State Strategies for Efficiently Allocating Health Resources: Use of Area-Level Indices in Policy, Funding, and Reimbursement

BY CASEY P. BALIO, NICOLE GALLER, NATHAN DOCKERY, AND MICHAEL B. MEIT,
EAST TENNESSEE STATE UNIVERSITY CENTER FOR RURAL HEALTH AND RESEARCH

REPORT | May 2025

Milbank
Memorial Fund

ABSTRACT

The United States ranks below peer nations on many measures of health status, health care access and quality, and health outcomes while spending significantly more on health care.[1] This combination of factors has driven an effort to better align resources with need to address health disparities and use funds more efficiently. To identify areas with high need, area-level vulnerability and resilience indices (ALVRIs) have been developed to create composite need scores based on combined underlying measures. Federal, state, and local agencies, as well as philanthropies, are using ALVRIs as data-driven strategies to better allocate resources and improve outcomes. This report describes the historical approaches to resource allocation, introduces ALVRIs, and provides considerations for decision makers in states that are using an ALVRI, such as state health officials, Medicaid directors, hospital and health system administrators, and other state agency and department directors.

HISTORY OF RESOURCE ALLOCATION

Resources in public health are typically allocated based on imperfect and limited information, and resources themselves are often limited. Given the insufficiency of resources to meet the needs of all, allocation of resources based on individual, community, or population-level need may maximize their impact. Therefore, measures that accurately reflect needs are crucial to inform evidence-based allocation and demonstrate fiscal responsibility.

Historically, resource allocation in the United States has been based on either population size or simple measures of potential need. In the absence of data on community health needs, funding is often distributed based on the total population size, poverty levels, measures of land area, or a combination of these. These strategies generally assume a direct and linear relationship between these factors and need, and do not include many other important factors such as population demographics, health-related social needs at the individual level, social determinants of health at the population level, health care context, and health status and outcomes.

Other resources, such as disproportionate share hospital payments that provide higher reimbursement for certain hospitals, have been allocated using somewhat more sophisticated measures of need that directly align with the purpose of the program, model, or payment, such as the proportion of patients who are enrolled in Medicaid, uninsured, or dually eligible for both Medicare and Medicaid.[2–4] Similar measures have been used to define health professional shortage areas, a category developed by the Health Resources and Services Administration to inform program eligibility and provider loan repayment.[4,5] While these measures are designed to reflect population, organizational, or individual-level needs, they are still somewhat coarse measures reflecting few dimensions of need or vulnerability, and may not reflect the complex nature of vulnerability, risk, or need within any given community.

To address this gap, several US government agencies, philanthropies, and non-governmental agencies have begun to develop and use numerous area-level vulnerability and resilience indices (ALVRIs; e.g., Area Deprivation Index [ADI], Social Vulnerability Index [SVI]), which combine several measures of need into a single metric providing more comprehensive and robust measures of area-level need to inform resource allocation.[4] ALVRIs combine several dimensions or measures of potential need (often reflecting social determinants of health) into a single composite measure of need.

INTRODUCTION TO ALVRIs

ALVRIs combine community-level measures that capture the relative presence in a community of the social factors that influence health to assess community vulnerability or resilience in a single metric. Most ALVRIs in the United States include similar underlying constructs, such as measures of poverty, housing, education, and employment, and generally use the US Census Bureau's American Community Survey data.[4,6–8] Despite their similarities, ALVRIs also differ in several key ways, including their geographic level(s), domains and measures, method of development, and original purpose.[4,6–8] The ways in which ALVRIs differ are described below, and specific details on these characteristics for a selection of frequently used ALVRIs are available in Table 1.

All ALVRIs aim to convert a complex set of measures into an intuitive and easily digestible format to drive evidence-based decision-making. But they vary according to the following characteristics:

Purpose of Development: Some indices were developed for specific use cases. For example, the SVI, SoVI, and BRIC are primarily intended for uses related to emergency preparedness and disaster response, while others were created for more general applications. These purposes may inform the way in which the index is created and the characteristics described below.

Geographic Level(s): ALVRIs are commonly available at the county or census tract levels, depending primarily on the granularity of the data used to develop the index; however, some are available at the census block group or zip code tabulation area level. Some are also available at multiple levels; for example, the SVI is available at both the county and census tract levels.

