

Life Course Indicator: Concentrated Disadvantage

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: Concentrated Disadvantage (LC-6)

Brief description: Proportion of households located in census tracts with a high level of concentrated disadvantage, calculated using five census variables

Indicator category: Community Well-being

Indicator domain: Risk/Outcome

Numerator: Number of households with children less than 18 years of age located in census tracts of high concentrated disadvantage

Denominator: Total number of households with children less than 18 years of age

Potential modifiers: age, race, ethnicity, gender, geographic location

Data source: American Community Survey (ACS)

Notes on calculation: Concentrated disadvantage is calculated from five Census variables: 1) Percent of individuals below the poverty line, 2) Percent of individuals on public assistance, 3) Percent female-headed households, 4) Percent unemployed, 5) Percent less than age 18. The percentages of each individual indicator are z-score transformed. A Z-score transformation is achieved by subtracting the mean of the distribution from the variable value and dividing the difference by the standard deviation of the distribution. $Z = (\text{score} - \text{mean}) / \text{standard deviation}$. The resulting value should be averaged into an overall index of concentrated disadvantage or deprivation (6, 9).

Once the index is calculated for all census tracts, the analyst will need to apply a cutoff to determine which census tracts are considered to have “high concentrated disadvantage” and then calculate the number of households in that tract. While there are many options presented in the literature for how to determine what constitutes “high” disadvantage or deprivation, we present a methodology here to start with and that can be used to perform

comparisons across jurisdictions. To that end, areas of “high concentrated disadvantage” are defined as those census tracts whose averaged z-scores fall within the 75th percentile of values. The indicator’s purpose or use determines 1) the desired level of geography for establishing the 75th percentile of values and 2) the geographic unit for the numerator and denominator. If the purpose is to compare this indicator across states to identify states with higher and lower values, the 75th percentile of the averaged z-score for census tracts needs to be established at a national level. For a comparison across counties, the percentile could also be established at a state level. A simple comparison of a jurisdiction or jurisdictions over time is more complicated because the indicator needs to be able to change in a meaningful fashion over time. We recommend 1) the absolute value of the averaged z-score of the 75th percentile for the first time period be held constant over time, and 2) the absolute values of the statistical parameters (means and standard deviations) used to calculate the z-scores for each of the components for the first time period also be held constant. The indicator itself is simply the number of households with children living in a census tract above the 75 percentile in that jurisdiction divided by the total number of households in the same jurisdiction.

This indicator relies on the American Community Survey (ACS) to produce census-tract level estimates. The ACS provides yearly estimates for all states, as well as all cities, counties, metropolitan areas, and population groups of 65,000 people or more. For smaller areas, such as census tracts, multiple survey years are combined to obtain reliable estimates: three survey years in areas with 20,000 to 65,000 people, and five survey years in areas with fewer than 20,000 people.

Similar measures in other indicator sets: None

Life Course Criteria

Introduction

Concentrated disadvantage, poverty, and socioeconomic position are all very similar markers, but concentrated disadvantage may be the most relevant indicator for life course. Poverty or socioeconomic position, which includes income, education, and employment, by themselves do not capture the synergistic effects of economic and social factors cluster geographically and create truly disadvantaged neighborhoods (11).

The components of concentrated disadvantage include poverty, use of public assistance, female-headed households, unemployment, and density of children. Each of these factors was shown by Sampson (1997) to be highly associated with the others and together constitute a proxy of a community at an economic disadvantage (19). In other words, single-parent households and those with children are differentially found in neighborhoods with high concentrations of poverty, unemployment, and use of public assistance (19). Communities with concentrated disadvantage have less mutual trust and willingness among community members to intervene for the common good, which is sometimes referred to as collective efficacy or social capital. Since collective efficacy is a critical way that neighborhoods inhibit the perpetration of violence, individuals, particularly children, who live and grow in disadvantaged neighborhoods are therefore more likely to experience violence just because of where they live.

Implications for equity

The relationship between concentrated disadvantage and various forms of equity has been long known, particularly among children. African American children who lived in severely disadvantaged communities had decreased verbal ability (skill with understanding and using words and language) equivalent to missing a year of schooling when compared with peers who live in less disadvantaged neighborhoods (2). Concentrated poverty also contributes to increased rates of high school drop-out, teen pregnancy, and adolescent delinquency (3,4). Finch (2010) identifies concentrated disadvantage as being associated with decreased overall health (8). More specifically, adverse health outcomes relating to childbearing such as infant mortality rate, low birth weight, and child maltreatment increase among communities with concentrated disadvantage (3,4). Mental health has similarly been linked to concentrated disadvantage, as girls who grew up in communities with high levels of poverty have decreased mental health and increased risk-taking behaviors (10). High poverty neighborhoods are also more likely to lack affordable access to healthy foods and spaces for recreation, resulting in less social capital.

