



Population Health Measures

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The United States (U.S.) spends nearly twice the average of other Organization for Economic Cooperation and Development (OECD) countries' expenditures on health, but has the lowest average life expectancy, performs worse than average on many population health outcomes, and has more outcome-related disparities^① compared to peer OECD countries ([OECD, 2021](#)[↗]; [Tikkanen, & Abrams, 2020, January](#)[↗]). A recent analysis of 2020 Commonwealth Fund International Health Policy Survey data found lower income adults in the U.S. fare relatively worse on affordability and access to primary care and income-related disparities across domains than those in ten other high-income countries ([Doty et al., 2020](#)[↗]). The 2021 Commonwealth Fund report ([Schneider et al., 2021](#)[↗]) notes the U.S. has the largest disparities between income groups, except for preventive services and safety of care.

The U.S. and CMS acknowledge the importance of quality measurement and that quality reporting and incentive programs have improved outcomes and how measured entities^① deliver care. Additionally, population health measurement is critical to improving the nation's overall health. As such, CMS is committed to four principles for improving population health:

- Establish health equity as a strategic priority
- Empower and enable measured entities and other interested parties to take a data-driven approach to measuring and improving population health
- Leverage state¹ innovation and local leadership through partnerships
- Address all drivers of health including clinical, social, behavioral, and environmental factors.

¹ References to states include the District of Columbia and the territories.

This document provides a high-level overview and definition of population health. It addresses considerations for population health [quality measures](#) with respect to the Measure Lifecycle. As population health measures evolve, so will this document.

1 INTRODUCTION TO POPULATION HEALTH

CMS defines population health as health behaviors and outcomes of a broad group of individuals, including the distribution of such outcomes affected by the contextual factors² within the group. The definition is a slight variation from the widely cited [2003 Kindig & Stoddard](#) definition of population health³ adopted by many, including the U.S. Department of Health and Human Services (HHS), Office of the National Coordinator for Health Information Technology (ONC) ([ONC, 2020](#), p.7). Note that CMS's definition does not delineate how to define the groups themselves. Therefore, when developing population health measures, clarity of the [denominator](#) is critical for measurement. Also, the definition does not delineate the contextual factors. The current approach for commonly published summary measures of population health, such as [mortality](#) rates, primarily uses geopolitical areas. However, other population identifiers may include panels of patients (e.g., persons assigned to a specific measured entity or measured entity team), members of a health plan, or members of a specific social demographic (e.g., women of color). Social determinants/drivers⁴ of health (SDOH) (e.g., economic stability, education, social and community context, health and health care, and neighborhood and built environment), and social risk factors (e.g., food and housing insecurity, lack of transportation), also impact population health significantly ([Green & Zook, 2019](#)).

CMS defines a population health measure as a broadly applicable indicator reflecting the quality of a group's overall health and well-being. Examples of measure topics include access to care, clinical outcomes, coordination of care and community services, health behaviors, preventive care and screening, and utilization of health services. Without guidance as to how to define a group, these working definitions reflect important distinctions between population health measures and quality measures. The current intent of quality measures is to assess the quality, cost, or efficiency of particular services to individuals by health care setting, so there is an attachment of quality measures to particular services and specific types of measured entities. Population health measures would not necessarily have these restrictions. Population health measures are more expansive in that they include what is happening outside the direct health care system.

[Section 1890 of the Social Security Act](#) (the Act) requires the CMS consensus-based entity (CBE) to report annually on its work to Congress and the HHS Secretary. Section §1890(b)(5)(A) of the Act also requires the CMS CBE to include descriptions of matters related to convening multistakeholder groups to provide input on national priorities for improvement in population health.

The National Quality Forum ([NQF 2018 Activities: Report to Congress and the Secretary of the Department of Health and Human Services](#)) identified six population health measure gaps in the NQF portfolio:

- measures detecting differences in quality across institutions or in relation to certain benchmarks, but also differences in quality among populations or social groups
- measures assessing access to care
- measures assessing environmental factors

² Factors which reflect a particular context, the characteristics unique to a particular group, community, society, or individual.

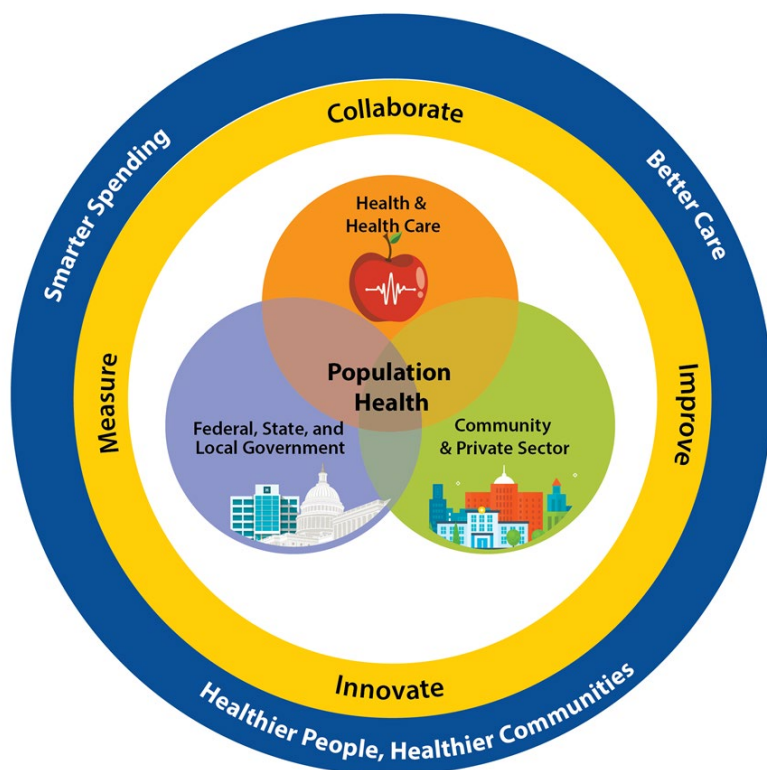
³ "The health outcomes of a group of individuals, including the distribution of such outcomes within the group."