Measures: While nearly all ALVRIs include measures related to poverty, housing, education, and employment, other characteristics such as race, ethnicity, internet access, language, and health care context are less frequently used.

Method of Development and Calculation: The techniques used to determine measures and calculate the index score differ. For some indices, measure selection was informed using statistical techniques such as principal component analysis (e.g., ADI[9]), while other indices were informed by expert consensus (e.g., SVI). Across both of these approaches for determining measures, index scores are calculated with weights, and some use standardized measures. For example, there is a complex weighting scheme for measures within the ADI based on principal component analysis, while the SVI equally weights each measure and domain.

Scale: The scale and range of scores for indices differ. For example, some are calculated on an unbounded continuous scale, while others are available on a percentile scale. Depending on the index, a higher score may reflect the positive (i.e., greater resilience) or the negative (i.e., greater risk).

Table 1. Commonly Used Area-Level Vulnerability and Resilience Indices

Index	Geographic level(s)	Domains or types of constructs represented (as described by developer)	Original design purpose	Includes race and/or ethnicity?	Developer/owner
Area Deprivation Index (ADI)[9–11]	Census block group and nine-digit zip code	Domains include income, education, employment, and housing quality	Rank neighborhoods by socioeconomic disadvantage; originally developed by Dr. Gopal Singh at Health Resources & Services Administration with regard to mortality rates by demographic characteristics[9]	No	Center for Health Disparities Research, University of Wisconsin School of Medicine and Public Health

Social Vulnerability Index (SVI)[12]	County and census tract	Themes include socioeconomic status, household characteristic, racial & ethnic minority status, and housing type & transportation	Emergency preparedness and response	Yes	Centers for Disease Control and Prevention (CDC), Agency for Toxic Substances and Disease Registry
Community Resilience Estimates (CRE)[13]	National, state, county, and census tract	Components include those related to income-to-poverty ratio, single or zero caregiver household, unit-level crowding, communication barriers, employment, disability, health insurance coverage, age, transportation, and broadband access	Individual and household disaster preparedness and response	No	US Census Bureau
Minority Health Social Vulnerability Index (MHSVI)[14,15]	County	Themes include socioeconomic status, household characteristics, racial & ethnic minority status, housing type & transportation, health care infrastructure and access, and medical vulnerability	Adapted from the CDC/ATSDR SVI with factors related to COVID-19 outcomes	Yes	CDC and US Department of Health and Human Services Office of Minority Health
Social Vulnerability Index (SoVI) for environmental hazards[16,17]	County	Factors include wealth, race and social status, age, ethnicity, special needs population, service sector employment, race (Native American), and gender	Vulnerability to environmental hazards	Yes	Hazards Vulnerability and Resilience Institute, University of South Carolina
Baseline Resilience Indicators for Communities (BRIC)[18]	County	Categories include human well-being/cultural/social, economic/financial, infrastructure/built environment/housing, institutional/governance, community capacity, and environmental/natural	Resilience to natural hazards	No	Hazards Vulnerability and Resilience Institute, University of South Carolina
Social Deprivation Index (SDI)[19]	County, census tract, zip code tabulation area, primary care service area	Components related to income, education, employment, housing, dependents, and transportation	Quantify disadvantage across small areas	No	Robert Graham Center for Policy Studies in Family Medicine and Primary Care

Child Opportunity Index (COI, currently on COI 3.0)[20]	Census tract (note that census block level data is used in COI 3.0, the most recent version, but that level of data is not publicly available)	COI 3.0 includes measures within subdomains related to early childhood education, elementary education, secondary and post-secondary education, educational resources, pollution, healthy environments, safety resources, health resources, employment, economic resources, socioeconomic inequity, housing resources, social resources, and wealth	Measures the resources and context of environments in which children live that affect their development and future opportunities	No	Based at the Institute for Equity in Child Opportunity & Healthy Development at Boston University School of Social Work

EXAMPLES OF ALVRI USE IN RESOURCE ALLOCATION

The use of ALVRIs has become increasingly common as a strategy to address health disparities through policy and resource allocation, which is likely driven by the growing body of evidence on the relationships between ALVRIs and health outcomes.[7,21–24,25] The Department of Health and Human Services Office of the Assistant Secretary for Planning and Evaluation, in partnership with RAND, and the National Academies of Sciences, Engineering, and Medicine have developed multiple reports to assess applicability and use of social risk factors, and ALVRIs specifically, for these purposes.[4,8,26,27] In addition to this general interest in the use of ALVRIs, there have been numerous applications of ALVRIs within reimbursement mechanisms and other activities by federal, state, and local agencies as well as health care organizations, private payers, philanthropies, and other organizations.