Public health impact

While the association between health and wealth is well established, the direction between the two factors is less so. Literature suggests that the relationship is bidirectional, with health affecting a person's or community's wealth and their wealth also affecting their overall health. It is safe to say, however, that there is an inverse relationship, where reduction of poverty is associated with an increase in health. In addition, as concentrated disadvantage has been shown to be related to reduced educational attainment, future earnings potential is also affected, which continues to deleteriously affect health in these communities.

A positive and sustained change in this indicator would be a decrease in the number of census tracts that meet the initial definition of high concentrated disadvantage and therefore a lower proportion of households exposed to concentrated disadvantage. A positive change in this indicator should result in communities that have improved social capital or collective efficacy. Improved social capital would mean there are more neighborhood-level supports for families, resulting in more opportunities to participate fully as individuals within their communities and ultimately, improved health status.

Leverage or realign resources

Bollens (1997) identifies concentrated disadvantage as a result of institutional discrimination and individual prejudice, arguing that segregation concentrates poverty, particularly among metropolitan inner-cities (1). Quilian (2012) identifies three different types of segregation that affect concentrated disadvantage; racial segregation, poverty-status segregation within race, and segregation from high- and middle-income members of other racial groups (5).

In addressing concentrated poverty, Bollens (1997) references the importance of public policy-makers, regional and city planners, and lawmakers at various levels (particularly at the regional level). Concentrated poverty can be addressed in two primary ways: via enrichment, or in-place, and integration, or mobility interventions. Enrichment consists largely of improvement of living and economic conditions through community development and revitalization programs. Integration interventions, conversely, refer to moving concentrations of poor people to other areas, often suburbs, with better economic and social structures. The mobility method of intervention is effective to some degree; moving an individual out of a high-poverty area to a low poverty area does result in some improved outcomes, such as improved mental health, indicating that the effect of poverty on an individual is not necessarily permanent (17). However, as a strategy to build healthy communities, enrichment through place-based initiatives is preferable to the removal of resources and families from an already disadvantaged area and perpetuating the concentration of disadvantage. The Best Babies Zone Initiative (<http://www.bestbabieszone.org/>) is a place-based multi-sector approach to reducing infant mortality and racial disparities in birth outcomes that works through mobilizing communities to address the social determinants of health in four critical sectors: economics, education, health, and community. The approach aims to strengthen environments that support healthier outcomes and works within a very small zone, sometimes just a few blocks of a neighborhood, where change is needed and resources can be aligned to have a measureable impact.

Within a community, concentrated disadvantage can indicate reduced access to health care, social services, resources, skills, work, education, technology, nutrition, and safety. Addressing these issues of access would cross into every other sector of life. Starting at the most basic level, education is one of the strongest predictors of access to resources for good health and has to be addressed early in the life course. There are many policies that could improve access to better nutrition, physical activity, safety, resources, health care, technology, health care, and social services. Changing the experience of concentrated disadvantage through a strategy like enrichment requires a multi-pronged approach in where activities to improve health work in concert with activities to stimulate the economy, improve educational opportunity, and access to affordable housing.

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

The driving force in concentrated disadvantage revolves around experiences of concentrated poverty. Particularly when experienced early in life, poverty is a solid indicator of an individual's health. In addition, exposure during adolescence raises an individual's risk for teen pregnancy, which in turn raises the risk for adverse birth outcomes. It is clear that concentrated disadvantage affects an individual's future mortality and affects health outcomes for their offspring as well. It is clear that experiencing poverty, particularly during important and transitive phases in the life course, will have an adverse impact on future health. This impact likely exists even if the effect is minimized by later life course events or removing the individual from a highly disadvantaged community.

Data Criteria

Data availability

ACS is an ongoing nationwide survey that collects and provides annually data on demographic, social, economic and housing in the United States. The survey is administered by the U.S. Census Bureau, and it replaced the decennial census long form starting in 2010. The ACS is sampled each year, resulting in three million addresses selected and approximately two million final interviews. However, the sample drawn is substantially smaller than the one used for the previous Census long form; as a result, data must be pooled across years in order to provide reliable estimates for some geographic units. ACS data are released the year following the year in which they were collected, making the estimates extremely timely.

Data quality

Since the ACS is a sampled survey, there are questions about response rates and the statistical precision of the estimates. The Census Bureau takes steps to minimize the error associated with non-sampling error (reporting, coding, sampling frame, survey questionnaires, non-response and interviewer bias) through the use of trained interviewers and careful review of all questionnaire design, sampling, and analytic steps. In addition, the Census Bureau began releasing margin of error data for ACS estimates starting in 2006; these estimates allow data users to calculate 90 percent confidence limits for all point estimates released from the ACS.