⁴ The terminology is mixed using social determinants to social drivers. For brevity, this document uses social drivers.

- measures addressing food insecurity
- measures addressing language and literacy (e.g., health literacy)
- measures addressing social cohesion

2 APPROACH TO POPULATION HEALTH MEASUREMENT AND IMPROVEMENT

The population health of a group is dependent upon the interplay of several factors (e.g., economic, social, environmental, cultural, behavioral), of which clinical care represents only a portion ([Stoto, 2014](#)). As such, population health depends on a multiplicity of factors, many of which are not within CMS's traditional role to address as a health care services payor. Because of this, the achievement of measurement and improvement in population health depends upon innovation, collaboration, and coordination across interested parties. These include local, tribal, state, national government agencies, and the community, such as members of the care team, payors, hospitals, and nursing homes in delivering care to the target population(s), as well as community members and organizations. [Figure 1](#) reflects this overlap of roles in improving population health and showing the joint influence on population health outcomes by health care, government, the community, and the private sector.



Population health improvement requires a multisector approach. Government agencies, including tribal agencies, measured entities and payors, community service providers, and the private sector can join together to improve the health of every person and population in their communities, together through measurement, innovation, collaboration, and improvement to achieve the triple aim goals of better care, smarter spending, and healthier people and communities.

Figure 1. Population Health and the Triple Aim

No single entity in the public or private sector has sole capacity or responsibility for overall population health improvement. Multiple organizations, public and private, perform public health activities. As opposed to other sectors with interorganizational partnerships and alliances, these public health activities are largely uncoordinated, leading to gaps, inefficiencies, and inequities ([Deprez & Thomas, 2016](#); [Mays & Scutckfield, 2010](#)). Systems thinking—understanding the collective effect of multiple actors and actions—is necessary to organize and sustain population health improvement ([Woulfe et al.,](#)

[2010](#)). There must be “a shared measurement system.” By extension, a multi-sector approach is essential to addressing the multiple determinants of population health. Emerging partnerships between measured entities, federal, state, tribal, and local health agencies, community service providers, and multiple other organizations (e.g., education systems and the justice system), and the private sector can help call attention to underlying problems, shift resources to increase returns on investments, and sustain population-level improvements in health.

Peter Drucker, among others, stated that “you cannot improve what you do not measure.” Stoto ([2014](#)) noted measurement is critical to improving population health. The Institute of Medicine (IOM), now known as the National Academy of Medicine, said “Without a strong measurement capability, the nation cannot learn what initiatives and programs work best, resources cannot be guided toward the most promising strategies, and there is little ability to promote accountability in results” (IOM, [2013a](#), p. 2).

Parrish ([2010](#)) identified three approaches to measuring population health:

- aggregating health outcome measurements made on people into summary statistics, such as population averages or medians
- assessing the distribution of individual health outcome measures in a population and among specific population subgroups
- measuring the function and well-being of the population or society itself, as opposed to individuals

In 2013(b), the [IOM](#), identified criteria for selecting and prioritizing measures of quality for use in population health improvement:

Conditions or outcomes for measurement should be

- reflective of a high preventable burden
- actionable at the appropriate level for intervention

Measures should be

- timely
- usable for assessing various populations
- understandable
- methodologically rigorous
- accepted and harmonized

Of particular importance is CMS’s partnerships with state agencies, Medicaid in particular. Because all health care is local, states are in the best position to assess the unique needs of their respective Medicaid-eligible populations and drive reforms that result in better health outcomes. CMS is committed to ushering in a new era for the federal and state Medicaid partnership, where states have more freedom to design programs meeting the spectrum of diverse needs of their Medicaid population. CMS aims to empower all states to advance the next wave of innovative solutions to Medicaid’s challenges – solutions focusing on improving quality, accessibility, and outcomes in the most cost-effective and equitable manner. Working together, through local organizations, tribal agencies, state agencies, other parts of HHS (e.g., Indian Health Service), and federal partners such as the Departments of Education, Agriculture, Transportation, Housing and Urban Development, and Veterans’ Affairs, CMS

believes they can collectively manage and improve population health for all individuals and families served by CMS programs.

Current CMS initiatives seeking to focus on improving population health and not focusing solely on the quality of care rendered by a singular measured entity include

- [Accountable Care Organizations \(ACOs\)](#): ACOs are responsible for clinical care, costs, and outcomes in a particular population of Medicare patients.
- [Accountable Health Communities \(AHCs\) Model](#): AHCs address a gap between clinical care and community services in the health care delivery system by testing whether identifying and addressing the health-related social needs of Medicare and Medicaid beneficiaries through screening, referral, and community navigation services will impact health care costs and reduce health care utilization.
- [Medicare Advantage](#) plans (MA plans): MA plans are responsible for care in the population of enrollees. MA plans may provide additional services not covered by traditional Medicare ([Tompkins et al., 2013](#)), such as transportation to appointments and non-permanent home modifications to allow beneficiaries to age in place.
- [Program of All-Inclusive Care for the Elderly \(PACE\)](#): PACE is a Medicare and Medicaid program that provides comprehensive medical and social services to certain frail, elderly people living in the community. PACE helps people meet their health care and social needs in the community instead of going to a nursing home or other care facility.

