Unmet Need Score (UNS) and Service Area Status (SAS) Resource Guide

Description of Service Area Needs Assessment Methodology (SANAM) and Resulting UNS and SAS

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1 Background

This resource guide is designed to provide information on the Health Resources and Services Administration (HRSA) Service Area Needs Assessment Methodology (SANAM), a methodology that generates a quantitative assessment of an area's unmet need for primary and preventive health care services for the Health Center Program. This guide describes how the SANAM calculates an Unmet Need Score (UNS), the measures and measure weights used in the calculation, and data sources from which the measures are derived. It also provides the conceptual model and evidence-based methodology that is incorporated into the design of the SANAM.

The UNS was developed with input from relevant parties, in order to identify unmet need for primary and preventive health care services and advance health equity. The first version of the UNS was deployed in 2019. This document will cover the updated UNS.

The HRSA Health Center Program historically used a variety of methods to evaluate an area's unmet need for primary and preventive health care services. The SANAM advances the Health Center Program's mission to support equitable allocation of resources by applying a standard, transparent, verifiable, and automated approach to assess the primary and preventive care needs of proposed service areas. The SANAM reduces the data collection and reporting burden on health center applicants, in order to create an equitable process for all applicants.

The SANAM leverages publicly available data to estimate the overall need for primary and preventive health care at the ZIP Code level,[1] which allows for calculation of an UNS for any combination of ZIP Codes that health centers are proposing to serve through the addition of one or more service delivery sites. These data were selected to create a comprehensive profile of the social, economic, and health status of a proposed service area. The SANAM automates and standardizes the calculation of an UNS and facilitates assessment of unmet primary and preventive health care need across different service areas to assist the Health Center Program in targeting its resource allocation.

The SANAM was designed to objectively capture aspects of need that are particularly relevant to the Health Center Program in order to contribute to the Program's mission to provide high-quality primary health care services to the nation's underserved and vulnerable populations. For more information on the development, testing, and selection of the SANAM measures, see Appendix A.

The SANAM and resulting UNS for the 50 states and the District of Columbia is described in the main body of this resource guide. Differences in availability of data and key drivers of morbidity and mortality necessitated the development of UNS calculations specific to Puerto Rico, the other U.S. Territories, and the Freely Associated States, which are discussed in Appendix B. A use case for a modified UNS, called the Service Area Status (SAS), is discussed in Appendix C.

[1] In this document, ZIP Code refers to a ZIP Code Tabulation Area (ZCTA), which is a construct of the U.S. Census Bureau to represent the U.S. Postal Service ZIP Code service area.

2 Description of Measures Used to Calculate the UNS

The UNS is essentially a weighted sum of measure values. For the SANAM and resulting UNS, need is defined as the relative disparities in population health status exhibited across health center service areas, as well as the upstream and downstream determinants that lead to health disparities. This definition provides a basis for selecting the measures and weights. See Appendix A for more on the selection of measures and weights.

The 28 measures used in the calculation of the UNS are listed in Figure 1, along with a number representing the measure's weight. The measure weight indicates the relative importance of the measure in estimating unmet need. Each measure weight is presented as a percentage of the total weight. The total weight allocated across all measures is 100.[2] The calculation details are provided in Section 4.

The measures are organized into measure groups under the health determinants and health status measure categories. All the health determinants measures focus on health care access except for Violent Crime and Limited Access to Healthy Foods. The Violent Crime measure primarily affects health outside the pathway of access to care, while the Limited Access to Healthy Foods measure captures the neighborhood and built environment. The access outcome measure group captures retrospective information about outcomes related to access, while the access barrier measure group captures information on impediments to timely access to care. Six of the 12 access barrier measures are indicators of socioeconomic status and are key social determinants of health. These six measures also serve as proxy measures of health status. The direct measures of health status provide information on morbidity and mortality, as well as top risk factors and health behaviors driving morbidity and mortality. For more on this organizing conceptual framework, see Appendix A.2.

[2] Throughout this document, measure weights are presented in rounded form. Total weights are always normalized to sum to 100.

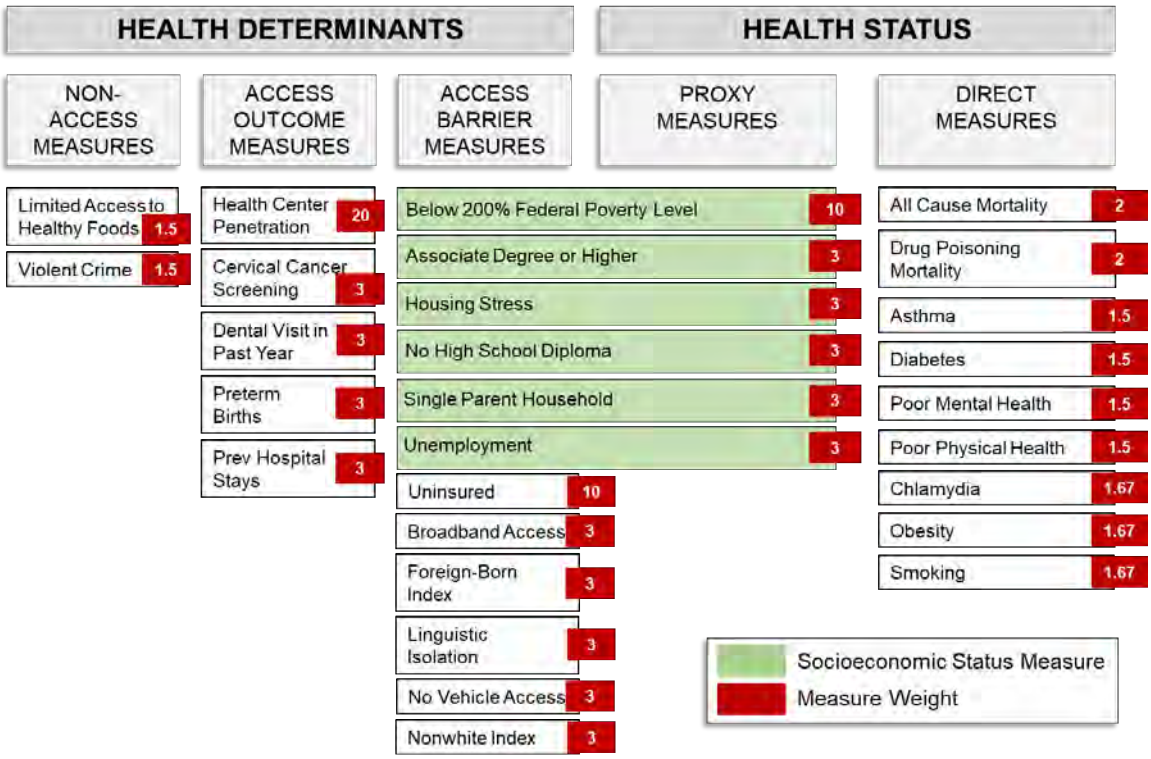

Figure 1. The Measures and Measure Weights Used in the UNS Calculation

Table 1 provides a definition for each measure, the weight assigned to the measure, and a summary of the rationale for the measure's inclusion. The measure selection process prioritized the inclusion of measures used by reputable needs assessment instruments that make important and unique contributions to measuring area-level unmet need for primary and preventive health care. Further information on the measure selection process can be found in Appendix A. A list of the key scientific reports and articles consulted to develop the conceptual framework and to evaluate, select, and weight the measures can be found in Appendix D.

For the health determinants measures involving access, the summary rationale presented in Table 1 includes a discussion of interrelated "access dimensions," that when combined, form a comprehensive and evidence-based assessment of access to health care, as follows:

Availability/Accommodation: ability to reach health care
Affordability: ability to pay for health care
Approachability: ability to identify health care services that address needs
Acceptability: ability to seek health care services based on social and cultural factors
Appropriateness: ability to receive timely quality health care (also termed "access outcome" or "realized access")

Table 1. Information for Measures Used in Calculation of UNS

Measure	Definition	Weight	Rationale
Non-Access Measures (Total Weight = 3%)			
Limited Access to Healthy Foods	Percent of population that is low-income (below 200% the Federal Poverty Level) and does not live close to a grocery store (more than 10 miles for rural and 1 mile for non-rural)	1.50%	Access to healthy, nutritious foods is widely accepted as essential for good health. Communities that do not have a grocery store in close proximity have increased difficulty in obtaining healthy foods, resulting in increased vulnerability to adverse health outcomes. This measure captures an aspect of the neighborhood and built environment, which is not directly assessed by other UNS measures.
Violent Crime	Number of violent crimes per 100,000 population	1.50%	High crime rates negatively influence physical and mental well-being by affecting stress levels and contributing to stress-related disorders, in addition to discouraging participation in healthy behaviors such as exercise and socialization.
Access Outcome Measures (Total Weight = 32%)			
Health Center Penetration	Ratio of the population served by a health center to the population with household income below 200% of the Federal Poverty Level (FPL). Health Center Penetration is capped at a value of one	20.00%	This measure helps capture multiple dimensions of access (acceptability, affordability, availability, and appropriateness), and has been used in previous New Access Point (NAP) opportunities to award priority points. This ratio provides insight into the extent of the unmet need for health services among underserved populations in a ZIP Code. Relative to other access measures, it is the most specific to the Health Center Program in that it approximates the degree to which the Health Center Program potential patient populations have already achieved access to existing health center sites. It is also one of the most "actionable" measures for the Health Center Program in that funding and site approval decisions can directly affect the measure's numerator—the population that has accessed services at a health center. Consequently, this measure carries the most weight.

Measure	Definition	Weight	Rationale
Cervical Cancer Screening	Percent of women ages 21 to 64 years who had the recommended cervical cancer screening (considers both Pap smear and human papillomavirus test)	3.00%	This measure helps capture the appropriateness dimension of access and is used to assess population-level receipt of quality and timely preventive care. Underserved populations have lower rates of Pap smear screenings and are at higher risk for behaviors that negatively impact reproductive health. Of the publicly available measures commonly used to assess population-level receipt of quality and timely preventive screenings, this measure was best suited for incorporation, based upon availability of data for small geographic areas.
Dental Visit in Past Year	Percent of adults aged 18 and older who visited a dentist or dental clinic in the past year	3.00%	This measure helps capture multiple dimensions of access (acceptability, affordability, availability, appropriateness). Oral health is essential to general health and well-being. This measure provides a more complete and reliable assessment of a service area population's access to dental care than other measures that are publicly available and cover this area of health-related need (e.g., "Population to Dentist Ratio" only partially captures the dimensions of access).
Preterm Births	Fraction of babies born before 37 weeks gestation	3.00%	This measure helps capture the appropriateness dimension of access. Preterm birth is the principal contributor to low birthweight and the main underlying cause of stillbirth and infant mortality. The overwhelming consensus by authoritative bodies is to directly examine the proportion of preterm births in the population (over low birthweight and infant mortality) if data quality and availability allow.
Preventable Hospital Stays	Age and sex adjusted rate of hospitalizations for ambulatory-care sensitive conditions per 100,000 Medicare enrollees	3.00%	This measure helps capture the appropriateness dimension of access. Preventable hospitalization is often a consequence of the failure to receive timely quality primary care, and it indicates the costly overuse of hospitals as a main source of care.

Measure	Definition	Weight	Rationale
Access Barrier Measures and Proxy Measures of Health Status (Total Weight = 50%)			
Below 200% Federal Poverty Level (FPL)	Fraction of the area's population living in households with income below 200% of the FPL	10.00%	This measure helps capture the affordability dimension of access. This measure contributes to a robust assessment of socioeconomic status, one of the main drivers of population health disparities. The measure approximates the proportion of the potential population of Health Center Program patients in a ZIP Code, in addition to being one of the most common determinants of access, quality of care, and health status among populations served by the Health Center Program. This measure is important to the Health Center Program because it identifies the proportion of a population in a defined area that could benefit from the sliding fee discount program offered by health centers. Therefore, the measure has a higher weight.
Associate Degree or Higher	Fraction of the population age 25 and older whose highest level of education attained is an Associate- level degree or higher	3.00%	This measure helps capture the approachability dimension of access. In addition to serving as a measure of educational attainment, this measure serves as a proxy for occupational status in needs assessment instruments. Educational attainment and occupation are key determinants of population health care access and health status, and contribute to a robust assessment of socioeconomic status, one of the chief drivers of population health disparities.