Federal Uses. At the federal level, several agencies have applied ALVRIs in payment, policy, resource distribution, and other related activities, particularly because of their simplicity, transparency, and national relevance. Notably, the Centers for Medicare & Medicaid Services and Centers for Medicare & Medicaid Innovation (CMMI) are using the ADI to identify underserved communities in their Health Equity Benchmark Adjustments as part of the ACO REACH Model, within the Medicare Shared Savings Program, and in their Making Care Primary Model.[23,25,26,28–31] The SVI was also used in multiple federal applications during the COVID-19 pandemic, including identification of areas for testing locations, vaccine allocation, and areas for additional communication and outreach.[32] Similarly, the Department of Health and Human Services Office of Minority Health and the CDC created a Minority Health Social Vulnerability Index based on the original SVI that added components of health care accessibility and health-related vulnerability to further assess COVID-19 vaccination.[33]

State and Local Uses. ALVRIs are also being implemented at the state, city, and county levels. For example, Massachusetts previously used the Neighborhood Stress Score to adjust payments to providers based on area-level economic stress.[38–40] The Maryland Primary Care Program Management Office is using the ADI to inform its Health Equity Advancement Resource and Transformation payment plan, designed to provide support to providers serving Medicare patients with complex needs. The city of Milwaukee has proposed the use of the ADI

to identify disadvantaged areas to prioritize replacement of lead water pipes in the city.[11,41] The Child Opportunity Index (COI) has been used in many states and cities to understand local risk, including in Albany, where it was used to describe variation in neighborhood need and resources, ultimately leading to funding secured to revitalize parks and playgrounds.[42] Further, one study documented the application of eight different indices, including ADI, SVI, and the Healthy Places Index, across 37 states to inform COVID-19 vaccination allocation.[43] Within applications related to COVID-19 response, Pennsylvania considered the ADI when allocating emergency treatments during the COVID-19 pandemic,[10,44] and Michigan used the SVI for vaccine allocation purposes.[45]

Some states created their own or adapted area-level indices by adding or changing variables to better meet policy needs. For example, Vermont created an index adapted from the CDC's SVI based on the number of census tract "flags" of vulnerability.[46] Nebraska has also developed an index based on unemployment, housing burden, and BIPOC (Black, Indigenous, and people of color) population for use in allocating the state's Community Services Block Grant.[47]

Other Uses. Other types of organizations are also using ALVRIs. For example, Blue Cross Blue Shield of Michigan is using the ADI as a part of its value-based care strategy.[48] Chicago-based Rush University Medical Center, Lurie Children's Hospital, and partners have used the COI to identify areas with greater needs to inform various clinical and community efforts to support health.[49]

Challenges to the ADI

Because the ADI has been implemented more widely, it has been subject to the most scrutiny, and concerns have been raised.[34–37] Specifically, the ADI includes three measures related to the cost of housing (median home value, median gross rent, and median monthly mortgage). These measures are not standardized in the calculation of the ADI. Thus, some evidence suggests that these measures may mask the potential vulnerability in communities in areas with high housing costs.[36] This has been identified as potentially most relevant in highly urban areas with very high housing costs, such as New York City and Washington, DC.[36,37] Since this dialogue regarding the applicability of the ADI has begun, CMMI has adjusted the Health Equity Benefit Adjustment structure within the ACO REACH Model to include both national and state ADI measures, as well as low-income subsidy enrollment and dual eligibility.[30]

CONSIDERATIONS FOR USING AND IMPLEMENTING AREA-LEVEL INDICES

A growing body of evidence suggests that ALVRIs do not all behave in the same way, no ALVRI is perfect, and there may not be one ALVRI that is best for all situations.[4,8,50,51] Importantly, there is insufficient evidence around how best to choose and implement an ALVRI, especially for specific populations or applications, and the evidence of the impact of existing applications is limited. Therefore, we have identified several factors to consider when designing policies or activities to address health equity based on risk, vulnerability, or deprivation, each of which is described below.