3 CONSIDERATIONS FOR DEVELOPING, EVALUATING, AND MAINTAINING POPULATION HEALTH MEASURES

3.1 MEASURE CONCEPTUALIZATION

Conceptualization of population health measures should identify opportunities for improvement at the population level, rather than only seeking to identify gaps or variations in clinical care. Similarly, information gathering and business case development should be at the population level to identify health differences among populations, including disparities among subpopulations. During measure conceptualization, measure developers should always consider whether to stratify and/or risk adjust the measure(s). Measure developers should estimate the potential for population level improvement as well as the potential benefits, burdens, and costs of achieving the population health goals.

Conceptualization of population health measures presents unique challenges for measure developers. CMS notes that the current health care delivery system lacks an incentive structure to support local problem-solving. For example, insurers have not traditionally paid measured entities and systems for their efforts, e.g., screening for social risk factors or coordinating with local community providers and governments beyond the clinical setting. Existing value-based purchasing programs had not been rewarding coordinated community health improvement efforts. Although population health improvement is a priority goal, there are limited incentives tied to improvements or disincentives to worsening of population health.

CMS is working to change this while also addressing equity. For example, the [Hospital Inpatient Quality Reporting Program](#) adopted Hospital Commitment to Health Equity, Screening for Social Drivers of Health, and Screen Positive Rate for Social Drivers of Health. The [ACO Merit-based Incentive Payment System \(MIPS\)](#) added a health equity adjustment to the ACO MIPS quality performance category score. CMS has released [guidance](#) to give states greater flexibility to address health disparities and

health-related social needs among Medicaid beneficiaries in managed care. The next step is to evaluate the outcomes of these new measures and adjustments.

Although the focus of population health measures differs from clinical quality measures, measure development should address alignment of the population measures with existing or potential measures of clinical care and other drivers of population health improvement. These may include individual behaviors, prevention, and social drivers of health, e.g., housing, transportation, food security, economic stability, education, social and community context, access to health care, and neighborhood environment.

3.1.1 Environmental Scan

Where should measure developers go to find population health areas needing improvement? Measure developers need to expand their [environmental scan](#) search criteria beyond their usual sources for quality measures, e.g., [CMS Measures Inventory Tool \(CMIT\)](#) and [Submission Tool and Repository \(STAR\) Measures Database](#). For example, the OECD has approximately 80 key indicators for population health and health system performance. These key indicators use data from official national statistics to compare countries in terms of health status and health-seeking behavior, access to and quality of health care, and the resources available for health ([OECD, 2021](#)). These key indicators may provide insights to population health areas needing further investigation and offer ideas for measure concepts. For information about conducting an environmental scan, see the [Environmental Scans for Quality Measurement](#) supplemental material.

3.1.1.1 Community Health Needs Assessment and Implementation Strategy

The Patient Protection and Affordable Care Act of 2010 requires a community health needs assessment (CHNA) and implementation strategy every three years for all Section 501(c)(3) nonprofit hospitals (charitable hospitals) working with public health agencies and community members ([Internal Revenue Service \[IRS\], n.d.](#)). The IRS requires hospitals to submit their needs assessment and implementation strategy with their IRS Form 990 (or provide the URLs) and provide an annual description of how the hospital is addressing the needs identified in their CHNA and implementation strategy. The IRS also requires hospitals to make their CHNA and implementation strategy publicly available, which is usually only on the individual hospital's website. There is no requirement for the CHNA to include measures. However, the implementation strategy must include an evaluation of the impact of any action taken since the last CHNA to address the significant health needs identified ([IRS, 2014](#)). There is no oversight on the quality of the content of these CHNAs, no public central repository (other than the IRS), no public state-based repository, and no widely available measures focused on measuring the impact of the hospitals' implementation strategy on the population of the community. Some state hospital associations may collect CHNAs and the American Hospital Association's [Health Research & Educational Trust \(HRET\)](#) has collected and analyzed 3000 CHNA's from 2011-2016, which they make available to their members. The HRET website also has articles related to CHNAs.

These CHNAs and implementation strategies have the potential to provide ideas for improvement opportunities in population health. However, a review of the first CHNAs in Texas ([Pennel et al., 2016](#)) found that few included health improvement or program goals and objectives. Ruggles ([2020](#)) noted the CHNA requirements have "surprisingly little accountability for improving outcomes" (p. 1). Fos et al. (2019) assessed whether the CHNA requirement incentivized North Carolina tax-exempt hospitals to increase spending in community health programs. They found the hospitals continue to spend primarily on patient care financial assistance and little on community health programs. They suggest meeting the CHNA requirement is more about compliance than a tool to improve population health.

Stoto et al. (2019) reviewed the CHNAs and implementation strategies from 10 exemplary hospital systems. They found variability in the format and content in implementation strategies compared with CHNAs. Some hospital systems developed models with population-level goals, objectives, and strategies with clear accountability and metrics. A few of the implementation strategies they reviewed were less developed. Stoto et al. (2019) recommend strengthening the CHNA regulations to require reporting of the evaluation measures the hospitals intend to monitor based on an established community health improvement model.