Measure	Definition	Weight	Rationale
Housing Stress	Fraction of households where one or more of the following conditions are met: (1) housing expense/income threshold—monthly housing costs, including utilities, exceed 30% of income, (2) crowding—more household members than rooms, (3) incomplete plumbing—home lacks necessary bathroom facilities, and (4) incomplete kitchen—home lacks essential kitchen facilities	3.00%	This measure helps capture the affordability dimension of access. In addition to contributing to a robust assessment of socioeconomic status by adding information about household financial well-being, this measure accounts for the effect of the physical environment on population health, since poor housing conditions are a risk factor for chronic obstructive pulmonary disease and asthma—two top drivers of mortality and health care cost burden in the United States.
No High School Diploma	Fraction of individuals age 18 and older without a high school diploma or equivalent	3.00%	This measure helps capture the approachability dimension of access. Educational attainment is a principal determinant of access to health care and population health status. Populations without a high school degree fare worse on population health indicators compared to those with higher levels of education. The use of this measure contributes to a robust assessment of socioeconomic status, along with the measures Unemployment and Associate Degree or Higher, which help approximate occupational status, stability, and mobility; and Housing Stress, Single-Parent Household, and Below 200% Federal Poverty Level, which help approximate household financial resources.

Measure	Definition	Weight	Rationale
Single-Parent Household	Fraction of children under 18 who are living in single-parent households in a family or subfamily (excludes institutions, group homes, and other group living situations)	3.00%	This measure helps capture the affordability and availability dimensions of access. Single-parent households are restricted in financial and human resources, and they experience social and material deprivation. These factors impact the ability to seek and afford health care, as well as to participate in behaviors that promote health.
Unemployment	Fraction of civilian labor force age 16 and older that is unemployed	3.00%	This measure helps capture the affordability dimension of access. This measure contributes to a robust assessment of socioeconomic status, one of the main drivers of population health disparities. Unemployment impacts the ability to afford health care as well as to participate in behaviors that promote health. Unemployment contributes to stress levels and is a risk factor for negative health behaviors, such as substance misuse, that can lead to a cascade of negative life consequences, such as loss of income and further health deterioration.
Uninsured	Fraction of civilian non-institutionalized population without health insurance	10.00%	This measure helps capture the affordability dimension of access. Health insurance absorbs some of the costs associated with seeking health care. This measure is important to the Health Center Program because it identifies the proportion of a population in a defined area that could benefit from the sliding fee discount program offered by health centers. Therefore, this measure has higher weight.
Broadband Access	Fraction of households that have a subscription to broadband	3.00%	This measure helps capture the ability to access virtual primary and preventive care services. Researchers have identified broadband access as an important social determinant of health.

Measure	Definition	Weight	Rationale
Foreign-born Concentration Index	The number of high-income, native-born individuals minus number of low-income, foreign-born individuals divided by total population	3.00%	This measure compares the relative concentration of low-income, foreign-born populations (below 20th percentile in individual income) to high-income, native-born populations (above 80th percentile in individual income) to capture the extent of spatial polarization between these groups. Disparities between foreign-born and native-born individuals' access to health services and health care utilization have been attributed to stigmatization, fear of deportation, absence of culturally sensitive care and health information, and difficulty navigating complex health insurance systems. Low-income, foreign-born populations also access public benefits at a lower rate than native-born populations.
Linguistic Isolation	Fraction of the population age 5 years and older who speak English less than "very well"	3.00%	This measure helps capture the approachability and acceptability dimensions of access. Linguistic and cultural differences impact a population's ability to access health care as well as to participate in behaviors that promote health. In the absence of other publicly available and feasible measures of the cultural and linguistic determinants of health care access and health status, this measure best captures the populations requiring culturally and linguistically competent care, including migratory and seasonal agricultural worker populations that are of concern to the Health Center Program.

Measure	Definition	Weight	Rationale
No Vehicle Access	Fraction of households with no vehicles (passenger cars, vans, and pickup or panel trucks of one-ton capacity or less kept at home, including vehicles rented/leased for one month or more, company vehicles, and government vehicles used for non-business purposes) available for personal use	3.00%	This measure helps capture the affordability and availability dimensions of access. Vehicle availability may increase the number of providers and other health-promoting resources that are accessible to a population and may provide additional insight into a family's financial situation beyond the yearly household income information captured by other measures.
Nonwhite Concentration Index	The number of high-income white, non-Hispanic / Latino individuals minus number of low-income nonwhite individuals divided by total population	3.00%	This measure compares the relative concentrations of low-income nonwhite populations (below 20th percentile in household income) in relation to high-income, white non-Hispanic / Latino populations (above 80th percentile in household income) to capture the extent of spatial polarization between these groups. Racial and ethnic disparities in insurance rates, quality of care, health status, and health outcomes are well-documented within a large body of literature. This measure considers the intersection of racial / ethnic identity and income to identify areas with predominantly low-income, nonwhite populations.

Measure	Definition	Weight	Rationale
Direct Measures of Health Status (Total Weight = 15%)			
Direct Measures of Mortality (Total Weight = 4%)			
All-Cause Mortality Rate	Age-adjusted deaths from all causes per 100,000 population	2.00%	This measure approximates the burden of excess and preventable mortality in a population and is highly correlated with individual rates of the top causes of mortality experienced in the United States (i.e., heart disease and cancer). Preventable mortality, especially at younger ages, is experienced at higher rates by populations served by the Health Center Program.
Drug Poisoning Mortality	Estimated number of drug poisoning deaths per 100,000 population	2.00%	This measure encompasses mortality due to drug overdoses and addresses the impact of substance use disorders which is a focus of the Health Center Program.
Direct Measures of Morbidity (Total Weight = 6%)			
Asthma	Percent of adults who have been told they currently have asthma	1.50%	Asthma is a top driver of morbidity and health care cost burden in the U.S. population, and is a risk factor for additional top causes of mortality (influenza and pneumonia). Populations served by the Health Center Program are at increased risk for asthma diagnosis and poor health outcomes resulting from asthma. This measure also captures other health determinants related to the physical environment, such as poor housing conditions and particulate matter and ozone pollution.
Diabetes	Percent of adults age 20 and older who report having been diagnosed with diabetes	1.50%	Diabetes is one of the top causes of mortality and a driver of health care cost burden in the U.S. population, and is a risk factor for other top causes of mortality (stroke, heart disease) and drivers of high health care cost (kidney disease). This measure is also indicative of other preventable and costly health determinants such as the presence of food insecurity, unhealthy diet, and obesity.

Measure	Definition	Weight	Rationale
Poor Mental Health	Percent of adults who reported that their mental health was not good for 14 or more days during the past 30 days	1.50%	Mental health is an important measure of health-related quality of life and an important driver of morbidity, mortality, and health care cost burden in the United States.
Poor Physical Health	Percent of adults who reported that their physical health was not good for 14 or more days during the past 30 days	1.50%	Self-rated health is the mostly widely used and validated single-item indicator of health status that independently predicts morbidity, mortality, and health care utilization across languages, cultures, and population groups.
Direct Measures of Health Behaviors (Total Weight = 5%)			
Chlamydia	Number of newly diagnosed chlamydia cases per 100,000 population	1.67%	Chlamydia is the most reported sexually transmitted infection (STI) in the United States and is an important upstream determinant of reproductive health. The measure also has higher data quality compared to other publicly available STI measures.
Obesity	Percent of adults with a body mass index ≥ 30 kg/m^2, based upon self-reported height and weight	1.67%	Obesity is a risk factor for leading causes of morbidity and mortality in the United States (heart disease, cancer, stroke, chronic lower respiratory diseases, and diabetes).
Smoking	Percent of adults who are current smokers	1.67%	Smoking is the leading cause of preventable mortality in the United States and a risk factor for leading causes of mortality in the United States (heart disease, cancer, stroke, chronic lower respiratory diseases, and diabetes). Smoking is also a key driver of health care cost burden in the United States.

3 Data Sources Used to Calculate the UNS

The UNS is calculated using the latest available data. Brief descriptions of the data sources used for the UNS are given below. These data sources were accessed in September 2023. For the purposes of this document and the UNS, ZIP Code refers to a ZIP Code Tabulation Area (ZCTA)—a construct of the U.S. Census Bureau to represent U.S. Postal Service ZIP Code service areas.

American Community Survey (ACS): The U.S. Census Bureau conducts this annual survey on a wide range of topics, and the data are available at ZIP Code level.

The measures used in the calculation of the UNS for which ACS provides data include:

1) Associate Degree or Higher (from table: B15003 Educational Attainment for the Population 25 Years and Over)
2) Below 200% Federal Poverty Level (from table: S1701 Poverty Status in the Past 12 Months)
3) Broadband Access (from table: B28002: Presence and Type of Internet Subscription in Households)
4) Foreign-born Concentration Index (from table: B06010 Place of Birth by Individual Income in the Past 12 Months (in 2021 Inflation-Adjusted Dollars) in the United States)
5) Linguistic Isolation (from table: S1601 Language Spoken at Home)
6) No High School Diploma (from table: S1501 Educational Attainment)
7) Nonwhite Concentration Index (from tables: B19001 Household Income in the Past 12 months (in 2021 Inflation-Adjusted Dollars) and B19001H Household Income in the Past 12 Months (in 2021 Inflation-Adjusted Dollars) (White Alone, Not Hispanic or Latino Householder))
8) No Vehicle Access (from table: B08201 Household Size by Vehicles Available)
9) Single-Parent Household (from table: B09005 Household Type for Children Under 18 Years in Households (Excluding Householders, Spouses, and Unmarried Partners))
10) Unemployment (from table: S2301 Employment Status)

In addition to the measures used in the calculation of the UNS, the ACS was the source for data on population sizes for each ZIP Code, which are used to compute the service area UNS described in Section 4.2. Demographic data from the ACS were also used in implementing the extrapolation procedures described in Section 4.1. For the extrapolations, the sources include:

1) Race/ethnicity (from table: B03002 Hispanic or Latino Origin by Race)
2) Income (from table: B19001 Household Income in the Past 12 months (in 2021 Inflation-Adjusted Dollars))

The ZIP Code population sizes used in calculating the service area UNS were taken from the "population for whom poverty status is determined" columns available in these same tables. ACS data are available from the site https://data.census.gov/cedsci/?q=United States.

Population Level Analysis and Community Estimates (PLACES)*:* The PLACES project is a collaboration between the Centers for Disease Control and Prevention (CDC) and the Robert Wood Johnson Foundation (RWJF) that provides small area estimates for a selection of health measures. The UNS relies on the PLACES project for the Asthma, Cervical Cancer Screening, Dental Visit in Past Year, Diabetes, Obesity, Poor Mental Health, Poor Physical Health, and Smoking measures. The data are available at the ZIP Code level. For each of these measures, the estimates are based on the Behavioral Risk Factor and Surveillance Survey (BRFSS), which is an annual survey conducted by the CDC for U.S. States, the District of Columbia, and three U.S. Territories.

The PLACES data are available from the site https://www.cdc.gov/places/index.html.

County Health Rankings (CHR)*:* The RWJF and the University of Wisconsin Population Health Institute collaboratively maintain this annual report of social, demographic, and health information by synthesizing information from multiple sources. The UNS relies on CHR for data for the Violent Crime measure. CHR derived these data from the Federal Bureau of Investigation's Uniform Crime Reporting program. As of the 2023 UNS update, CHR no longer provides Violent Crime data. The most recent CHR data are used for this measure. Other county-level CHR data can be found at http://www.countyhealthrankings.org/. Information on methods and the downloadable file can be found at http://www.countyhealthrankings.org/explore-health-rankings/rankings-data-documentation.

Centers for Medicare and Medicaid Services (CMS) Mapping Medicare Disparities (MMD) Tool*:* CMS maintains the MMD Tool as a way to display data related to preventable hospitalization and other outcomes. The data for the Preventable Hospital Stays rate are calculated by CMS using 14 age- and sex-adjusted Prevention Quality Indicators (PQI) from the Agency for Healthcare Research and Quality. The data are available from CMS at https://data.cms.gov/tools/mapping-medicare-disparities-by-population.

