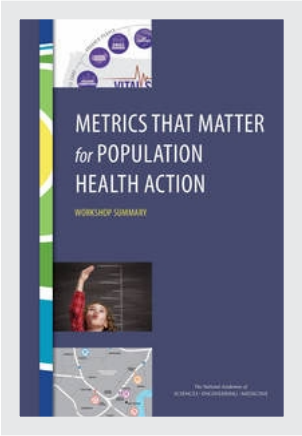

Metrics That Matter for Population Health Action: Workshop Summary

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Metrics That Matter for Population Health Action

Workshop Summary

Joe Alper, *Rapporteur*

Roundtable on Population Health Improvement

Board on Population Health and Public Health Practice

Institute of Medicine

The National Academies of
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This workshop summary has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published workshop summary as sound as possible and to ensure that the workshop summary meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the process. We wish to thank the following individuals for their review of this workshop summary:

Sarah Burd-Sharps, Social Science Research Council
Dale Fleming, County of San Diego
Moira Inkelas, University of California, Los Angeles
Kristen Lewis, Social Science Research Council
Matt Stiefel, Kaiser Permanente

Although the reviewers listed above have provided many constructive comments and suggestions, they did not see the final draft of the workshop summary before its release. The review of this workshop summary was overseen by **Sue Curry**, University of Iowa. She was responsible for making certain that an independent examination of this workshop summary was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this workshop summary rests entirely with the rapporteur and the institution.

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Acronyms and Abbreviations

ADL	activity of daily living
AHA	American Hospital Association
BRFSS	Behavioral Risk Factor Surveillance Surveys
CDC	Centers for Disease Control and Prevention
GDP	Gross Domestic Product
GPI	Genuine Progress Indicator
HALE	health-adjusted life expectancy
HIPAA	Health Insurance Portability and Accountability Act
HUD	U.S. Department of Housing and Urban Development
IOM	Institute of Medicine
IT	information technology
NCI	National Cancer Institute
NIDA	National Institute on Drug Abuse
PERE	Program for Environmental and Regional Equity at the University of South California
RBA	results-based accountability
RWJF	Robert Wood Johnson Foundation
SEER	Surveillance, Epidemiology, and End Results
UCLA	University of California, Los Angeles
WHO	World Health Organization

1

Introduction[1]

As was stated succinctly in the 2015 Institute of Medicine (IOM) report *Vital Signs*, progress in any human endeavor is a product of understanding the circumstances at play, having the tools available to address the controllable factors, and resolving to take the actions required. Basic to each is the choice of measures—measures that can give the best sense of challenges and opportunities, measures that can guide actions, and measures that can be used to gauge impact. In times of rapid change and constrained resources, measures that are important, focused, and reliable are vital (IOM, 2015). This same report concluded that the number of available metrics for health and health care has grown without concomitant gains in health outcomes. Indeed, said David Kindig, Professor Emeritus and Emeritus Vice-Chancellor, University of Wisconsin School of Medicine and Public Health, not only is there an overabundance of measures and indicators available for measuring various aspects of population health, but there have been multiple efforts to examine the nature, validity, uses, and usefulness of existing measures with the goal of simplifying existing sets to meet the needs of all decision makers, from policymakers to communities, without much success in meeting that goal.

An ad hoc committee was appointed to plan and convene a workshop exploring the status and uses of measures and measurement in the work of improving population health. The committee's charge is described in Box 1-1.

BOX 1-1
Statement of Task

An ad hoc committee will plan and convene a workshop exploring the status and uses of measures and measurement in the work of improving population health. The committee will

[1] The planning committee's role was limited to planning the workshop, and the workshop summary has been prepared by the workshop rapporteur as a factual summary of what occurred at the workshop. Statements, recommendations, and opinions expressed are those of individual presenters and participants, and are not necessarily endorsed or verified by the National Academies of Sciences, Engineering, and Medicine, and they should not be construed as reflecting any group consensus.

develop the agenda and identify meeting objectives, select appropriate speakers, and moderate the discussions. The workshop may include relevant examples of national, state, and local measure sets currently in use or recently proposed (e.g., examples from pertinent National Academies of Science, Engineering, and Medicine reports). The workshop also may have a special focus on measures from outside the health domain that have relevance to health (e.g., economic measures, measures of the built environment that can influence health) and on measures of health equity and disparities, as well as their determinants. A summary of the presentations and discussion at the workshop will be prepared by a designated rapporteur in accordance with institutional guidelines.

As part of its activities, the workshop planning committee developed a set of four objectives for workshop:

1. Highlight existing and emerging population health metrics sets and explore their purposes, areas of overlap and gaps.
2. Highlight population health metrics with attention to equity and disparities.
3. Discuss characteristics of metrics necessary for stakeholder action across multiple sectors whose engagement is needed to transform the conditions for health in communities.
4. Highlight population health metrics useful to addressing health beyond health care and engaging "total population health," again, across multiple sectors.

ORGANIZATION OF THE SUMMARY

The workshop (see Appendix B for the agenda) was organized by a planning committee comprised of Rajiv Bhatia, Mary Lou Goeke, Marthe Gold, George Isham (Co-Chair), David Kindig (Co-Chair), Thomas LaVeist, Sanne Magnan, Katherine Papa, Pamela Russo, and Lila Finney Rutten. This publication summarizes the discussions that occurred during the workshop, and highlights speakers' perspectives on potential needs and opportunities for identifying a set of metrics to help drive the nation's efforts to improve population health. Chapter 2 describes the current metrics landscape, including several important milestones (events and publications). Chapter 3 presents some examples of how metrics are being used to drive improvements in population health in communities, and Chapter 4 discusses the uses of metrics to assess health equity at the population level. Chapter 5 recounts the key learnings from four rounds of World Café discussions, and Chapter 6 provides a reflection on the day's discussions.

In accordance with the policies of the National Academies of Sciences, Engineering, and Medicine, workshop participants did not attempt to establish any conclusions or recommendations about needs and future directions, focusing instead on issues identified by the speakers and workshop participants. In addition, the organizing committee's role was limited to planning the workshop. The workshop summary has been prepared by workshop rapporteur Joe Alper as a factual summary of what occurred at the workshop.

2

The Metrics Landscape

The workshop's first panel featured three speakers who provided an overview of the current state of population health metrics, shared the context to and broad outlines of an emerging major metrics set, and discussed the use of multi-sector metrics to inform health improvement. Steven Teutsch, Senior Scholar at the University of Southern California's Leonard D. Schaeffer Center for Health Policy and Economics, senior fellow at the Public Health Institute, and adjunct professor at the Fielding School of Public Health, University of California, Los Angeles (UCLA), reviewed a few of the available metrics sets, described some of their characteristics, and discussed some of the opportunities that they provide to move from measurement to action. Alonzo Plough, Vice President of Research-Evaluation-Learning and Chief Science Officer at the Robert Wood Johnson Foundation (RWJF), made his presentation via video conferencing and spoke about the set of metrics that RWJF has adopted as part of its new 20-year Culture of Health initiative. Rajiv Bhatia, Founder and Principal at The Civic Engine, described an interdisciplinary, multisectoral set of metrics developed in San Francisco to track progress in meeting population health goals. Following the three presentations (highlights provided in Box 2-1), David Kindig moderated an open discussion among the workshop participants.

BOX 2-1
Highlights from Presentations on the Metrics Landscape

1. Proliferation of metrics creates confusion (Teutsch).
2. The best measures drive action and are linked to interventions (Teutsch).
3. The greatest opportunities to improve population health reside outside the traditional health sector; therefore, good measures are needed to catalyze action (and collaboration) among those sectors (Plough, Teutsch).
4. However, indicators work best in catalyzing population health action in multiple sectors when they reflect collective needs and priorities determined by community stakeholders and have been measured at a human scale (Bhatia).
5. The metrics realm requires a shift from "data first" to "purpose first."

CONTEXT SETTING[1]

In many ways, said Steven Teutsch, the topic of population health metrics harkens back to public health surveillance, a subject that has long been discussed in public health. He defined public health surveillance as "the ongoing systematic collection, analysis and interpretation of health-related data essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know" (Lee et al., 2010; Thacker, 2010, pg. #1). He then highlighted a few the salient points about public health surveillance. Such surveillance, he said, is ongoing and not a "one-shot affair." It is systematic in that it is done in a coherent manner, and it involves the collection, analysis, and interpretation of health-related data essential to planning, implementing, and evaluating public health practices. For the most part, public health surveillance has been a part of governmental public health practice, but at this workshop the discussion includes public health in a broader sense. Public health surveillance "is closely integrated with the timely dissemination of those data to those who need to know them and most importantly, actually apply that information and those data to prevention and control in improving health," said Teutsch.

The long tradition of public health surveillance has included a number of uses, such as detecting problems, estimating the magnitude of a health problem in a population, documenting the distribution and extent of a problem, generating hypotheses about causes, stimulating control activities, and evaluating control strategies. Teutsch noted that while most people think of public health surveillance in terms of detecting outbreaks of infectious diseases and pathogen changes, it can be used to detect any kind of problem affecting public health.

Turning to the definition of a population, Teutsch noted that there are many different conceptions of populations and subpopulations (see Figure 2-1). In his opinion, "we should be thinking about this in the broadest sense as being the health of a total population and that the total population being that of a geopolitical area, while fully recognizing that there are many subpopulations about which one is interested," he explained. "We need to think about the entire population when we think about metrics and recognize that whenever we are dealing with subpopulations, they are only part of the problem and not representing the broadest sense of the total population."

[1] This section is based on remarks from Steven Teutsch, Senior Scholar at the University of Southern California's Leonard D. Schaeffer Center for Health Policy and Economics, senior fellow at the Public Health Institute, and adjunct professor at the Fielding School of Public Health, University of California, Los Angeles, and the statements are not endorsed or verified by the National Academies of Sciences, Engineering, and Medicine.

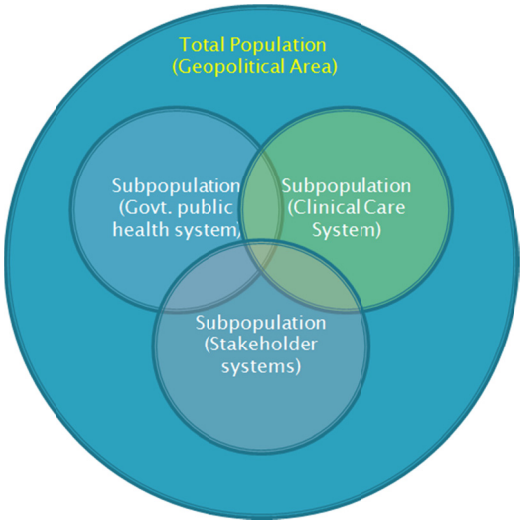


FIGURE 2-1 Measurement of the total population and subpopulations.
SOURCES: Teutsch presentation, July 30, 2015; Jacobson and Teutsch, 2012.

Teutsch noted that a 2012 IOM report (IOM, 2012a) identified three areas of population health for which metrics were needed: health outcomes, the health of communities, and health-adjusted life expectancy (HALE), which would be a summary measure of the health of the total population. To measure the health of the communities in which people live, metrics should account for social circumstances, the environment, policies, and other factors that reflect the health of communities, he explained. As an example, Teutsch mentioned the work in California by groups such as the Health in All Policies Task Force, housed in the state's Sustainable Growth Council, and staffed by the California Department of Public Health in partnership with the Public Health Institute, and attempting to determine what a healthy community might look like. Such efforts paint a health community as a place that meets the needs of everyone across multiple dimensions by providing a quality and sustainable environment, adequate levels of economic and social development, social relationships that are supportive and respectful, and health and social equity.

One challenge in measuring these characteristics, said Teutsch, is to capture the breadth of what it takes to build a healthy community and to do so in a manner that provides succinct, understandable, and actionable data. Before discussing some of the different ways in which this challenge has been addressed, he explained some terms. A metrics set, he said, is an organized set of measures to assess and improve population health and health equity, while a core metrics set is a parsimonious set of measures that provides a quantitative indication of current status on the most important elements in a given field and can be used as a standardized and accurate tool for informing, comparing, focusing, monitoring, and reporting change (IOM, 2015). Good metrics sets need to drive some sort of action if they are to serve their purpose, Teutsch noted. Therefore they need to be compelling, comprehensive enough to cover the breadth of things of interest, easily understood, and supportive of change. He stressed that a good metrics set "needs to be parsimonious, and that in the end, [it has] to reflect things that are the most important so that [it] can help bring focus and stimulate action." The individual measures in a good metrics set should be understandable, meaningful, compelling, mutable, and technically sound, he continued. They should also use available data at national, state, and local levels and provide

information on subpopulations. He also said that many different groups develop metrics sets, and each group approaches the subject based on a particular purpose and perspective. "That in some ways reflects why metrics sets do not align as well as we might expect," he noted.

Teutsch then briefly reviewed a number of available metrics sets. One of the first sets of population health metrics was developed as part of the Healthy People initiative. The leading health indicators from *Healthy People 2020* (Office of Disease Prevention and Health Promotion, 2015), for example, includes

- Access to Health Services
- Clinical Preventive Services
- Environmental Quality
- Injury and Violence
- Maternal, Infant, and Child Health
- Mental Health
- Nutrition, Physical Activity, and Obesity
- Oral Health
- Social Determinants
- Substance Abuse
- Tobacco

Although the Leading Health Indicators list does serve a purpose in setting a comprehensive set of national goals and objectives for improving the health of all Americans, Teutsch said it does not provide an accurate reflection of population health as likely viewed by the roundtable and most workshop attendees. The IOM undertook an effort to develop a more useful set of metrics for population health, and it produced a framework for health and health care indicator development (IOM, 2009) (see Figure 2-2). This effort, however, never went further than to develop this framework, said Teutsch.

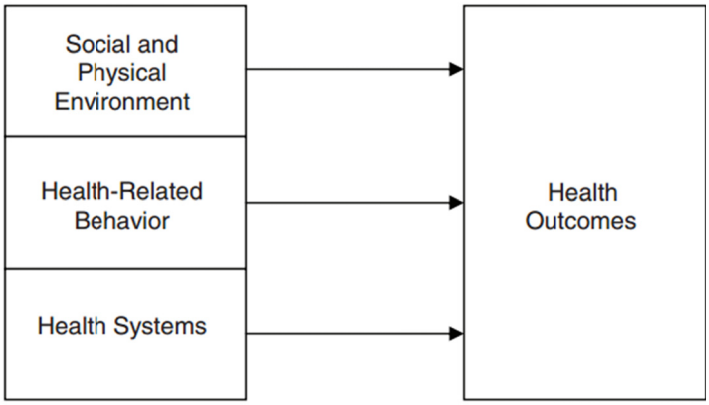


FIGURE 2-2 Framework for health and health care indicator development.
SOURCES: Teutsch presentation, July 30, 2015; IOM, 2009.

The County Health Rankings (University of Wisconsin Population Health Institute, 2015), which have been available since 2004, separate health outcomes, such as length of life

and quality of life, from the determinants of health that contribute to outcomes (see Figure 2-3). Teutsch said he finds it useful to look at the rough proportions of health that can be attributed to the four health factors of health behaviors, clinical care, social and economic environment, and physical environment. "This puts in perspective what is generally perceived in this country to be the relative importance of clinical care compared to all of the other factors that impact health," he noted. Policies and programs, he explained, include the activities needed to move those health factors, and they are connected to roadmaps and other types of evidence-based processes. The America's Health Rankings framework (UnitedHealth Foundation, 2015) (see Figure 2-4) is a partner to the county health rankings. This model is similar in many ways to the County Health Rankings model, but it places more emphasis on policies and combines community engagement and environmental factors.

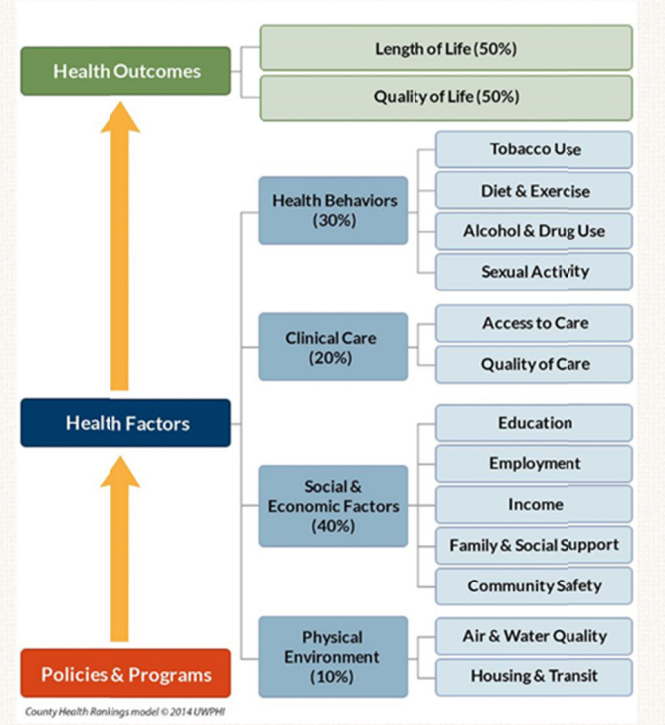


FIGURE 2-3 County Health Rankings Data Model.
SOURCE: Teutsch presentation, July 30, 2015; http://countyhealthrankings.org/our-approach (accessed February 25, 2016).

FIGURE 2-4 America's Health Rankings Framework.
SOURCES: Teutsch presentation, July 30, 2015; United Health Foundation, 2015.

The IOM's *Vital Signs* report uses a different framework (IOM, 2015) (see Figure 2-5). One challenge associated with this model, said Teutsch, is that it is difficult to find measures from some of these factors. Another issue is that some of the terms, such as engagement, are not clearly defined.

FIGURE 2-5 The Vital Signs framework.
SOURCES: Teutsch presentation, July 30, 2015; IOM, 2015.

The AARP Livability Index (AARP, 2015), said Teutsch, includes many domains that are relevant to population health and aggregates them in a linear fashion without relative weights. He characterized the index as a "nice resource." Los Angeles recently launched a healthy community network (Think Health LA, 2015) organized around a website that provides a list of

roughly 200 metrics. "It is a great resource, but it does not provide summary estimates," said Teutsch. The Gallup-Healthways Well-Being Index (Healthways, 2015), which he called a "black box," uses five domains to characterize well-being: sense of purpose, social relationships, financial security, relationship to community, and physical health. Both this index and the AARP index look at well-being from a broader perspective than simply population health, he noted. Teutsch also mentioned the National Equity Atlas (PolicyLink, 2015) as a useful source of data on equity and disparities, demographics, economic vitality, readiness, connectedness, and economic benefits.

A number of challenges are associated with all of these metrics sets, said Teutsch. One is the issue of parsimony versus completeness. "There is no good answer to what the right number of metrics is," he said. His own bias, he noted, is that some composite measures that can then be disentangled are needed. For example, an air quality index would be a poor measure for reflecting all of the environmental concerns that can impact the health of a community. What is needed instead, he said, would be something analogous to a consumer price index that the public could understand without needing to know how it was calculated from its component measures, yet could be broken down into its components when the need arises. Teutsch added that parsimony promotes focus.

Another challenge is to address the paucity of good equity measures for an entire community. Current approaches, Teutsch explained, gather information on different demographic groups that can be analyzed for information on disparities. However, it is challenging to draw conclusions on how equitable a given community is from those measures. Outcome measures are also problematic in that they are not particularly useful for monitoring progress given how slowly population health outcomes change. "We need other measures to assess progress, a set of process measures that are relevant to a planned action," he said.

The proliferation of core metrics sets, said Teutsch, is causing confusion among many constituents. "We could benefit from some authoritative leadership that pulls these together into a more coherent and smaller number that we use routinely and people become familiar with," he said. Similarly, different metrics sets use data representing various levels of aggregation. The *Vital Signs* report, for example, uses national data, while America's Health Ranking uses primarily state data and the County Health Rankings use county data. As the geographic unit gets smaller, down to the level of communities, the data often become scant, which Teutsch said is a problem when localities try to understand what is happening in their own community.

With regard to linking metrics to action, Teutsch noted that the County Health Rankings and Healthy People measures do a good job of using roadmaps that link various metrics to evidence-based interventions. These linkages can direct people to evidence-based resources on policies, programs, and systems change, he said. However, there is still the need to examine the components, actions, and systems changes that are needed in the measures themselves, Teutsch continued. He noted that the next presentation, on RWJF's metrics for its action framework, would highlight a different type of metrics set, one designed to foster change. Along those lines, said Teutsch, is a need to develop more detailed measures that relate to specific interventions. He described the logic model from an IOM report (IOM, 2012b) on quality measures linked to the Leading Health Indicators from *Healthy People 2020* (see Figure 2-6). This logic model, he said, tries to bridge the health outcomes monitored by the Leading Health Indicators to the conditions, interventions, resources, and capabilities that need to be in place at the policy, program, and systems levels to change those indicators.

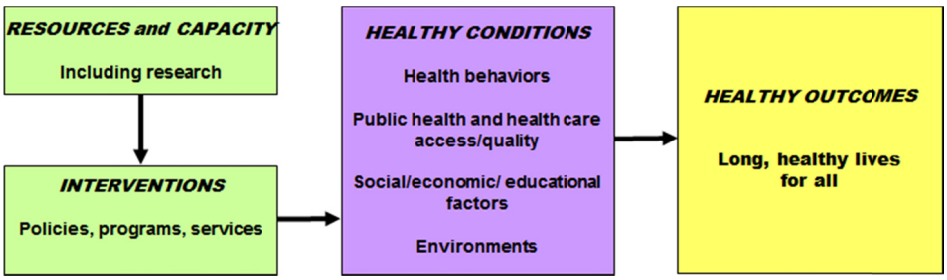


FIGURE 2-6 Logic model for developing quality measures for the Leading Health Indicators.
SOURCES: Teutsch presentation, July 30, 2015; IOM, 2012b.

As an example, he discussed how this model can be applied to tobacco use (see Figure 2-7). The model looks at the steps that the health care system and clinician can take to reduce tobacco use, as well as what kinds of policies and enforcement are needed. It identifies and defines possible interventions and the resources and capabilities that are needed to put those interventions into place. Alternatively, the model can start with resources and capabilities and look at how well an intervention would work given those initial constraints. Metrics can then be attached to each of these components.