3.1.1.2 Research Social Drivers of Health and Social Risk Factors

Research into the effects of social drivers of health (SDOH) and social risk factors may also provide measure developers with ideas for population health measure concepts. For example, a recent analysis of state and local government spending on non-health care services (e.g., education, social services, environment, and housing) noted an association between increased spending and lower infant mortality rates among certain high-risk populations (Goldstein et al., 2020).

3.1.1.3 Healthy People

Healthy People 2020 started and Health People 2030 continues with providing a set of broad population level goals and objectives broken down into five categories: health conditions, health behaviors, populations, settings and systems, and social determinants⁵ of health (HHS, Office of Disease Prevention and Health Promotion, n.d.). These goals and objectives may also be concepts for population health measure developers to consider. Healthy People 2030 continues to address SDOH. Healthy People 2030 identifies five SDOH domains each with multiple objectives: economic stability, education access and quality, health care access and quality, neighborhood and built environment, and social and community context.

3.1.1.4 Existing Population Health Measures

Measure developers should look for existing measures currently identified as population health measures, but these may not meet the CMS definition. In 2015, IOM identified several existing measures that are indicators for population health, for example, life expectancy, overweight and obesity rates, and teenage pregnancy rates. The usual databases of measures, e.g., CMIT and STAR, have historically not included these types of measures. CMIT and STAR can also help identify existing measures to use as proxies for population health, e.g., communication between measured entities and patients for patient-centered care.

A recent scan focusing on existing clinician-level measures applicable to population health identified 248 measures. The reviewers then categorized the measures according to level of analysis using clinician/clinician group, facility, health plan, integrated delivery system, and population. Some measures applied to more than one level of analysis. Table 1 shows the number of measures identified for each conceptual topic and the number of measures with population as the level of analysis (CMS, Health Services Advisory Group, 2021). For brevity, Table 1 omits numbers for other levels of analysis.

Table 1. Existing Quality Measures at Population Level of Analysis

Conceptual Topic	Number of Quality Measures Identified	Number of quality measures with population as level of analysis
Access to care	21	3
Clinical outcomes	108	19

⁵ Healthy People 2030 use the term social determinants of health..

Coordination of care and community services	39	13
Health behaviors	26	5
Preventive care and screening	50	5
Utilization of health services	4	0

3.2 MEASURE SPECIFICATION

The general processes for specifying population health measures are no different than other types of measures. See the Blueprint [Measure Specification](#) content on the *CMS MMS Hub*. There are, however, some specification building blocks needing closer consideration. The measure developer must distinguish population health measures from clinical quality measures.

3.2.1 Target/Initial population

3.2.1.1 Population level specification – geography-based

The geographic level of specification may include zip code, county, city, state, national, or other geographically-based areas.

Example – all adults, 18 years and older, living in zip code 20500

3.2.1.2 Population level specification – patient panel-based

Denominator specifications may be beneficial for use in assessing population health improvement based on the work of health care delivery systems. When specifying at a patient panel level, it is critical to avoid limiting the measure denominator to only patients who receive specific services. In other words, the denominator should include all patients in the patient panel without regard to particular services rendered or patient encounters that occur. Otherwise, the measures no longer address the health of the entire patient panel population, but rather only those that receive certain services. As such, they become clinical quality (measured entity-focused) measures assessing quality of the services rendered rather than an assessment of the health of the population.

Example – all Medicare beneficiaries in Acme ACO

3.2.2 Stratification

Most population health measures will need a stratification plan. As noted by the IOM (2015), factors outside of health care substantially shape the health of populations, e.g., social, environmental, individual behaviors. Stratification is necessary to provide actionable information to measured entities and policymakers, beyond the collection and sharing of data. Stratifying the data by race, ethnicity, language preference, sexual orientation, gender identity, age, disability, and SDOH, including those related to education and literacy, social and community context, economic stability, and neighborhood and built environment, can enable focused quality improvement activities.

As CMS moves toward population-based payments and shared risk, it is increasingly important for measured entities and payors to be able to quantify and address differences and disparities among the communities and populations served by CMS programs. Stratified data is the critical first step to improving the health of all individuals and families.

As part of the [Reducing Provider and Patient Burden proposed rule](#), released December 10, 2020, CMS included a request for information on barriers to adopting standards, and opportunities to

accelerate adoption of standards, related to social risk factors. CMS acknowledges health care “providers in value-based payment arrangements rely on comprehensive, high-quality data to identify opportunities to improve patient care and drive value.” The goal is to standardize and liberate these data for multiple reasons, such as to decrease patient reporting burden and increase the chances of connecting patients with appropriate community care and support.

3.2.3 Data Sources

As with clinical quality measures, measure developers must specify [data sources](#) for population health measures. Data sources may include clinical data (electronic health records [EHRs], registries, paper patient records), claims, surveys, patient assessments (e.g., Minimum Data Set), screening tools (e.g., the Accountable Health Communities Health-related Social Needs screening tool [Billioux et al., 2017]), and administrative data that can include census data, crime data, birth and death records, etc. The Gravity Project is working to change inconsistencies in existing SDOH data collection processes. [The Gravity Project](#) convenes interested parties across the country through an open and transparent collaborative process where they develop and test consensus-based standards to facilitate SDOH data capture and exchange across a variety of systems and settings of care and social services. The Gravity Project submitted SDOH-related data elements for inclusion in the [United States Core Data for Interoperability \(USCDI\)](#). The Office of the National Coordinator for Health Information Technology (ONC) incorporated these data elements into USCDI version 2.

