnerable to food insecurity as a result of parental substance abuse, physical/emotional abuse, or neglect (Anda 2004).

Examples of psychosocial measures that ACEs indicators might reflect and influence include depression, hopelessness, and aggression/hostility. Research suggests that individuals who had adverse experiences in childhood are more vulnerable to social/developmental problems (poor self-control, aggression, violence, social isolation) (Dong et al 2004; Evans et al 2008). Additionally, they may be more likely to have social/emotional development problems, alcohol, tobacco, or substance abuse disorders, or mental health disorders (such as depression, suicidal thoughts/attempts, borderline personality disorder, post-traumatic-stress disorder) (Van Der Kolk et al 1991; Chapman et al 2004; Dube et al 2001; Varese et al 2012).

In addition, the basic framework for examining and understanding the impact of any ACE or collection of ACEs across the lifetime trajectory of an individual is also exemplary of the life course perspective and therefore has multiple inherent implications for equity. As Bravemen and Barclay summarize, “[T]he life course perspective focuses on understanding how early-life experiences can shape health across an entire lifetime and potentially across generations; it systematically directs attention to the role of context, including social and physical content along with biological factors, over time. This approach is particularly relevant to understanding and addressing health disparities, because the social and physical contextual factors underlie socioeconomic and racial/ethnic disparities in health.”

Public health impact

The public health impact of ACEs can be framed in two ways: the relationship of individual health trajectories on larger public health spending and the overall impact of risk and protective factors throughout the life course and their influences on intergenerational outcomes.

Analysis reveals that ACEs put individuals at risk for a wide variety of chronic mental, physical and emotional health problems in adulthood. Additionally, ACEs have been associated with an increased propensity to engage in health risk behaviors that are associated with chronic disease and injury, including risky sexual behavior, alcohol, drug, and tobacco use, and a greater likelihood of being overweight/obese (Goodwin 2004; CDC 2013; Anda 2007). Overall, in relation to individual’s experiences of ACEs and larger public health impacts, if the number of children experiencing multiple adverse circumstances was reduced, one might expect to see a substantial reduction in mortality and prevalence rates for these key public health risk and chronic disease indicators. Additionally, a reduction in overall health costs would be expected, as individuals experiencing ACEs are more likely to incur higher health care costs as a result of riskier behavior and a higher rate of physical and mental health issues (Bremner 2003; Walker et al 1999).

A measure called the population attributable fraction (PAF) can be used to quantify the reduction in population disease or mortality if exposure to a risk factor were reduced or eliminated. A specific analysis conducted in the state of Maine of the PAF of a person with four or more ACEs having subsequent poor adult mental, physical or emotional health outcomes demonstrated PAFs of seven to 58 percent. For example, severe obesity in adulthood had a PAF of seven percent while an attempted suicide has a PAF of 58 percent. The authors of this report noted these ACEs are therefore resulting in millions of dollars of costs for individuals and health systems: \$863 million for severe obesity and \$29.5 million for attempted suicides (Forstadt and Rains, 2011).

When framing impact beyond specific health outcomes, linking ACEs to the broader life course theory is important. Life course theory focuses on exposures and experiences, including both risk factors and protective factors, that occur during critical periods of development, such as childhood, and their impact on the future for the individual, the family unit, the community, and the larger society. The impact of ACEs throughout the life cycle has been well established within the life course science literature. This research reveals that ACEs are pervasive, can negatively impact the life trajectory of the individuals experiencing them, and increase the potential for inter-generational familial adversity (Forrest and Riley 2004; Kelly-Irving et al 2013). On the other hand, protective factors can decrease inter-generational familial adversity (Bremner 2003; Richardson et al 2013). This type of mitigation can influence not only the individual but his or her children as well.

Leverage or realign resources

Traditionally, MCH programs have tended to focus on physical and developmental health outcomes as they pertain to the pregnant mother and her fetus, infant, or child. ACEs information provide opportunities for data-driven approaches to improving both pediatric and adult primary care through risk screening individuals for poor mental and physical health outcomes in childhood and beyond. The inclusion of ACEs in public health data analyses and assessments expands the sphere of MCH services to include collaborations with mental/behavioral health services, child abuse/neglect programs, and law enforcement. Additionally, the assessment of ACEs risks within the MCH community could also be of use for other public health promotion and disease prevention programs including chronic disease and communicable/sexually transmitted disease (Fine and Kotelchuck 2010; Shonkoff et al 2009; Foege 1998).