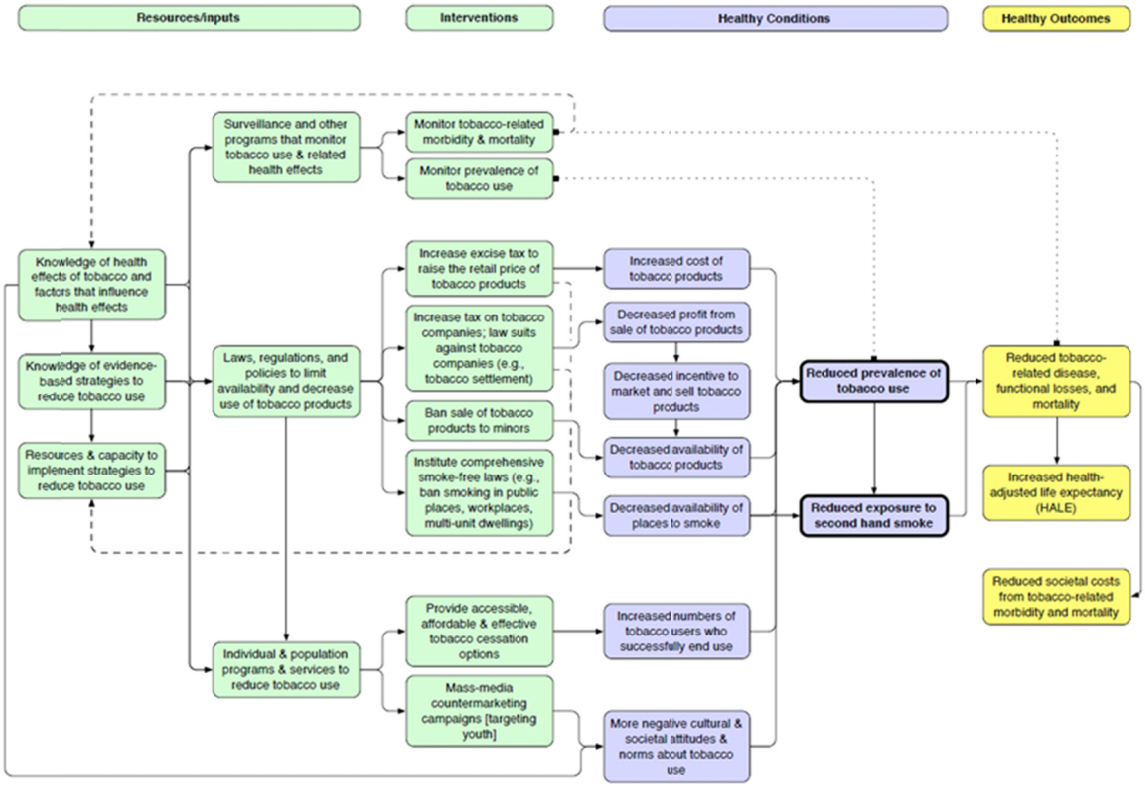


FIGURE 2-7 Applying the IOM logic model to tobacco use.
SOURCES: Teutsch presentation, July 30, 2015; IOM, 2012b.

"The best measures are the ones that drive action," said Teutsch. "They provide the greatest health improvement and contribute to health equity for the total population. He also noted that the greatest opportunities to improve population health reside outside the traditional health sector, as well as in systems and policy change, and that good measures are needed for those sectors, too. Measures must be tied to interventions, he added, and they need to be part of collective action and quality improvement processes if they are to drive change.

RWJF CULTURE OF HEALTH[2]

Building from the constructs, challenges, and opportunities that Teutsch introduced, Alonzo Plough described the process and framework that RWJF used to develop the set of national measures for its Culture of Health initiative. This framework and the associated measures, he said, are to serve as a catalyst for the national movement to build a culture of health in the United States. He also noted that these measures were developed through a collaboration with RAND, which will continue to be a key partner in the research that underlies the framework.

RWJF's process of developing an action framework started with a big question, Plough stated. What is holding us back as a nation from achieving the health status and health equity to which we aspire? From this question came two additional questions: What do we know about that is evidence-based that we do not take to scale? What do we need to know more about to improve the health and health equity of the nation?

Given what is known about the importance of the social determinants of health, and the knowledge that many, or even most, of the assets that would drive change in those determinants are outside of the health care system, the challenge was to develop a framework and measures that engages those non-health sectors in an evidence-based manner and builds bridges to connect activities between the health and non-health sectors, Plough explained. As Teutsch noted, developing a set of measures that are both compelling and catalytic is critical, said Plough, and that is what RWJF has been doing for the past several months.

The process, he explained, included multiple meetings with leadership at the Centers for Disease Control and Prevention (CDC) and the National Institutes of Health, an extensive review of the literature and environment to identify evidence and linkages conducted by RAND, and focus groups with 13 communities nationwide. He noted that RWJF conducted surveys about the Culture of Health strategy and tried to engage as many different political perspectives as possible. The framework that came out of this effort includes four action areas:

- Making health a shared value;
- Fostering cross-sector collaboration to improve well-being;
- Creating healthier, more equitable communities; and
- Strengthening integration of health services and systems.

RWJF, said Plough, believes the available evidence supports the idea that implementing what is known in each of these areas will over time create a culture of health and improve population health, well-being, and equity. He added that the foundation's board of directors has made a 20-

[2] This section is based on the presentation by Alonzo Plough, Vice President of Research-Evaluation-Learning and Chief Science Officer at the Robert Wood Johnson Foundation, and the statements are not endorsed or verified by the National Academies of Sciences, Engineering, and Medicine.

year commitment to creating this culture of health. "These are the population health and systems changes that are not going to happen overnight and involve the interdependence of many social, economic, physical environment, and even spiritual factors affecting health and well-being," said Plough. In total, RWJF selected 41 Culture of Health national measures based on the availability of national data, their application to the entire lifespan and "health span," the connection to broad determinants and upstream drivers, the appeal to multiple audiences, and equitability. He noted that achieving health equity in the United States is one of RWJF's overarching concerns.

Rather than discussing each of the 41 measures, Plough gave an example from each of the four action areas. Starting with the first action area—making health a shared value—he explained that the three main drivers are mindset and expectation, a sense of community, and civic engagement. He noted that this is probably the most difficult of the action areas to measure because the changes that RWJF is trying to bring about require a gestalt shift in the way people think about health. One measure that RWJF believes is a reasonable indicator for this action area is the percentage of respondents who agree strongly that their health is influenced by peers, neighborhood, and broader community. The data sources for this metric will be the RAND American Life Panel Culture of Health survey (RAND, 2015). It is based on work on social cohesion (McMillan and Chavis, 1986).

For the second action area of the Culture of Health action framework—fostering cross-sector collaboration to improve well-being—the drivers are enumeration and quality of partnerships, resource investments across sectors, and policies that support collaboration. The foundation's stakeholder engagement work found that many sectors not traditionally involved in health respond to the term "well-being" in a more actionable way than when the problem is defined as being about health. A measure for this action item is the percentage of full-time personnel who have served as community policing or community relations officers or were designated to engage in community-oriented policing in the past year, and the data source will be the Bureau of Justice Statistics Census of State and Local Law Enforcement Agencies (Office of Justice Programs, 2015). Plough said that when this measure was first proposed, it was expected to be controversial, but given recent incidents around the country that highlight the distrust between communities and the police, the measure has become an important indicator of cross-sector collaboration. Another measure in this area, developed with the American Hospital Association (AHA), will examine the prevalence of sustainable and high-value hospital–community partnerships that go beyond Internal Revenue Service requirements and will use data from the AHA's survey of chief executive officers. Plough noted this area does not overlap with other management systems, but it is important to the way in which the foundation believes change will happen. It is also closely aligned with many of RWJF's grant-making activities and the partnerships it is trying to catalyze.

The drivers for the third action area of the Culture of Health action framework—creating healthier, more equitable communities—are the built environment and physical conditions, the social and economic environment, and policy and governance. One measure for this area, which has been an RWJF focus area for many years, is the percentage of middle- and high-school students who report feeling safe on their walk to school. the data source for this metric will be the NIDA (National Institute on Drug Abuse) Monitoring the Future survey (NIDA, 2015). This measure, explained Plough, shows significant racial and ethnic disparities in the percentage of students who feel safe and, as with many of the other measures, provides a window on actions that would bring sectors together to make a difference. "It is a measure of a problem, but it is

also a measure that speaks to the kind of engagement that we want to get to resolve that problem," said Plough.

For the fourth action area of the Culture of Health action framework—strengthening integration of health services and systems—the drivers are access, consumer experience and quality, and balance and integration. A measure for this action item is the percentage of the population whose health care provider is part of an accountable care organization, and Leavitt Partners will provide the data for this metric. Plough called this a placeholder measure for what is called value-based prevention-oriented care. Other measures will focus on consumer experience and quality and on providing a better balance between preventive and acute services, and in particular, on the integration of social services into the health care continuum.

For the desired outcome—improved population health and well-being—the drivers are well-being, chronic disease management, adverse experiences, and cost, and there are measures for each of those drivers. Examples will include disability-adjusted life years for chronic disease burden, adverse childhood events, end-of-life costs, family out-of-pocket costs, and some well-being measures used by other countries. One measure, for example, will be the average annual Medicare payment for a descendant in the last year of life. The data source will be Medicare claims data.

Plough said RWJF tried not to duplicate existing metric sets, but did try to complement them. "We paid particular attention to our sister set of measures in County Health Rankings and Roadmap, which is a very important measurement system at the foundation," said Plough. For example, the Culture of Health measures include the number of states with expanded practice laws for nurse practitioners as a window on actions to improve access to health care, which the County Health Rankings track. With regard to the *Vital Signs* metrics, Plough noted four specific areas of synergy. Making health a shared value, for example, matches up with *Vital Signs*'s domain of engaged people, while creating healthier more equitable communities is synergistic with *Vital Signs*'s healthy people domain. Culture of Health's strengthening integration of health services and systems action area is synergistic with the *Vital Signs* domain of care quality and lower cost. The improved population health, equity, and well-being outcomes align with the *Vital Signs* domain of engaged people, healthy people, care quality, and lower cost.

RWJF has tried to look at potential measures to understand how engaged people are in health, such as a Twitter measure to gauge how social media affects engagement, and how multisector partnership can impact engagement. Plough noted that RWJF has created partnerships with the Federal Reserve and community developers to create more affordable housing and ease residential segregation, and with the National YMCA and United Way to leverage the culture of health, but it needs indicators to measure how effective those collaborations are at improving health.

An important issue when developing a national metric system, said Plough, is deciding how to tie it into changes in public health at the local level given that health happens locally. "How do you understand whether the measures, the dynamics, and the action areas that we have posited make sense and reflect effective, collective action to improve health and well-being at a local level?" he asked. To answer that question, RWJF is launching a Sentinel Community Study that aims to understand the evolution of collective action for health in all of its variations and to identify new measures using sentinel surveillance. This initiative will not just study best practices but the variety of practices drawn from the work of communities at different levels of development with the goal of identifying clusters of programs that are effective in developing collective action around health. Plough said it will track some 30 communities with different

geographic and sociodemographic characteristics and use mixed methods of data collection and monitoring. RWJF is also collaborating with the University of Chicago to identify the different ways in which people across the nation think about the factors that generate health and the role of market versus governmental forces. Data collected in the 30 communities will show how different communities try to build a culture of health and the role that metrics play in those efforts. The data from that study will be available via a new website that the foundation will launch simultaneously with this study.

At the same time the foundation is launching what it considers to be a bold strategy using measures that are not all conventional, it is trying to build an evidence base to support this approach to improving the health of the nation. Toward that end, RWJF is launching three new research programs: Evidence for Action, Policies for Action, and Systems for Action. These programs, said Plough, will emphasize the imperative of the translational role of research so that the research is meaningful and will engage the sectors that need to use this information to build the culture of health. Evidence for Action, which has already launched from its national program office at the University of California, San Francisco, has a rolling application period. Policies for Action, which will launch with Temple University serving as the national program office, aims to build what Plough called the science of health in all policies. Systems for Action, which is an evolution of Glen Mays's work at the University of Kentucky on public health services and systems research, will study how to integrate public health systems with other systems to improve health and well-being.

In closing, Plough said that taken together, these measures and the framework characterize where RWJF is aligning all of its resources going forward to build a culture of health. He noted that RWJF will release version 2.0 of these measures in late 2016, and that it will be using its website and other engagement strategies to solicit comments on how it might improve this effort going forward.

MULTISECTORAL METRICS[3]

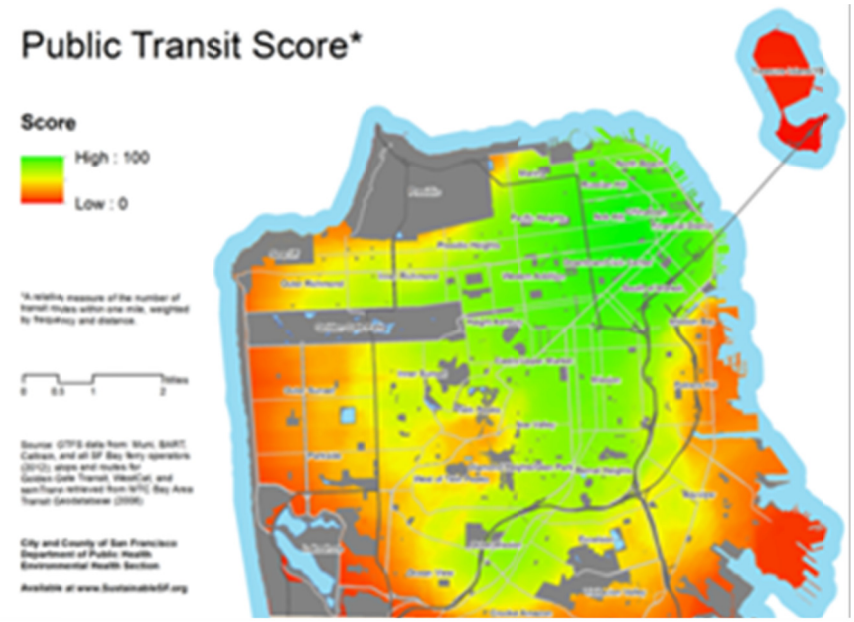
Good social indicators serve multiple functions, said Rajiv Bhatia. One function, is to communicate the magnitude of needs and problems. Indicators can emphasize or imply the cause of problems, for example, whether health is an individual or a collective responsibility. Indicators or metrics also serve as benchmarks, a means to measure progress toward a goal, as well as a driver of rules for policies, laws, and institutions. Many health laws and policies, said Bhatia, use indicators in their implementation, for example, environmental and occupational health standards. Finally, indicators or metrics help hold responsible parties accountable. "If we are going to hold people and other sectors accountable for not considering and not acting on health in their decision making, we are going to need indicators that both sides feel credible as evidence of inaction," said Bhatia.

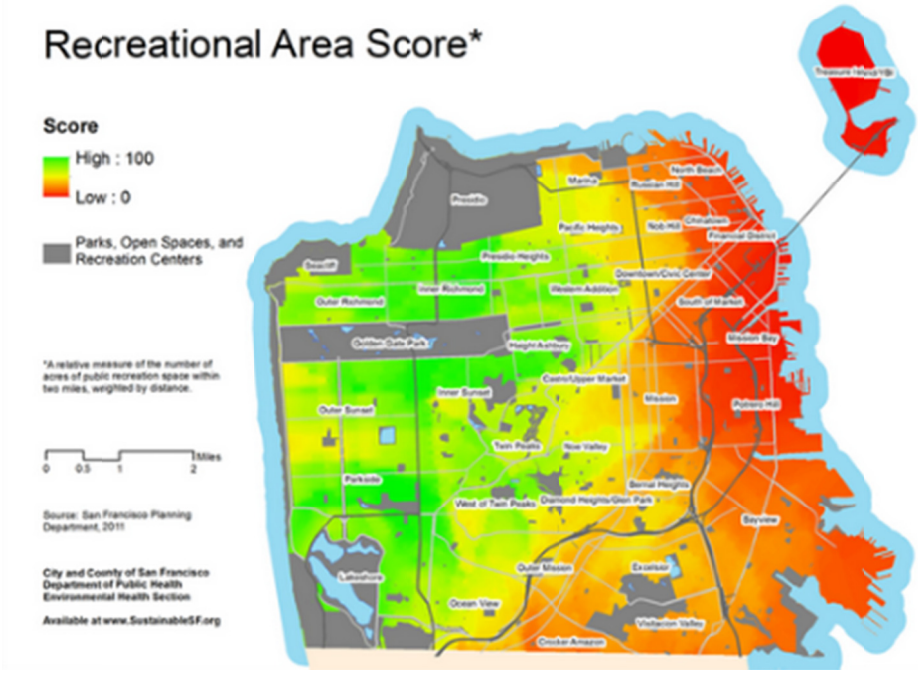
His first experience with metrics came in the late 1990s, when San Francisco began repurposing historically industrial land for residential and office uses. Communities in the city were complaining that development was increasing pollution and noise without building community serving infrastructure, such as schools, parks, and libraries. The San Francisco Health Department responded by bringing together nonprofit organizations, businesses, and public agencies to examine growth plans through a health and equity lens and consider what

[3] This section is based on the presentation by Rajiv Bhatia, Executive Director of The Civic Engine, and the statements are not endorsed or verified by the National Academies of Sciences, Engineering, and Medicine.

healthy growth would look like. The 40 community organizations involved in this examination wanted a yardstick to measure progress and to hold the city accountable to a vision of healthy development. In response, San Francisco developed the Sustainable Communities Index as a system of performance indicators to measure land use and growth plans. "We did not come to this process thinking that we were going to develop an indicator set," said Bhatia, "but there was a clear target for action and a clear purpose from the outset. That, I think, was essential to the success of this work."

Bhatia noted that the Sustainable Communities Index uses local data and is not replicable on a national scale. It includes 90 neighborhood-scale measures and is not parsimonious. City agencies first used the Index to analyze whether four neighborhood development plans addressed the problems the indicators were identifying. For example, the indicators showed that neighborhoods with planned growth excelled in some health-related resources, such as access to public transit, but had gaps in other resources, such as access to recreation and quality elementary education (see Figure 2-8). These findings demonstrated that the existing development plans lacked the tools to address these access issues, thereby justifying a number of actions, including instituting a development impact fee that went to a community resource fund, and an increasing the affordable housing set-aside.





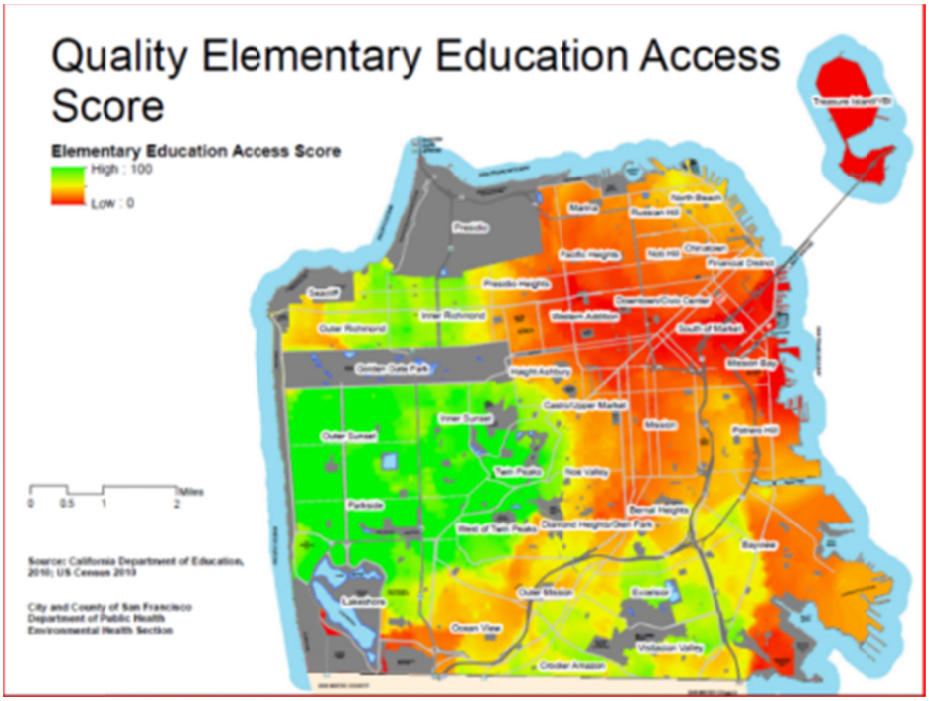


FIGURE 2-8 Heat maps showing measures of public transit, recreation, and quality elementary education.
SOURCE: Bhatia presentation, July 30, 2015.

Of the 90 measures in the Sustainable Communities Index, only a handful actually resulted in an action and response through the city's planning process, said Bhatia. Some indicators helped to set numerical targets for planning policy and action thresholds for environmental land use regulations. In one case, the city used an existing indicator as a novel application of this regulation: a federal regulation governing airborne particulate matter that it collected at a street-level scale. The indicators were also used to justify impact fees, change the way infrastructure funding was targeted in the city, and promote community advocacy.

One lesson learned from this example, said Bhatia, is that indicators could be effective in catalyzing population health action in multiple sectors when they reflected collective needs and priorities determined by community stakeholders and were measured at a human scale. "Many people can not relate to citywide statistics," said Bhatia, who added that data today are becoming what he called hyper-personalized. "If you can know everything about your environment through your mobile device, why consider a citywide average? We need to pay attention to how people relate to data today when we think about the scale of indicators."

Bhatia said, too, that the indicators were more effective in catalyzing action when they documented unequal and harmful conditions, particularly when they disproportionately affected children, than when they were documenting unequal access to a good. They were also most successful at catalyzing action when they identified responsible parties and responsive actions and when they could be integrated into institutional rules.

Based on that experience, Bhatia decided the proper approach to indicators was not to use the set of 90, or even a subset, but to design an indicator for a particular problem and its solution set. As an example, Bhatia discussed the indicator that the city developed to measure pedestrian injury density to document the spatial concentration of serious pedestrian injuries on busy streets

in mixed-use neighborhoods. The existing frame of the problem he explained, was that pedestrian injuries had roots in bad behavior, not road design. Furthermore, the city's traffic calming and police enforcement solutions were not being applied where the most severe injuries were occurring. The new indicator, computed as the linear density of severe injuries on a road, showed that 5 percent of San Francisco's streets were responsible for 55 percent of the severe and fatal injuries (see Figure 2-9), and it justified redeploying enforcement and engineering resources. The new indicator, said Bhatia, was highly effective in changing city policy and programs because it was designed for purpose and with consideration of the barriers to be addressed. He noted that this seems to be the approach that RWJF is taking with its measures.

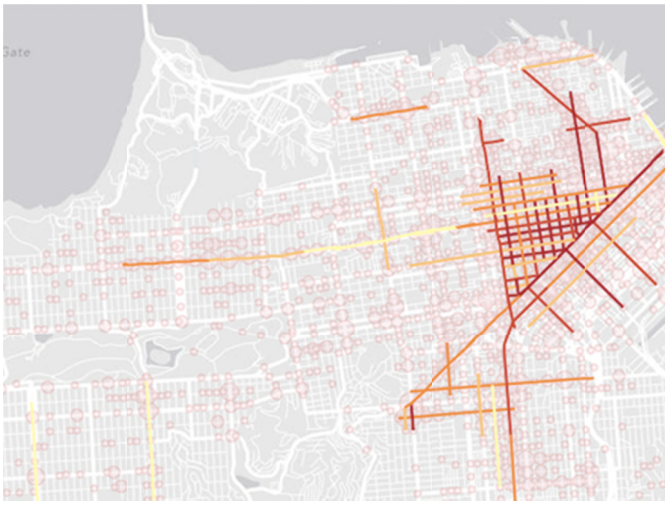
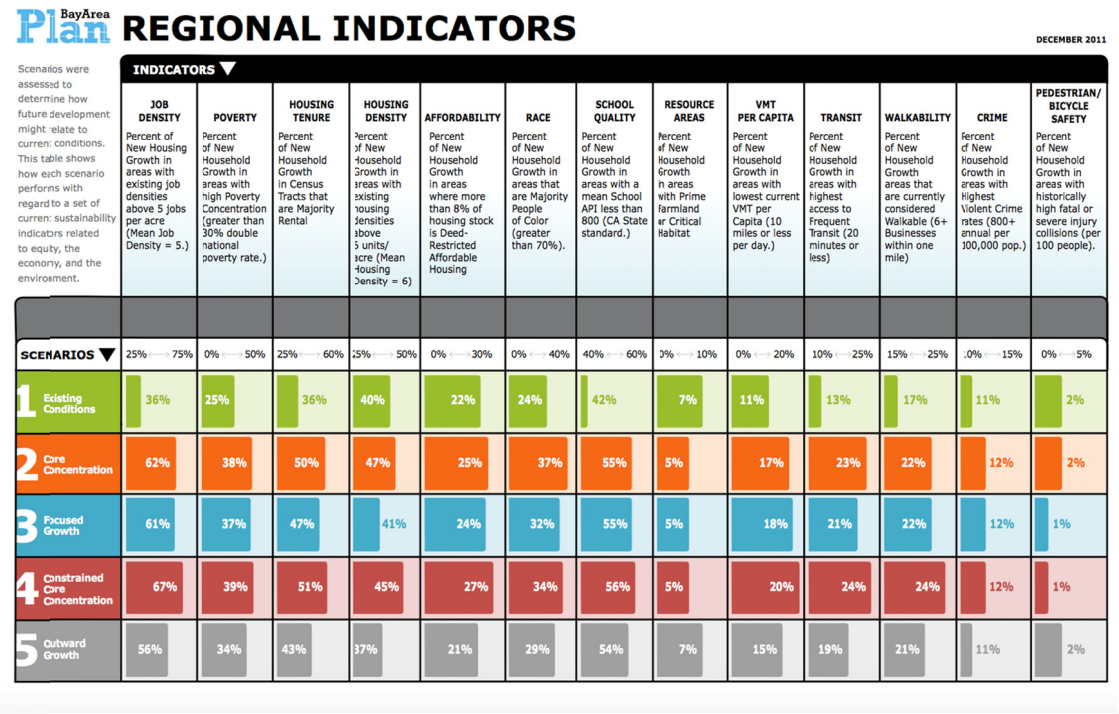


FIGURE 2-9 Injury density per mile in San Francisco.
SOURCE: Bhatia presentation, July 30, 2015.