1. Is the policy or activity meant to address individual- or area-level inequities or disparities?

All of these indices are designed to capture area-level risk or resilience only. Some individuals living in a community that is considered low risk on one of these indices may actually experience high risk on many of these factors. Thus, these indices should not be used as a proxy for individual-level risk.

2. Is the index fit for the given use?

Indices were developed for various purposes and using different methodologies, yet many are being applied outside of their initial purpose. For example, the SVI, SoVI, and BRIC were all designed for emergency and natural disaster preparedness and response,[12,16,18,52] while others, such as the ADI and SDI, were designed for more general purposes to quantify socioeconomic disadvantage. It is important to consider the original intended use of the index, as well as the metrics it comprises, in relation to policy objectives. For example, to identify priority areas for distributing resources after a weather event, indices designed for natural disaster preparedness and response are likely well-suited. However, using an index to identify priority areas for adjusting insurance reimbursement levels may not be the best fit.

3. What geographic level is the most relevant?

Indices are constructed at various geographic levels including county, census tract, census block group, and zip code tabulation areas. Several indices also have separate versions at different geographic levels. For example, the CDC's SVI is available at both the county and census tract levels.[12] The choice of geographic level may be driven by several factors, including geographic level of other data for the specific use, political structures such as county or city governments, and geographic scope of the activity or policy for resource allocation. Understanding the geographic level that is used by an index and how this relates to policy objectives is an important consideration for policy implementation.[4,8,50]

Further, the ADI is calculated on a national basis in percentiles and on a state basis in deciles. Each version may be relevant to different applications, or in combination. For example, CMMI's use of the ADI in the Health Equity Benchmark Adjustments combines both the national percentile and state decile (in addition to other measures).[30]

4. Does the index include race and ethnicity?

Some indices, such as the CDC's SVI, include measures of race and ethnicity, but most others do not. While there are differing perspectives on whether indices should include race and ethnicity given that they are not modifiable factors,[8,50] factors that drive disparities by race and ethnicity (i.e., structural racism and historical barriers) should be considered either within or in combination with the use of an index.

5. How is the index operationalized?

Most area-level indices are measured on a continuous or percentile scale. However, using the index on this scale may not always be feasible or appropriate. If the index is categorized based on thresholds, it is important to consider where the threshold(s) are drawn. For example, while

the national ADI is often dichotomized at the 85th percentile,[22,24] research varies considerably in terms of the threshold that designates the highest level of deprivation or vulnerability.[53] Thresholds should be informed by a combination of existing evidence, the variation or scope that exists within the data or population for the particular use, and expert insight.

6. Are there other measures that should be included in combination with an index?

Many area-level indices include socioeconomic factors, especially those related to income, education, housing, and transportation. However, recent reports have noted that these factors alone may not reflect the variety of health-related measures of need or additional variables that can impact risk for individuals and communities. Because of this, when applying indices for policy and resource allocation purposes, it is important to consider indices in tandem with other measures of health or social need such as health care access. For example, if using an index to support identification of priority areas for vaccine administration, other factors such as previous vaccination rates or presence of local facilities that offer vaccination services, such as pharmacies, clinics, and local health departments, may be important to consider.

7. Does the index represent the population now?

The underlying data that is used to calculate an index is relevant to its applicability. Indices are generally based on large national data sets such as the American Community Survey. Indices may be calculated from different years of data, and some indices (and underlying data sources) may be updated more frequently than others. Because of shifts in population and characteristics that can occur over time, looking at the underlying data in the index, including the years of data used, is relevant to understanding whether the index is representative of the current population.[8] Further, given the novelty of many of these indices, their stability and ability to capture changes over time is largely understudied.

8. How do we know if an index will meet our needs?

Area-level measures present useful tools for quickly identifying areas of need. However, most applications of these indices are still new, with limited information on the impacts and long-term effects of using these indices. When using an area-level index, it is important to continuously evaluate its use and ensure flexibility to adjust the use based on findings.[8] Evaluation should not only measure the impacts on the population(s) of focus to ensure that the intended effects are being realized, but also consider how to identify any unintended consequences or heterogeneous effects on different populations or communities.