Protective factors (e.g., child’s positive relationship with a caring adult, easy temperament of the child, health insurance coverage for the child) can be more important than risk factors as they mitigate the negative effects of risk factors such as ACEs (Werner and Smith 1992). More attention could be paid to leveraging or realigning resources to provide supports for positive factors. Public health and other partners could work together to support policy and program interventions that

contribute to or enhance protective factors, such as helping parents and family members understand how to support easy temperament in children, establishing family-friendly work policies to allow parents time to parent (i.e. paid maternity and paternity leaves) and working to provide health insurance coverage for all children.

Predict an individual's health and wellness and/or that of their offspring

The level of exposure to ACEs correlates to an association with adult risk behavior, poor health status and disease. The number of categories of adverse childhood experiences shows a graded relationship to the presence of adult diseases (Felitti 1998).

This graded relationship has been documented throughout a significant body of research (Dube et al 2003; Danese et al 2009; Hillis et al 2001; Williamson et al 2002; Ford et al 2011; Chapman et al 2013). Specifically, individuals reporting ACEs, especially multiple ACEs, have greater risks of developing:

- Chronic diseases (autoimmune, COPD, chronic headaches, ischemic heart disease, liver disease, and lung cancer)
- Poor reproductive health outcomes and risky sexual behaviors (fetal death, promiscuity, sexual risk behaviors, sexually transmitted diseases, teen pregnancy, and unintended pregnancy)
- Health risk behaviors (alcohol abuse, drug abuse, obesity, smoking)
- Poor mental health (memory disturbances, depression, hallucinations, suicidal tendencies, work absenteeism, sleep disturbances)

As a result, individuals having ACEs are at increased risk of premature mortality, compared with individuals who did not have ACEs (Brown et al 2009). Additionally, research reveals that ACEs often do not occur in a vacuum – they are comorbid conditions that often occur simultaneously (e.g. a single parent that is mentally ill becomes an alcoholic and physically abuses their child) (Dong et al 2004; Chartier 2010; Edwards 2003).

Data Criteria

Data availability

The National Survey of Children's Health (NSCH), sponsored by the Maternal and Child Health Bureau of the Health Resources and Services Administration, examines the physical and emotional health of children ages zero to 17 years of age. The survey is administered using the State and Local Area Integrated Telephone Survey (SLAITS) methodology, and it is sampled and conducted in such a way that state-level estimates can be obtained for the 50 states, the District of Columbia, and the Virgin Islands. The survey has been designed to emphasize factors that may relate to the well-being of children, including medical homes, family interactions, parental health, school and after-school experiences, and safe neighborhoods. The Maternal and Child Health Bureau leads the development of the NSCH and NS-CSHCN survey and indicators, in collaboration with the National Center for Health Statistics (NCHS) and a national technical expert panel. The expert panel includes representatives from other federal agencies, state Title V leaders, family organizations, and child health researchers, and experts in all fields related to the surveys (adolescent health, family and neighborhoods, early childhood and development, etc.). The most recent data set, the 2011-2012 NSCH, encompasses a sample size of more than 95,000 children with approximately 1,800 interviews completed in each of the 50 states and the District of Columbia.

MCH programs can readily gain immediate access to the data through datasets released by the National Center for Health Statistics, and on the MCHB-sponsored National Data Resource Center for Child and Adolescent Health website (childhealthdata.org). Data from the 2011/2012 NSCH were made available in early 2013. The survey questionnaire and raw dataset are available for download on the Centers for Disease Control and Prevention NCHS website in SAS format. The Data Resource Center (DRC) website provides data nationwide, for all 50 states and the District of Columbia. Additionally, both the raw datasets and the website allow users to stratify measures by sociodemographic groups, including but not limited to age, sex, race/ethnicity, primary household language, household income, and special health care needs. Cleaned, state-specific datasets with new variables that include national and state indicators are available at no cost in SAS and SPSS formats. For information on how to order state-specific sets, contact cahmi@ohsu.edu. Local data is not searchable. The NSCH is not administered annually. Over the past decade, the NSCH has been administered four times.

The ACE module is a new series of questions included for the first time beginning with the 2011-12 survey. Presumably, these questions will be included in subsequent NSCH questionnaires; however, there is no documentation to this effect.

cdc.gov/nchs/slaits/nsch.htm

<http://www.childhealthdata.org/learn/NSCH>

Data quality

The main limitation of the NSCH is that the information provided is from parent recollection of screenings received and the perception of the child's health and development over the past year. The survey methodology does not provide an opportunity for confirmation with medical records or physical measurements. The NSCH is weighted to represent the national population of non-institutionalized children age zero to 17 years. According to the survey documentation, missing data for income were relatively high for 2011-2012 data, and a study of nonresponse patterns indicated that excluding records with missing income could impact the representativeness of the remaining data; therefore, a data file with imputed values for income is provided to be used with the datasets.