On a regional level, Bhatia recounted an effort of the Bay Area Metropolitan Transportation Commission that integrated health and neighborhood well-being indicators to prioritize transportation funding based on community goals and priorities. The regional transportation agency wanted to broaden the way it evaluated how it was spending federal transportation money from one that just measured how quickly people were getting to work to a one based on a broader set of livability measures. The agency developed several health and equity measures for transportation system performance (see Figure 2-10), and integrated these into a larger measures into used to evaluate both the overall regional plan and individual transportation project performance (see Figure 2-11). The agency used some, but not all, of the health measures to estimate individual project cost/benefit ratios (see Figure 2-12). He noted that these comprehensive decision criteria were only relevant to the 15 percent of the federal transportation funding available for discretionary projects and did not affect the majority of funding committed to legacy projects.



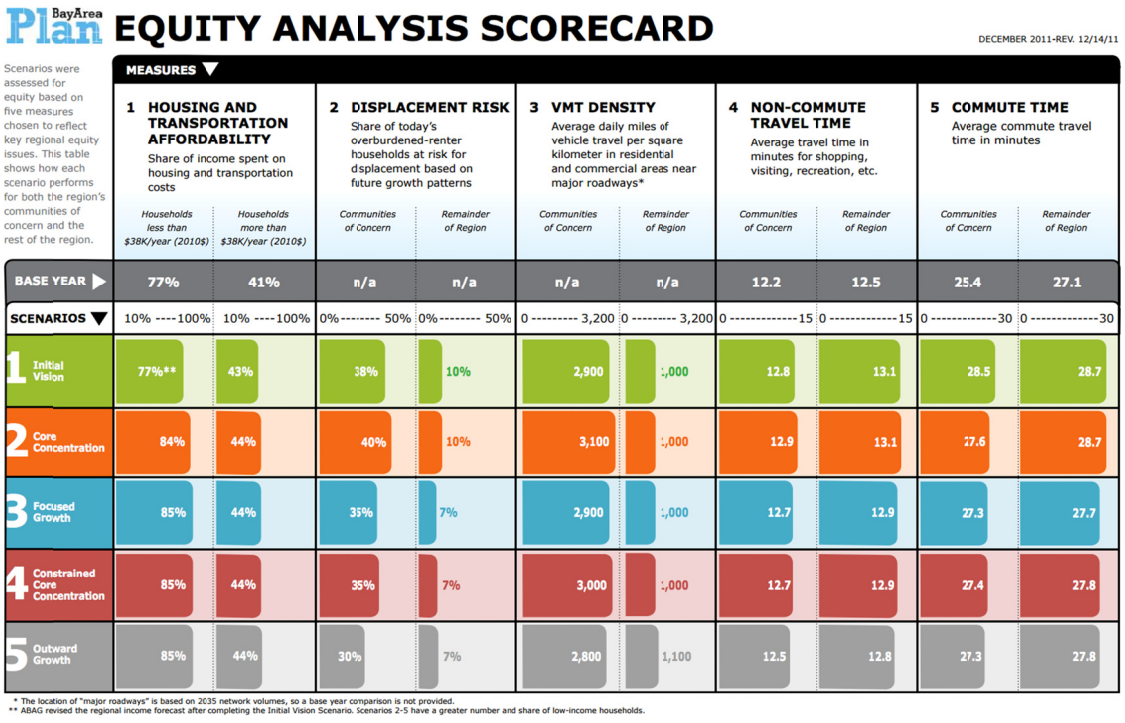
Plan BayArea **REGIONAL INDICATORS**

DECEMBER 2011

Scenarios were assessed to determine how future development might relate to curren: conditions. This table shows how each scenario performs with regard to a set of curren: sustainability indicators related to equity, the economy, and the environment.

SCENARIOS ▼	JOB DENSITY: Percent of New Housing Growth in areas with existing job densities above 5 jobs per acre (Mean Job Density = 5.)	POVERTY: Percent of New Household Growth in areas with high Poverty Concentration (greater than 30% double national poverty rate.)	HOUSING TENURE: Percent of New Household Growth in Census Tracts that are Majority Rental	HOUSING DENSITY: Percent of New Household Growth in areas with existing housing densities above 5 units/acre (Mean Housing Density = 6)	AFFORDABILITY: Percent of New Household Growth in areas where more than 8% of housing stock is Deed-Restricted Affordable Housing	RACE: Percent of New Household Growth in areas that are Majority People of Color (greater than 70%).	SCHOOL QUALITY: Percent of New Household Growth in areas with a mean School API less than 800 (CA State standard.)	RESOURCE AREAS: Percent of New Household Growth in areas with Prime farmland or Critical Habitat	VMT PER CAPITA: Percent of New Household Growth in areas with lowest current VMT per Capita (10 miles or less per day.)	TRANSIT: Percent of New Household Growth in areas with highest access to Frequent Transit (20 minutes or less)	WALKABILITY: Percent of New Household Growth areas that are currently considered Walkable (6+ Businesses within one mile)	CRIME: Percent of New Household Growth in areas with Highest Violent Crime rates (800+ annual per 100,000 pop.)	PEDESTRIAN/ BICYCLE SAFETY: Percent of New Household Growth in areas with historically high fatal or severe injury collisions (per 100 people).
	25% ⟷ 75%	0% ⟷ 50%	25% ⟷ 60%	25% ⟷ 50%	0% ⟷ 30%	0% ⟷ 40%	40% ⟷ 60%	0% ⟷ 10%	0% ⟷ 20%	10% ⟷ 25%	15% ⟷ 25%	0% ⟷ 15%	0% ⟷ 5%
1 Existing Conditions	36%	25%	36%	40%	22%	24%	42%	7%	11%	13%	17%	11%	2%
2 Core Concentration	62%	38%	50%	47%	25%	37%	55%	5%	17%	23%	22%	12%	2%
3 Focused Growth	61%	37%	47%	41%	24%	32%	55%	5%	18%	21%	22%	12%	1%
4 Constrained Core Concentration	67%	39%	51%	45%	27%	34%	56%	5%	20%	24%	24%	12%	1%
5 Outward Growth	56%	34%	43%	37%	21%	29%	54%	7%	15%	19%	21%	11%	2%

FIGURE 2-10 Bay Area regional indicators for transportation planning.
SOURCE: Bhatia presentation, July 30, 2015.



Plan BayArea **EQUITY ANALYSIS SCORECARD**

DECEMBER 2011-REV. 12/14/11

Scenarios were assessed for equity based on five measures chosen to reflect key regional equity issues. This table shows how each scenario performs for both the region's communities of concern and the rest of the region.

	1 HOUSING AND TRANSPORTATION AFFORDABILITY: Share of income spent on housing and transportation costs		2 DISPLACEMENT RISK: Share of today's overburdened-renter households at risk for displacement based on future growth patterns		3 VMT DENSITY: Average daily miles of vehicle travel per square kilometer in residential and commercial areas near major roadways*		4 NON-COMMUTE TRAVEL TIME: Average travel time in minutes for shopping, visiting, recreation, etc.		5 COMMUTE TIME: Average commute travel time in minutes	
MEASURES ▼	*Households less than $38K/year (2010$)*	*Households more than $38K/year (2010$)*	*Communities of Concern*	*Remainder of Region*	*Communities of Concern*	*Remainder of Region*	*Communities of Concern*	*Remainder of Region*	*Communities of Concern*	*Remainder of Region*
BASE YEAR ▶	77%	41%	n/a	n/a	n/a	n/a	12.2	12.5	25.4	27.1
SCENARIOS ▼	10% ----100%	10% ----100%	0%-------- 50%	0%-------- 50%	0 --------- 3,200	0 --------- 3,200	0 ----------15	0 ----------15	0 ----------30	0 ----------30
1 Initial Vision	77%**	43%	38%	10%	2,900	:,000	12.8	13.1	28.5	28.7
2 Core Concentration	84%	44%	40%	10%	3,100	:,000	12.9	13.1	27.6	28.7
3 Focused Growth	85%	44%	35%	7%	2,900	:,000	12.7	12.9	27.3	27.7
4 Constrained Core Concentration	85%	44%	35%	7%	3,000	:,000	12.7	12.9	27.4	27.8
5 Outward Growth	85%	44%	30%	7%	2,800	1,100	12.5	12.8	27.3	27.8

* The location of "major roadways" is based on 2035 network volumes, so a base year comparison is not provided.
** ABAG revised the regional income forecast after completing the Initial Vision Scenario. Scenarios 2-5 have a greater number and share of low-income households.

FIGURE 2-11 Regional indicators used to score a proposed transportation project.
SOURCE: Bhatia presentation, July 30, 2015.

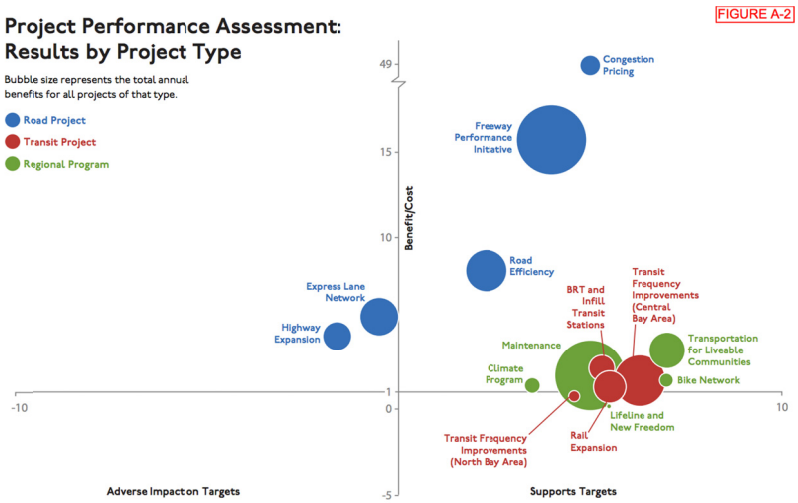


FIGURE 2-12 Cost–benefit analysis for transportation projects in San Francisco Bay Area. SOURCE: Bhatia presentation, July 30, 2015.

Turning to the national level, Bhatia discussed some of the early lessons learned from the Healthy Communities Index project sponsored by the U.S. Department of Housing and Urban Development (HUD) to support investments in the physical, social, and economic determinants of health. HUD initiated this project specifically to respond to the need for a comprehensive and uniform practice for monitoring neighborhood level determinants of community health, he explained. "HUD wanted to get to measures at the neighborhood level, to have uniformity, and to go beyond those available from the American Community Survey and other sources like that," said Bhatia.

The project began in 2012 with four indicator selection criteria. An indicator had to have an established, evidence-based nexus to population health and it had to be measurable at a neighborhood scale, which meant that it was already being collected or that local data could be processed uniformly to construct neighborhood-level indicators. Selected measures had to be connected to available actions to improve the indicator and the measures had to be relevant to community needs and priorities. A group of domain experts examined 220 indicators reviewed against these criteria, producing a set of 90 that went through a final review process. A national advisory committee commented on the proposed set, and HUD selected 37 core indicators and 5 city-level contextual indicators that were organized into 10 domains (see Figure 2-13).

FIGURE 2-13 The domains of the Healthy Communities Index indicators.
SOURCE: Bhatia presentation, July 30, 2015.

This project is currently in a pilot phase in Albuquerque, Minneapolis, Providence, San Diego, and which have collected the measures, ranked every neighborhood on all 37 indicators, and posted the results on websites. The cities are now in a process of stakeholder engagement to determine how to best use the indicators. So far, multiple cities have been able to implement uniform methods to "measure health resources at a neighborhood scale in multiple cities," said Bhatia. He considers the ability to reconcile multiple data sources with community–defined neighborhood definitions a particular innovation of the work.

At the same time, he noted that the top-down national approach has limited community engagement, buy-in, and application in the pilot cities. Stakeholders want to be in the driver seat in selecting the measures used to assess the health of communities. By contrast, the indicators initiative in San Francisco started with engagement and offered community organizations the ability to decide what measures were important. He noted that while the engagement that is happening now with the HUD project has been positive, people are going to need time to own these measures. "They are not going to accept these measures as the ones that they need to solve their problems," said Bhatia. "I think that is an important lesson." He also noted these measures were intended to lead to action, but because the data came first rather than in response to a specific problem or set of problems, the indicators are still searching for applications.

Bhatia underscored the point that indicators themselves do not necessarily lead to progress. As an example, he used the Gross Domestic Product (GDP), an indicator with "an army of economists and Wall Street behind it," and the Genuine Progress Indicator (GPI), which was created to be a more holistic measure of well-being. Although GDP has grown substantially, GPI has remained largely unchanged since the mid-1970s (see Figure 2-14). "There is not much of an engine behind that indicator," said Bhatia.

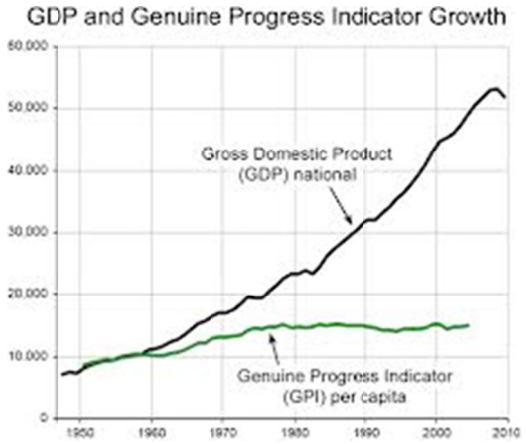


FIGURE 2-14 Indicators do not necessarily lead to progress (x = year; y = GDP).
SOURCE: Bhatia presentation, July 30, 2015.

Bhatia concluded his talk by describing two simple prototypes of highly effective indicators: a speedometer and a blood pressure cuff. Both provide measures that can lead to action—stepping on the gas or brake pedal to change velocity in the case of the speedometer, or changing health behaviors or taking high blood pressure medication in response to readings from the blood pressure cuff. "While these may seem to be strange examples, they represent working indicators," said Bhatia. He encouraged a shift from thinking about data first to thinking about purpose first.

DISCUSSION

Veronica Shepherd of the San Francisco Department of Public Health asked the panelists how people can hold organizations accountable when they themselves face many daily struggles to meet basic needs. Bhatia said the ability to hold organizations accountable is a function of power and prestige and that anyone struggling to meet basic needs is not likely to have either of those. He agreed that without a certain level of having basic needs met, it is difficult for people to be engaged participants, whether it be in the medical system or the political system.

Israel Nieves-Rivera from the San Francisco Department of Public Health asked the panelists if gentrification was factored in their work with county health rankings. Teutsch said he could not speak directly to the matter of gentrification, but he did recount Bhatia's remarks about GDP not painting a complete picture of the nation's well-being. On the surface, increases in GDP, said Teutsch, would suggest the nation is doing great, but GDP does not include the consequences of externalities such as climate change, environmental health services, ecosystem destruction, and the displacement of people. "Part of the problem we have with some of our metrics is that we think they are measuring one thing, but they also blind us to many of the other factors that are really central," said Teutsch. "That leads to some significant imbalances, whether they are equity issues or environmental issues, because they are not central. That is why our metrics have got to be relevant to the issues that we care about." Bhatia added that most metric sets and measurement techniques look at a cross-section of a community at one specific time point, but tracking and understanding gentrification, a dynamic process, requires following a

cohort over time. This is an important issue, he said, because measures of health of a community might improve with gentrification. One new approach, he said, is to measure changes in spatial disparities, which can be done with cross-sectional data. Another approach is to follow sentinel individuals in communities, though the latter involves some challenging privacy issues.

Helen Wu from the University of California, Davis Institute for Population Health Improvement also noted the importance of identifying measures that accurately reflect issues of concern. She questioned how the field is going to move from measuring indicators to making progress without better metrics. Plough noted that RWJF has two measures of housing —residential segregation and housing unaffordability as measured by housing costs being equal to or greater than 50 percent of income—that it believes will address some of the issues around income inequality and that may help understand actions that can improve life conditions in a community without gentrification. "We use those measures to catalyze actions to bring developers in to create approaches to mixed income housing that can improve housing stock without gentrification," explained Plough. This approach, he said, combines an action element with the measure so that the measure and actions are synergistic.

Teutsch said collective action among constituents in a community is important and that constituent groups have to hold each other accountable. "You need the local commitment to do things that matter locally or change doesn't happen," said Teutsch. "You can drive actions by helping communities look at the real outcomes they want, find interventions that they are prepared to take on, and then [make them] hold themselves mutually accountable." Bhatia agreed with both Plough and Teutsch and said the goal should be to design a system that has an action, a measure of its success, and a feedback loop.

Matt Stiefel from the Kaiser Permanente Care Management Institute commented that Teutsch's list of criteria for good indicators did not list latency, the time between publication of a measure and action taken. He also noted that Teutsch introduced a broader and more geographically focused set of indicators than has been used traditionally in health care, but that they all suffer from providing data that are old and may not reflect current progress. Bhatia agreed that latency can be important for some issues, but not all. He cited environmental conditions, which tend to be more stable, as a case where older data may have continued relevance. Kindig pointed out that RWJF is using Twitter data as more timely metrics of well-being. Teutsch added that the field is still trying to determine how best to tap into this kind of data. He also said that outcomes do not change that fast, processes and actions change more quickly. However, measuring changes in processes and actions requires local data that oftentimes do not exist. He also noted the overarching problem that the nation's data systems are slow, are not local, and suffer from inadequate investment.

Kindig agreed with that last statement with regard to the mortality data that he uses in policy research, though he noted that a measure such as low birth weight can be more proximal and more directly related to policy. Kelly Hunt from the Hunt Strategy Group commented on the importance of teaching community members who are working on population health projects to collect their own data, something that she is doing in conjunction with the New York State Health Foundation. "To get real-time information and keep people active and seeking change at the ground level, we have to help everybody collect that information themselves," said Hunt.

Abigail Kroch from Contra Costa Health Services asked about the collinearity of so many of the indicators given that the primary drivers of poor health outcomes are race, particularly African American, and poverty. "We are overwhelming these communities with negative indicators that can be as disparaging as they can be a call to action," said Kroch. Plough replied

that RWJF was cognizant of that issue and said the foundation's 41 measures represent a move away from identifying disparities and deficits to one that focuses more on assets and on measures that can be moved through collective action. He added that there is a need to triangulate around the many different mechanisms through which those disparities can be addressed. Kindig noted that 20 years ago, metrics focused on tobacco use rates, infant mortality, and little else. "If we have too many social indicators we are paying attention to, that is something we need to deal with, but it certainly is a sign of progress in our field," said Kindig.

Margaret Guerin-Calvert from the Center for Healthcare Economics and Policy at FTI Consulting said some communities she works with have baseline data, but are not satisfied that national or state averages are good aspirational goals for their communities, both with regard to process and outcome measures. She asked the panelists if they had suggestions for best practices to help define aspirational-specific targets for measuring progress. Teutsch agreed that this was a challenge, noting that the Healthy People objectives, for example, are simply national percentage reductions. "It is helpful to have local data that are from relevant comparison areas that can be used as a standard," said Teutsch. He noted that some available datasets could serve as reasonable benchmarks. He added that the benchmarks established in the IOM report *For the Public's Health: Investing in a Healthier Future* (IOM, 2012a) were to serve as goals to reach the averages for health outcomes and health care costs of other developed nations in the world and to send a message about the problems facing the U.S. health care system with regard to outcomes and costs. Bhatia said local groups should set local targets based on what they want, believe they can achieve in a given timeframe, and believe is right for their community.

Susan Burden from the Beach Cities Health District noted that her organization has found that communities understand the measures in the Gallup-Healthways poll. She also commented that the idea of measurement with a purpose inspires her and asked if there is any research on that concept. Teutsch replied that surveillance is essentially measurement with a purpose with respect to achieving a certain end. Burden responded that one problem is that data that are collected nationally are often bunched in sectors that are not applicable locally, a point with which Teutsch agreed. Bhatia suggested that part of the problem is that indicators are being proposed from the top down rather than in partnership with the communities that need data to drive change. "We have to do things in partnership," said Bhatia. "We need to ask, Who is the engine? Who has the controls?"

Plough pointed out that RWJF uses the term "national measures" when referring to its metrics set because it can get national averages for them, but that the goal is for them to serve as catalysts for thinking about what is most meaningful at other levels, be it at the community, neighborhood, or block level. He used jazz as an analogy, where the proposed measures are just the initial tune and the end result includes what the band members do with key changes and variations. "In the development of metrics that matter, it is important to have frameworks that speak to the urgency of the problems we collectively want to solve, but have nuanced, locally generated ways of finding the right metric to do that," said Plough.

3

Using Metrics Locally

The workshop's second panel included three presentations illustrating how metrics can be used locally. Julie Willems Van Dijk, Associate Scientist and Co-Director of the County Health Rankings and Roadmaps Program at the University of Wisconsin, spoke briefly about the County Health Rankings and Roadmaps, and Megan Joseph, Director of Community Organizing at the United Way of Santa Cruz County, California, spoke about her organization's work using data to shape youth violence programs. Michael Bilton, Senior Director of Community Health and Benefit at Dignity Health, then discussed the use of local metrics to shape his organization's socially responsible community and population health improvement initiatives. Following the presentations, Willems Van Dijk moderated an open discussion.

BOX 3-1
Highlights from Presentations on Local Use of Metrics

1. The County Health Rankings are about using data as a starting point for community discussion about social and economic factors and the actionable areas that can help improve health (Willems Van Dijk).
2. Choose indicators that would be measured over time to produce trend data and provide indications of progress (Joseph).
3. Organizations need to demonstrate transparency in conveying data and metrics, and trust is needed to ensure accountability from stakeholders who need to "own" their data (Joseph).
4. Using qualitative data in addition to quantitative data is important, as is telling the stories behind the data (Joseph) because data without context will not motivate people to action (Bilton).
5. Metrics can help bridge the community health needs assessment and community-focused programs side of what a hospital and health system do, with the population health management and changing reimbursement system side (Bilton).

COUNTY HEALTH RANKINGS AND ROADMAPS[1]

One thing that she has learned over the previous 6 years of working on the County Health Rankings and Roadmaps, said Julie Willems Van Dijk, is that for most communities, county-level data are not actionable. To address that problem, she and her colleagues, as well as researchers in other groups, are working on methods for providing better links to local data. She noted that the County Health Rankings added a measure on income equality in 2015 as a start on getting at equity within a county instead of just comparing counties to counties. "This is an important area for focusing action," said Willems Van Dijk. She then acknowledged that the term "health" can be misleading and serve as a barrier to use, and that data has to be about purpose first.