U.S. Department of Housing and Urban Development (HUD)*:* HUD provides annual data on housing and the extent of housing problems, known as the Comprehensive Housing Affordability Strategy (CHAS) data, using custom tabulation of ACS data. The UNS calculation uses census tract-level data on Housing Stress from CHAS, which are available from https://www.huduser.gov/portal/datasets/cp.html.

National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention (NCHHSTP)*:* NCHHSTP is a CDC center that aggregates local and state data on sexually transmitted diseases. NCHHSTP is the source for the data on chlamydia incidence, which are provided at the county level. The data are available from https://www.cdc.gov/nchhstp/atlas/index.htm.

National Vital Statistics System (NVSS)*:* The CDC maintains the NVSS, which includes data on both natality and mortality. The natality surveillance system uses birth certificates to compile data on birth outcomes, including the Preterm Birth measure used in the UNS calculation, and can be found at https://wonder.cdc.gov/natality-current.html. For Preterm Birth, county-level data were extrapolated to the ZIP Code level using information on race and ethnicity for the ZIP Codes (see Section 4.1 for further explanation of the extrapolation strategy). The mortality data for the Estimated Drug Poisoning Mortality measure can be found at https://www.cdc.gov/nchs/data-visualization/drug-poisoning-mortality/index.htm.

***Uniform Data System (UDS) Mapper**:* The American Academy of Family Physicians supports the collection of data on the geographic reach and penetration of health center awardees and look-alikes on behalf of HRSA. The UDS Mapper also provides estimates of several measures collected by other national surveys at the ZIP Code level.

General instructions for retrieving data from the UDS Mapper are at https://www.udsmapper.org/. After registering on the website, click "Go Straight to the UDS Mapper." Click the "Explore Service Area" icon and select "By Geography." In the box that appears, enter service-area ZIP Codes or ZCTAs, and click "Add." From the bar below the map, click on the "Data Table" icon.

The UDS Mapper provides data for the following measures used in the calculation of the UNS:

1) Health Center Penetration: These data come directly from the Health Center Program population as reported annually in the UDS. To access these data, after following the general instructions above, click on the "Standard UDS Mapper Report" tab. If the tab titled "HCP: Penetration of Low-Income (%)" is checked, then the values for the ZIP Codes will appear in the UDS Mapper Data Table.)
2) All-Cause Mortality: These estimates are derived by combining data from CDC Vital Statistics with block population data from the Census Bureau. To access these data, after following the general instructions above, click on the "Additional Population Data and Indicators" tab, then click on "Pop: Age-Adjusted Mortality Rate (per 100,000)."
3) Uninsured: These estimates are derived using data from the ACS. To access these data, after following the general instructions above, click on the "Additional Population Data and Indicators" tab, then click on "Pop: Uninsured, Est. (%)."

Information about the measures can also be found at the following link: https://support.udsmapper.org/hc/en-us. Further detail about how the estimates from national surveys are derived is available from https://udsmapper.org/data-estimation-methodologies/.

***United States Department of Agriculture (USDA)**:* The USDA maintains the Food Access Research Atlas, which is available at the following link: https://www.ers.usda.gov/data-products/food-access-research-atlas/. The source of data for the Limited Access to Healthy Foods measure is available in a data file labeled "Food Access Research Atlas Data Download 2019." The data in column "LALOWI1_10," which captures the count of low-income population who live >1 mile for urban areas or >10 miles for rural areas from a supermarket, are divided by the population, to get the percentage of the population that does not have access to a supermarket.

Table 2 summarizes the data characteristics for each of the measures used in the UNS calculation. The summary includes the data source, the geographic unit of the collected data, and the years of data used.

Table 2. Data Characteristics for Measures Used in UNS Calculation

Measure	Data Source	Source Data Geographic Unit	Data Years
All-Cause Mortality	Uniform Data System (UDS) Mapper	ZIP Code	2018-2020
Associate Degree or Higher	American Community Survey (ACS)	ZIP Code	2017-2021

Measure	Data Source	Source Data Geographic Unit	Data Years
Asthma	Population Level Analysis and Community Estimates (PLACES)	ZIP Code	2020-2021[3]
Below 200% Federal Poverty Level	ACS	ZIP Code	2017-2021
Broadband Access	ACS	ZIP Code	2017-2021
Cervical Cancer Screening	PLACES	ZIP Code	2020-2021
Chlamydia	National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention	County	2021
Dental Visit in Past Year	PLACES	ZIP Code	2020-2021
Diabetes	PLACES	ZIP Code	2020-2021
Drug Poisoning Mortality	National Vital Statistics System (NVSS)	County	2021
Foreign-born Concentration Index	ACS	ZIP Code	2017-2021
Health Center Penetration	UDS Mapper	ZIP Code	2022[4]
Housing Stress	U.S. Department of Housing and Urban Development	Census Tract	2016-2020
Limited Access to Healthy Foods	U.S. Department of Agriculture	Census Tract	2019
Linguistic Isolation	ACS	ZIP Code	2017-2021
No High School Diploma	ACS	ZIP Code	2017-2021
No Vehicle Access	ACS	ZIP Code	2017-2021
Nonwhite Concentration Index	ACS	ZIP Code	2017-2021
Obesity	PLACES	ZIP Code	2020-2021
Poor Mental Health	PLACES	ZIP Code	2020-2021
Poor Physical Health	PLACES	ZIP Code	2020-2021
Preterm Births	NVSS	County	2017-2021
Preventable Hospital Stays	Centers for Medicare and Medicaid Services (CMS)	County	2021
Single-Parent Household	ACS	ZIP Code	2017-2021
Smoking	PLACES	ZIP Code	2020-2021
Unemployment	ACS	ZIP Code	2017-2021
Uninsured	UDS Mapper	ZIP Code	2017-2021
Violent Crime	CHR	County	2016

[3] PLACES data are based on whichever of the two most recent BRFSS years contains relevant data. PLACES data for Florida are available only in the previous (2022) release, which is based on the 2019 and 2020 BRFSS data.

[4] The health center patient data are from 2022. The data for the population below 200% of the FPL are from 2017 to 2021.

4 Methodology for Calculating the UNS

The previously described measures are used to generate an UNS for each ZIP Code. The ZIP Code UNS is then used to calculate an UNS for a proposed health center service area, which includes one or more ZIP Codes. The steps for generating the UNS for ZIP Codes and service areas are described below.

4.1 ZIP Code UNS

The UNS for a ZIP Code[5] is the sum of weighted measure values that have been standardized. The steps below describe the specific calculations to transform the measure values to an UNS. Table 3 provides an example tabulation of selected steps for a hypothetical ZIP Code.

1. **Extrapolate to ZIP Code level**: Where applicable, measure values that are not already reported at the ZIP Code level are extrapolated to the ZIP Code level. In some cases, a measure reported at the State, Territory, or county level that is stratified (i.e., reported by demographic category such as income level or race), can be estimated or extrapolated for a ZIP Code within the State, Territory, or county. To do this, the measure values for different demographic groups are weighted by the proportion of the population of the different demographic groups in the target ZIP Code. The measure that is extrapolated in this way is Preterm Births. In addition, some of the measures used for the Puerto Rico UNS calculation discussed in Appendix B.1 are also extrapolated in this way. In cases where data are missing for a number of the demographic categories used for the extrapolation, the extrapolation is not performed and the State, Territory, or county value is used, as described next.

   Some of the measures used in the UNS are reported at the county level but are not stratified by demographic group. These measures are Drug Poisoning Mortality, Chlamydia, Preventable Hospital Stays, and Violent Crime. For these measures, a ZIP Code that is completely contained in a county is assigned the county's value. ZIP Codes that are split across multiple counties are assigned a value using a population-based weighted average of the county values. A similar approach is used to obtain ZIP Code values for Housing Stress and Limited Access to Healthy Foods, which are reported for Census tracts: when a ZIP Code is split over multiple Census tracts, a value is assigned using a population-based weighted average of the Census tract values. At the end of this step, except in cases where there are missing data,[6] each ZIP Code has a measure value for each of the 28 measures.[7]

2. **Standardize measure values based on percentile ranks**: After assigning values to each measure across all ZIP Codes, the values are standardized using percentile ranks. This step is necessary to ensure that all the disparate measures are on similar scale, with higher numbers indicating areas with greater need. After computing the percentile ranks, each of the 28 measures is transformed so that the values range from 0 to 100, where 0 would indicate the least need and 100 the greatest.

[5] Again, note that ZIP Code here is taken to mean ZCTA.

[6] See Section 4.3 for more information on how missing data are handled.

[7] ZCTA definitions change over time. Major changes are associated with the decennial census. When those changes occur (e.g., for the 2023 UNS release), data are also extrapolated to a common year of ZCTAs. ZCTAs are standardized to the newest definitions by a population-based extrapolation if possible, otherwise an area-based extrapolation is used.

In the first step of calculating percentile ranks for a measure, the measure values across all the ZIP Codes are ranked from lowest need to highest need. In Table 3, the hypothetical ZIP Code's Health Center Penetration ***value from the data source*** is 0.389, which places the ZIP Code's value at the ***measure rank*** of 9,431 among the 33,138 ***available values*** across all ZIP Codes.[8] The ***percentile rank*** for a measure value is calculated by dividing the value's ***measure rank*** by the ***number of available values*** for all ZIP Codes and multiplying by 100 (i.e., [9,431/33,138] ×100). In the example in Table 3, the ***percentile rank*** for Health Center Penetration is 28.5. The calculation illustrates that the percentile rank for a measure value is the percentage of all ZIP Codes that have values indicating equal or less need. Higher percentile ranks indicate greater need.

3. **Weight the percentile ranks**: The ***percentile ranks*** computed in step 2 are weighted based on the relevance of that measure to the Health Center Program. The ***percentile ranks*** are multiplied by the ***measure weights*** assigned to each of the 28 measures (see Figure 1 or Table 1). Health Center Penetration has a ***measure weight*** of 20%. In the example in Table 3, this weight is multiplied by the ***percentile rank*** (28.5) to yield a ***weighted measure*** of 5.69.
4. **Sum the weighted measures**: The ZIP Code's 28 weighted measures are summed together to get a total for the ZIP Code. For the hypothetical ZIP Code in Table 3, the sum of the weighted measures presented in the last column is 36.4. Similar to the percentile, the sum of weighted measures for a ZIP Code is between 0 and 100, with higher values indicating greater need. The vast majority (99%) of the ZIP Code sums fall between 18.4 and 82.6, necessitating the next and final step to calculate the ZIP Code UNS.

Table 3. Example Calculations for a Hypothetical ZIP Code UNS

Measure	Measure Value (from Data Source)	Measure Rank	Number of Available Values	Percentile Rank	Measure Weight (%)	Weighted Measure
Health Center Penetration	0.389	9,431	33,138	28.5	20.00	5.69
Below 200% Federal Poverty Level	0.219	8,965	32,565	27.5	10.00	2.75
Uninsured	0.073	16,966	33,138	51.2	10.00	5.12
Associate Degree or Higher	0.523	4,631	32,736	14.1	3.00	0.42
Housing Stress	0.294	21,765	32,772	66.4	3.00	1.99
Linguistic Isolation	9.2	28,668	32,773	87.5	3.00	2.62
Dental Visit in Past Year	70.9	6,225	32,535	19.1	3.00	0.57
No High School Diploma	7.04	10,261	32,773	31.3	3.00	0.94

[8] These counts are examples; they change over time as the set of valid ZIP Codes changes.