TAKEAWAYS FOR DECISION MAKERS

The use of ALVRIs provides the opportunity to improve the distribution of limited resources to help ensure that resource allocations align with need, maximizing their impact and efficiency. Given the number of ALVRIs and limited evidence to inform how best to implement ALVRIs in resource allocation efforts, those selecting an ALVRI should consider factors such as what the index was designed for originally, whether additional measures should be included in its application, and the need to evaluate the impact of its use. As ALVRIs become used more frequently, the evidence base for their use will grow, providing additional opportunities to refine the criteria for their selection and use. Leaders and decision makers using ALVRIs should continue evaluating the impacts of their use and adjust practices as new evidence becomes available.

NOTES

1. Blumenthal D, Gumas ED, Shah A, Gunja MZ, Williams RD II. *Mirror, Mirror 2024: A Portrait of the Failing U.S. Health System.* 2024. Accessed December 10, 2024. https://www.commonwealthfund.org/publications/fund-reports/2024/sep/mirror-mirror-2024

2. Centers for Medicare & Medicaid Services. *Disproportionate Share Hospital (DSH).* 2024. Accessed December 10, 2024. https://www.cms.gov/medicare/payment/prospective-payment-systems/acute-inpatient-pps/disproportionate-share-hospital-dsh

3. Centers for Medicare & Medicaid Services. *Medicaid Disproportionate Share Hospital (DSH) Payments.* Accessed December 10, 2024. https://www.medicaid.gov/medicaid/financial-management/medicaid-disproportionate-share-hospital-dsh-payments/index.html

4. Breslau J, Martin L, Timbie J, Qureshi N, Zajdman D. *Landscape of Area-Level Deprivation Measures and Other Approaches to Account for Social Risk and Social Determinants of Health in Health Care Payments.* Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services. September 26, 2022. Accessed August 1, 2023. https://aspe.hhs.gov/reports/area-level-measures-account-sdoh

5. Health Resources & Services Administration. *What Is Shortage Designation?* June 2023. Accessed December 10, 2024. https://bhw.hrsa.gov/workforce-shortage-areas/shortage-designation

6. Trinidad S, Brokamp C, Huertas AM, et al. Use of area-based socioeconomic deprivation indices: a scoping review and qualitative analysis. *Health Aff.* 2022;41(12):1804-1811. doi:10.1377/HLTHAFF.2022.00482

7. Mah JC, Penwarden JL, Pott H, Theou O, Andrew MK. Social vulnerability indices: a scoping review. *BMC Public Health.* 2023;23(1):1-11. doi:10.1186/S12889-023-16097-6/FIGURES/3

8. Sheingold S, Zuckerman R, Alberto C, Samson L, Lee E, Aysola V. Reflections *Accompanying a Report on Addressing Social Drivers of Health: Evaluating Area-Level Indices* (Issue Brief No. HP-2022-26). Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services. September 2022. https://aspe.hhs.gov/sites/default/files/documents/7814e2c613d6004f419b357ed85b8d7d/Area-level-Indices-ASPE-Reflections.pdf

9. Singh GK. Area deprivation and widening inequalities in US mortality, 1969–1998. *Am J Public Health.* 2003;93(7):1137. doi:10.2105/AJPH.93.7.1137

10. Kind AJH, Buckingham WR. Making neighborhood-disadvantage metrics accessible — the Neighborhood Atlas. *N Engl J Med.* 2018;378(26):2456. doi:10.1056/NEJMP1802313

11. Center for Health Disparities Research, University of Wisconsin School of Medicine and Public Health. *Neighborhood Atlas.* Accessed August 1, 2023. https://www.neighborhoodatlas.medicine.wisc.edu/

12. Centers for Disease Control and Prevention, Agency for Toxic Substances and Disease Registry. *CDC/ATSDR Social Vulnerability Index.* Accessed August 1, 2023. https://www.atsdr.cdc.gov/placeandhealth/svi/index.html

[13] U.S. Census Bureau Department of Commerce. *2022 Community Resilience Estimates: Quick Guide;* 2024. Accessed December 11, 2024. https://www2.census.gov/programs-surveys/demo/technical-documentation/community-resilience/2022/cre_quickguide_2022.pdf

[14] U.S. Department of Health and Human Services Office of Minority Health. *Minority Health SVI.* September 22, 2023. Accessed December 11, 2024. https://minorityhealth.hhs.gov/minority-health-svi