The County Health Rankings (see Figure 2-3, in Chapter 2, for the County Health Rankings model), Willems Van Dijk explained, are not primarily a data project, a remark she said she was making with great respect for her colleagues who collect the data. "It is about using data to raise awareness about this model and about putting some pieces of data in context so that we wake up people who do not understand what is happening in their communities," she said. The County Health Rankings, she added, are only intended to be a starting point for a discussion about data. Over the course of the project, she has found that this model, while not perfect, is one to which people can relate. "In particular, it is helping to move the discussion about social and economic factors from one that is about the demographics we report in a community health assessment to actionable areas for improving the health of our communities," said Willems Van Dijk.

One of the best kept secrets about County Health Rankings and Roadmaps, said Willems Van Dijk, is the set of tools and resources associated with the project's action model (see Figure 3-1). These tools and resources are designed to help community leaders who want to take action to think about how they can work together to assess needs and resources and focus on what is most important. "You can go into the action center and find succinct guidance and linkages to numerous tools to help do that in your community," said Willems Van Dijk. Included in the tool set is a robust evidence analysis tool called "What Works for Health" that reviews the literature and rates the evidence supporting the various actions a community might take.

Willems Van Dijk said her career goal is to move beyond community health assessment—she hopes to eliminate that terminology—to action. "We need to use data to identify the most important areas and then target our actions, and we need to use data to monitor and track progress as defined locally in a meaningful way," she said. "We need to leverage mandatory assessments such as the ones the Internal Revenue Service requires of hospitals and the accreditation process available to local health departments and the voluntary assessments such as the ones that United Way of Santa Cruz does in a community to achieve meaningful action." The goal, Willems Van Dijk added, should be to move from the situation where 90 percent of the effort is spent on assessment to one of action and doing something meaningful to improve health. In concluding her remarks, she said that she hoped this session of the workshop would provide examples of how to make the transition from measurement for measurement's sake to measurement with a purpose.

[1] This section is based on remarks from Julie Willems Van Dijk, Associate Scientist and Co-Director of the County Health Rankings and Roadmaps Program at the University of Wisconsin, and the statements are not endorsed or verified by the National Academies of the Sciences, Engineering, and Medicine.

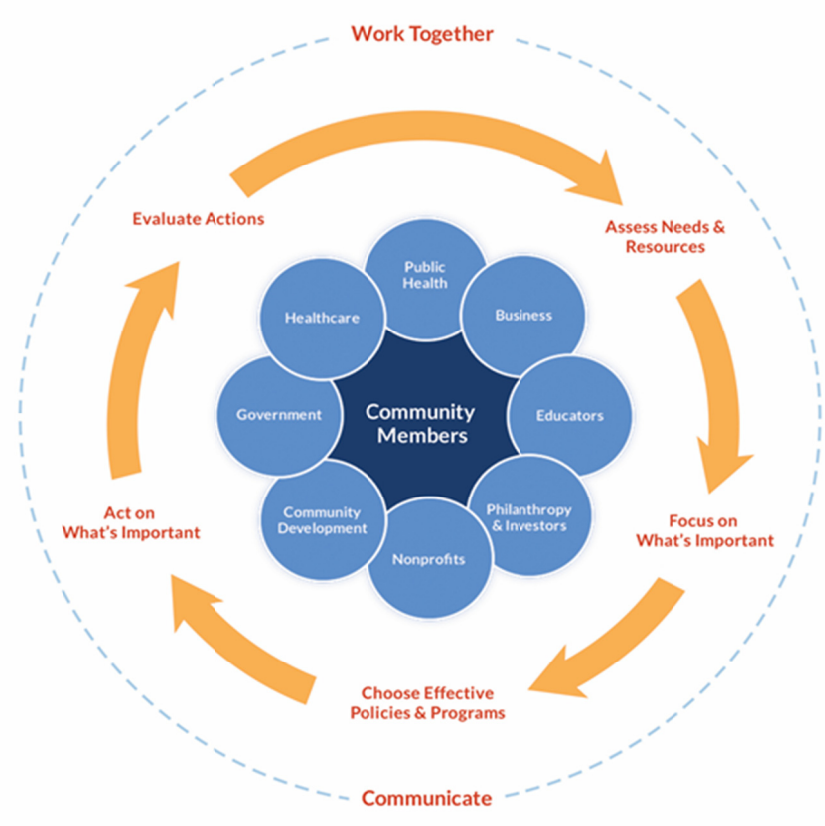


FIGURE 3-1 The County Health Rankings and Roadmaps action model.
SOURCE: Willems Van Dijk presentation, July 30, 2015.

MOVING FROM DATA TO ACTION IN A COMMUNITY[2]

Three years ago, a few critical incidents involving youth violence prompted the community in Santa Cruz County, California, to come together and look at how it was dealing with the problem of youth violence, explained Megan Joseph. The discussions clarified that the community had many programs, but they were not connected or operating with a common plan or goal. The time was right, however, to do things differently, she said, and that resolve led to an effort to undertake a community assessment of youth violence prevention using the United Way of Santa Cruz County's Community Assessment Project's indicators. The 12-month assessment, which began in December 2013, collected data on approximately 60 different indicators that were then used to inform a 15-month planning process, said Joseph. One output from the planning process was a mission statement for the Youth Violence Prevention Task Force that was created based on shared values the group agreed to follow:

> An equitable and united county where all youth are engaged in family, school, and community; where all youth have a sense of safety and well-being; where all

[2] This section is based on the presentation by Megan Joseph, Director of Community Organizing at the United Way of Santa Cruz County, California, and the statements are not endorsed or verified by the National Academies of Sciences, Engineering, and Medicine

youth feel they have a voice and are empowered to use it; and where all youth are able to access opportunities for successful transition into adulthood.

Joseph said this mission statement also reflects the core principles used to drive this process. One such core principle, she said, is to take a public health approach to addressing youth violence. "We knew we needed to look at those social and economic factors driving youth violence in our community," she said. "We wanted to make sure we were using balanced strategies that were not just using suppression or prevention but included everything in between." The task force also wanted to make sure it was using data from multiple sources, reflecting the knowledge that the core data it could access were important, but did not include all of the voices that needed to be represented and all of the stories informing the trends in violence that were spurring action. Collecting qualitative as well as quantitative information proved to be an important component of the data-gathering process, said Joseph.

Another of the task force's core values was to focus on demonstrating an understanding of the disparities and inequities the data revealed and to create a plan for addressing them. Joseph noted the task force made sure the strategies it chose to push forward reflected the knowledge it had gained from involving the community in the data-gathering and planning activities. The task force also focused on what Joseph called "authentic community engagement" that stressed going into those sectors of the community that are often underrepresented in such efforts and letting the youth and families in those parts of the community present their perspectives and their understanding of what the data meant to them, how they were represented in those data, and what efforts to bend the curve on youth violence should look like. Joseph noted that the strategic plan resulting from these activities launched in May 2015, and at the time of the workshop several components of the plan were already in motion. "This could not just be an assessment," said Joseph. "It was an assessment and an action from day one."

Joseph credited her organization's partners in this effort—Applied Survey Research, the Lucille and David Packard Foundation, and the Criminal Justice Council of Santa Cruz County—and hundreds of volunteers for putting aside their differences and coming together to develop this strategic plan. This was not an easy process, she said, given that some of the partners had adversarial relationships regarding youth violence, with having different ideas on what gangs and public safety meant, for example. Building bridges, said Joseph, required a values-informed framework, something that would bring disparate partners together for the first time to "truly look at what could be our North Star, what could get us to our goal together." That framework, she said, was one of results-based accountability (RBA), which focused on six steps (see Figure 3-2) starting with identifying the population (Step 1), which was youth ages 10 to 24, and the specific desired results for the community (Step 2).

✓	**RBA Step 1:**	**Population:** Identify the population you will be discussing
✓	**RBA Step 2:**	**Result:** Identify the specific result
✓	**RBA Step 3:**	**Indicator:** Identify data points that will measure your progress
✓	**RBA Step 4:**	**The Story Behind the Trend:** Identify what the indicators say, what the cause and forces are that affect these indicators
✓	**RBA Step 5:**	**Key Partnerships:** Identify partners with a role to play in turning the curve
✓	**RBA Step 6a:**	**Steps Toward Action:** Identify the 5 best ideas for Turning the Curve and improving the results
✓	**RBA Step 6b:**	**Strategies:** Identify which strategies are best suited to turning the curve in the areas identified above

FIGURE 3-2 Bending the Youth Violence Curve in 6 Steps.
NOTE: RBA = results-based accountability.
SOURCE: Joseph presentation, July 30, 2015.

Once the population and desired results were identified, the task force picked those indicators that provided a gauge of progress toward those results and then looked for stories behind those indicators. In their application of the RBA Steps 3 and 4, Joseph said the group looked at 60 indicators, and then examined the story behind the trend on an indicator such as graduation rates. "If rates are going down for a certain population in our community" she asked, "what do we do with that? Why is that? What is the cause? What is the root cause? What are people's experiences, lived experiences of that? That is what we worked really hard to get behind." Community engagement with data can be tricky, said Joseph, given that people can gloss over the numbers unless there are concrete stories that can explain trends and turn numbers into reasons to care about what happens. Next, the task force built partnerships (Step 5) based on what it knew it needed to bend the youth violence curve, and only then did it develop strategies for action (Steps 6a and 6b). "We decided that we wanted to do that last because we wanted people to come in the room and let go of their pet projects, let go of their programs, let go of what they thought worked, and get down to the difference we wanted to make, what the numbers say, what our community is telling us, and then build something together," explained Joseph. "That really did reduce the barriers between groups and bring people to the table who we never thought we would even get to the table." More importantly, she added, those groups and individuals stayed at the table.

The plan, said Joseph, had three focus areas—families, neighborhoods, and youth development—and the indicators used to measure results covered those three areas. Data came from an array of sources, including family and youth focus groups, an online education survey with educational leaders across the county, ride-alongs with the Santa Cruz and Watsonville police departments, and interviews with more than 60 stakeholders representing business, community-based organizations, education, government, and justice. More formal data sources

included the American Community Survey, California Department of Justice, California Healthy Kids Survey, Community Assessment Project, Child Welfare Services, and Department of Education reports. The probation department gang taskforce even provided data it had never given before. For this project, in keeping with the framework of results-based accountability, it was important to choose indicators that would be measured over time to produce trend data and provide indications of progress. Another important action was to use indicators that had what Joseph called "communication power," that people could understand and with which they could connect.

She noted the importance of looking at new and innovative ways of measuring social determinants and some of the "softer factors" around youth violence for which there were no measures that were meaningful at the neighborhood level. For example, the task force knew that neighborhood connectivity and social capital are important to safety at the neighborhood level, but there was no direct measure of those factors. Instead, it looked at the Community Assessment Project for suitable proxy measures. For example, one proxy measure for social connectivity and social capital was how much people believe they can go to their neighbor for help, which is a question in the biannual survey that the Community Assessment Project conducts. She called on the research community to help develop indicators for these "softer" components of community health.

To ensure that it had the most inclusive qualitative data possible and authentic community inclusion, the task force worked to get alternative education schools to conduct the California Healthy Kids Survey, which previously had been administered only in traditional schools. "That was a big shift for our community, and we are excited to see what the first year's data say," said Joseph. She noted that the qualitative process—putting meat on the bones of the data, as she put it—brought disparities to life. "Yes, they were there in the initial data, but we wanted to make sure that the qualitative processes informed what we were seeing in the data and what strategies we needed to enact," said Joseph, who then discussed several examples of the qualitative data the task force collected.

Safety at school is an important indicator when dealing with youth violence, and the California Healthy Kids Survey showed a disparity across the county as to how safe students felt at school (see Figure 3-3). These data showed that students in the Pajaro Valley Unified School District and the San Lorenzo Valley School District felt less safe in their schools compared to students in the other schools in Santa Cruz County. A deeper dive, including a comment from one of the alternative education teachers in the Pajaro Valley district, found that one of the biggest factors for whether a student would become involved with a gang was whether the student had safe transportation to school – students who had to walk to school were more likely to be tapped to join a gang. That was a big "aha" moment, said Joseph, because that was something the task force could address, which it is doing through a new Safe Havens program.

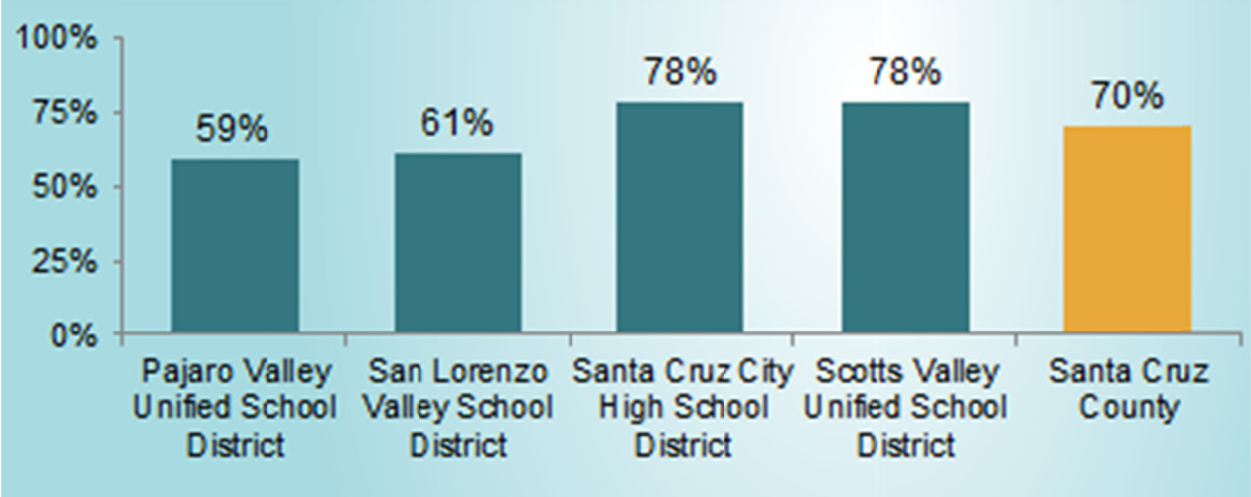


FIGURE 3-3 Percentage of 11th grade students who reported feeling "very safe" or "safe" at school.
SOURCE: Joseph presentation, July 30, 2015.

Equity has always been an important consideration, but it was not always at the forefront of discussions when this process started, said Joseph. As the quantitative and qualitative data started showing clear disparities, the conversations of the task force's workgroups shifted to make equity and disparities a central part of the discussions. "They became a driving force of why people wanted to be at the table and do this work," said Joseph, and that shift led to a myriad of different, specific strategies to address those disparities. One effort, for example, found that disparities in the use of prosocial youth activities was not a result of such activities not being available, but because of access problems: they were too expensive, located in the wrong place or the wrong time, or required unavailable transportation to get to them. "Access equity became a big 'aha' for us and something that we could do something about," said Joseph.

She then highlighted an example of the kind of insights that can be gained when data are transparent and stakeholders own up to what the data reveal. Data from the probation department showed that 88 percent of the youth in Santa Cruz County who were tried as adults were Latino. "There are many easy explanations and answers for that if you do not want to own that, so we dug deeper," said Joseph. Doing so revealed that after accounting for similar charges, Latinos are still tried more often as an adult. That finding enabled the task force, through its partnerships, to advocate for change.

Joseph noted the importance of trusted partnerships in gaining access to data, and as an example she showed some newly acquired data on gangs (see Figure 3-4). "Having law enforcement at the table and be able to understand this from a data perspective was a huge door opening for us," said Joseph, who explained that it took one police lieutenant to come to the table, to see the value of participating in the task force and of having good data to inform actions, to bring about a change in attitude among the police departments in the county.

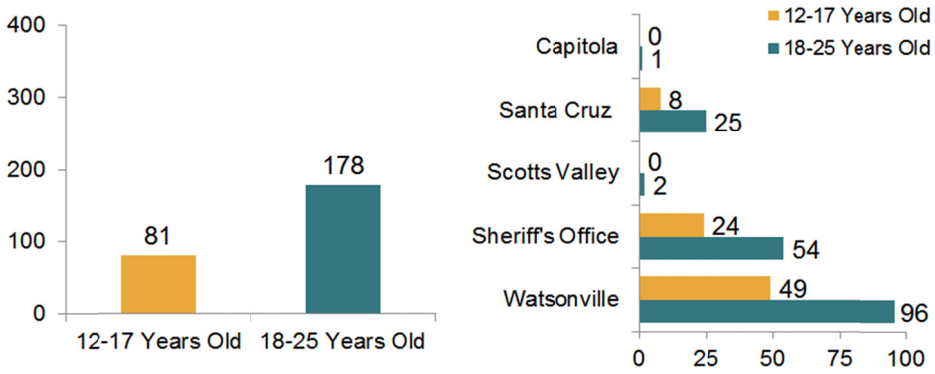


FIGURE 3-4 Gang-related cases (left) and number of gang-related cases by jurisdiction (right), January to June 2013.
SOURCES: Joseph presentation, July 30, 2015; Santa Cruz County Gang Task Force.

Another result of digging more deeply into data was a change in school disciplinary policies to address disparities in high school graduation rates. In particular, one director of student services at the school with the biggest disparities in graduation rates looked more deeply at the data and proposed changes in school policies that reduced suspensions by 60 percent and expulsions by 40 percent in 1 year. A closer look at youth employment data found that jobs were available but that employers were not hiring area youth because of the way they looked, talked, or dressed. "We need to engage employers differently and engage youth to be good employees and to make sure that those jobs that did exist were accessible to the youth that wanted them," said Joseph. "Again, there was more to the story behind that initial look at the data that gave us direction."

This effort has not been without challenges, said Joseph. Some challenges arose from a lack of accurate, up-to-date, objective data. Some sources, such as the Department of Justice, are notoriously poor at providing timely data. In some cases, methods of data collection varied significantly, making it difficult to compare data on truancy and school discipline, for example, across school districts. One recommendation from the task force calls for an effort to work with school districts to create a uniform system of measurement. Another challenge was a lack of resources to conduct as many deep levels of analysis as desired, particularly with regard to geography and racial and ethnic disparities. "Getting to that level of data is expensive, and we are a small community," said Joseph.

Some of the self-reported data sources do not always represent everyone in the community, and sometimes stakeholders are unaware of pertinent data sources that could better inform their policymaking activities. "We had a superintendent who did not know the California Healthy Kids Survey existed in her district, and now she does," said Joseph. "We are proud to be able to engage people in that way and reduce some of those barriers." Another challenge, and a big "aha" moment for the task force, was the realization that some stakeholders look at the data and still deny a problem exists. In those cases, telling the story behind the data, and not just providing numbers and data sources, has proven particularly important for promoting action.

Today's biggest challenge, said Joseph, is implementation. Communities are now aware of the data illustrating the problems they face, she said, but the data also reveal the strengths on which these communities can build. After launching the strategic plan in May 2015, the task force started seeking resources to set in motion a prioritized set of strategies at the community

level, not at the county level at which this plan was created. "We are now looking at what each jurisdiction, each neighborhood, wants to do," said Joseph. "We believe everyone has a contribution to make in implementing this plan." The task force is also seeking resources to deepen its analysis of the disparities and geographies so it can document progress at an incremental level and to evaluate its processes. "It is a challenge to piece together local resources with larger resources that can truly support what is possible with this work," said Joseph.

MOVING FROM DATA TO ACTION IN A HEALTH SYSTEM[3]

Dignity Health, explained Michael Bilton, is a large health care system with hospitals in Arizona, California, and Nevada. In fiscal year 2014, Dignity Health operated 39 acute care facilities and a wide range of outpatient facilities, employed 55,000 employees, had $10 billion in operating revenue, and provided $1.3 billion in community benefits and absorbed another $674 million in unpaid Medicare costs. He noted that of this $1.3 billion approximately $210 million were funds the system spent other than providing financial assistance to poor patients. Those expenditures paid for proactive community health programs, subsidized health services that Dignity Health supports as a community resource, health research, and education of health professionals. A theme of his presentation, he said, would be considering how to maximize the value of those community benefit funds where the system has greater discretion about how to allocate them, and in particular with regard to population health improvement initiatives. "How do we think about doing that in the most effective way possible? A part of that answer is to focus on population health metrics," said Bilton.

Dignity Health, explained Bilton, was founded as a faith-based system and employs a number of programs that help address the many facets of community health, including a socially responsible investment program, ecology initiatives, its community benefit and community health improvement programs, a global mission program, and two grants programs. A community grant program, funded by a formula applied to each hospital, supports projects in local communities, and a new social innovation partnership grant program supports collaboration among nonprofit organizations to design innovative ways to address social determinants of health and thereby better serve the health and well-being of their communities.

At Dignity Health, population health is a strategy to manage health not just inside hospitals and care centers, but also outside the walls through education, programs, advocacy, resources, and partnerships. In the health care delivery system context, Bilton said there are two sides to population health. One is the community health needs assessment and community-focused programs side of what a hospital and health system do, while the other side is population health management as it relates to changing reimbursement systems and the advent of accountable care organizations, bundled payments, and the like. He noted that Dignity Health recently hired a new director of community and population health to begin aligning these two sides at both the system and facility level, a key component of its strategy going forward for population health.

Three components of Dignity Health's engagement in population health improvement today include physicians and hospitals, community health programs funded by Dignity Health grants and by grants and work with external partners such as faith-based organizations, schools,

[3] This section is based on the presentation by Michael Bilton, Senior Director of Community Health and Benefit at Dignity Health, and the statements are not endorsed or verified by the National Academies of Sciences, Engineering, and Medicine.

and public health agencies each conducting their own set of activities (see Figure 3-5). Metrics can be found in each of these silos, said Bilton, and there is not much connectivity among these three components, particularly among the very discrete health outcomes for the people who receive care at Dignity Health and the social determinants that impact patients before they come into the facility and that are being addressed by external partners. The goal, then, is for Dignity Health to use its community health programs as a bridge between these two sides of population health and create a continuum from the care experience to the system's engagement in its communities (see Figure 3-6). In addition to the new director of community and population health, Dignity Health is creating interdisciplinary teams within its facilities that include care managers and community outreach staff. "Ultimately, this is going to be both a workflow and a data and information technology (IT) infrastructure issue," said Bilton. "We are going to need relationships in the organization and an IT infrastructure to support them."

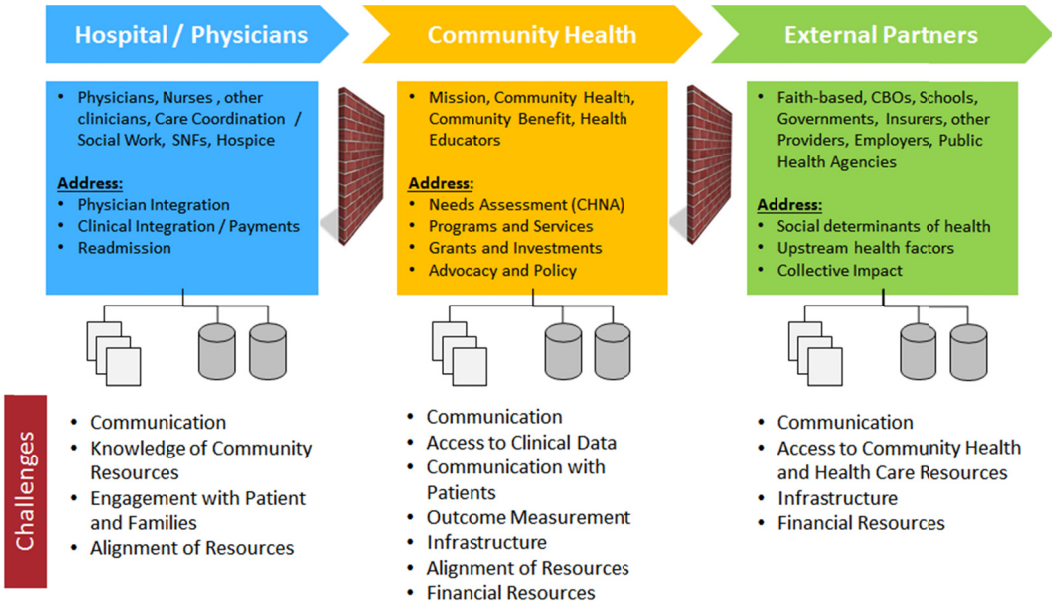


FIGURE 3-5 Elements of the population health continuum today.
NOTE: CBO = community based organizations; CHNA = community health needs assessment; SNF = skilled nursing facilities.
SOURCE: Bilton presentation, July 30, 2015.