Measure	Measure Value (from Data Source)	Measure Rank	Number of Available Values	Percentile Rank	Measure Weight (%)	Weighted Measure
Cervical Cancer Screening	88.4	1,661	32,398	5.1	3.00	0.15
Preterm Births	0.097	19,873	32,632	60.9	3.00	1.83
Preventable Hospital Stays	2,926.2	3,966	32,889	12.1	3.00	0.36
Single-Parent Household	0.123	9,073	31,490	28.8	3.00	0.86
Unemployment	3.0	10,435	32,551	32.1	3.00	0.96
No Vehicle Access	0.040	16,077	32,518	49.4	3.00	1.48
Broadband Access	0.836	11,162	32,518	34.3	3.00	1.03
Nonwhite Index	0.133	10,009	32,391	30.9	3.00	0.93
Foreign-Born Index	0.115	15,272	32,644	46.8	3.00	1.40
Drug Poisoning Mortality	34.30	29,375	32,762	89.7	2.00	1.79
All-Cause Mortality	702.32	12,819	32,973	38.9	2.00	0.78
Obesity	26.3	3,496	32,566	10.7	1.67	0.18
Chlamydia	437.1	20,106	32,936	61.0	1.67	1.02
Smoking	15.9	7,018	32,566	21.6	1.67	0.36
Limited Access to Healthy Foods	0.127	25,266	32,681	77.3	1.50	1.16
Violent Crime	259.98	17,275	31,946	54.1	1.50	0.81
Asthma	8.9	6,165	32,535	18.9	1.50	0.28
Diabetes	8.8	5,312	32,566	16.3	1.50	0.24
Poor Mental Health	12.2	7,737	32,535	23.8	1.50	0.36
Poor Physical Health	11.0	5,607	32,535	17.2	1.50	0.26
Total	**NA**	**NA**	**NA**	**NA**	**100**	**36.4**

5. **Rescale the weighted sum to create the ZIP Code UNS:** To facilitate meaningful distinctions, the sum of the weighted measures from step 4 is rescaled to ensure the maximum UNS is 100 and the minimum UNS is 0. The sums of the weighted measures are concentrated between 18.4 and 82.6 across all ZIP Codes, which has a range of 64.2 (i.e., 82.6–18.4=64.2). To rescale so that the range is 0 to 100, 18.4 is first subtracted from the sum of the weighted measures (36.4–18.4 = 18.0). Next, the result is divided by the range, and multiplied by 100 ([18.0/64.2]×100). For the hypothetical ZIP Code in Table 3 where the sum of the weighted measures is 36.4, the rescaling step creates a ZIP Code UNS of 28.0.

   This rescaling is applied to the sum of the weighted measures for every ZIP Code. One percent of the ZIP Code weighted sums are either greater than 82.6 or less than 18.4. The

sums that are greater than 82.6, are rescaled to 100. The sums that are less than 18.4 are rescaled to 0.

4.2 Service Area UNS

Proposed health center service areas are often composed of more than one ZIP Code. Service areas composed of multiple ZIP Codes are scored by computing a population-based weighted average of the Unmet Need Scores for the ZIP Codes in the service area. Table 4 provides example calculations for a hypothetical service area UNS. The steps are as follows:

1. **Calculate population-based weighted scores for the ZIP Codes in the service area**: For each ZIP Code in the service area, a population-based weight is calculated to account for how much the ZIP Code contributes to the total population in the service area. The weight is the percentage of the total service area population for that ZIP Code. In the example in Table 4, ZIP Code 1 accounts for 10,000 of the 50,000 people in the service area, so its population-based weight is 20%. To get the ZIP Code population-based weighted UNS, multiply the ZIP Code UNS by the value for the population-based weight (i.e., 28.0×20%=5.6).
2. **Sum the weighted Unmet Need Scores**: To calculate the service area UNS, each ZIP Code's population-based weighted UNS is summed. For the hypothetical service area in Table 4, the UNS is the sum of the weighted scores presented in the last column which is 36.0. Similar to the ZIP Code UNS, a service area UNS ranges from 0 to 100, with higher values indicating greater need.

Table 4. Example Calculation of a UNS for a Hypothetical Service Area with Three ZIP Codes

ZIP Code	ZIP Code UNS	Population Size	Population-based Weight (%)	Population-based Weighted UNS
ZIP Code 1	28.0	10,000	20	5.6
ZIP Code 2	44.2	20,000	40	17.7
ZIP Code 3	31.7	20,000	40	12.7
Total	**NA**	**50,000**	**100**	**36.0**

4.3 Additional Notes on the UNS Methodology

Health Center Penetration: Health Center Penetration required modification to some of the values reported by the data source (UDS Mapper). ZIP Codes with health center patient counts meeting or exceeding the population below 200% of the FPL are treated as having a ratio of one, indicating the lowest level of need. This includes ZIP Codes in which the entire population is reported to be above 200% of the FPL.

Missing Data: Some ZIP Codes have missing data for certain measures. For these ZIP Codes, the sum of weighted measures is normalized by the total weight of the available measures. For example, if one measure is missing (e.g., Poor Physical Health which has a weight of 1.5%), the sum would be normalized by the remaining weight (98.5% in the case where Poor Physical Health is missing). In effect, the weights for the available measures are increased proportionally so that the total weight across the measures is 100%. Note that missing data occurs infrequently; less than 3% of U.S. ZIP Codes have more than one missing measure.

Unscored ZIP Codes: Not all ZIP Codes are scored. There are some ZIP Codes with 0 population according to the ACS, and these are not scored. These include some ZIP Codes whose population consists only of those living in group quarters, such as prisons, military bases, and university dormitories. For these ZIP Codes, critical measures are missing, including the fraction of the population Below 200% FPL and Health Center Penetration, so they cannot be scored. In total, fewer than 3% of the ZIP Codes are not scored.

Appendix A Service Area Needs Assessment Methodology

The specific composition of measures and measure weights in the UNS will likely shift over time due to changes in the public health research evidence base and data availability. However, the UNS remains rooted in the processes established as part of the SANAM. This includes a conceptual framework to guide measure selection and measure weight allocation, as well as tests to validate the UNS.

A.1 The SANAM Measures and Evaluation Criteria

Beginning in 2017, an extensive environmental scan was conducted in the initial phase of the development of the SANAM. The initial SANAM environmental scan sought to understand the Health Center Program's history and goals, and the challenges with the Need for Assistance (NFA) worksheet, which was used in New Access Point (NAP) funding applications to assess service area need prior to Fiscal Year 2019. The environmental scan also evaluated other assessments of population health-related need to ascertain the extent to which the methodology being used by the Health Center Program aligned with methodological guidance from the scientific community and reports by authoritative organizations, such as the Agency for Healthcare Research and Quality (AHRQ), Centers for Disease Control and Prevention (CDC), National Academy of Medicine (formerly the Institute of Medicine [IOM]), and the National Quality Forum (NQF).

To develop a conceptual framework and set of measures appropriate for the Health Center Program, four formal objectives were established. The objectives were informed by a thorough review of the Health Center Program statute and requirements, as well as the objectives of quantitative needs assessments by organizations with similar programmatic goals and scope. These objectives, enumerated below, were also shaped by discussions with HRSA staff and leadership about the Health Center Program scope, goals, and priorities, and how the UNS would be used to inform decision making. The four objectives are as follows:

1. The UNS resulting from the SANAM should support resource allocation decisions that increase access to primary and preventive health care services among medically underserved populations.
2. The SANAM should prioritize measures that capture indicators of need that are most relevant to underserved populations, and that are most actionable to the Health Center Program.
3. The SANAM should use rigorous methods that reflect advancements in science and availability of new and wide-ranging geographic and population data.
4. The development process and measures used to calculate the UNS should be open and transparent to relevant parties.

A definition for need was developed based on the four objectives above, current literature, and the Health Center Program statute and mandate. Need is defined as the relative disparities in population health status exhibited across health center service areas, as well as the upstream and downstream determinants that lead to disparate health outcomes.

As noted extensively in the research literature as well as in technical reports by authoritative bodies such as AHRQ, IOM, and NQF, separating the concept of access into "dimensions" makes it possible to map measures to the definition of access most highly promoted by the public health community. Access accounts for the geographic, financial, educational, cultural, and linguistic characteristics of patients and providers that converge to facilitate or impede receipt of needed and

timely quality care. The definition of access posited by Levesque et al. 2013 was used for the SANAM. This definition integrates and builds upon the aggregate body of well-regarded research on access, and is defined by the following dimensions:

Availability/Accommodation: ability to reach health care
Affordability: ability to pay for health care
Approachability: ability to identify health care services that address needs
Acceptability: ability to seek health care services based on social and cultural factors
Appropriateness: ability to receive timely quality health care (also termed "access outcome" or "realized access")

A.2 The Conceptual Framework

Using the definition of need and guided by the latest research from the scientific community and recommendations from authoritative bodies, the social-ecological perspective was adopted to create a SANAM conceptual framework. This conceptual framework is presented in Figure A-1. It identifies measure groups that are most important to estimating service area need while considering the Health Center Program statute and mandate.

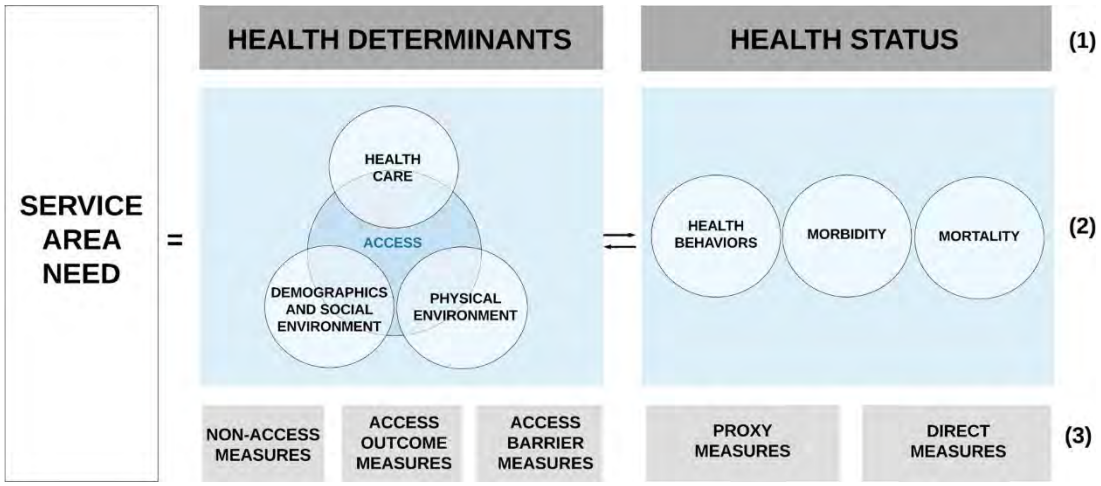

Figure A-1. Conceptual Framework for Definition of Need

The SANAM conceptual framework identifies the two primary measure categories (see (1) in Figure A-1) and measure domains (see (2) in Figure A-1) that are most commonly employed by needs assessments promoted by authoritative bodies and the research literature. Importantly, it also identifies the measure groups (see (3) in Figure A-1) that reflect the specific objectives and priorities of the Health Center Program.

The **health determinants measure category** captures upstream drivers of health status, including the social determinants of health and aspects of the physical environment. Of central importance to the Health Center Program, these measures indicate which service areas encounter more difficulty in accessing primary and preventive health care compared to other areas by accounting for factors that directly or indirectly impede access to care. Under the health determinants measure category, the **non-access measure group** captures information about factors that impact health outside the pathway of access to health care. The **access outcome measure group** captures retrospective

information about health care utilization and the timeliness and quality of care received. The **access barrier measure group** captures information about characteristics of the health-seeking populations that have been demonstrated to impede timely access to care.

The **health status measure category** includes measures that indicate the health status of the different service areas by representing service areas' current morbidity and mortality rates, as well as the health behaviors that influence the future burden of morbidity and mortality. Here, the top causes of mortality and health care cost burden as well as their top risk factors are considered.

For health status, the framework considers both **direct** and **proxy measures**. Informed by the social-ecological model of health, the framework considers measures of socioeconomic status as indicating possible barriers to population access to care, while also serving as proxy measures of population health status.

A.3 Selecting Specific Measures

An essential step in SANAM involves applying five criteria to evaluate specific measures for inclusion in the UNS. The criteria align with NQF criteria for selecting health quality measures that were first published in 2016 (updated on a yearly basis). The five criteria are:

> **Importance**: The measure is important to making gains in overall population health (e.g., represents top causes of mortality or reflects a high preventable burden based on financial cost, disability, or lifespan impacts), and is evidence-based.
>
> **Relevance and Usability**: The measure produces information that is meaningful, understandable, and useful for decision making, and there is robust evidence that actions on the measure influence disparities in population health or access to health care for underserved populations of concern to the Health Center Program. The measure must also be available for defined geographical areas with a strong preference for those available at or able to be extrapolated to the ZIP Code level.
>
> **Scientific Soundness**: The measure meets NQF endorsement or meets the criteria for acceptance as an indicator of health or access by frameworks in standard use (e.g., County Health Rankings), public health and provider organizations, and/or public health and quality reporting programs.
>
> **Feasibility**: The measure is captured without undue burden (e.g., via UDS Mapper), collected frequently enough to track changes over time, and updated at least every five years.
>
> **Harmonization and Parsimony**: When compared to other measures, the measure makes a unique contribution to measuring (a) population access to health care and/or (b) current or future level of health, as determined by the research literature and correlation analyses.