However, most medical record and other clinical data are unable to describe population health for the total population group, and therefore, are insufficient. For example, although the measure developer may consider immunization status a measure of population health, if a measure denominator includes solely patients who receive certain clinical services or have documented patient encounters, the measure becomes one of clinical care quality. Immunization status for a population must consider the population as a whole. As such, public health data sources, such as those provided by CDC, or other repurposed data, e.g., crime statistics, number of grocery stores, community health assessments, and community health needs assessments, may be more valuable than the typical patient care data used for clinical quality measures. [CDC’s National Center for Health Statistics](#) administers and/or collects data from multiple surveys, e.g., National Health and Nutrition Examination Survey and the National Health Interview Survey, and vital statistics, which can provide population-level data for comparison. In the absence of appropriate data sources, survey development and implementation may be necessary.

3.2.4 Level of Analysis

The level of analysis for population health measures should be at the population level and not limited solely to patients who receive particular services. However, obtaining information on persons not receiving care is challenging. The measure developer must clearly define the population in the target/initial population.

3.2.5 Time Interval

What is the appropriate [time interval](#) for population health measures? Is one year long enough or do these measures require a longer time interval to determine significant changes? Measure developers should consider the appropriate time interval for measurement, bearing in mind a longer period of time may be necessary to identify significant changes at the population level.

3.2.6 Risk Adjustment

Outcome measures typically require [risk adjustment](#)^①, where the purpose is to assess clinical quality. The intent of population health measures is to produce true values without adjustment. However, measure developers should *consider* risk adjustment. Stratification by key risk factors may be a better alternative. See section 3.2.2.

3.3 MEASURE TESTING

[Measure testing](#)^① may be challenging due to the potential use of multiple data sources in a single measure and a lack of data, especially SDOH data. Lack of interoperability among data sources is likely. Consider the (in)completeness of data sources and data elements (e.g., incomplete SDOH data). The measure developer needs to be creative with their testing plan and should partner with a variety of interested parties including data owners. See the Blueprint [Measure Testing](#)^① content on the *CMS MMS Hub*.

For the purposes of testing measures of population health, the nature of the quality construct (inferences about underlying processes or structures [[Messick, 1987](#)]) determines the testing approach ([Table 2](#)). The first consideration is which system owns the quality construct and then whether the construct is a public good. A public good is one for which consumption of the good by one person does not preclude consumption of the same good by another person (e.g., a city park, clean air).

Until recently, the distinction in attribution was more well defined. Hospitals and physicians provided clinical care; public health and social service agencies did not provide clinical services or they were very limited. With the increased emphasis on the importance of social risk factors, health care systems are more directly involved in addressing these social risk factors through the direct provision of or referral to services like housing or food security, and/or are formalizing collaborations with entities outside the health care system. For the purposes of defining the quality construct for measure testing, the measure developer needs to expand attribution for traditional measured entities to include the delivery of public health and social services, and/or to expand the measured entity to include both health care and non-health care providers.

Table 2. The nature of the quality construct for population health measures

System owning the quality construct	The quality construct is a public good	The quality construct is not a public good
Health care	Population health	Preventive health care
Non-health care	Public health	Social services

Assuming the quality construct is not a public good, once the measure developer defines the quality construct, then measure testing would proceed as with any quality measure with the focus on [importance](#)^①, [scientific acceptability](#)^① ([reliability](#)^① and [validity](#)^①), [feasibility](#)^①, and [usability](#)^①.

[Measure validation](#)^① is critical. If the intervention is a public good, then the validation should demonstrate that. If the focus is on allocative efficiency,⁶ then there is no need for validation. If the focus is on some population characteristic like “cohesion,” then the focus is on that construct. The reliability focus would be whether there is detectable variation in the quality construct across measured entities (signal), or whether there is overwhelming variation in factors independent of the quality

⁶ Allocative efficiency is when the right share of resources is being devoted to health care versus other goods in the economy ([Baicker & Chandra, 2011](#)).

construct (noise). Because there is an extended pathway between, for example, food (in)security-to-clinical care-to-outcome, one might surmise a greater influence of factors independent (e.g., transportation availability) of the quality construct, thereby reducing reliability. The measure developer might need to consider strategies to increase reliability, such as increasing the effective sample size, e.g., borrowing statistical strength of related process or outcome measures (NQF, 2015) or enhancing the information context (e.g., incorporating structure measures in reliability adjustment⁷).

The second consideration is whether the quality construct is a public good. For example, testing for lead poisoning and removing lead from city water pipes are both interventions that might improve adverse outcomes. The second intervention is a public good, the first is not. In the testing for lead poisoning intervention, the evidence for validity is the same as any quality measure. There must be a person-level process/outcome relationship established with rigorous evidence and there must be an entity-level (e.g., ACO) demonstration of validity of the quality construct which shows that there is alignment between the behavioral response of persons and clinicians to the measure with the end user intent.

However, in the second public good intervention, there is no person-level process/outcome relationship (e.g., an individual's health might improve whether that individual consumes the good or not). The effectiveness of the intervention is only determined by examining population level outcomes. Measure testing might be cross-sectional (e.g., geopolitical areas with and without the intervention that are similar in other measurable aspects) or temporal (e.g., the same geopolitical area before and after implementation of the intervention). The focus on measure testing is more about characterizing the attributes of the population and attempting to demonstrate that the attribute that matters for variation in population level outcomes is the intervention of interest: removing lead from city water pipes. Testing might focus on statistical significance of the assertion about the attribute, but reliability conceptualized as to whether there is detectable variation in the quality construct across measured entities is not relevant (i.e., there is no within and between variation).