[15] Department of Health & Human Services, U.S. Department of Health and Human Services Office of Minority Health, Centers for Disease Control and Prevention Agency for Toxic Substances and Disease Registry. *Minority Health Social Vulnerability Index Fact Sheet.* 2023. Accessed December 11, 2024. https://s3.us-gov-west-1.amazonaws.com/cg-d102dd1b-a880-440b-9eae-e2445148aee9/s3fs-public/documents/2020%20MH%20SVI%20Fact%20Sheet%5B12%5D.pdf

[16] University of South Carolina Hazards Vulnerability & Resilience Institute. *SoVI®: Social Vulnerability Index for the United States — 2010–14 and 2019 Indexes.* Accessed December 11, 2024. https://sc.edu/study/colleges_schools/artsandsciences/centers_and_institutes/hvri/data_and_resources/sovi/index.php

[17] Cutter SL, Boruff BJ, Shirley WL. Social vulnerability to environmental hazards. *Soc Sci Q.* 2003;84(2):242-261. doi:10.1111/1540-6237.8402002

[18] University of South Carolina Hazards Vulnerability & Resilience Institute. *BRIC: Baseline Resilience Indicators for Communities.* Accessed December 11, 2024. https://sc.edu/study/colleges_schools/artsandsciences/centers_and_institutes/hvri/data_and_resources/bric/

[19] Robert Graham Center – Policy Studies in Family Medicine & Primary Care. *Social Deprivation Index (SDI).* November 5, 2018. Accessed December 11, 2024. https://www.graham-center.org/maps-data-tools/social-deprivation-index.html

[20] diversitydatakids.org. *Child Opportunity Index (COI).* Accessed February 20, 2025. https://www.diversitydatakids.org/child-opportunity-index

[21] Morenz AM, Liao JM, Au DH, Hayes SA. Area-level socioeconomic disadvantage and health care spending: a systematic review. *JAMA Netw Open.* 2024;7(2):e2356121. doi:10.1001/JAMANETWORKOPEN.2023.56121

[22] Hu J, Kind AJH, Nerenz D. Area deprivation index (ADI) predicts readmission risk at an urban teaching hospital. *Am J Med Qual.* 2018;33(5):493-501. doi:10.1177/1062860617753063

[23] Powell WR, Sheehy AM, Kind AJH. The Area Deprivation Index is the most scientifically validated social exposome tool available for policies advancing health equity. *Health Affairs Forefront.* July 20, 2023. doi:10.1377/FOREFRONT.20230714.676093

[24] Kind AJH, Jencks S, Brock J, et al. Neighborhood socioeconomic disadvantage and 30-day rehospitalization: a retrospective cohort study. *Ann Intern Med.* 2014;161(11):765-774. doi:10.7326/M13-2946

[25] Phillips RL Jr, Ostrovsky A, Bazemore AW. Adjusting Medicare payments for social risk to better support social needs. *Health Affairs Forefront.* June 1, 2021. doi:10.1377/hblog20210526.933567

[26] National Academies of Sciences, Engineering, and Medicine. *Accounting for Social Risk Factors in Medicare Payment*. The National Academies Press; 2017.

[27] Phillips RL Jr, Ostrovsky A, Gilfillian R, Price D, Bazemore AW. *Accounting for Social Risks in Medicare and Medicaid Payments*. Commonwealth Fund. February 1, 2023. Accessed October 23, 2023. https://www.commonwealthfund.org/blog/2023/accounting-social-risks-medicare-and-medicaid-payments

[28] Centers for Medicare & Medicaid Services. *Medicare Advantage Value-Based Insurance Design Model Extension Fact Sheet*. March 23, 2023. Accessed December 10, 2024. https://www.cms.gov/priorities/innovation/vbid-extension-fs

[29] Crowell Health Solutions. *Examining the Use of the Area Deprivation Index in Value-Based Care Models*. Accessed December 11, 2024. https://www.crowellhealthsolutionsblog.com/2023/07/examining-the-use-of-the-area-deprivation-index-in-value-based-care-models/#_ftn6

[30] Centers for Medicare & Medicaid Services. *ACO REACH Model Performance Year 2024 (PY2024) Model Update – Quick Reference*. September 10, 2024. Accessed December 10, 2024. https://www.cms.gov/priorities/innovation/innovation-models/reach-py24-model-perf