A key part of applying the five criteria is the use of an equity lens that considers the impact of inclusion or exclusion of each measure on health disparities. The measures should align with existing research on health disparities and must not exacerbate health inequities. Use of the equity lens includes examining the possibility that inclusion or exclusion of a measure could disadvantage or harm populations impacted by health inequities.

In addition to using the criteria above, a key step in the UNS development process involves soliciting and incorporating feedback from relevant parties. To this end, HRSA hosted webinars to introduce relevant parties to the measures selected using the SANAM measure evaluation criteria.

Feedback received from relevant parties during these webinars led to consideration of additional measures for the UNS.

A.4 Assigning Weights to Measure Groups

The weights assigned to the individual measures used in the UNS calculation sum to 100. The total weight is divided among the measure groups based on the measures' importance to assessing need in the context of the Health Center Program statute and potential patient populations. Most of the weight is therefore allocated to measures that contribute to an assessment of access—the main measurement and improvement priority of the Health Center Program. Between the two groups of measures that evaluate access, the access barrier measure group is allocated more weight than the access outcome measure group due to the dual role some of the access barrier measures play in the framework. Six of the access barrier measures when combined form a robust indicator of socioeconomic status, and these measures contribute to both an assessment of access and an indirect, or "proxy" assessment of health status.

Three measures used in the UNS calculation are particularly relevant to the Health Center Program: Health Center Penetration, Below 200% Federal Poverty Level (FPL), and Uninsured. Health Center Penetration is conceptualized as an access outcome measure, while the other two measures belong to the access barrier and proxy measure groups. These measures each performed better than other measures within the same measure group on the degree to which each measure is (a) actionable to the Health Center Program, (b) relevant to the Health Center Program populations, and (c) substantiated in the literature or reinforced by authoritative assessments as a significant indicator of underserved populations' level of access to primary and preventive health care. Consequently, these measures have the most weight individually.

A.5 SANAM Testing

The final step in SANAM is testing how UNS values for specified geographic areas compare to the values obtained from other reputable, independently crafted needs assessment instruments with similar goals, such as the County Health Rankings, Health Professional Shortage Areas, the Social Deprivation Index, Social Vulnerability Index, Child Opportunity Index, and HRSA's Need for Assistance (NFA). Additional assessment includes calculating UNS values for three previous cycles of NAP applications to ensure that there are no systematic differences among applicants proposing to serve statutorily defined special populations (migratory and seasonal agricultural workers, people experiencing homelessness, and residents of public housing) or those in rural versus urban areas.

Appendix B U.S. Territories and the Freely Associated States

The UNS discussed above applies to the 50 States and the District of Columbia. That UNS is referred to as the "States UNS" in this appendix. The SANAM conceptual framework and measure evaluation and selection criteria discussed above were used to generate scores for the U.S. Territories and the Freely Associated States. The effort led to the development of three UNS calculations for ZIP Codes in Puerto Rico, U.S. Territories excluding Puerto Rico, and the Freely Associated States. The UNS calculation for Puerto Rico uses 20 measures, while the UNS calculations for U.S. Territories excluding Puerto Rico and for the Freely Associated States use 11 and 10 measures, respectively.

B.1 Measures and Weight Assignment for Puerto Rico

Figure B-1 displays the measures and weights for the Puerto Rico UNS calculation. The data sources and definitions for the Puerto Rico UNS Measures are the same as those for the States UNS, described in Section 2 and 3, except for eight measures (Asthma, Dental Visit in Past Year, Diabetes, Obesity, Pap Smear Screening, Poor Mental Health, Poor Physical Health, and Smoking). For these measures, the corresponding measures in the States UNS leverage the PLACES Project data, which are not available for Puerto Rico. For seven of these measures, the Puerto Rico measures use BRFSS data instead of the PLACES Project data. The definitions are the same as those for the States UNS.

However, the Pap Smear Screening measure for Puerto Rico differs from the Cervical Cancer Screening measure in the States UNS, as the equivalent data were not available from BRFSS. Instead, a similar Pap Smear Screening measure is constructed from BRFSS data. Puerto Rico's measure is the fraction of women aged 21-65 who have had a Pap smear in the past three years (calculated from one or more BRFSS questions). The Cervical Cancer Screening measure used for the States UNS is the fraction of women who have received the recommended cervical cancer screening involving the Pap smear and human papillomavirus test, where the recommended type of test and frequency of testing is dependent on the woman's age.

Each of these eight BRFSS measures is extrapolated from the State or Territory level to the ZIP Code level using data stratified by income. See Section 4.1 for more information. Summary-level BRFSS data are available from the interactive site https://www.cdc.gov/brfss/brfssprevalence/. The file can be downloaded from https://chronicdata.cdc.gov/Behavioral-Risk-Factors/Behavioral-Risk-Factor-Surveillance-System-BRFSS-P/dttw-5yxu/about_data.

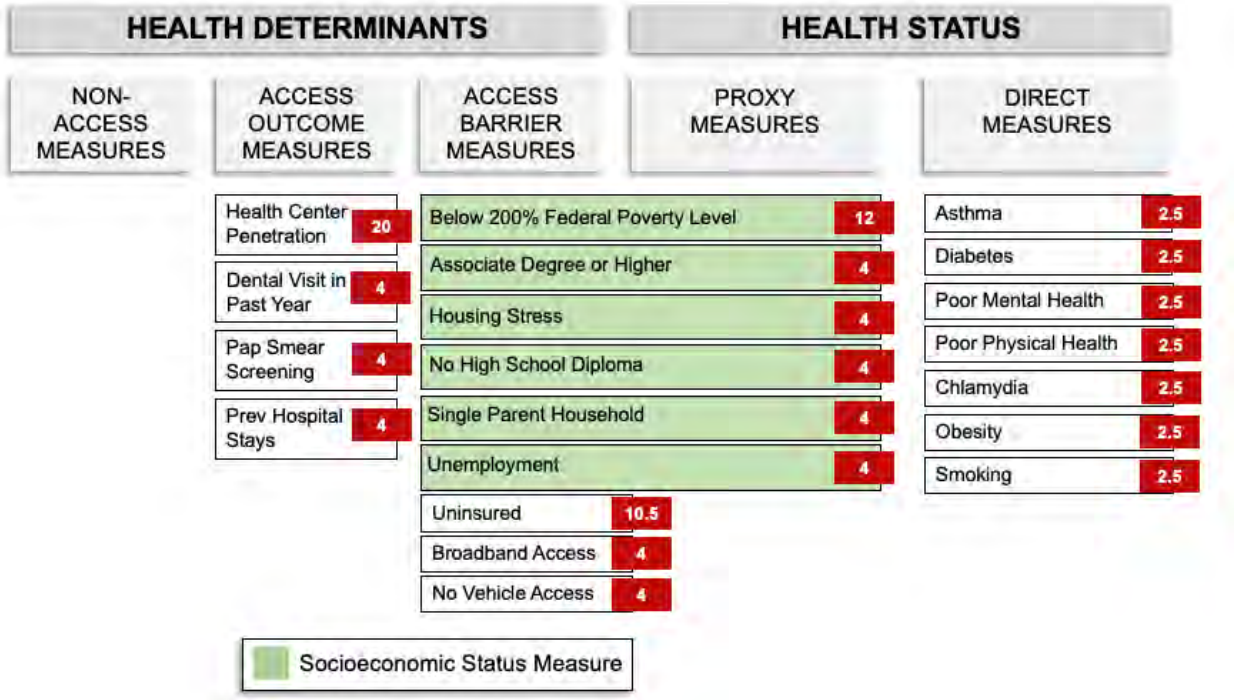

Figure B-1. The Measures and Measure Weights Used in the UNS Calculation for Puerto Rico

B.2 Measures and Weight Assignment for U.S. Territories Excluding Puerto Rico and the Freely Associated States

The UNS calculation for U.S. Territories excluding Puerto Rico uses 11 measures, while the calculation for the Freely Associated States uses 10 measures. The difference in measures is because of the inclusion of data from UDS Mapper for the Uninsured measure in the U.S. Territories excluding Puerto Rico. This data source is not available for the Freely Associated States. Figure B-2 and Figure B-3 display the measures and weights for the UNS calculations developed for the U.S. Territories excluding Puerto Rico and the Freely Associated States, respectively. The definitions of the measures are found following the figures.

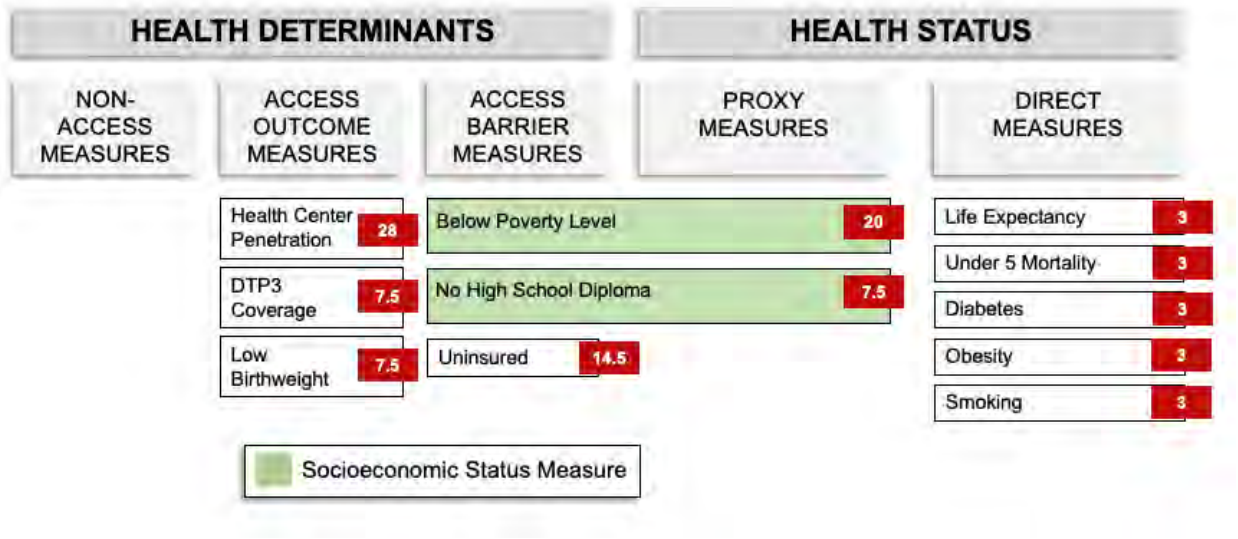

Figure B-2. The Measures and Measure Weights Used in the UNS Calculation for the U.S. Territories Excluding Puerto Rico

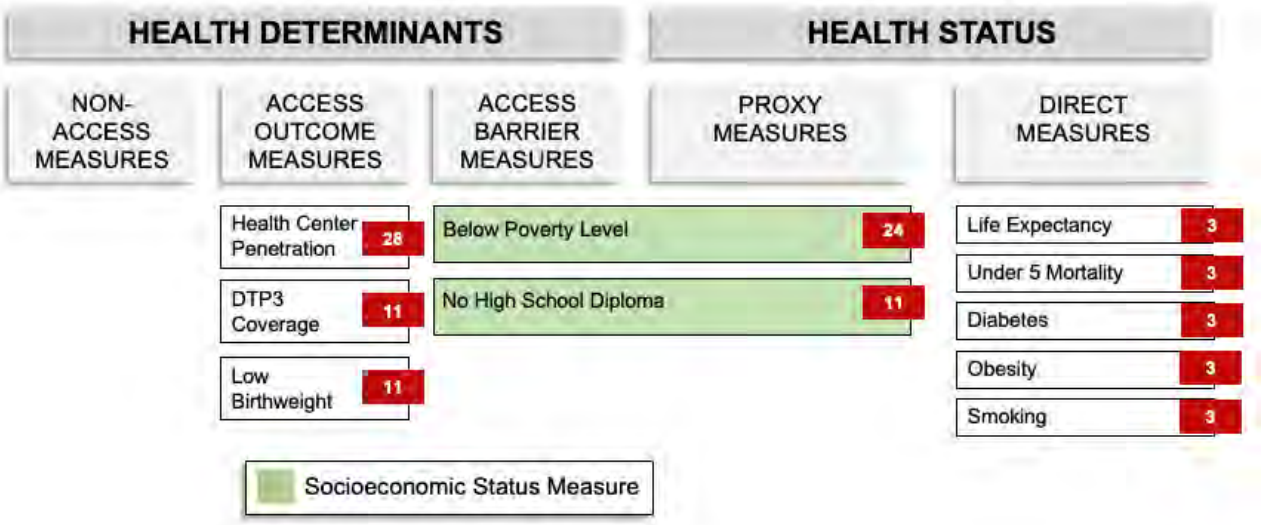

Figure B-3. The Measures and Measure Weights Used in the UNS Calculation for the Freely Associated States

B.2.1 Access Outcome Measures

Health Center Penetration

The calculation of this measure follows the formula used in Section 2, which is the ratio of the population served by a health center to the population with household income below 200% of the FPL. The U.S. Census does not provide information on the percentage below 200% of the FPL for the Freely Associated States; therefore, the entire population of these nations (rather than their low-income population) is used as the denominator in calculating Health Center Penetration. Similar to the calculation for the States UNS, this measure carries the most weight, reflecting its importance in assessing need for health center services.