A final testing consideration is the nature of the population level outcome. In productive efficiency,⁸ the focus is on maximizing the individual's outcome for a given amount of health care or social services. A population level outcome might be like those used by OECD such as cancer deaths per 1,000 persons. An intervention to improve the population level outcome would be to improve maternal mortality for individuals. In allocative efficiency, the focus is on maximizing the outcomes for a population by allocating or distributing a given amount of health care or social services to the best marginal use. A population level outcome might examine the distribution of outcomes across population subgroups and consider whether increasing access to health care or social services for certain subgroups would have the largest impact on outcomes. Testing would focus on demonstrating the hypothesis by, for example, demonstrating that the geopolitical areas where those subgroups have better access have better outcomes.

3.4 MEASURE IMPLEMENTATION

Because population health measures are not setting specific, their adoption would primarily be into CMS programs such as the Medicare Shared Savings Program (MSSP), Marketplace Quality Rating System, and Medicare Advantage program. CMS is using population health measures in Merit-Based Incentive Payment System Value Pathways (MVPs) in the Foundational Layer, which is promoting interoperability

⁷ Although risk adjustment considers differences in patient disease severity and case mix, reliability adjustment allows for repeatability of estimates related to the relative number of cases and outcomes used to calculate the indicator of interest (Wakeam & Hyder, 2016).

⁸ Productive efficiency is when health care resources are put to the best use possible and produce as much health as they can (Baicker & Chandra, 2011).

and population health. MVPs are one of three reporting options for clinicians and topics cover a variety of specialties. There are two population health measures available, Q479 Hospital-Wide, 30-Day, All-Cause Unplanned Readmission (HWR) Rate for the Merit-Based Incentive System (MIPS) Groups, and Q484 Clinician and Clinician Group Risk-standardized Hospital Readmission Rates for Patients with Multiple Chronic Conditions. QPP MVP participants must select one of the measures. Neither measure requires additional data submission from the clinician as both are claims-based measures.

Commercial insurers could adopt population health measures for continuous quality improvement and serve as a comparison with other commercial insurers. Communities could adopt population health measures to assess the success of pertinent implemented community programs. Measure results could also serve as input to community resource and intervention planning and impact policy decisions at the local, state, and national levels.

The ideal plan is to use population health measures broadly, report them at the community level, and share results among participating clinicians, public health, community, and other organizations. Consistent with the notion of a “shared measurement system,” this arrangement increases the likelihood of multiple interested parties coalescing around addressing the measure concept.

See the Blueprint [Measure Implementation](#) content on the *CMS MMS Hub*.

3.5 MEASURE USE, CONTINUING EVALUATION, AND MAINTENANCE

Population health measures are subject to the same three types of [measure maintenance](#) reviews as other types of measures – annual, triennial comprehensive, and early maintenance – using the [measure evaluation criteria](#) outlined in the content on the *CMS MMS Hub* and the [Measure Maintenance Reviews](#) supplemental material.

3.6 INTERESTED PARTY ENGAGEMENT

Given the broad nature of population health measures, it is critical to include community members and organizations early in the development process. These would include local community organizations and local governments that address social needs. Community organizations, e.g., soup kitchens and homeless shelters, can provide important input as to the gaps in population health, the drivers of improvement, and the benefits of improvement. Measure developers should adhere to the latest [Person and Family Engagement \(PFE\) Toolkit](#) at the earliest stages of developing population health measures. Also see the [Interested Party Engagement](#) content on the *CMS MMS Hub*, the [Person and Family Engagement in Quality Measurement](#) and [Technical Expert Panels](#) supplemental materials.


3.6.1 Public Comment

Soliciting public comments for population health measures should occur frequently throughout the Measure Lifecycle. The timing in which the measure developer solicits comments in the Measure Lifecycle may be different than other quality measures. The measure developer may want to target representatives of the populations and/or communities for measurement. These groups are not the usual readers and responders to the Federal Register and websites requesting comments from the public, so concerted targeting may be necessary.

3.6.2 Technical Expert Panel (TEP)

The composition of a TEP for a population health measure may vary from other measure development TEPs. The TEP should include representatives of the proposed population, group, and/or community for measurement. Again, as with public comment, concerted outreach may be necessary.

4 KEY POINTS

Most current population health measures summarize population outcomes at a geographic level. Generally, these encompass health outcomes based on mortality or life expectancy, and survey-based measures of subjective health status, psychological state, or ability to function ([Parish, 2010](#) ).

Measure developers may need to expand their interested party outreach, e.g., community organizations. Multiple data sources may be necessary to include non-health care sources.

There is much more to learn about population health and population health measurement. While the principle of rigor in measure development remains the same, learning the details will come by doing and iterating.