[31] Centers for Medicare & Medicaid Services, Centers for Medicare & Medicaid Innovation. *Making Care Primary: Payment and Attribution Methodologies PY 2025 (Version 1.0)*. 2024. Accessed December 11, 2024. https://www.cms.gov/files/document/mcp-pymt-att-methodologies.pdf

[32] ATSDR Place and Health – Geospatial Research Analysis and Services Program (GRASP). *Innovative Uses of SVI During COVID-19*. July 21, 2024. Accessed December 10, 2024. https://www.atsdr.cdc.gov/place-health/php/covid19response/innovative-uses-of-svi-during-covid-19.html

[33] Saelee R, Chandra Murthy N, Patel Murthy B, et al. Minority Health Social Vulnerability Index and COVID-19 vaccination coverage — the United States, December 14, 2020–January 31, 2022. *Vaccine*. 2023;41(12):1943. doi:10.1016/J.VACCINE.2023.02.022

[34] Rehkopf DH, Phillips RL. The Neighborhood Atlas Area Deprivation Index and recommendations for area-based deprivation measures. *Health Aff*. 2023;42(5):710-711. doi:10.1377/HLTHAFF.2023.00282

[35] Azar KMJ, Alexander M, Smits K, Tio A, deGhetaldi L. ACO benchmarks based on Area Deprivation Index mask inequities. *Health Affairs Forefront*. February 17, 2023. doi:10.1377/FOREFRONT.20230215.8850

[36] Petterson S. Deciphering the Neighborhood Atlas Area Deprivation Index: the consequences of not standardizing. *Health Affairs Scholar*. 2023;1(5). doi:10.1093/HASCHL/QXAD063

[37] Hannan EL, Wu Y, Cozzens K, Anderson B. The Neighborhood Atlas Area Deprivation Index for measuring socioeconomic status: an overemphasis on home value. *Health Aff*. 2023;42(5):702-709. doi:10.1377/HLTHAFF.2022.01406

[38] *FAQs for MassHealth's 2017 Payment Model.* Accessed December 11, 2024. https://www.mass.gov/files/documents/2017/11/07/social-determinants-of-health-faq.pdf

[39] Ash AS, Mick E. *UMASS Risk Adjustment Project for MassHealth Payment and Care Delivery Reform: Describing the 2017 Payment Model.* October 11, 2016. Accessed December 10, 2024. https://www.mass.gov/doc/umass-modeling-sdh-summary-report-3/download

[40] Alcusky MJ, Mick EO, Allison JJ, et al. Paying for medical and social complexity in Massachusetts Medicaid. *JAMA Netw Open.* 2023;6(9):e2332173. doi:10.1001/JAMANETWORKOPEN.2023.32173

[41] Eddy T, Gallagher S. *Milwaukee Water Works developing Equity Prioritization Plan.* WTMJ-TV Milwaukee. March 29, 2023. Accessed December 11, 2024. https://www.tmj4.com/news/i-team/milwaukee-water-works-developing-equity-prioritization-plan

[42] Sofer N. Keeping kids active in Albany. diversitydatakids.org. December 22, 2019. Accessed February 20, 2025. https://www.diversitydatakids.org/research-library/impact-story/keeping-kids-active-albany

[43] Srivastava T, Schmidt H, Sadecki E, Kornides ML. Disadvantage indices deployed to promote equitable allocation of COVID-19 vaccines in the US: a scoping review of differences and similarities in design. *JAMA Health Forum.* 2022;3(1):e214501. doi:10.1001/JAMAHEALTHFORUM.2021.4501

[44] Pennsylvania Department of Health, Pennsylvania Emergency Management Agency, Pennsylvania Department of Human Services. *Ethical Allocation Framework for Emerging Treatments of COVID-19.* Accessed December 11, 2024. https://www.neighborhoodatlas.medicine.wisc.edu/FOR_DISTRO_Ethical_Allocation_Framework_for_Emerging_Treatments_of_COVID-19.pdf

[45] Michigan Department of Health & Human Services. *Michigan COVID-19 Vaccination Interim Prioritization Guidance.* 2021. Accessed December 11, 2024. https://www.michigan.gov/-/media/Project/Websites/coronavirus/Folder11/MI_COVID-19_Vaccination_Prioritization_Guidance.pdf