DTP3 Coverage (Diphtheria, Tetanus, and Pertussis Coverage)

This measure captures the percentage of children in an area who have received the third dose of the combined immunization for Diphtheria, Tetanus, and Pertussis (DTP3) by the age of 12 months. The World Health Organization (WHO) uses DTP3 coverage as an evaluation of how well nations are doing in providing routine immunization services for children. Also, the WHO views DTP3 as an indication of how well families are set up for other complementary immunization as the child grows. While this measure was not used in the States UNS' calculation, it is an important upstream determinant of child health in global contexts.

Low Birthweight

This measure captures the percent of low birthweight deliveries (less than 2,500 grams). Low birthweight usually results from preterm birth (which is the measure used for calculating the States UNS, but it is not available for these regions). Low birthweight can also result from poor fetal growth while in the uterus. Therefore, this measure provides an evaluation of the physical environment and access to health services for mothers and infants in a region. According to the WHO, low birthweight is associated with an increased likelihood of early death and inhibitions in physical and cognitive development, and it is an indicator of future health of the infant.

B.2.2 Access Barrier Measures and Proxy Measures of Health Status

Below Poverty Level

This measure captures the fraction of individuals living in households with income below the poverty level for each area. This measure is different from the one used to calculate the States UNS, which captured the fraction of the population below 200% of the FPL. For the U.S. Territories, information from the U.S. Census was used to calculate the measure. Each of the Freely Associated States has an individual designation of poverty level, which is primarily derived from country-specific "Household Income and Expenditure Surveys." Similar to the States UNS' calculation, this measure is allocated a higher weight.

No High School Diploma

This measure captures the fraction of the population without a high school education or equivalent by age 25. Educational attainment is a principal determinant of access to health care and population health status. It also contributes to a robust assessment of socioeconomic status. The data source used for the States UNS provided information on attainment of high school education or equivalent by age 18, but 25 was the lowest age for which data were available for all the U.S. Territories excluding Puerto Rico and the Freely Associated States.

Uninsured

This measure captures the fraction of the civilian non-institutionalized population without health insurance. Health insurance helps absorb some costs associated with seeking health care. Similar to the States UNS' calculation, this measure is allocated higher weight. This measure is not included in the calculation of the UNS for the Freely Associated States.

B.2.3 Direct Measures of Health Status

Life Expectancy

The WHO defines this measure as the number of years people in a region are expected to live at birth. It reflects the mortality pattern across all age groups in a given year for the region. All regions use the same calculation in the definition of life expectancy at birth.

Under 5 Mortality

The WHO defines this measure as the probability of death before age 5 for a child born in a specified year, calculated as the rate per 1,000 live births and using the age-specific mortality rate for the specified year. This indicator captures the socioeconomic and environmental conditions for children in an area. About 90% of mortality before age 18 occurs before age 5.

Smoking

This measure presents the age-standardized smoking prevalence estimates among the population aged 15 years and older based on the 2019 Global Burden of Disease Study. Smoking is a major driver of morbidity and mortality, and it is a leading risk factor for disease in the U.S. Territories excluding Puerto Rico and Freely Associated States.

Obesity

This measure captures the proportion of adults with a body mass index ≥ 30 kg/m^2. Weight and height were self-reported in the CDC BRFSS for Guam and the U.S. Virgin Islands. For the other data sources, including American Samoa Adult Hybrid Non-Communicable Diseases (NCD) and Risk Factor Survey, Commonwealth of the Northern Mariana Islands Hybrid Non-Communicable Diseases Risk Factor Survey and the WHO STEPwise approach to noncommunicable disease risk factor surveillance (STEPS) surveys, height and weight were measured for survey participants. Obesity is a leading cause of morbidity and mortality (e.g., heart disease, cancer, stroke, and diabetes) and one of the most prevalent health conditions in the U.S. Territories and Freely Associated States.

Diabetes

This measure presents the diabetes prevalence among the population between the ages of 20 to 79 based on data catalogued by the World Bank. Diabetes is one of the top causes of mortality and morbidity, as well as one of the most prevalent conditions in the U.S. Territories and Freely Associated States. Diabetes is a risk factor for other top causes of mortality (e.g., stroke, heart disease) and drivers of high health care cost (e.g., kidney disease). This measure is also indicative of other preventable and costly health determinants such as the presence of food insecurity, unhealthy diet, and obesity.

B.3 Data Sources for the UNS for the U.S. Territories Excluding Puerto Rico and the Freely Associated States

Obtaining data for the U.S. Territories excluding Puerto Rico and the Freely Associated States required additional data sources. Table B-1 displays these data sources, which were accessed in September 2023. The abbreviations used in this resource guide for the data sources are listed first,

followed by a description of the source and web link to the source. While all of the sources listed below were initially accessed to obtain measure values, a few of these sources have since gone offline or had public access restricted. Those sources are indicated as "Not currently publicly available" within the table.

Table B-1. List of Data Sources for the U.S. Territories Excluding Puerto Rico and the Freely Associated States

Abbreviation	Description of Source	Link to Source
AS WHO	American Samoa World Health Organization Country Profile	Not currently publicly available
BRFSS Int	Behavioral Risk Factor Surveillance System (BRFSS) Interactive	https://www.cdc.gov/brfss/brfssprevalence/
CDC ChildVax	National Center for Immunization and Respiratory Diseases (NCIRD), Vaccination Coverage among Young Children (0-35 Months)	https://data.cdc.gov/Child-Vaccinations/Vaccination-Coverage-among-Young-Children-0-35-Mon/fhky-rtsk
CNMI NCD	Commonwealth of the Northern Mariana Islands Non-Communicable Diseases & Risk Factor Hybrid Survey Report 2016	https://microdata.pacificdata.org/index.php/catalog/280/related-materials
CNMI WHO	Northern Mariana Islands WHO Country Profile	Not currently publicly available
FSM Census	Summary Analysis of Key Indicators from the Federated States of Micronesia 2010 Census of Population and Housing	https://sdd.spc.int/digital_library/federated-states-micronesia-2010-census-summary-analysis-key-indicators
FSM Poverty	Poverty Profile of the Federated States of Micronesia (World Bank)	http://documents.worldbank.org/curated/en/629961528185586614/pdf/FSM-HIES-2013-Poverty-Assessment.pdf
HRSA MCHB	HRSA Maternal and Child Health Services Title V Block Grant	https://mchb.tvisdata.hrsa.gov/Home/StateApplicationOrAnnualReport
HRSA UDS	HRSA UDS Data	https://www.hrsa.gov/foia/electronic-reading
IDF	International Diabetes Federation, Diabetes Atlas from World Bank	https://data.worldbank.org/indicator/SH.STA.DIAB.ZS
IGME	UN Inter-agency Group for Child Mortality Estimation	https://childmortality.org/data
IHME	Institute for Health Metrics and Evaluation, Country Profiles	https://www.healthdata.org/research-analysis/health-by-location/profiles

Abbreviation	Description of Source	Link to Source
IHME GBD Life	Institute for Health Metrics and Evaluation, Global Burden of Disease, Compare Viz Tool for Life Expectancy	https://vizhub.healthdata.org/gbd-compare/
IHME GBD Smoke	Institute for Health Metrics and Evaluation, Global Burden of Disease, Smoking Prevalence	https://ghdx.healthdata.org/record/ihme-data/gbd-2019-smoking-tobacco-use-prevalence-1990-2019
Palau Census	2020 Census of Population and Housing of the Republic of Palau	https://www.palaugov.pw/wp-content/uploads/2022/09/2020-Census-of-Population-and-Housing.pdf
Palau HIES	Palau Analysis of the 2006 Household Income and Expenditure Survey	https://www.palaugov.pw/wp-content/uploads/2015/01/Palau-Poverty-Analysis.pdf
RMI Census	Republic of the Marshall Islands 2011 Census Report	https://rmi-data.sprep.org/resource/marshall-islands-2011-full-census-report
RMI HIES	Republic of the Marshall Islands Household Income & Expenditure Survey 2002 Basic Tables	http://catalog.ihsn.org/index.php/catalog/2191
UDS Mapper	Uniform Data System (UDS) Mapper	https://www.udsmapper.org/ (See instructions in Section 3 of this guide)
US Census	2020 Decennial Census of Island Areas	https://data.census.gov/ (Use the Advanced Search option)
USVI CDC ChildVax	Childhood Diphtheria Toxoid, Tetanus Toxoid, Acellular Pertussis (DTaP) Vaccination Coverage Report for US Virgin Islands; archived 2016 data	Not currently publicly available
WHO DTP3	World Health Organization Global Health Observatory - Diphtheria Tetanus Toxoid and Pertussis (DTP3) Immunization Coverage Among 1-Year-Olds (%)	https://www.who.int/data/gho/data/indicators/indicator-details/GHO/diphtheria-tetanus-toxoid-and-pertussis-(dtp3)-immunization-coverage-among-1-year-olds-(-)
WHO STEPS	World Health Organization STEPwise approach to noncommunicable disease risk factor surveillance (STEPS)	https://www.who.int/teams/noncommunicable-diseases/surveillance/data

Table B-2 lists the measures and corresponding data sources used in calculating the UNS for the U.S. Territories excluding Puerto Rico and the Freely Associated States.

Table B-2. Data Sources by Measure for Each U.S. Territory and the Freely Associated States

Measure	American Samoa	Guam	Northern Mariana Islands	U.S. Virgin Islands	Marshall Islands	Federated States of Micronesia	Palau
Below Poverty Level	US Census	US Census	US Census	US Census	RMI HIES	FSM Poverty	Palau HIES
Diabetes	IDF	IDF	IDF	IDF	IDF	IDF	IDF
DTP3 Coverage	AS WHO	CDC ChildVax	CNMI WHO	USVI CDC ChildVax	WHO DTP3	WHO DTP3	WHO DTP3
Health Center Penetration	UDS Mapper	UDS Mapper	UDS Mapper	UDS Mapper	HRSA UDS, RMI Census	HRSA UDS, FSM Census	HRSA UDS, Palau Census
Life Expectancy	IHME GBD Life	IHME GBD Life	IHME GBD Life	IHME GBD Life	IHME GBD Life	IHME GBD Life	IHME GBD Life
Low Birthweight	HRSA MCHB	HRSA MCHB	HRSA MCHB	HRSA MCHB	HRSA MCHB	HRSA MCHB	HRSA MCHB
No High School Diploma	US Census	US Census	US Census	US Census	RMI Census	FSM Census	Palau Census
Obesity	WHO STEPS	BRFSS Int	CNMI NCD	BRFSS Int	WHO STEPS	WHO STEPS	WHO STEPS
Smoking	IHME GBD Smoke	IHME GBD Smoke	IHME GBD Smoke	IHME GBD Smoke	IHME GBD Smoke	IHME GBD Smoke	IHME GBD Smoke
Under 5 Mortality	IHME	IHME	IHME	IHME	IGME	IGME	IGME
Uninsured	UDS Mapper	UDS Mapper	UDS Mapper	UDS Mapper	N/A	N/A	N/A

B.3.1 Information and Source of Data for U.S. Comparators

Calculating the UNS for each area involves standardizing measure values using percentile ranks, and then weighting and summing the standardized measure values. The percentile ranks for the U.S. Territories excluding Puerto Rico and the Freely Associated States were computed relative to measure values for the United States. The sources of the U.S. measure values used in the percentile calculation are provided in Table B-3.