REFERENCES

- Additional Requirement for Charitable Hospitals; Community Health Needs Assessment for Charitable Hospitals; Requirement of a Section 4959 Excise Tax Return and Time for Filing the Return; Final Rule. 79 F.R. 78954-79016. December 31, 2014. <https://www.govinfo.gov/content/pkg/FR-2014-12-31/pdf/2014-30525.pdf>
- American Hospital Association. (n.d.). *Health research & educational trust*. Retrieved September 28, 2023, from <https://www.aha.org/center/hret>
- Baicker, K., & Chandra, A. (2011, September 9). *Aspirin, angioplasty, and proton beam therapy: The economics of smarter health care spending*. https://www.kansascityfed.org/documents/3074/2011-Baicker-Chandra_final.pdf
- Billieux, A., Verlander, K., Anthony, S., & Alley, D. (2017). Standardized screening for health-related social needs in clinical settings. The accountable health communities screening tool. *National Academy of Medicine Perspectives*, 1-9. <https://doi.org/10.31478/201705b>
- Centers for Disease Control and Prevention. (n.d.). *National Center for Health Statistics*. Retrieved September 28, 2023, from <https://www.cdc.gov/nchs/index.htm>
- Centers for Medicare & Medicaid Services. (n.d.-a). *Accountable care organizations (ACOs)*. Retrieved September 28, 2023, from <https://www.cms.gov/medicare/payment/fee-for-service-providers/shared-savings-program-ssp-acos/about>
- Centers for Medicare & Medicaid Services. (n.d.-b). *Accountable health communities model*. Retrieved September 28, 2023, from <https://www.cms.gov/priorities/innovation/innovation-models/ahcm>
- Centers for Medicare & Medicaid Services. (n.d.-c). *CMS measures inventory tool*. Retrieved September 28, 2023, from <https://cmit.cms.gov/cmit/#/MeasureInventory>
- Centers for Medicare & Medicaid Services. (n.d.-d). *Health plans – General Information*. Retrieved September 28, 2023, from <https://www.cms.gov/medicare/enrollment-renewal/health-plans>
- Centers for Medicare & Medicaid Services. (n.d.-e). *PACE*. Retrieved September 28, 2023, from <https://www.medicare.gov/health-drug-plans/health-plans/your-coverage-options/other-medicare-health-plans/PACE>
- Centers for Medicare & Medicaid Services. (2023, January 4). SMD #:23-001. Additional guidance on use of in lieu of services and settings in Medicaid Managed Care. Retrieved September 28, 2023, from <https://www.medicaid.gov/sites/default/files/2023-01/smd23001.pdf>
- Centers for Medicare & Medicaid Services. (2023, April). *Person and family engagement (PFE) toolkit*. Retrieved September 28, 2023, from <https://mmshub.cms.gov/sites/default/files/Guide-PFE-Toolkit.pdf>
- Centers for Medicare & Medicaid Services, Health Services Advisory Group. (2021). *2020 CMS quality measure development plan 2020 population health environmental scan and gap analysis report for the Quality Payment Program*. <https://www.cms.gov/files/zip/2020-mdp-population-health-e-scan.zip>

- Deprez, R., & Thomas, R. (2016). Population health improvement: It's up to the community-not the healthcare system. *Maine Policy Review*, 25(2), 44-52. <https://digitalcommons.library.umaine.edu/mpr/vol25/iss2/8>
- Doty, M. M., Tikkanen, R. S., FitzGerald, M., Fields, K., & Williams, R. D. (2020). Income-related inequality in affordability and access to primary care in eleven high-income countries. *Health Affairs*, 40(1). <https://doi.org/10.1377/hlthaff.2020.01566>
- Fos, E. B., Thompson, M. E., Elnitsky, C. A., & Platonova, E. A. (2019). Did performing community health needs assessments increase community health program spending by North Carolina's tax-exempt hospitals? *Population Health Management*, 22(4). <https://doi.org/10.1089/pop.2018.0140>
- Goldstein, N. D., Palumbo, A. J., Bellamy, S. L., Purtle, J., & Locke, R. (2020). State and local government expenditures and infant mortality in the United States. *Pediatrics*, 146(4). <https://doi.org/10.1542/peds.2020-1134>
- Green, K., & Zook, M. (2019, October 29). When talking about social determinants, precision matters. *Health Affairs*. <https://doi.org/10.1377/forefront.20191025.776011>
- Health Level Seven International. (n.d.). *The Gravity Project*. Retrieved September 28, 2023, from <https://confluence.hl7.org/display/GRAV/The+Gravity+Project>
- Heath, S. (2017, September 11). *How to create, conduct community health needs assessments*. Retrieved September 28, 2023, from <https://patientengagementhit.com/news/how-to-create-and-conduct-community-health-needs-assessments>
- Heath, S. (2018, January 15). *3 things to know to conduct a community health needs assessment*. Retrieved June 30, 2023, from <https://patientengagementhit.com/news/3-things-to-know-to-conduct-a-community-health-needs-assessment>
- Institute of Medicine. (2013a). *Core measurement needs for better care, better health, and lower costs: Counting what counts: Workshop summary*. The National Academies Press. <https://doi.org/10.17226/18333>
- Institute of Medicine. (2013b). *Toward quality measures for population health and the leading health indicators*. The National Academies Press. <https://doi.org/10.17226/18339>
- Institute of Medicine. (2015). *Vital signs. Core metrics for health and health care progress*. The National Academies Press. <https://doi.org/10.17226/19402>
- Internal Revenue Service. (n.d.). *Community health needs assessment for charitable hospital organizations section 501(r)(3)*. Retrieved September 28, 2023, from <https://www.irs.gov/charities-non-profits/community-health-needs-assessment-for-charitable-hospital-organizations-section-501r3>
- Kindig, D., & Stoddard, G. (2003). What is population health? *American Journal of Public Health*, 93, 380-383. <https://doi.org/10.2105/AJPH.93.3.380>
- Mays, G. P., & Scutchfield, F. D. (2010). Improving public health system performance through multiorganizational partnerships. *Preventing Chronic Disease*, 7(6), A116. https://www.cdc.gov/pcd/issues/2010/nov/10_0088.htm