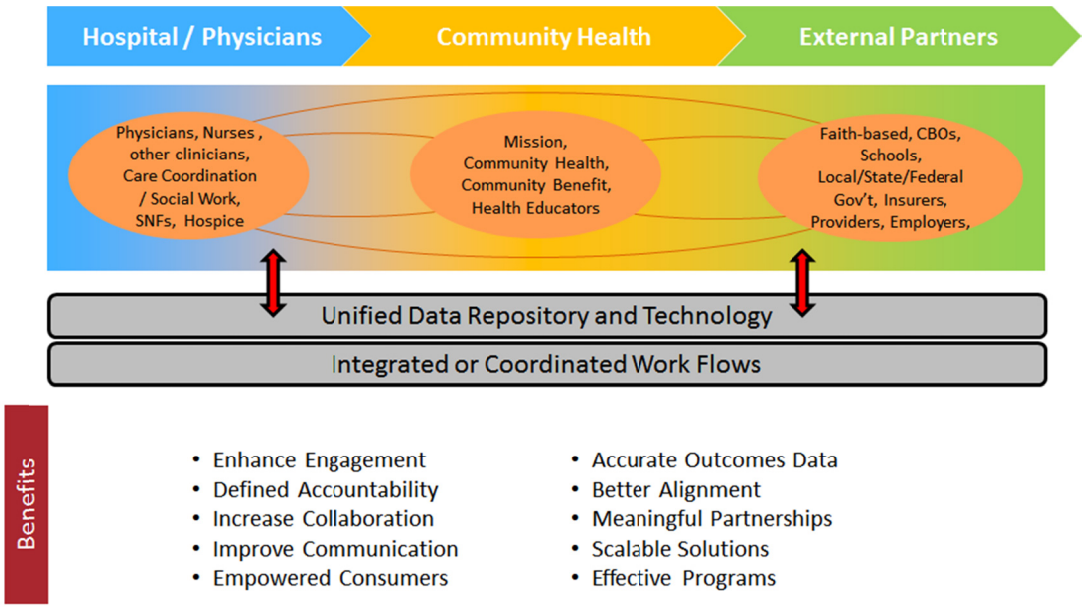


FIGURE 3-6 The desired population health continuum of the future.
NOTE: CBO = community based organization; SNF = skilled nursing facilities
SOURCE: Bilton presentation, July 30, 2015.

Population health metrics reside in multiple places inside Dignity Health, said Bilton. Like all other nonprofit health systems and hospitals, it conducts Community Health Needs Assessments every 3 years. It also compiles a Community Need Index, which was one of the system's early forays into thinking about population health from a social determinants perspective, and it has community benefit reports and plans and the data in its health IT systems. Dignity Health created its Community Need Index a decade ago in partnership with Truven Health Analytics. It comprises a set of nine indicators in five areas that include income, culture and language, education, insurance, and housing as determinants of health or barriers to good health. The indicators are updated annually at a zip code level, and Dignity Health makes a mapping tool available free online (see Figure 3-7). It uses this index as a tool for creating needs assessments that it builds into its planning for community health programs and for community and other partner engagement. It also uses the maps as conversation starters to help pinpoint the neediest areas in a community. Bilton stated that today, zip code–level analysis is not local enough in some cases, and it is considering ways to address that limitation.

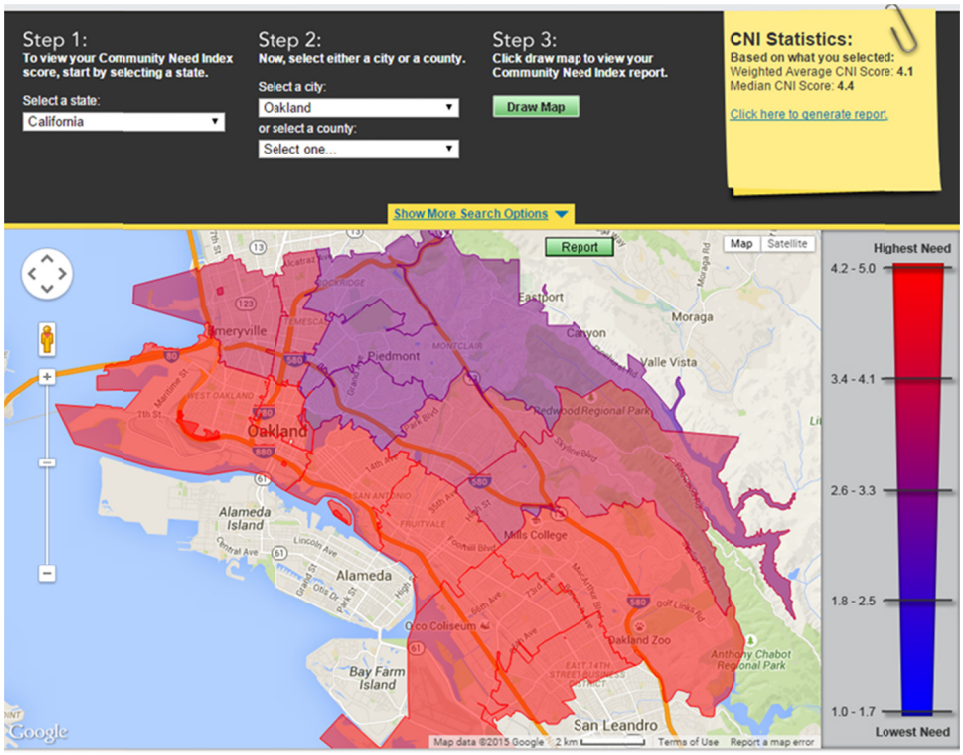


FIGURE 3-7 Dignity Health's Community Need Index (CNI) online mapping tool.
SOURCE: Bilton presentation, July 30, 2015.

Dignity Health uses its community and population health metrics to drive implementation strategies. "We need to use these data not only to set goals for ourselves, but as enablers to decide what actions to take and to evaluate those actions," said Bilton. He noted Joseph's comment about a lack of resources for data collection, and he said that same lack of resources exists on the evaluation side. He called for more research on how metrics can be used to assess both the scale of program interventions and their impacts, as they relate to changing outcomes at the population level. Priorities for its Community Grants Program are guided using data from the community health needs assessment and applicants must tie their proposals back to priorities and the associated implementation plans that Dignity Health's hospitals are required to develop and that are explicitly focused on community metrics.

Population health data also inform Dignity Health's own grant-seeking activities for building resources to address high-priority needs. To some degree, they also inform Dignity Health's policy advocacy work that includes a social determinants framework around harmful chemicals, community conditions that do not promote strong health, and community health needs assessment priorities, said Bilton.

He then commented on the ways in which hospitals and health care delivery organizations beyond Dignity Health are beginning to use and incorporate population health metrics into the flow of patient care. For example, hospitals are now looking at the role community factors play in hospital readmission rates (Herrin et al., 2015) and at adjusting risk for socioeconomic and other sociodemographic factors (National Quality Forum, 2014). They are also capturing social and behavioral domains and measures in electronic health records (IOM, 2014), a development that will give the nation's health care delivery system more

intelligence about addressing those needs. More importantly, said Bilton, an increasing number of projects and partnerships are building the capacity to work with social resources so that health care systems can begin to better identify those needs, incorporate them into decision making and care, and then have the capacity to connect people to community assets in new ways.

With regard to making population health metrics relevant, Bilton said it is important to establish a context for their use. For example, having data on mortality and morbidity associated with diabetes, combined with prevention quality indicators and admission rates for preventable conditions in a community, provides a more complete picture for action. Behavioral Risk Factor Surveillance Surveys (BRFSS), he noted, can provide information about behaviors and knowledge that contribute to those factors, as can data on food deserts and locations of fast food restaurants and convenience stores. "If we contextualize our indicators, I think we can build a story to tell," said Bilton. He added that many indicator reports are filled with dozens of pages of tables and graphs with minimal descriptive or interpretive contextual content. "Those compendia of data are critical and they have a use, but they are more effective as reference documents in my view," he said.

In his opinion, the field needs to focus more on purpose and build population health dashboards to address the issue of parsimony. He acknowledged that there may be a variety of different dashboards to fit specific purposes—a hospital or health system may have a different dashboard than a public health agency or the United Way—but a dashboard aligned with specific targets would, in his opinion, tell a better story to motivate action. Part of putting metrics into context, said Bilton, is stating them in terms of quantiles or rankings, which can also motivate action. "Data absent context do not motivate most people," said Bilton.

Another strategy for making metrics relevant, he said, is to relate broad and sometimes abstract indicators to more practical and tangible indicators. As an example, national- or even county-level data taken to the level of neighborhoods and subpopulations can identify specific contributing factors that can enable a set of actions to target those factors and make those actions more relevant to a specific group of people. "If we can demonstrate results for 100 people, or 1,000 people, or 10,000 people at a time, we can begin to make progress," said Bilton. He also said the evaluation and performance improvement process aspects of population health metrics are also keys to making them relevant for action.

DISCUSSION

Susan Hull from Wellspring Consulting commented on how exciting it is that health care systems are including a minimum dataset on social and behavioral determinants of health in the electronic health record and on the informatics challenges associated with thinking about those measures in a dynamic, real-time manner that would make them meaningful to the health care provider, patient, family, and neighborhood. She then asked the panelists for suggestions on how to approach that informatics challenge and if they had any ideas on how care might change as a result of having that information. One way that care would change, said Bilton, is by creating new relationships among the care providers, care coordinators, and community health staff. As an example, he said that a care manager at Dignity Health today may have knowledge of and access to some community resources, and is likely screening for some social determinants of health, but may not have the same relationship with community resources that the community health staff has.

Bilton noted that a regional care coordinator at Dignity Health recently asked him for the community health needs assessments and implementation plans for some of the system's

hospitals, a sign that these new relationships are starting to affect the way in which health care's role is being understood. "We are beginning to build that sort of awareness as we continue to talk about population health improvement," said Bilton, who added that providing informatics tools will only help to accelerate the awareness of the importance of population health factors in improving health. He also raised the importance of including population health in professional education curricula.

A workshop participant raised the point that health care systems may be working toward connecting people to social resources, but in many cases the necessary social resources are not present in a community. Bilton replied that many health care systems are aware of this problem and are seeking to address it by providing grants and making investments in community resources. He added that he believes health care systems can play a role in advocating for expansion of community services, and he wondered if new payment models and new definitions of the continuum of care will enable wrapping community services into reimbursable care. What will be needed to enable that to occur is evidence that demonstrates the effectiveness of those community services with regard to improving population health and data systems to support managing and coordinating those services.

Jean McGuire from Northeastern University asked Bilton if he had an idea of which community health metrics would matter in terms of informing investment strategies in upstream services. Bilton replied that he and his colleagues at Dignity Health have started to think about those metrics but do not yet have a specific set in mind. He cited one example, not specific to Dignity Health, of a letter sent by the American Hospital Association to the Internal Revenue Service about the idea of counting support of stable housing as a community benefit for hospital reporting purposes. The key here, he said, was the wealth of research-based evidence showing that stable housing has a beneficial impact on health. "I would look for those places where there is evidence of a connection between a social and environmental condition, health status, and health care seeking behavior," said Bilton, citing asthma as a great example in which there is strong evidence identifying the environmental triggers that are place-specific.

Veronica Shepherd asked Joseph to comment on the mechanisms that her organization to create pathways to economic sustainability for community youth at risk of engaging in violent behavior and ending up in the justice system. One step that the task force has taken, said Joseph, has been to open summer jobs programs to youth who previously were not eligible because they did not meet grade point average and other requirements and then provide them with the supports and skills needed to meet employer demands. Toward this end, the program's Community Action Board is working with local Chambers of Commerce to educate employers about the benefits of working with this particular youth population. She noted that the Chambers have a *Jails to Jobs* initiative that starts in jail and connects youth to employers. Santa Cruz County is also following the lead of Alameda County's A Good Hire program that helps address employers' concerns—mostly myths, she said—about hiring someone with a criminal record.

4

Measurement and Health Equity

In introducing the workshop's third panel on metrics for identifying disparities and inequities in health care, David Kindig said that population health has two goals—raising the average level of the nation's health and reducing the health equity gap—yet in his view, the metrics community spends more time developing measures for the mean and less time on measuring disparities and equity. "Of course, you are not going to improve the mean if you do not reduce the gaps," said Kindig.

This panel featured three presentations; highlights are provided in Box 4-1. Session moderator Steven Woolf, Director of the Center on Society and Health and Professor of Family Medicine and Population Health at Virginia Commonwealth University, provided a short introduction to the subject of measuring health inequity. Thomas LaVeist, Professor and Director of the Johns Hopkins Center for Health Disparities Solutions at the Johns Hopkins Bloomberg School of Public Health, discussed some of the challenges of using metrics to describe population health inequities, and Sarah Treuhaft, Director of Equitable Growth Initiatives at PolicyLink, spoke about the National Equity Atlas as a tool for building an equitable economy.

BOX 4-1
Highlights from the Session on Measurement and Health Equity

1. Maps are powerful communicators of differences in health outcomes across a geographic area and highlight a history of policy decisions that have contributed to poor health outcomes (Woolf).
2. Measuring disparities over time demonstrates the high economic cost of premature death (LaVeist).
3. Sharing data and metrics about demographic change can help start a conversation about disparities and inequities (Treuhaft).

MEASURING HEALTH DISPARITIES[1]

The subject of how to measure health inequity has existed for a long time, said Steven Woolf (Satcher et al., 2005), who noted that there is still a debate about how to define equity, equality, equal opportunity, and justice. There are also methodological questions, he added, about how best to measure health inequity to correctly reflect how health is shaped by sex, race, ethnicity, or cultural background, as well as by social determinants such as income and poverty. How metrics are presented so that they communicate to the public is also important. For example, he said life expectancy is a crude metric for much more complicated health outcomes, but his experience has shown that simple maps showing geographic disparities in life expectancy (see Figure 4-1) resonate deeply with the public. There was extensive media coverage when his group released life expectancy maps for Atlanta, Chicago, New York City, and Richmond, Virginia. The *New York Times* asked for the source data and produced an interactive graphic on its website[2] to enlighten its readership about how life expectancy varies by neighborhood (Tavernise and Sun, 2015).

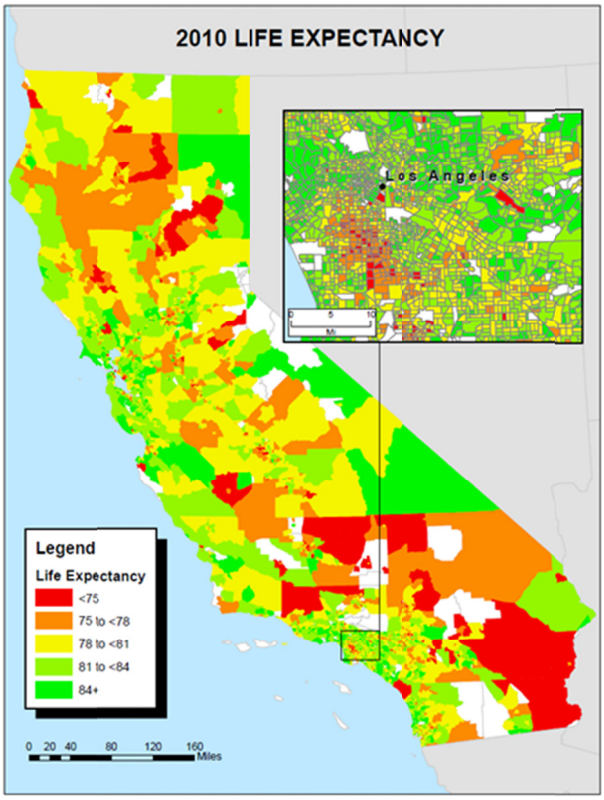


FIGURE 4-1 Impact of geography on life expectancy.
SOURCE: Woolf presentation, July 30, 2015.

[1] This section is based on remarks from Steven Woolf, Director of the Center on Society and Health and Professor of Family Medicine and Population Health at Virginia Commonwealth University, and the statements are not endorsed or verified by the National Academies of Sciences, Engineering, and Medicine.
[2] See http://www.nytimes.com/interactive/2015/04/29/health/life-expectancy-nyc-chi-atl-richmond.html?_r=0 (accessed February 8, 2016)

Given that health inequities are pervasive in the United States and widely acknowledged, the challenge is to identify what causes them, and purposeful metrics should provide knowledge for understanding the root causes of these disparities, said Woolf. The County Health Rankings and Roadmaps model provides one view of the different domains of health, but the conceptual model of the World Health Organization (WHO, 2010) shows the complexity of the linkages between these domains (see Figure 4-2). From an analytic perspective, said Woolf, thinking about measuring the drivers of health inequity requires thinking about equity across these specific domains. For example, health disparities across neighborhoods exist for a variety of reasons, including:

- Education and income;
- Unsafe or unhealthy housing;
- Stores and restaurants selling unhealthy food;
- Limited opportunities for residents to exercise, walk, or cycle;
- Proximity to highways, factories, or other sources of toxic agents;
- Limited access to primary care doctors and good hospitals;
- Unreliable or expensive public transit that isolates residents from good jobs, health and child care, and social services; and
- Residential segregation and features that isolate communities.

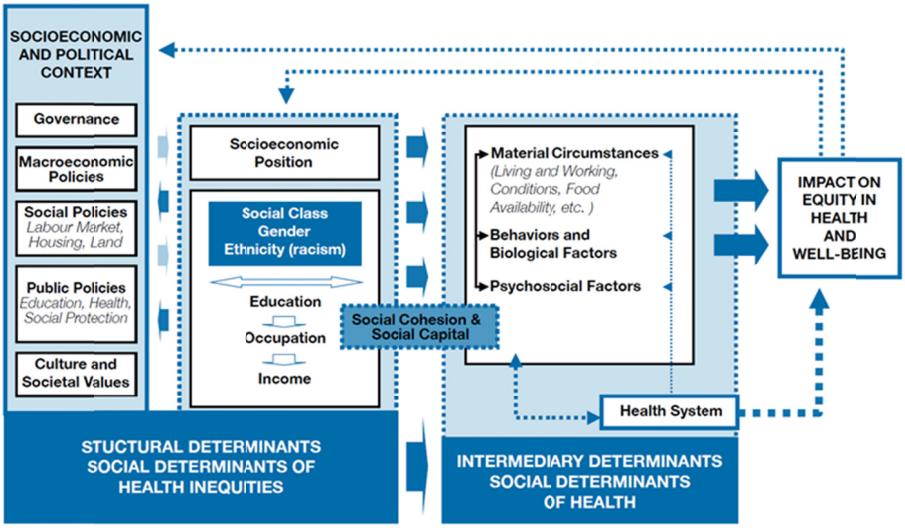


FIGURE 4-2 World Health Organization conceptual model for taking action on the social determinants of health.
SOURCES: Woolf presentation, July 30, 2015; WHO, 2010.

After noting that two of the better known social determinants of health are income (see Figure 4-3) and education (see Figure 4-4), Woolf described an analysis he and his colleagues conducted showing the number of lives that would be saved if every American had the mortality rate of those with some college education (see Figure 4-5). The goal of this analysis, he said, was to give the public a sense of magnitude about the importance of these root causes.

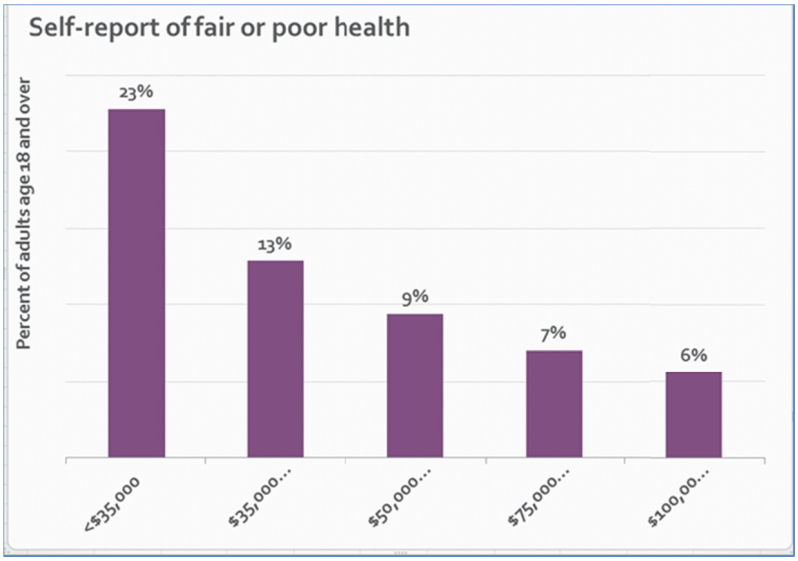


FIGURE 4-3 Income and disease burden.
SOURCE: Woolf presentation, July 30, 2015.

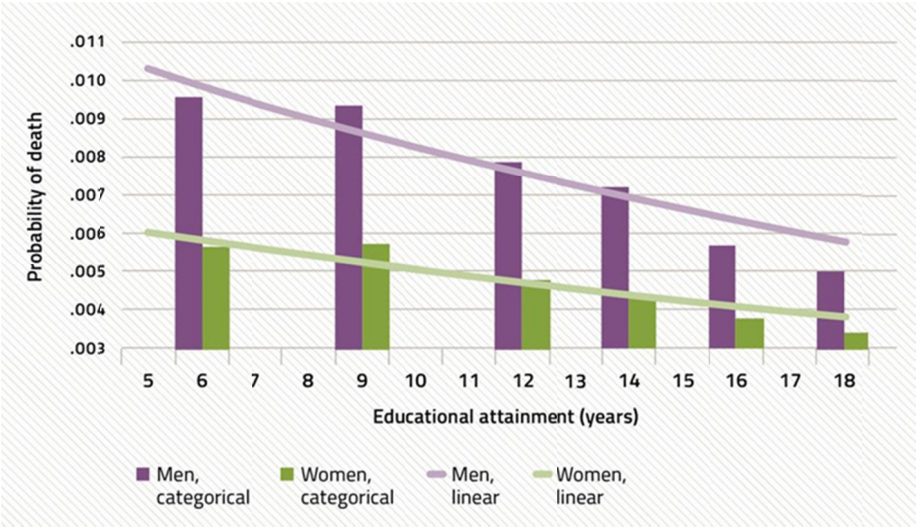


FIGURE 4-4 All-cause mortality risk for men and women by years of education.
SOURCES: Woolf presentation, July 30, 2015; Ross et al., 2012.