Table B-3. Data Sources for U.S. Comparators

Measure	Source	Link to source
Health Center Penetration	UDS Mapper	https://www.udsmapper.org
Below Poverty Level	American Community Survey	https://data.census.gov/cedsci/?q=United%20States
No High School Diploma (ages 25+)	American Community Survey	https://data.census.gov/cedsci/?q=United%20States
Uninsured	UDS Mapper	https://www.udsmapper.org
Low Birthweight	National Vital Statistics System	https://wonder.cdc.gov/natality-current.html
Diabetes	Population Level Analysis and Community Estimates	https://www.cdc.gov/places/index.html
Obesity	Population Level Analysis and Community Estimates	https://www.cdc.gov/places/index.html
Smoking	Population Level Analysis and Community Estimates	https://www.cdc.gov/places/index.html
Life Expectancy	Institute for Health Metrics and Evaluation	https://ghdx.healthdata.org/record/ihme-data/united-states-life-expectancy-by-county-race-ethnicity-2000-2019
Under 5 Mortality	National Vital Statistics Reports U.S. State Life Tables	https://www.cdc.gov/nchs/data/nvsr/nvsr71/nvsr71-02.pdf https://ftp.cdc.gov/pub/Health_Statistics/NCHS/Publications/NVSR/71-02
DTP3 Coverage	National Center for Immunization and Respiratory Diseases (NCIRD), Vaccination Coverage among Young Children (0-35 Months)	https://data.cdc.gov/Child-Vaccinations/Vaccination-Coverage-among-Young-Children-0-35-Mon/fhky-rtsk

Appendix C Service Area Status

C.1 Background

The value of the SANAM and UNS for the Health Center Program is its ability to ensure a clear, transparent, and standardized process to help assess the need for a new health center site within a proposed service area. Taking into consideration the benefits of using the SANAM and UNS for the 2019 NAP process, HRSA explored the possibility of developing a similar framework and score called the Service Area Status (SAS).

The SAS describes the health, economic, and social characteristics of health centers' service areas, and provides a quantitative, standard way to understand service areas. In contrast to the UNS, the SAS does not include the Health Center Penetration measure, because the SAS is attempting to capture the status of a service area, independent of the reach of the Health Center Program.

There are several possible use cases envisioned for the application of the SAS including the following:

- Assess need for, and provision of, training and technical assistance
- Provide information to inform funding decisions
- Contextualize health center challenges and performance
- Provide context for acute public health emergencies
- Use as component of needs assessment for compliance requirement
- Serve as a public tool that can be utilized by external entities

The formulation and calculation of the SAS score are described in the following sections of this appendix. While the methodology for the formulation of the SAS score was the same for the 50 states and the District of Columbia, the U.S. Territories, and the Freely Associated States; the measures used for the U.S. Territories and the Freely Associated States differed from that of the 50 States and the District of Columbia, based on data availability. These differences are discussed in Appendix B.

C.2 Formulation of the SAS for U.S. States and District of Columbia

C.2.1 Measures

The SAS is made up of 27 measures that are organized into measure groups under the health determinants and health status measure categories (Figure C-1), like the UNS. The set of measures includes all of the UNS measures except Health Center Penetration. Please refer to Section 2 for additional details about the measures.

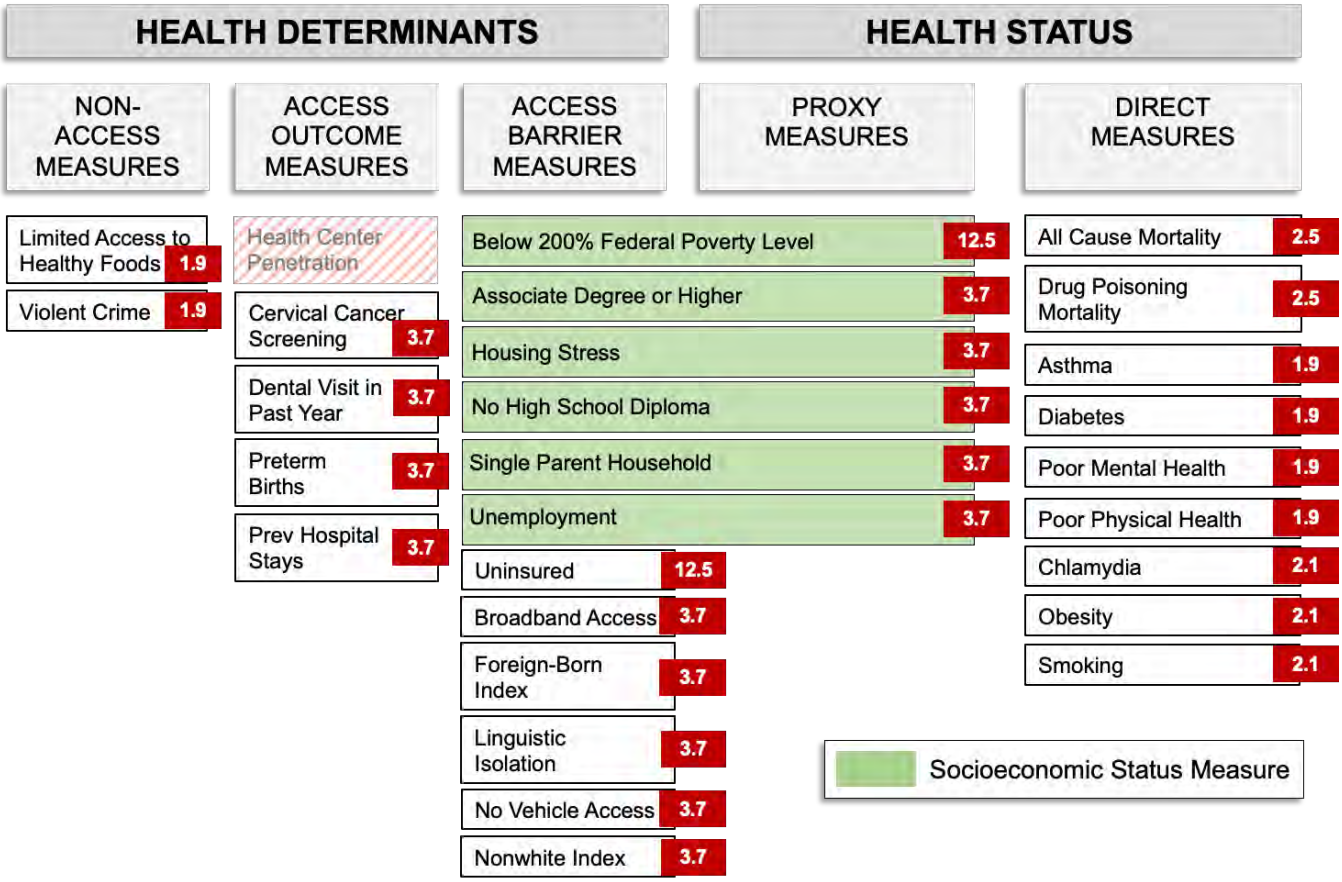

Figure C-1. SAS Measures and Weights

C.2.2 Measure Weight Assignments

The weights used for the SAS are based upon the measure weights used for the UNS, except for the exclusion of the Health Center Penetration measure weight. The weight that was allocated to Health Center Penetration in the UNS is distributed proportionately across all the other measures. The SAS score uses a weighted sum of standardized measure values, like the UNS. The 27 measures used in the calculation of the SAS are listed in Figure C-1 along with a number representing the measure's weight. Each measure weight is presented as a percentage of the total weight. The total weight allocated across all measures is 100. Please refer to Section 2 for additional details about measure weighting.

C.3 Formulation of the SAS for U.S. Territories and Freely Associated States

As mentioned, the measures and weight assignments differ for the U.S. Territories and Freely Associated States, as compared to those for the 50 States and District of Columbia, based on availability of data.

C.3.1 Measures and Weight Assignments for Puerto Rico

Figure C-2 displays the 19 measures and their weights for the Puerto Rico SAS. The definitions for the Puerto Rico SAS measures are the same as those used for the 50 States and District of Columbia.

Please refer to Section 2 and Appendix B-1 for additional details about the measures. As in the calculation of the SAS score for the 50 States and District of Columbia, the Health Center Penetration measure is removed and the weight that was allocated to Health Center Penetration in the Puerto Rico UNS, is distributed proportionately across all the other measures.

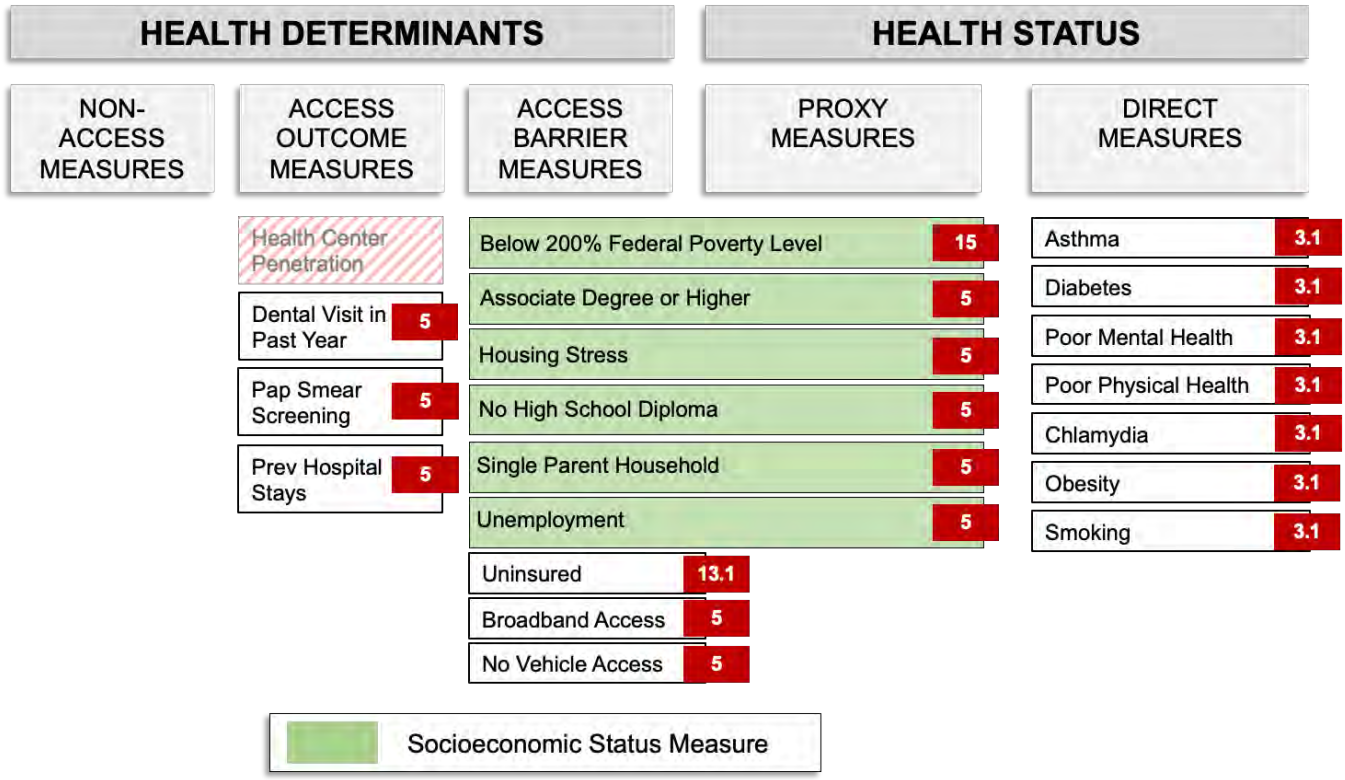

Figure C-2. Puerto Rico SAS Measures and Weights

C.3.2 Measures and Weight Assignments for U.S. Territories Excluding Puerto Rico

Figure C-3 displays the 10 SAS measures and their weights for the U.S. Territories, excluding Puerto Rico. The measure definitions are the same as those used for the UNS. Please refer to Appendix B.2 for additional details about the measures.