The NSCH documentation presents both response rates and completion rates. For 2011-2012 data, the combined national response rate for both landline and cell phone samples was 23 percent. The completion rate, which is calculated as the proportion of households known to include children that completed all sections up to and including Section Six (for children less than six years of age) or Section Seven (for children six to 17 years of age), was 54.1 percent for the landline sample and 41.2 percent for the cell-phone sample.

Qualitative testing of the entire 2007 National Survey of Children's Health was conducted by the National Center for Health Statistics. They conducted cognitive interviews with the 2007 NSCH Computer-Assisted Telephone Interview (CATI) to make sure the entire survey instrument was functioning properly. N=640 interviews were completed over three days in December 2006. The questionnaire was then revised and finalized based on feedback from participants in these interviews.

Previously validated questions and scales are used when available. All aspects of the survey are subjected to extensive literature and expert review. Respondents' cognitive understanding of the survey questions is assessed during the pretest phase and revisions made as required. All final data components are verified by NCHS and DRC/CAHMI staff prior to public release. Face validity is conducted in comparing results with prior years of the survey and/or results from other implementations of items.

No specific reliability results are available for this measure; however, several of the ACE questions included in the NSCH were adapted from a large, validated survey instrument (the Behavioral Risk Factor Surveillance System ACEs Module) measuring the frequency of adverse childhood experiences. Additional ACEs questions were added based on recommendations from the Technical Expert Panel and a period of public comment.

Factors that might impact the quality of the NSCH and/or ACE data include:

- 1) Respondents may feel uncomfortable responding to the sensitive, personal nature of the ACE questions. As a result, the ACE questions may have lower response rates than other questions on the NSCH, which increases the risk for response bias.
- 2) The sensitive, personal nature of the ACE questions on poverty, and incarceration, mental illness, drug, alcohol use/abuse, and physical violence taking place in the child's household or neighborhood may lead to a "social desirability bias". Respondents may feel uncomfortable disclosing their child's experiences related to these topics to a stranger over the phone. This tendency may vary by demographic characteristics.
- 3) Responses to some of the ACE questions may be inaccurate because it is based on parental report of their child's experiences. Parents may be unwilling to reveal experiences that reflect poorly on their parenting skills, or their own mental health or substance abuse issues. Similarly, while the questions do not ask directly about parental violence towards the child, parents who abuse their children may not want to reveal this due to fear of reprisal. In other cases, parents may not even be aware of their child's exposure to adverse experiences –such as their child's feelings and/or frequency of experiencing racial/ethnic bias.

Poor overall survey response rates for the NSCH overall can also impact the quality of the ACE estimates. In 2007, the NSCH survey response rate was 46.7 percent (Shonkoff 2009). For 2011-2012 data, the combined national response rate

for both landline and cell phone samples was 23 percent. The completion rate, which is calculated as the proportion of households known to include children that completed all sections up to and including Section Six (for children less than six years of age) or Section Seven (for children six to 17 years of age), was 54.1 percent for the landline sample and 41.2 percent for the cell-phone sample. A study published in 2012 examined non-response bias in the 2007 NSCH and found that even when nonresponse-adjusted survey weights were used, the interviewed population was more likely to live in areas associated with higher levels of home ownership, lower home values, and greater proportions of non-Hispanic white persons when compared with the non-responding population (Skalland 2012). As a result, estimates derived from the NSCH may not be reflective of the overall population.

Simplicity of indicator

There are a total of nine ACE questions (ACE1; ACE3; ACE4; ACE5; ACE6; ACE7; ACE8; ACE9; ACE10) included on the 2011-12 NSCH:

Results of all nine of the main ACE questions can be summed and scored. Most studies utilize a summative integer count across the different categories of ACEs to categorize responses into high, medium, and low levels of adverse experiences. The Data Resource Center uses the following methodology to generate percentages for experience of a) zero adverse experiences, b) one adverse experience and c) two or more adverse experiences: For question one, which assess how often an experience occurred, the response of 'somewhat often' or 'very often' is coded as an adverse family experience. The other questions are dichotomous 'Yes/No' response options.

The indicator is available pre-calculated for all 50 states and the District of Columbia, so for state and national level estimates no calculation is required. The Data Resource Center provides code for commonly used statistical programs, easing the complexity of performing the calculation from the raw data. The main complexity with this indicator may be with explaining the concept of ACEs to those who are unfamiliar.

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