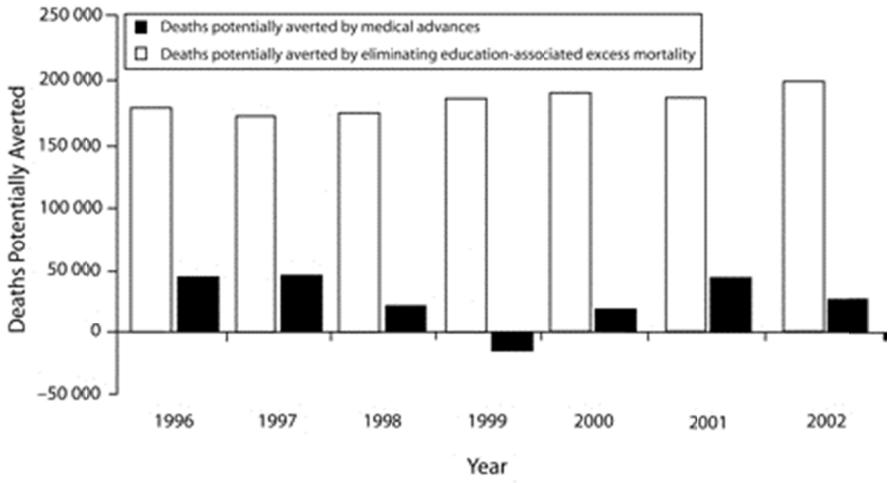


FIGURE 4-5 Potential impact of education on mortality.
SOURCES: Woolf presentation, July 30, 2015; Woolf et al., 2007.

Increasingly, said Woolf, the conversation about health disparities is turning to the role of place. "It is not just the classic social determinants of health that exist in people's households or in their personal lives, but the measurement of equity requires [greater emphasis] on understanding place and its influence on health outcome," he explained. "We are coming to appreciate more how place shapes opportunity." He noted that the public health community is used to thinking about the connection between place and health and talking about including health in all policies, but it is opportunity and wellbeing more generally—not just health—that resonates more broadly with policymakers. Place matters to opportunity at a more fundamental level. To illustrate this, he used a tree as an analogy, with the trunk of the tree representing opportunity and the branches representing health, crime, social services, the environment, jobs, and other outcomes. Woolf used this analogy to suggest that this group think more holistically about the metrics for understanding equity. "Maybe the question is less about how we in the health field measure health inequity and more about how we as a society measure inequity in general." He advocated core measures of inequity in opportunity, along with metrics of the manifestations of inequity in various domains—health among them

Another important factor, he said, is to remember the historical context when measuring inequity. For example, Woolf and his colleagues looked at factors affecting health disparities in various neighborhoods of Baltimore and examined the issue of redlining, a set of housing policies from the 1930s that cast the die for neighborhoods in Baltimore mired in a cycle of persistent poverty, disadvantage, and unemployment (Evans et al., 2012). The areas highlighted in the redlining map were the same neighborhoods struggling today with problems of violence, socioeconomic disadvantage, and poor health outcomes. The recent riots that occurred in Baltimore were in those same neighborhoods. He noted that unrest in places such as Ferguson, Missouri, and Baltimore is creating a growing public awareness of the inequality that exists simply because people are born in or mired in the wrong geography.

The larger point, he said, is that health outcomes and health inequities are shaped by a complex set of factors. In addition to the temporal and longitudinal analyses that earlier speakers had noted were important, the field should also think about metrics that account for the factors across the life course of individuals. He cited the fatal arrest of Freddie Gray, which sparked the

riots in Baltimore. Gray's problems did not begin with his arrest, said Woolf. Rather, they started when he was an infant living in a dilapidated house contaminated by peeling lead-based paint, Woolf noted. Lead poisoning later contributed to his behavioral problems during childhood and ultimately to his arrest. "Understanding this larger ecological context from the life course perspective will help us think about how to measure inequality in a way that measures those kinds of temporal patterns," said Woolf. A better understanding of adverse child experiences and their effects on health throughout life will require new metrics, he added.

This is not just an inner city problem, as Woolf illustrated with data from the County Health Rankings showing worse health outcomes in eastern Kentucky (see Figure 4-6). Very poor health outcomes, as well as persistent poverty and other social disadvantages, occur in coal fields that were once vibrant in earlier generations, he said. "Increasingly, we have to become sociologists and political scientists to understand that today's economic conditions exist because of policy and economic choices made years ago about the coal industry that set into motion this pattern," said Woolf. "If we are going to close the gap, then we need to have policies addressing that history."

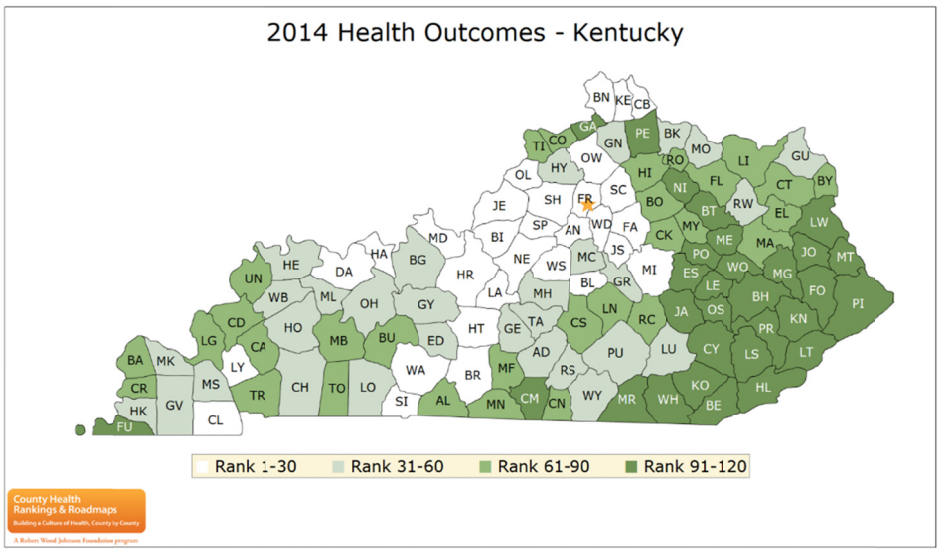


FIGURE 4-6 Health outcomes in Kentucky, 2014.
SOURCE: Woolf presentation, July 30, 2015.

In closing, Woolf reiterated Steven Teutsch's recommendation to develop a logic model that identifies which factors are responsible for driving health inequities. "Such a logic model can help in establishing indicators and metrics for setting policy priorities. We can see how far we are getting in addressing the root causes that the logic model tells us are responsible for our outcomes," said Woolf.

DESCRIBING POPULATION HEALTH INEQUITIES[3]

There is a small but growing literature, said Thomas LaVeist, on the creation of indices of health equity (Harper et al., 2008, 2009, 2010). But as Woolf said previously, it is important to define terms such as equity, equality, and disparities before going too far down the road of metrics development. "If we are to create a purpose, a goal for metrics, it is important for us to think about what we mean by these terms and what we are trying to accomplish," said LaVeist. "Are we looking for equality or are we looking for inequities? Both are valuable and valid goals, but they are not the same goal." As an example, he discussed a study he conducted that identified racially integrated communities around the country that did not have disparities by race and socioeconomic status as measured by high school graduation rates and median income. One of those communities was in southwest Baltimore and there were, in fact, no disparities in health status by race because both African Americans and whites were experiencing the same high rates of adverse health events. "Race is not protective if you live in an environment that is going to produce bad health outcomes," said LaVeist. Equity was not the problem in this community, he added, disparity was. He also mentioned in passing that there is a small and growing literature on the creation of indexes that are conceptually similar to GDP, which as Rajiv Bhatia had mentioned earlier, has a huge engine behind it and is an index that has meaning to most people.

Before turning to the subject of his presentation—a description of how metrics can be used to understand inequalities and some of the pitfalls involved in doing so—LaVeist noted that the National Cancer Institute (NCI) has created software that is free and available on its website for calculating health disparities (NCI, 2013). It was originally developed, he explained, to analyze data from NCI's Surveillance, Epidemiology, and End Results (SEER) Program, but the program can import other datasets as well. He said he has used this program a bit and found it to be robust and interesting.

Age-adjusted mortality rates by race, ethnicity, and gender (see Figure 4-7) have fallen over the years, but the relative rates have remained unchanged, said LaVeist, who noted there are limits to simply comparing rates among different groups. For example, the prevalence of smokers shows little difference between African American and white males, suggesting that there is not an equity problem with respect to smoking. However, plotting smoking prevalence by age and race (see Figure 4-8) reveals several patterns that LaVeist explained have implications for how interventions are planned and where resources are devoted. This analysis shows that smoking rates are much higher among whites compared to African Americans and Latinos during the teenage years, but that while the rate among whites declines over time, the rate among African Americans and Latinos, and particularly among the former, rises into adulthood. A similar pattern is seen among women (see Figure 4-9).

[3] This section is based on the presentation by Thomas LaVeist, Professor and Director of the Johns Hopkins Center for Health Disparities Solutions at the Johns Hopkins Bloomberg School of Public Health, and the statements are not endorsed or verified by the National Academies of Sciences, Engineering, and Medicine.

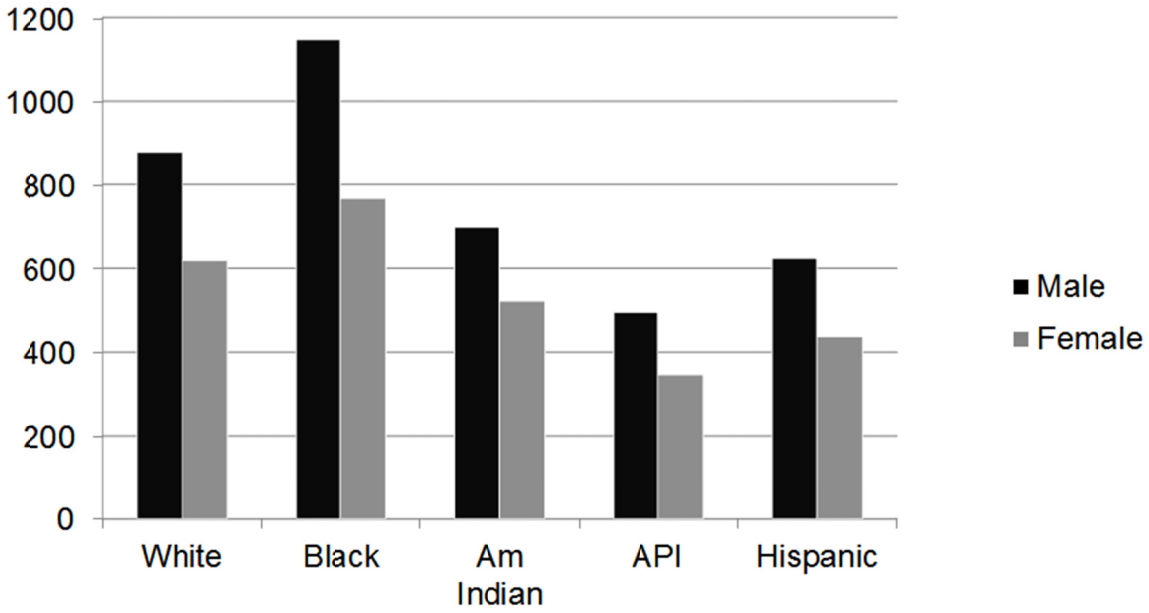


FIGURE 4-7 Age-adjusted mortality rates by race, ethnicity, and gender, 2009.
NOTE: Am Indian = American Indian; API = Asian or Pacific Islander.
SOURCES: LaVeist presentation, July 30, 2015; U.S. National Center for Health Statistics, 2011.

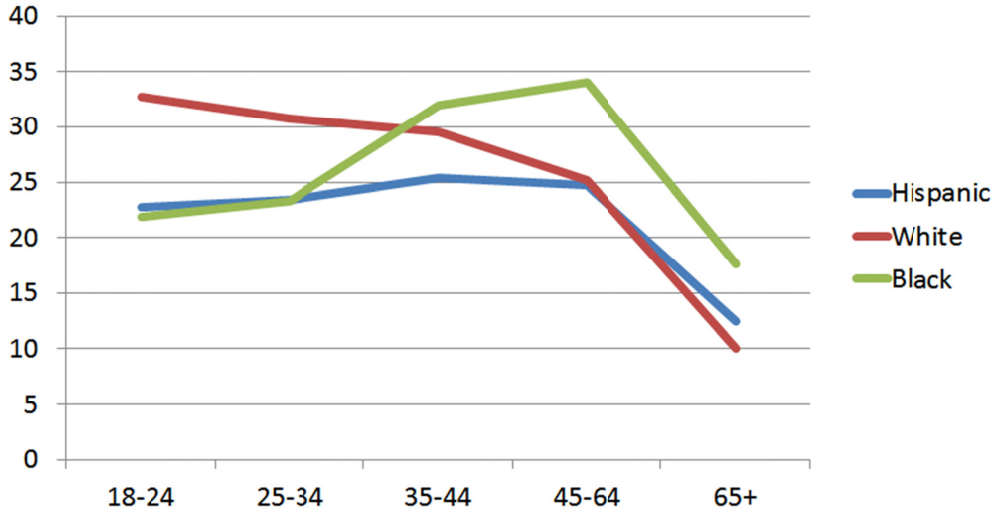


FIGURE 4-8 Age and smoking prevalence by race and ethnicity among men.
NOTE: x-axis = age; y-axis = percent of persons who were current smokers.
SOURCES: LaVeist presentation, July 30, 2015, U.S. National Center for Health Statistics, 2003.

What this analysis suggests is that are different mechanisms triggering tobacco use among different ethnic groups. For white teens, smoking is youthful experimentation that begins to decline as they move into adulthood, while LaVeist suspects that among Latinos, and even more so among African Americans, smoking is a coping mechanism in response to stress. "If we are going to craft messages to prevent smoking and to implore people to stop smoking, we would take different strategies and target people at different points in the life course," said LaVeist. Typically, he added, smoking prevention efforts focus on teenagers.

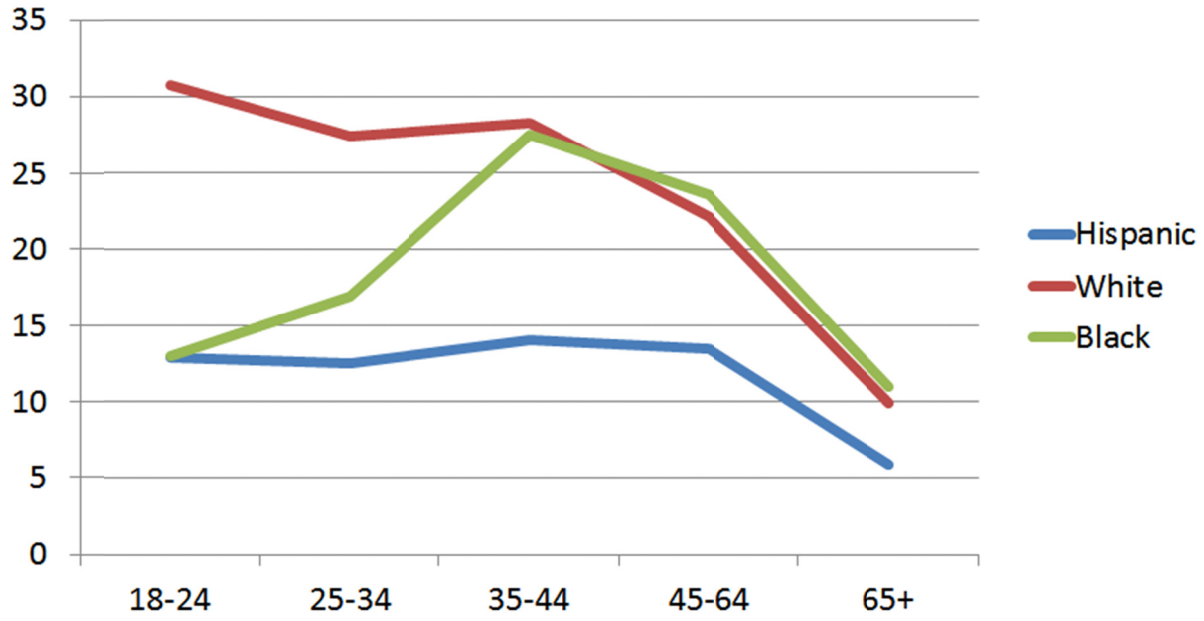


FIGURE 4-9 Age and smoking prevalence by race and ethnicity among women.
NOTE: x-axis = age; y-axis = percent of persons who were current smokers.
SOURCES: LaVeist presentation, July 30, 2015; U.S. National Center for Health Statistics, 2003.

Another issue to consider, said LaVeist, is social position or socioeconomic status. An analysis of a variety of health outcomes shows a similar pattern in which as education increases, the absolute rate of adverse health outcome decreases, with absolute rates among African Americans being higher than for whites (see Figures 4-10 and 4-11). Similarly, looking at health outcomes as a function of income shows that for most disorders, increasing income decreases risk (see Figure 4-13), with the exception being hypertension. White Americans, said LaVeist, show the typical pattern of increasing levels of income leading to decreased risk of hypertension, but African Americans show the opposite pattern. "The underlying phenomenon is different, and by simply calculating rates, we mask this difference," said LaVeist.

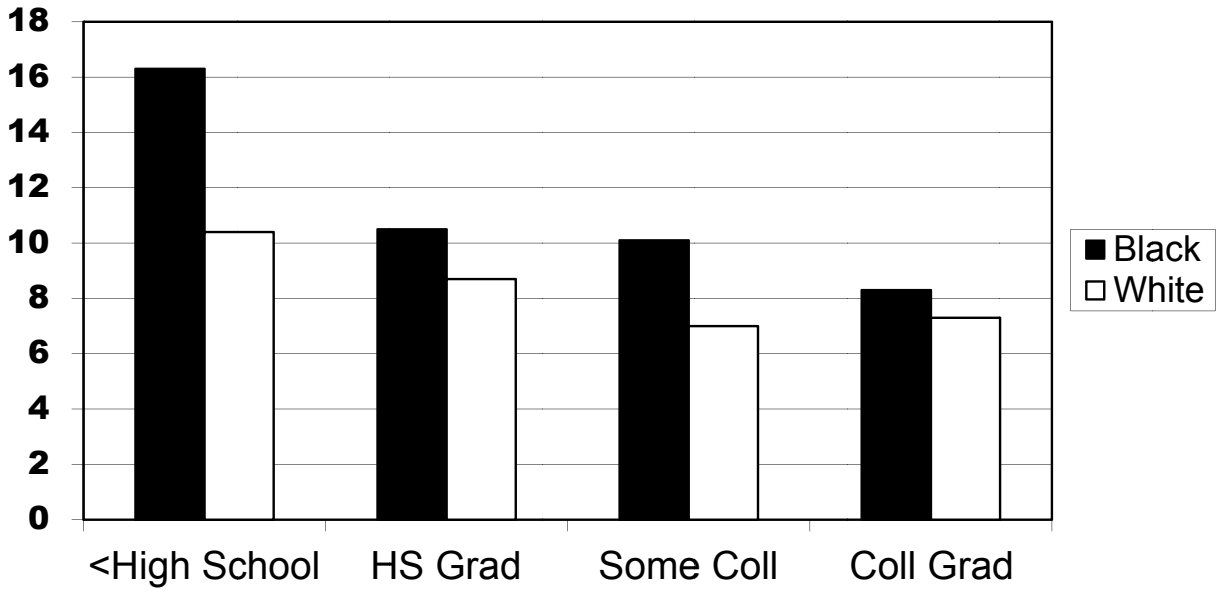


FIGURE 4-10 Education and disparities in diabetes, age adjusted.
NOTE: x = education level; y = percent of persons with diabetes; HS = High School; Coll = College.
SOURCE: LaVeist presentation, July 30, 2015.

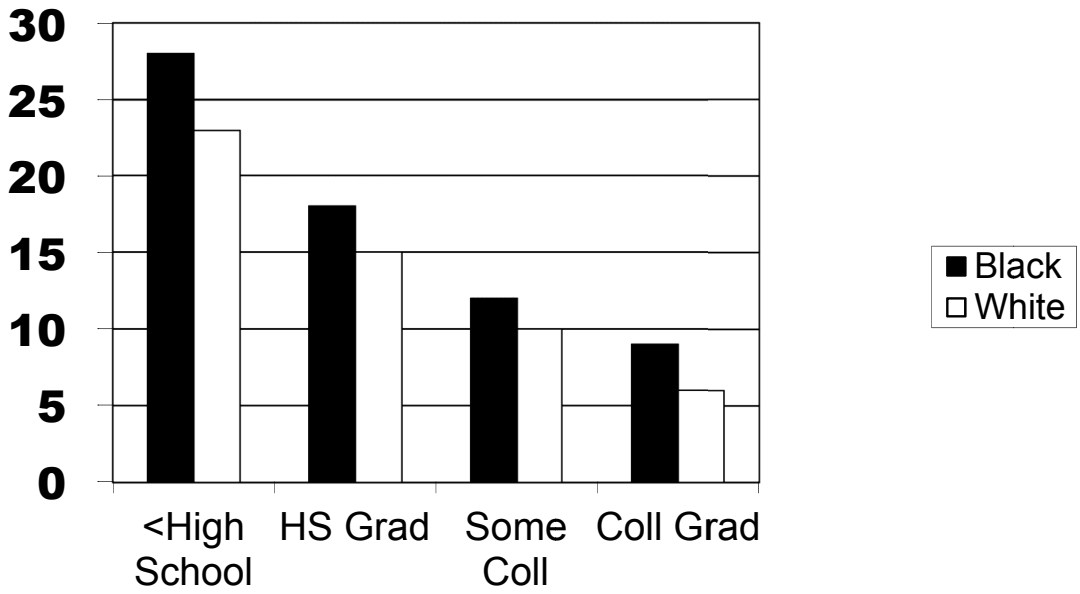


FIGURE 4-11 Education and disparities in self-reported "fair" or "poor" health, age-adjusted.
NOTE: x = education level; y = percentages of persons self-reporting "fair" or "poor" health; HS = High School; Coll = College.
SOURCE: LaVeist presentation, July 30, 2015.

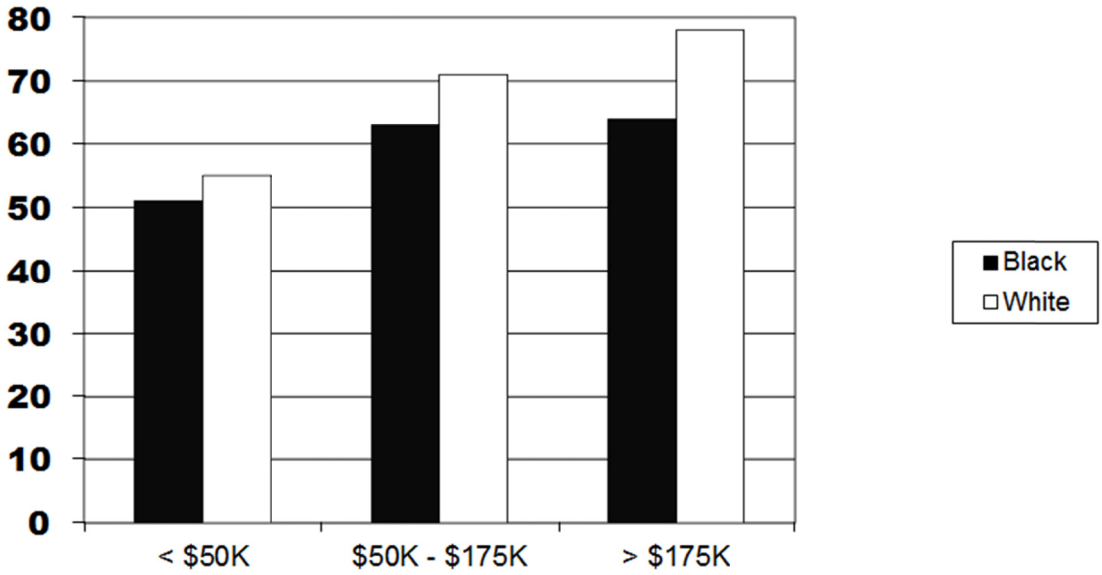


FIGURE 4-12 Income and self-rating of health: "Very Good" or "Excellent" Health.
NOTE: x-axis = income level; y-axis = percentage self-rating health as "Very Good" or "Excellent".
SOURCE: LaVeist presentation, July 30, 2015.