[46] Vermont Department of Health. *Social Vulnerability Index: A User's Guide.* 2015. Accessed December 11, 2024. https://www.healthvermont.gov/sites/default/files/documents/2016/12/ENV_EPHT_SocialVulnerabilityIndex.pdf

[47] Nebraska Department of Health and Human Services. *CSBG State Plan.* 2024. Accessed December 11, 2024. https://dhhs.ne.gov/Documents/CSBG-State-Plan-FY-2025-2026.pdf

[48] Huhn J, Fick A. *Health Equity in Value Based Care.* Presentation delivered at the Rural Health Symposium. 2024. Accessed December 11, 2024. https://mcrh.msu.edu/-/media/assets/mcrh/docs/events/2024rhc/109—-black-river—-social-rick-and-vbc—-fick-and-huhn-slides.pdf

[49] O'Connor L. *Moving Data to Action in Chicago: Education and City-Wide Collaboration Build a Healthier Chicago.* diversitydatakids.org. April 17, 2020. Accessed February 20, 2025. https://www.diversitydatakids.org/research-library/impact-story/moving-data-action-chicago

[50] Rollings KA, Noppert GA, Griggs JJ, Melendez RA, Clarke PJ. Comparison of two area-level socioeconomic deprivation indices: implications for public health research, practice, and policy. *PLoS One*. 2023;18(10):e0292281. doi:10.1371/JOURNAL.PONE.0292281

[51] Park C, Schappe T, Peskoe S, et al. A comparison of deprivation indices and application to transplant populations. *Am J Transplant*. 2023;23(3):377-386. doi:10.1016/J.AJT.2022.11.018

[52] Flanagan BE, Gregory EW, Hallisey EJ, Heitgerd JL, Lewis B. A social vulnerability index for disaster management. *J Homel Secur Emerg Manag*. 2020;8(1). doi:10.2202/1547-7355.1792

[53] Balio CP, Galler N, Mathis SM, et al. *Use of the Area Deprivation Index and Rural Applications in the Peer-Reviewed Literature*. Rural Health Research Gateway. March 2024. Accessed December 11, 2024. https://www.ruralhealthresearch.org/publications/1647

ABOUT THE AUTHORS

Casey Balio, PhD, is a research assistant professor at the East Tennessee State University (ETSU) Center for Rural Health and Research and the Department of Health Services Management and Policy. Her research focuses on the intersection of rural health, health policy, and public health. She is also a member of the ETSU/NORC Rural Health Research Center, focused on conducting policy-relevant rural health research, and the Consortium for Workforce Research in Public Health, focused on public health systems and workforce research.

Nicole Galler, DrPH, MPH, is a graduate of East Tennessee State University and a former graduate research assistant for the Center for Rural Health and Research and the Department of Health Services Management and Policy. Her research interests include health care access and quality, especially among rural populations. She has experience managing government funded research, training projects, analyzing and disseminating information at federal, state and local levels.

Nathan Dockery, BS, is a graduate research assistant at the East Tennessee State University Center for Rural Health and Research. He is also a Master of Public Health student with a concentration in Epidemiology. His research interests include rural health, harm reduction, and public health systems. He has supported projects with the ETSU Quillen College of Medicine, the ETSU/NORC Rural Health Research Center, and the Consortium for Workforce Research in Public Health.

Michael Meit, MA, MPH, serves as director of the East Tennessee State University Center for Rural Health and Research and deputy director of the ETSU/NORC Rural Health Research Center. His work centers on rural public health systems, with a focus on the capacities and needs of rural communities. He has led studies for HRSA, CDC, and the Appalachian Regional Commission, among others, and regularly shares findings at state and national rural and public health events. His career has included roles at the state and national levels and has consistently emphasized applied research to inform policy and practice.

Milbank Memorial Fund

Using evidence to improve population health

About the Milbank Memorial Fund

The Milbank Memorial Fund works to improve population health and health equity by collaborating with leaders and decision makers and connecting them with experience and sound evidence. Founded in 1905, the Milbank Memorial Fund advances its mission by identifying, informing, and inspiring current and future state health policy leaders to enhance their effectiveness; convening and supporting state health policy decision makers to advance strong primary care, and sustainable health care costs; and publishing high-quality, evidence-based publications and *The Milbank Quarterly*, a peer-reviewed journal of population health and health policy. For more information, visit **www.milbank.org**.