- Medicare and Medicaid Programs; CY 2023 Payment Policies Under the Physician Fee Schedule and Other Changes to Part B Payment and Coverage Policies; Medicare Shared Savings Program Requirements; Implementing Requirements for Manufacturers of Certain Single-dose Container or Single-use Package Drugs To Provide Refunds With Respect to Discarded Amounts; and COVID–19 Interim Final Rules, 87 FR 69404 (proposed November 18, 2022) (to be codified at 42 CFR Parts 405, 410, 411, 414, 415, 423, 424, 425, and 455). <https://www.govinfo.gov/content/pkg/FR-2022-11-18/pdf/2022-23873.pdf>
- Medicare Program; Hospital Inpatient Prospective Payment Systems for Acute Care Hospitals and the Long-Term Care Hospital Prospective Payment System and Policy Changes and Fiscal Year 2023 Rates; Quality Programs and Medicare Promoting Interoperability Program Requirements for Eligible Hospitals and Critical Access Hospitals; Costs Incurred for Qualified and Non-Qualified Deferred Compensation Plans; and Changes to Hospital and Critical Access Hospital Conditions of Participation, 87 FR 48780 (proposed August 10, 2022) (to be codified at 42 CFR Parts 412, 413, 482, 485, and 495). <https://www.govinfo.gov/content/pkg/FR-2022-08-10/pdf/2022-16472.pdf>
- Messick, S. (1987). *Validity*. Educational Testing Service. <https://onlinelibrary.wiley.com/doi/pdf/10.1002/j.2330-8516.1987.tb00244.x>
- National Quality Forum. (2015, September). *Performance measurement for rural low-volume providers*. <https://www.qualityforum.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=80442>
- National Quality Forum. (2019, March). *NQF report of 2018 activities to Congress and the Secretary of the Department of Health and Human Services*. <https://www.qualityforum.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=89478>
- OECD. (2021). *Health at a glance 2021: OECD indicators*. OECD Publishing. <https://doi.org/10.1787/ae3016b9-en>
- Parish, R. G. (2010). Measuring population health outcomes, *Preventing Chronic Disease. Public Health Research, Practice, and Policy*, 7(4), A71. https://www.cdc.gov/pcd/issues/2010/jul/10_0005.htm
- Pennel, C. L., McLeroy, K. R., Burdine, J. N., Matarrita-Cascante, D., & Wang, J. (2016). Community health needs assessment: Potential for population health improvement. *Population Health Management*, 19(3), 178-186. <https://doi.org/10.1089/pop.2015.0075>
- Ruggles, L. (2020). Frameworks for community impact- Community case study. *Frontiers in Public Health*, 8(197). <https://doi.org/10.3389/fpubh.2020.00197>
- Schneider, E. C., Shah, A., Doty, M. M., Tikkanen, R., Fields, K, Williams III, R. D. (2021, August). *Mirror, mirror 2021. Reflecting poorly: Health care in the I.S. compared to other high-oncome countries*. Retrieved September 28, 2023, from https://www.commonwealthfund.org/sites/default/files/2021-08/Schneider_Mirror_Mirror_2021.pdf
- Stoto, M. (2014). Population health measurement: Applying performance measure concepts in population health settings. *eGEMS (Generating Evidence & Methods to Improve Patient Outcomes)*, 2(4), 6. <https://doi.org/10.13063/2327-9214.1132>

- Stoto, M. A., Davis, M. V., & Atkins, A. (2019). Beyond CHNAs: Performance measurement for community health improvement. *eGEMS*, 7(1), 45. <https://doi.org/10.5334/egems.312>
- Tikkanen, R., & Abrams, M.K., (2020, January). *U.S. health care from a global perspective, 2019: Higher spending, worse outcomes?* Commonwealth Fund. https://www.commonwealthfund.org/sites/default/files/2020-01/Tikkanen_US_hlt_care_global_perspective_2019_OECD_db_v2.pdf
- Tompkins, C., Higgins, A., Perloff, J., & Veselovskiy, G. (2013, April 2). Population health management in Medicare Advantage. *Health Affairs*. <https://www.healthaffairs.org/doi/10.1377/hblog20130402.029363/full/>
- U.S. Department of Health and Human Services. (2017). *Letter to the nation's governors: Secretary Price and CMS Administrator Verma take first joint action: Affirm partnership of HHS, CMS, and States to Improve Medicaid Program*. <https://www.hhs.gov/about/news/2017/03/14/secretary-price-and-cms-administrator-verma-take-first-joint-action.html>
- U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. (n.d.). *Healthy people 2030*. Retrieved September 28, 2023, from <https://health.gov/healthypeople>
- U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. (n.d.-c). *Healthy People 2030. Social determinants of health*. Retrieved September 28, 2023, from <https://health.gov/healthypeople/objectives-and-data/social-determinants-health>
- U.S. Department of Health and Human Services, Office of the National Coordinator for Health Information Technology. (2020, October). *2020-2025 Federal Health IT Strategic Plan*. https://www.healthit.gov/sites/default/files/page/2020-10/Federal%20Health%20IT%20Strategic%20Plan_2020_2025.pdf
- Wakeam, E., & Hyder, J. A. (2016). Reliability of reliability adjustment for quality improvement and value-based payment. *Anesthesiology*, 124(1), 16-18. <https://doi.org/10.1097/ALN.0000000000000845>
- Woulfe, J., Oliver, T. R., Zahner, S. J., & Siemering, K. Q. (2010). Multisector partnerships in population health improvement. *Preventing Chronic Disease*, 7(6), A119. https://www.cdc.gov/pcd/issues/2010/nov/10_0104.htm