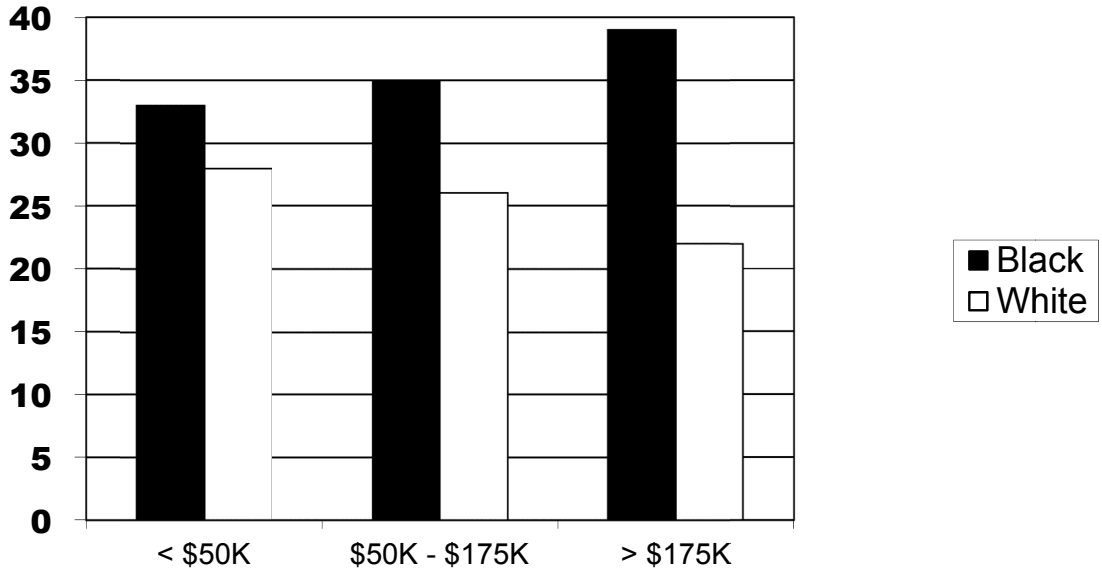


FIGURE 4-13 Income and hypertension diagnosis.
NOTE: x-axis = Income level; y-axis = percent with hypertension diagnosis.
SOURCE: LaVeist presentation, July 30, 2015.

One solution often used to deal with this kind of issue is to use multivariate modeling or regression modeling, but LaVeist said that regression modeling alone is not good enough. As an example, he used data from the 2005 National Health Interview Survey on all adults age 40 or older, of which there were more than 33,000 people (see Table 4-1). A simple analysis comparing African Americans and whites having at least one activity of daily living (ADL) limitation and falling in one of three income categories shows that the odds ratio declines as income increases. The bivariate relationship between race and ADL limitation yields an odds ratio of 1.46, leading to the conclusion that African Americans have a 46 percent greater odds of having at least one ADL limitation compared to whites. A similar calculation for ADL regressed on income shows the odds ratio declining as income increases. However, said LaVeist, putting income and race together in a multivariate regression yields a different result. In the lowest income category, there is a small, but statistically significant difference between African Americans and whites. Also at higher income levels, the number of African Americans with at least one ADL limitation is so small that the results are not statistically significant (see Table 4-2). LaVeist noted that the National Health Interview Survey is one of the largest datasets available, yet it does not permit even this simple analysis. "How many papers have you read on race disparities with smaller datasets and much more complex analyses?" asked LaVeist, who admitted publishing such papers himself. "Simple regression models do not solve this problem."

TABLE 4-1 National Health Interview Survey, 2005

- Total population surveyed, n=93,386
- Adults age 40+ with complete data on income, race and activities of daily living (ADL), n=33,148
- African Americans, n=4,473 (12%)
- Income, <$20K, n=6,813; $20K-$75K, n=19,504; >$75K, n=6,831
- At least 1 ADL n=1,043 (2.8%)

SOURCE: LaVeist presentation, July 30, 2015.

TABLE 4-2 Cross-Tabulation of Race and Activities of Daily Living Within Income Groupings

	White	Black	Total	P-Value
<$20K	6.1% e=304	7.6% e=97	6.4% e=401	.031
$20K-$75K	2.1% e=343	2.1% e=45	2.1% e=388	.50
>$75K	1.0% e=56	1.7% e=8	1.0% e=64	.10

SOURCE: LaVeist presentation, July 30, 2015.

One of the biggest issues with addressing race disparities, LaVeist explained, is racial residential segregation and the fact that races live in the country together, but experience the country differently because the risk environment is so different. Plotting all U.S. cities with a population of 100,000 or more by the Index of Dissimilarity, an index used to measure the degree to which census tracts in the city are racially integrated, shows that the average score in 2010 comparing African Americans and whites was 0.57, or 57 percent segregated, with a large spread, showing the dramatic variation across cities in terms of how segregated they are (see Figure 4-14) that would be missed by looking simply at the mean value. The same plot for

Hispanics and whites shows a similar pattern, with a mean score of 0.48 in 2010 (see Figure 4-15).

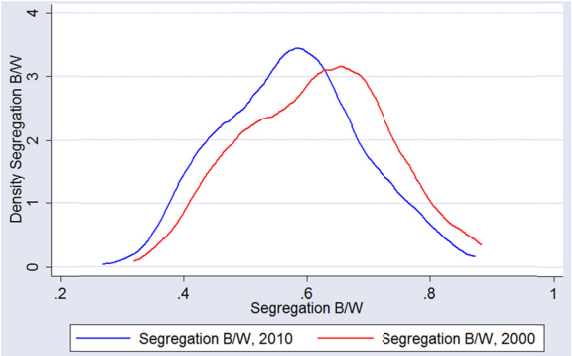


FIGURE 4-14 African American/White Index of Dissimilarity 2000 and 2010.
SOURCE: LaVeist presentation, July 30, 2015.

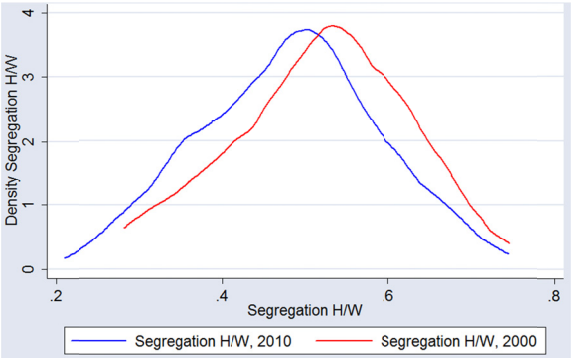


FIGURE 4-15 Hispanic/White Index of Dissimilarity 2000 and 2010.
SOURCE: LaVeist presentation, July 30, 2015.

LaVeist then addressed the common and problematic misuse of risk ratios, particularly when looking at trend data. To illustrate this problem, he used a hypothetical example of a statistic revealing a race difference of 50 deaths per 1,000 that falls by 10 deaths per 1000 for both racial groups every 5 years (see Table 4-3). Reliance only on the ratio of rates would lead to the conclusion that the disparity has increased dramatically over time, even with equal improvement for both racial groups. “This is what happens when we try to use a rate ratio to try to look at trend data,” said LaVeist. “This is something that we must stop doing without providing the full context of the absolute difference in addition to the relative difference.”

TABLE 4-3 A Hypothetical Example of Increasing Risk Ratios

Year	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005
Black	150	140	130	120	110	100	90	80	70	60
White	100	90	80	70	60	50	40	30	20	10
Diff	50	50	50	50	50	50	50	50	50	50
Ratio	1.5	1.55	1.65	1.71	1.83	2	2.25	2.67	3.5	6.0

NOTE: Diff = Difference
SOURCE: LaVeist presentation, July 30, 2015.

As he had noted earlier, some indexes are available for expressing inequality, and each uses what LaVeist said are unsuccessful approaches for addressing the problems he raised. Relative risk indexes, as he showed, are not ideal for trend analysis. The Theil Index, which calculates variance relative to the population average, suffers from the problem that population averages are also dynamic. An alternative approach that he suggested, one that he has found effective with policy makers because it is intuitive, is to look at excess deaths. Given that Asian Americans have the lowest death rate, it is possible to calculate how many fewer deaths would have occurred if every other racial or ethnic group had the same death rate as Asian Americans (see Figure 4-16). A more accurate picture of disparities, said LaVeist, is obtained by plotting the percentage of excess deaths relative to Asian Americans (see Figure 4-17).

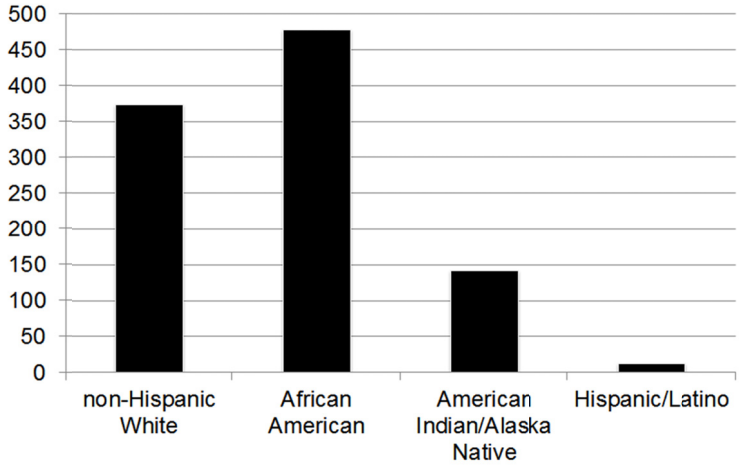


FIGURE 4-16 Excess deaths per 100,000 persons relative to Asian Americans, 2006.
SOURCES: LaVeist presentation, July 30, 2015; U.S. National Center for Health Statistics, 2011.

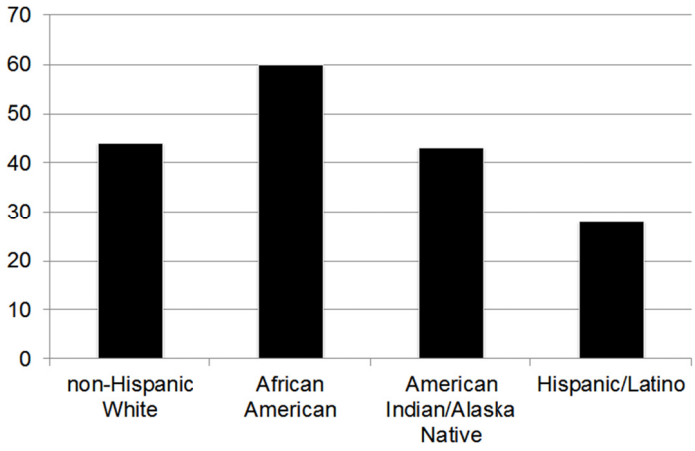


FIGURE 4-17 Percentage of deaths that can be considered excess relative to Asian Americans, 2006.
SOURCES: LaVeist presentation, July 30, 2015; U.S. National Center for Health Statistics, 2011.

Another approach he has found effective moves away from health metrics entirely and instead calculates the economic impact of health inequalities. An analysis he and his colleagues conducted (LaVeist et al., 2009) that looked at the cost of premature death, use of direct medical care, and the indirect cost to the economy of lost productivity, showed that between 2003 and 2006, eliminating disparities could have reduced direct medical care expenditures by $229.4 billion and the total economic cost was $1.24 trillion over that 4-year period.

LaVeist concluded his presentation by describing the documentary film he is creating on African American health as part of a large community engagement program. "When you talk to people in communities, it is difficult to talk about these statistics in ways that they really understand," he explained. The statistic he uses most frequently when talking to the general public is life expectancy, and the key number here is 4 to 6 years, the disparity between white and African Americans in life expectancy. The way he is framing this statistic for the documentary is to have people react to the question, "What could you do with 6 additional years of life?" In one case, he posed that question to a woman in a wheelchair from the Brownsville neighborhood in Brooklyn, which has the lowest life expectancy in New York and was his neighborhood growing up. Her response was, "In 6 years there could be a cure."

THE NATIONAL EQUITY ATLAS[4]

PolicyLink, explained Sarah Treuhaft, is a national research and action institute whose mission is to advance economic and social equity. That mission led PolicyLink to partner with the Program for Environmental and Regional Equity at the University of Southern California (PERE) to develop a National Equity Atlas (PolicyLink, 2014) as a data and policy tool for making the case for equity and changing the narrative on how to create a more equitable society. The narrative that PolicyLink is trying to create, laid out in a paper Treuhaft and her colleagues published in 2011 (Treuhaft et al., 2011), is one in which equity is seen as a superior growth

[4] This section is based on the presentation by Sarah Treuhaft, Director of Equitable Growth Initiatives at PolicyLink, and the statements are not endorsed or verified by the National Academies of Sciences, Engineering, and Medicine.

model for the economy. That paper made the case that as America's demographics shift to one that will have people of color as the majority of its population (see Figure 4-18), equity becomes an economic as much as a moral imperative for the nation as a whole.[5]

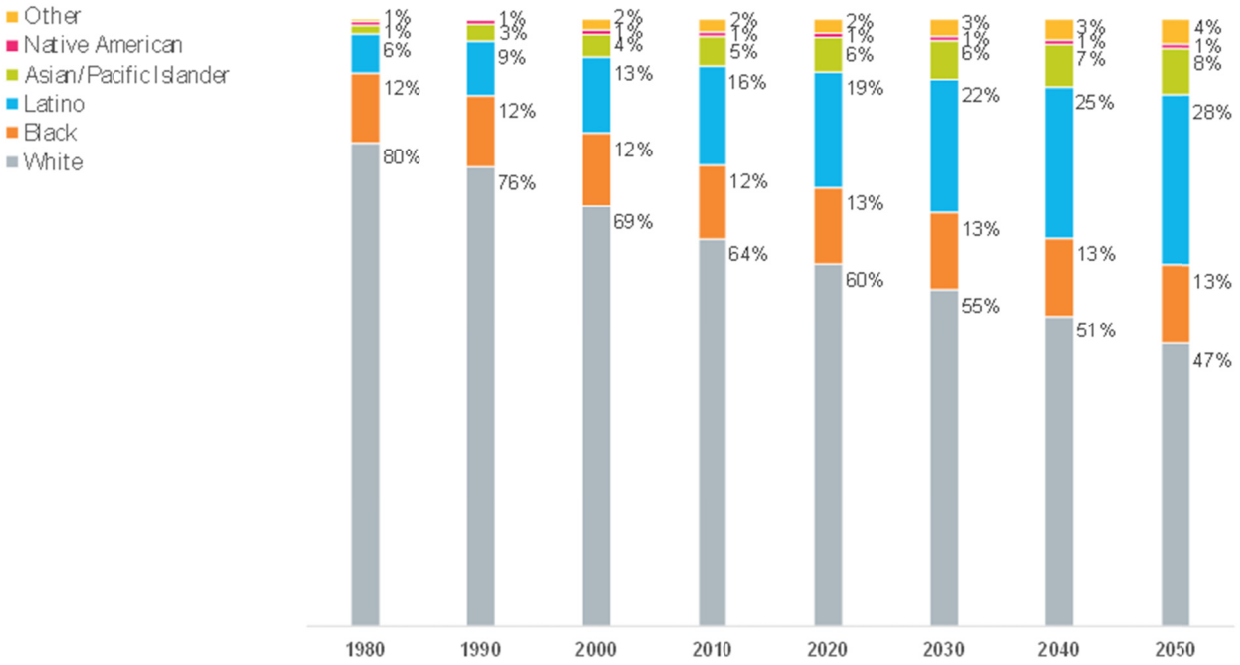


FIGURE 4-18 Projected demographic transformation of the United States, 1980-2050. SOURCE: Treuhaft presentation, July 30, 2015.

To illustrate this imperative, Treuhaft recounted a visit she made to a community center in the Gulfton neighborhood of Houston, a city which vies with Oakland for being the most diverse city in the United States. Gulfton is the city's densest neighborhood and is home to a diverse community of immigrant, African American, and white residents. The children at this community center all wore bright jerseys with a number on the back denoting the years in which those children would graduate from college. "These are school children in a neighborhood that has a 40 percent poverty level and a third of the children will drop out of school, yet they had these aspirations and were in a program that was helping them get there," said Treuhaft. "This is our future. Our future looks like this neighborhood, and equity is about enabling those children and people like them, as well as adult members of their community, to achieve their goals and reach their full potential."

PolicyLink, explained Treuhaft, believes in the power of data to start conversations, measure and track change, and advance this narrative about the importance of equity and inclusion. The data, she said, illustrate the demographic change that the nation is undergoing, both in terms of the percentage of the population that people of color will represent (see Figures 4-19 and 4-20) and the share of population growth (see Figure 4-21). Growth projections, she said, show that even in parts of the country that will still be predominantly white in coming

[5] Due to the tight schedule, this panel was not followed by a discussion period, but the closing discussion offered opportunities for questions and comments about this panel, along with the others.

decades, people of color will account for most of the growth in these areas. This change is creating a dynamic in which the senior population will leave the workforce and become more dependent on the growing population of people of color who will be the next generation of workers. "The demographics show that the contributions of every new worker are going to be increasingly important to the community as a whole because the burden of caring for the elders is going to be shifting onto them," said Treuhaft.

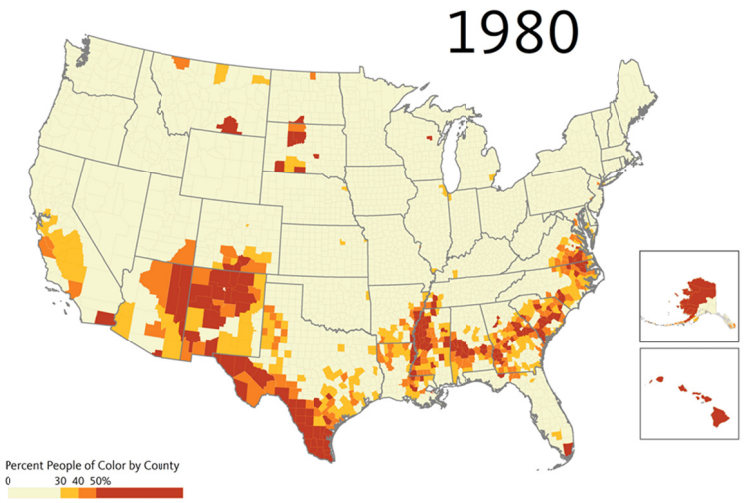


FIGURE 4-19 Percent of people by color by county, 1980.
SOURCE: Treuhaft presentation, July 30, 2015.

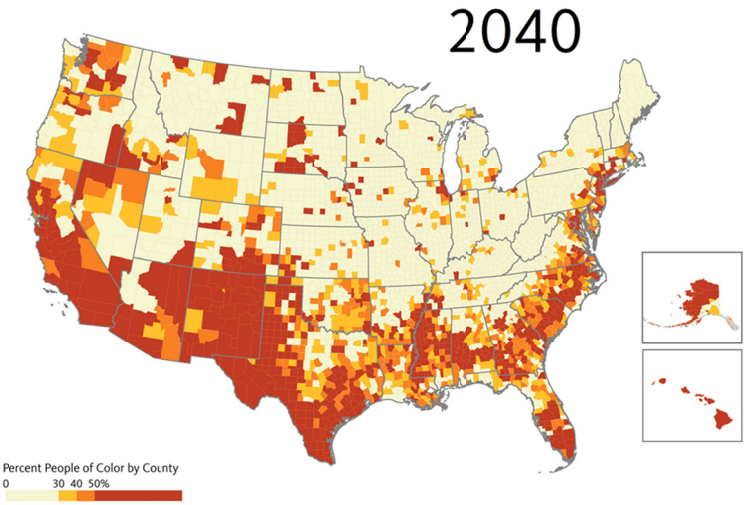


FIGURE 4-20 Percent of people by color by county, projected, 2040.
SOURCE: Treuhaft presentation, July 30, 2015.

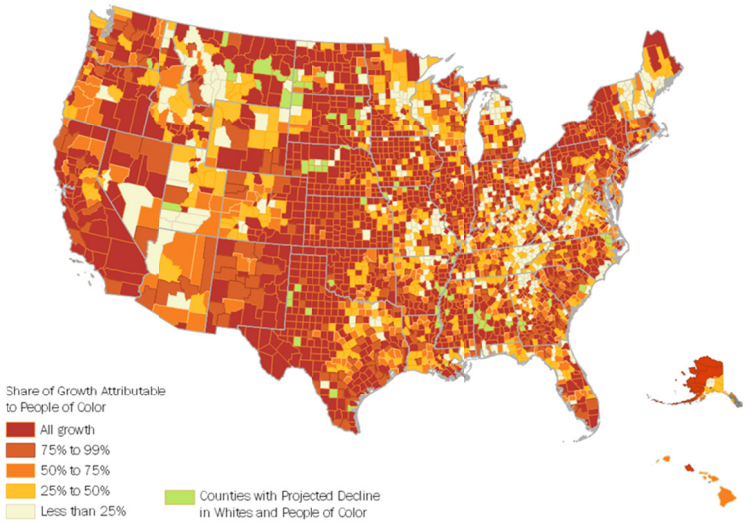


FIGURE 4-21 Projected population growth from 2010 to 2040 attributable to people of color. SOURCE: Treuhaft presentation, July 30, 2015.

These demographic changes are not just about the future, however. Of the nation's 100 largest cities, 65 already have a majority population of people of color. The majority of the babies being born in the United States are children of color, as are the majority of children under age 5 and the majority of youth in public schools. "A large part of our framing is around the barriers that these children face to reaching their potential, and the fact that we are leaving valuable human capital on the table," said Treuhaft

The narrative that PolicyLink is promoting is informed by research that supports a new consensus within the field of economics highlighting the risk of rising inequality to the nation's economic prosperity, said Treuhaft. She noted a recently released study from the International Monetary Fund examining the rise in inequality across nations and finding that it hinders sustained growth and prosperity (Dabla-Norris et al., 2015). Studies from the Organisation for Economic Cooperation and Development (Cingano, 2014) and others support this finding as well. She also mentioned research by PolicyLink and PERE showing how much stronger the economies of U.S. cities would be if the racial income gap was closed (see Figure 4-22). These gaps, she explained, are a function of differences in hours worked and differences in wages. Summed across the nation, they project that the increase in GDP from eliminating racial economic disparities would be $2.1 trillion annually.