As in the calculation of the SAS score for Puerto Rico, the Health Center Penetration measure is removed and the weight that was allocated to Health Center Penetration in the UNS for U.S. Territories, excluding Puerto Rico, is distributed proportionately across all the other measures.

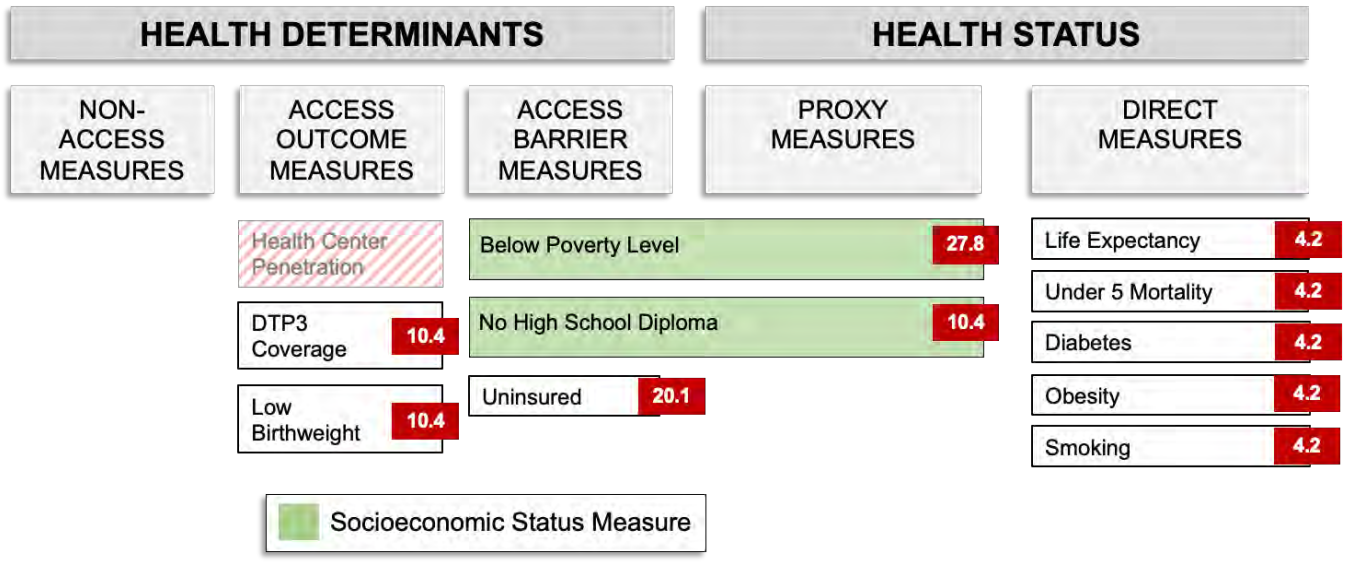

Figure C-3. U.S. Territories Excluding Puerto Rico SAS Measures and Weights

C.3.3 Measures and Weight Assignments for the Freely Associated States

Figure C-4 displays the nine SAS measures and weights for the Freely Associated States. The measure definitions are the same as those used for the UNS. Please refer to Appendix B.2 for additional details about the measures.

As in the calculation of the SAS score for U.S. Territories, the Health Center Penetration measure is removed and the weight that was allocated to Health Center Penetration in the UNS, is distributed proportionately across all the other measures.

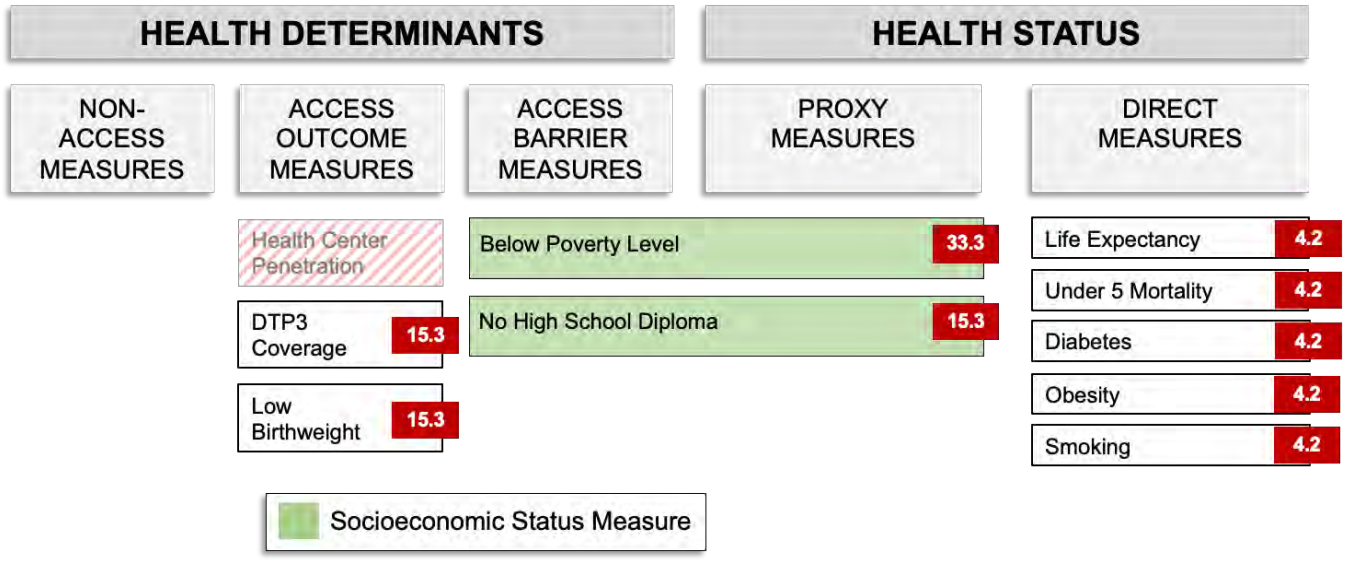

Figure C-4. Freely Associated States SAS Measures and Weights

C.4 Data Sources

The SAS uses the same data sources that are used for the UNS. Like the UNS, the SAS score is calculated using the most recent available data. For additional details on the data sources, please refer to Section 3 for the 50 U.S. States and District of Columbia, Appendix B.1 for Puerto Rico, and Appendix B.3 for the U.S. Territories and Freely Associated States. Additionally, the SAS uses health center service area ZIP Codes and patient counts from UDS for patient weighting.

C.5 Calculation of the SAS

The SAS score calculation is like the UNS calculation in that a ZIP Code score is first calculated for each ZIP Code in the service area and then the ZIP Code scores are aggregated to produce an overall SAS score.

In contrast to the UNS, which is calculated for *proposed* service areas, the SAS is calculated for *current* health center service areas. To aggregate the ZIP Code scores into a score for a health center service area, the SAS uses a patient-weighted method that emphasizes the areas where patients being served by the health center reside. Note that this contrasts with the population-weighted method used for the UNS, discussed in Section 4 that emphasizes *potential* patients.

The two steps to calculate the SAS are described below.

ZIP Code SAS Score

The SAS score for a ZIP Code is the sum of weighted measure values that have been standardized. The methodology for standardizing and weighting the measure values is identical to the UNS methodology. See Section 4.1 for more information.

Health Center SAS Score

For a health center with a service area composed of multiple ZIP Codes, the SAS score is computed by calculating a patient-weighted average of the ZIP Code SAS scores for the ZIP Codes in the service area. The patient weights are generated using counts of patients served by the health center for each ZIP Code that is reported in the UDS. The ZIP Code weight is the percentage of the total service area patient count that reside in that ZIP Code. In the example in Table C-1, ZIP Code 1 accounts for 1,000 of the 5,000 total patients, so its patient weight is 20%. This weight is multiplied by the ZIP Code 1 SAS score to get the ZIP Code 1 patient weighted SAS (i.e., 43.7×20%=8.7).

Finally, to obtain the health center's overall SAS score, the patient weighted SAS for each ZIP Code in the service area is summed. For the hypothetical service area in Table C-1 the SAS score is the sum of the weighted ZIP Code scores presented in the last column, which is 41. With this weighting method, the ZIP Codes in which most of the health center's patients reside get higher weights in the overall score calculation. By using patient weighting, the SAS score better reflects the health center's patient population.

Table C-1. Example Calculation of a SAS Score for a Hypothetical Health Center Service Area with Three ZIP Codes

ZIP Code	ZIP Code SAS Score	Patient Count	Patient Weight (%)	Patient Weighted SAS
ZIP Code 1	43.7	1,000	20	8.7
ZIP Code 2	50.2	2,000	40	20.1
ZIP Code 3	30.5	2,000	40	12.2
Total	**NA**	**5,000**	**100**	**41**

A service area SAS score ranges from 0 to 100, with higher values indicating populations that face increased health, social, or economic inequities, relative to other communities.

C.6 Summary of Differences between the SAS and UNS

Table C-2 summarizes the primary differences between the SAS and the UNS.

Table C-2. Comparison of SAS to UNS

Characteristic	SAS	UNS
Purpose	Describes the health, social, and economic status of communities served by existing health centers	Describes the community need for a proposed health center site
Health Center Penetration Measure Status	Not included, so that the SAS score focuses on the status of the community regardless of the presence of a health center	Included, so that the UNS captures the current presence of the health center program and consequently, the need for a new health center site
Geographic Areas Scored	Calculated for current health center service areas based on patient data from UDS	Calculated for proposed service areas
ZIP Code Weighting Method	Patient-weighted scoring emphasizes the relative sizes of patient populations served from each ZIP Code	Population-weighted scoring emphasizes high population areas within the proposed service area (and potential patients)

Appendix D Bibliography

An evidence-based approach was used in developing the SANAM and UNS. At each step, the SANAM development relied on systematic reviews of the white, grey, and peer-reviewed literature. This bibliography lists the sources that most significantly informed the measure composition and weighting scheme used to calculate the UNS. Sources in the bibliography also informed the objectives and conceptual framework as well as the methodology used for measure evaluation and selection. The references in the bibliography are organized into three categories based on how they were utilized during the development process:

1) *Needs Assessment Methodology*: Sources that informed the evidence-based methodology used in UNS calculations, including the structure of the conceptual framework and the procedure used to evaluate and select specific measures

2) *Health Determinants and Health Status Measurement*: Sources that informed the health determinants and health status measures included in the UNS calculations and their corresponding weights

3) *Socioeconomic Measurement*: Sources that informed the measurement of "socioeconomic" status and incorporation of the concept of social determinants of health given variability in practice and challenges of data feasibility when measuring these concepts in population health research

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Appendix E Acronyms

ACS	American Community Survey
AHRQ	Agency for Healthcare Research and Quality
BRFSS	Behavioral Risk Factor and Surveillance Survey
CDC	Centers for Disease Control and Prevention
CHAS	Comprehensive Housing Affordability Strategy
CHR	County Health Rankings
CMS	Centers for Medicare & Medicaid Services
CNMI	Commonwealth of the Northern Mariana Islands
DTP3	Diphtheria, Tetanus, and Pertussis
FSM	Federated States of Micronesia
FPL	Federal Poverty Level
HRSA	Health Resources and Services Administration
HUD	U.S. Department of Housing and Urban Development
IOM	Institute of Medicine
NAP	New Access Point
NCHHSTP	National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention
NFA	Need for Assistance
NQF	National Quality Forum
NVSS	National Vital Statistics System
PLACES	Population Level Analysis and Community Estimates
RMI	Republic of the Marshall Islands
SANAM	Service Area Needs Assessment Methodology
SAS	Service Area Status
STI	Sexually Transmitted Infection
UDS	Uniform Data System
UNS	Unmet Need Score
WHO	World Health Organization
ZCTA	ZIP Code Tabulation Area