To account for the complex sampling design, the ACS employs an equally complex weighting scheme. The weighting process is well-documented in the survey methodology handbook, accessible on the web. Response rates for the ACS are calculated for housing units and group quarters (person). From 2000 to 2011, the housing unit response rates were high and ranged from a low of 93.1 percent in 2004 to a high of 98 percent in 2009. Between 2006 and 2011, the group quarter response rate were even higher and ranged from a low of 97.4 percent in 2006 to a high of 98 percent in 2008 and 2009.

The data quality is excellent. Sensitivity, specificity, predictive value positive and reliability will vary depending on the outcome.

Simplicity of indicator

No linkages are required to calculate this indicator; all of the core elements are publicly available from the Census data. This indicator is somewhat complex to calculate because once the percentages are obtained for each of the five elements, they must be z-score transformed by the analyst. This indicator is designed to be calculated using household data at the county level and can be aggregated up to the state level, which adds analytic steps and levels of complexity to the indicator.

Perhaps the most complex aspect of concentrated disadvantage is the interpretation. The indicator scale, as originally conceptualized by Sampson and colleagues (1997) included a sixth element, percentage of black residents. During the public comment period, concerns were raised that this element was mismatched with the other five, which are primarily economic indicators. In communications with Sampson about this issue, he agreed that there is nothing inherent in racial composition that is disadvantageous. The inclusion of percent black was designed as a proxy to get at the confounding of segregation and poverty in the United States, which he noted is socially produced and maintained (Massey and Denton). Sampson's work originated in Chicago neighborhoods, and the concentrated disadvantage scale was an attempt to quantify the exposure of segregated African American neighborhoods to poverty and other forms of disadvantage (Sampson 2013 personal communication). Ultimately, the sixth element was excluded, with Sampson's guidance that careful interpretation is necessary. It may be useful to compare concentrated disadvantage with another life course indicator, the dissimilarity index, which is a measure of racial residential segregation.

References

1. Bollen SA. Concentrated Poverty and Metropolitan Equity Strategies. *Stanford Law & Policy Review* 1997;8:11.
2. Sampson RJ, Sharkey P, Raudenbush SW. Durable effects of concentrated disadvantage on verbal ability among African-American children. *Proceedings of the National Academy of Sciences of the United States of America* 2008;105(3):845-852.
3. Brooksgunn J, Duncan GJ, Klebanov PK, Sealander N. Do Neighborhoods Influence Child and Adolescent Development. *American Journal of Sociology* 1993;99(2):353-395.

4. Sampson RJ, Morenoff JD, Gannon-Rowley T. Assessing "neighborhood effects": Social processes and new directions in research. *Annual Review of Sociology* 2002;28:443-478.
5. Quillian L. Segregation and Poverty Concentration: The Role of Three Segregations. *American Sociological Review* 2012;77(3):354-379.
6. Messer LC, Laraia BA, Kaufman JS, Eyster J, Holzman C, Culhane J, et al. The development of a standardized neighborhood deprivation index. *Journal of Urban Health* 2006;83(6):1041-1062.
7. O'Campo P, Burke JG, Culhane J, Elo IT, Eyster J, Holzman C, et al. Neighborhood deprivation and preterm birth among non-Hispanic Black and White women in eight geographic areas in the United States. *American journal of epidemiology* 2008;167(2):155-163.
8. Finch BK, Phuong Do D, Heron M, Bird C, Seeman T, Lurie N. Neighborhood effects on health: Concentrated advantage and disadvantage. *Health Place* 2010;16(5):1058-60.
9. Sampson RJ, Raudenbush SW, Earls F. Neighborhoods and violent crime: a multilevel study of collective efficacy. *Science* 1997;277(5328):918-24.
10. Leventhal T, Dupere V. Moving to Opportunity: does long-term exposure to 'low-poverty' neighborhoods make a difference for adolescents? *Soc Sci Med* 2011;73(5):737-43.
11. Wilson WJ. *The truly disadvantaged: The inner city, the underclass, and public policy*: University of Chicago Press; 2012.
12. Wight RG, Cummings JR, Miller-Martinez D, Karlamangla AS, Seeman TE, Aneshensel CS. A multilevel analysis of urban neighborhood socioeconomic disadvantage and health in late life. *Social Science & Medicine* 2008;66(4):862-872.
13. Accountability USG. *Poverty in America: Economic Research Shows Adverse Impacts on Health Status and Other Social Conditions as well as the Economic Growth Rate*; 2011 January 1, 2011.

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