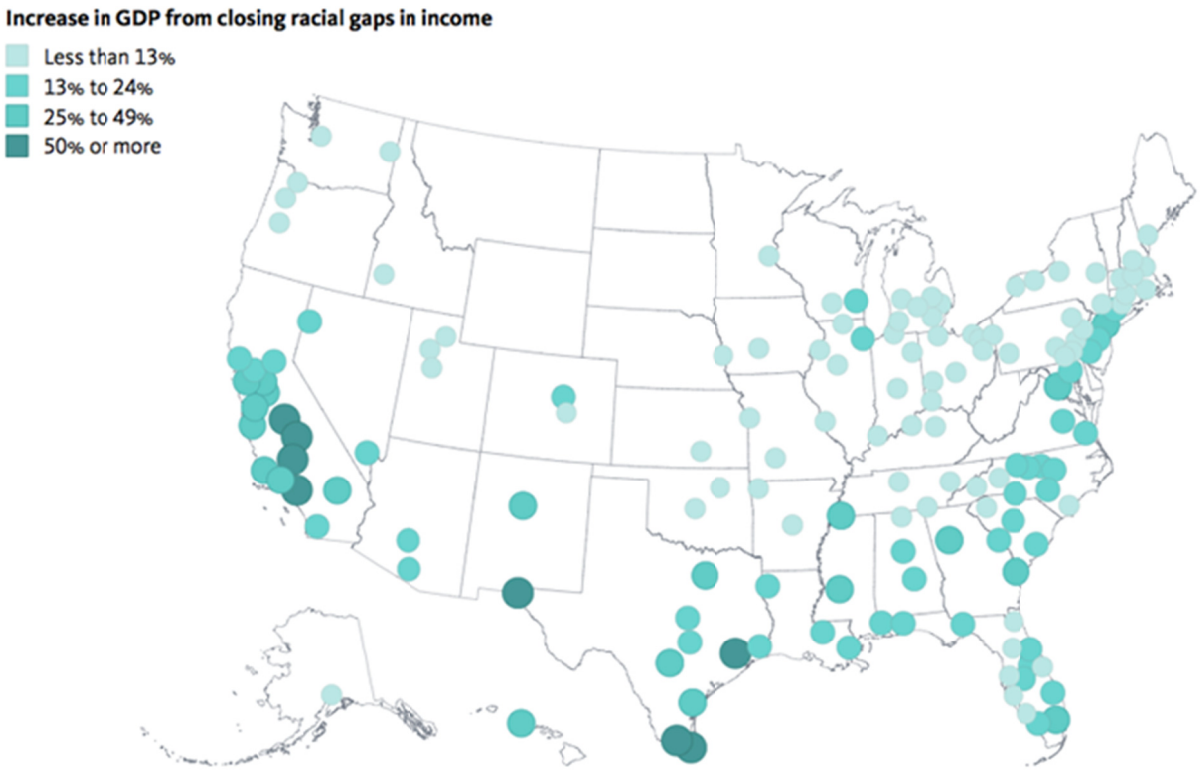


FIGURE 4-22 Reducing racial gaps in income would increase regional Gross Domestic Product (PolicyLink projection).
NOTE: GDP = Gross Domestic Product.
SOURCE: Treuhaft presentation, July 30, 2015.

One focus of the National Equity Atlas is to help tailor PolicyLink's framing to regions. PolicyLink, Treuhaft explained, defines an equitable region as one in which all residents—regardless of their race/ethnicity and nativity, gender, family income, or neighborhood of residence—are fully able to participate in the region's economic vitality, contribute to the region's readiness for the future, and connect to the region's assets and resources. From the definition, Treuhaft and her colleagues developed a framework with three characteristics that is used to prepare regional equity profiles:

- Economic vitality—are all of a region's residents able to contribute to the region's economy?
- Readiness—is the region ready with the workforce and human capital needed for the future?
- Connectedness—are all of the region's residents connected to the region's assets and resources?

In addition to examining these three components, the framework looks at demographic shifts. "We found that demographic change can be an effective way to start a conversation around disparities and inequities," said Treuhaft. "Conversations around race are hard, but the demographic shifts provide an entrée because people can see it happening in their communities."

She explained that the human capital component of readiness includes education levels and health equity, and that connectedness includes housing, transportation, and neighborhood poverty.

The database powering the Atlas was built for the 150 largest metropolitan regions in the United States (see Figure 4-23), plus all 50 states and the District of Columbia, and the United States as a whole. In October 2015, the PolicyLink and PERE team added data on the 100 largest cities to the Atlas. The data sources included the Integrated Public Use Microdata Series, Census Bureau, Geolytics, Behavioral Risk Factor Surveillance System, Bureau of Economic Analysis, and Bureau of Labor Statistics. Treuhaft noted that although the Atlas provides some unique data, one of its functions is to make disaggregated Census data more easily accessible because many advocates and policy makers do not find the Census Bureau's FactFinder tool easy to use. With funding from the HUD Sustainable Communities Initiative, she and her colleagues were able to work with 12 regions to develop detailed equity profiles. These regions were selected based on their interest in and willingness to develop these profiles and use the study to inform regional collaboration and policy strategies. The process, she explained, started with PolicyLink and PERE providing data looking at equity in a region and getting feedback from that region, which would also provide local data. Regional participants would then help Treuhaft and her team interpret the data and produce a story that was useful to the regions in helping them move forward their advocacy efforts. She noted the importance of the collaborations among city and suburban officials as well as representatives of different political persuasions, different community sectors, and civil right organizations that were fostered by this activity and required as part of the HUD grant.

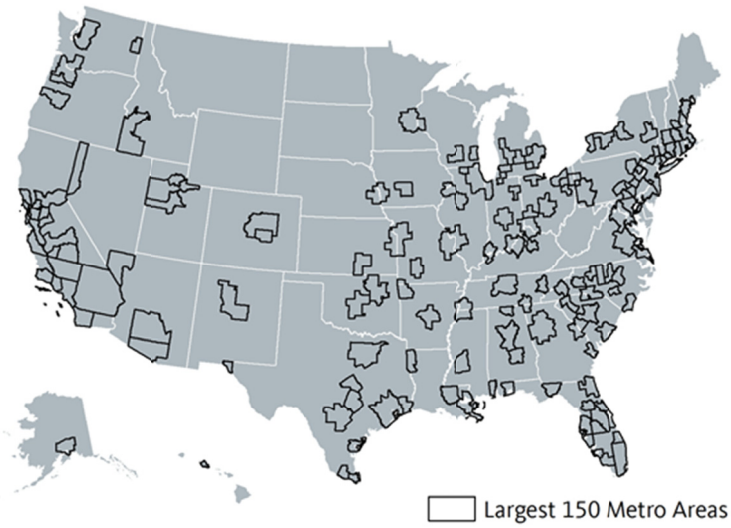


FIGURE 4-23 Regions included in the regional indicators database.
SOURCE: Treuhaft presentation, July 30, 2015.

Treuhaft showed an example of a data profile and commentary (see Figure 4-24), and while she did not discuss in depth what goes into these profiles, she noted that they are based on some 100 indicators disaggregated to the maximum extent possible by race, ethnicity, nativity, income, and gender. She also described some lessons learned regarding disaggregation. For

example, in southeast Florida, it was necessary to disaggregate data to reflect the large black immigrant population there, while in Detroit, the large Middle Eastern population was not reflected in any of the normal census categories.

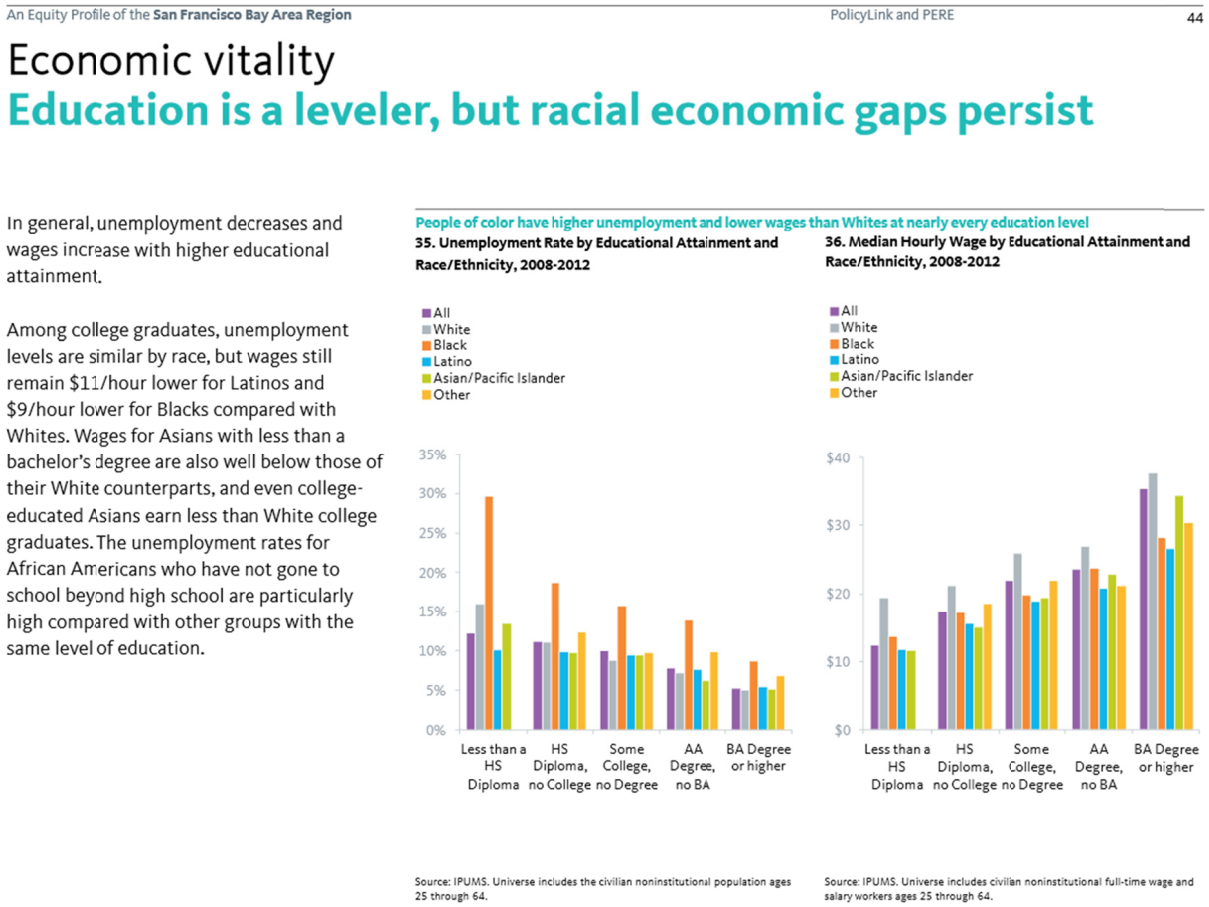


FIGURE 4-24 A regional data profile.
SOURCE: Treuhaft presentation, July 30, 2015.

The National Equity Atlas website, explained Treuhaft, embeds the central narrative and the indicator framework, and it attempts to democratize data and make them more broadly available and ready to use in policy contexts. The homepage focuses on the framing around demographic change, the threat of inequities, and the benefits of investing in equity. She provided a snapshot of the indicators (see Figure 4-25) and noted that they are arrayed in the three categories that form the messaging and profile framework. In creating these web pages, Treuhaft and her colleagues focused on data visualization in the form of useful charts, maps, and graphics that people share and use to start discussions around equity. The Atlas also provides what Treuhaft called "wraparound supports" to help people interpret these data. She explained that the goal is to provide people with information for understanding how to look at the data, interpret it, and understand how it matters and connects to the goal of inclusive growth. The Atlas also provides examples of the types of policy strategies that regions can use to make progress on these indicators and examples of community successes.

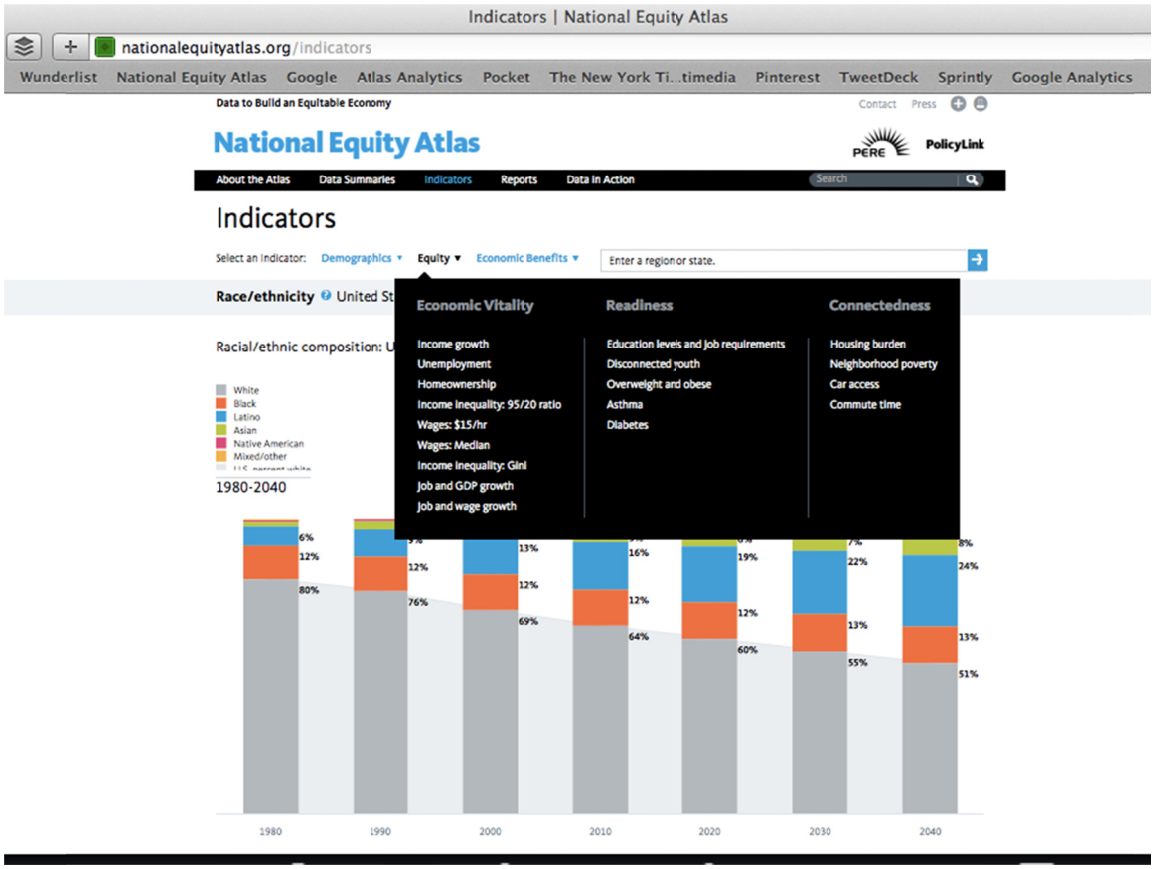


FIGURE 4-25 Indicators page of the National Equity Atlas.
SOURCE: Treuhaft presentation, July 30, 2015.

She then discussed several examples of how people are using these and similar data to inform their strategies. The mayor of Minneapolis, said Treuhaft, campaigned on the message that racial inclusion is key to the city's and region's growth and prosperity. Oakland, California, just created an Office of Equity, and in Rhode Island, the governor used the state's profile as the impetus to launch a new initiative focused on diversity, equity, and inclusion and created a new office to promote minority contracting and equity in hiring within the state government. The mayor of New Orleans has started a new effort called the Economic Prosperity Strategy, crafted with assistance from PolicyLink and others, after seeing local data showing that 52 percent of the city's African American males were jobless. One aspect of this strategy brings together the city's anchor institutions—its hospitals and education centers—that are planning on adding some 30,000 jobs over the next several years and connects them to this large unemployed male population.

Dubuque, Iowa, a smaller city of approximately 60,000 people not included in the Atlas, is using the Equity Atlas framework and data profiles to conduct its own community dialog and create its own community equity profile. Treuhaft explained that while Dubuque's residents are predominantly white, IBM has a facility there that brings higher skilled immigrants into the community, and there is a growing population of African Americans moving from Chicago who

are of lower income and living in Section 8 housing. "They are using this process of looking at the data to think about how to include everyone in the local economy," said Treuhaft. PolicyLink is also using these data in its own advocacy work, such as its efforts, through the Alliance for Boys and Men of Color, to reform harsh school discipline practices and expand economic opportunities for men and boys of color in California. Atlas data are also being used to inform data-driven journalism, such as a series on educational achievement gaps from the *National Journal*.

Treuhaft concluded her presentation with an example of how data can inform strategies that promote continuous improvement. Multnomah County's Cradle-to-Career Effort, spearheaded by the All Hands Raised Partnership, looks at a series of benchmarks and milestones that children need to meet to be on the path to careers (see Figure 4-26). This effort is creating a system that can gather data locally on a regular basis and that can be disaggregated by race to track how the county's children are doing on these milestones (see Figure 4-27). Her team plans to continue to evolve the National Equity Atlas to provide more data and tools to inform efforts to advance equitable growth.

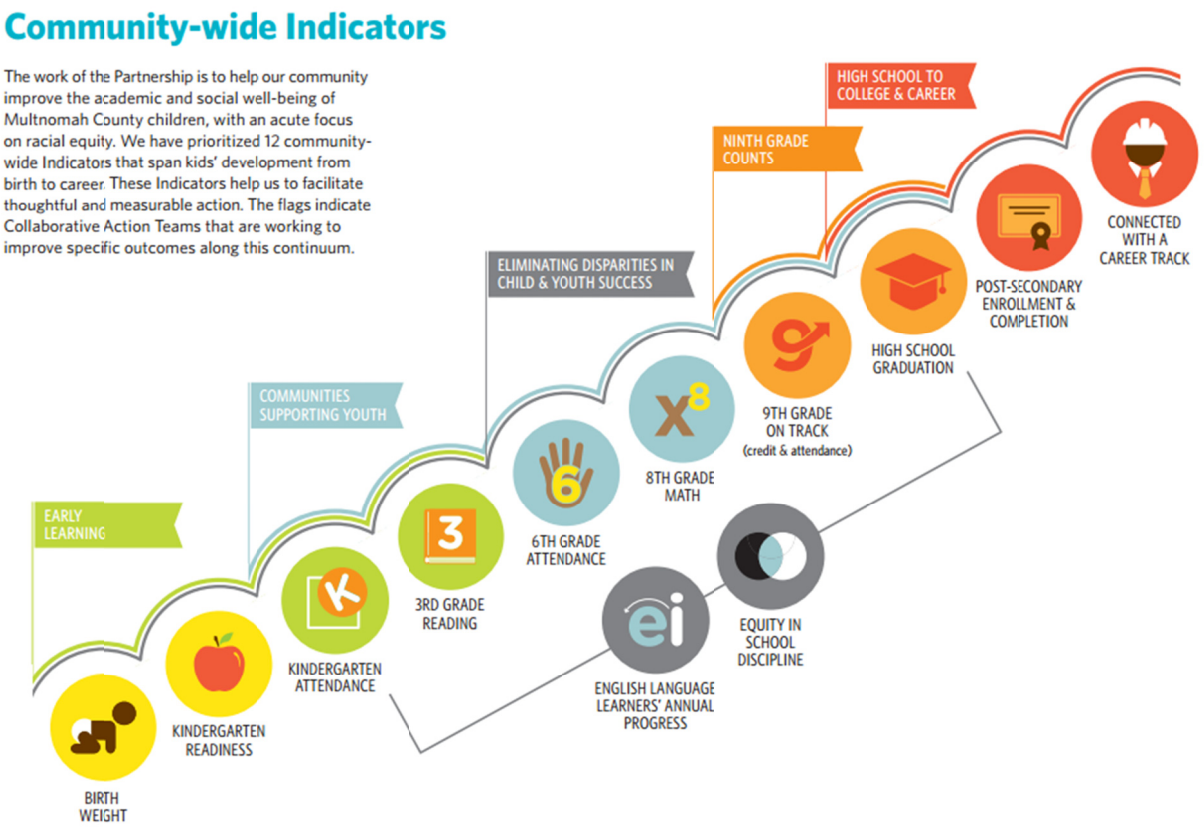
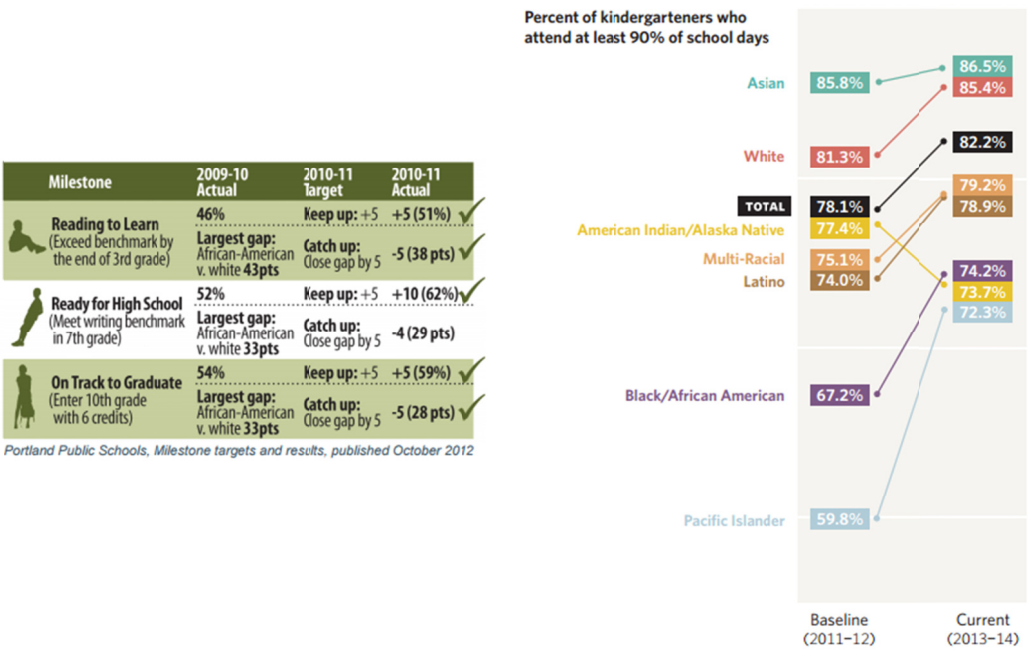


FIGURE 4-26 Indicators and milestones in Multnomah County's Cradle-to-Career Effort. SOURCE: Treuhaft presentation, July 30, 2015.



Milestone	2009-10 Actual	2010-11 Target	2010-11 Actual
Reading to Learn (Exceed benchmark by the end of 3rd grade)	46%	Keep up: +5	+5 (51%) ✓
	Largest gap: African-American v. white 43pts	Catch up: Close gap by 5	-5 (38 pts) ✓
Ready for High School (Meet writing benchmark in 7th grade)	52%	Keep up: +5	+10 (62%) ✓
	Largest gap: African-American v. white 33pts	Catch up: Close gap by 5	-4 (29 pts)
On Track to Graduate (Enter 10th grade with 6 credits)	54%	Keep up: +5	+5 (59%) ✓
	Largest gap: African-American v. white 33pts	Catch up: Close gap by 5	-5 (28 pts) ✓

Portland Public Schools, Milestone targets and results, published October 2012

FIGURE 4-27 Cradle-to-Career indicators disaggregated by race.
SOURCE: Treuhaft presentation, July 30, 2015.

5

World Café

With the wealth of available metrics sets relevant for population health, the planning committee decided that an important activity for this workshop would be to actively discuss options for using metrics to catalyze and assess efforts to improve population health. As a means of increasing the amount of meaningful dialog among all of the workshop participants, the planning committee chose to use the World Café format (Brown et al., 2005). In this format, small groups gather around a table and tackle a specific question posed to all the participants. After 20 minutes, the participants change tables and discuss the same question again. For this workshop, the planning committee chose two questions for the participants to consider, and so this process was repeated twice, once for each question. The two questions that participants were asked to discuss were:

1. What kinds of measures are helpful to communities working to improve health?
2. What are the barriers in your community to using measures to inform action? (see Box 5-1 provides some highlights from the wide range of comments made in the World Café breakout discussions).

BOX 5-1
Highlights from the World Café Session

Note that examples provided below simply represent an illustration of the wide range of ideas shared by individual participants in four rounds of World Café conversations. The question about "kinds of measures" yielded responses that reflect on both the attributes of useful measures (e.g., meaningful, easy to understand) and on the categories of content or work to which measures should refer (e.g., education, criminal justice).

Sample Characteristics of Useful Measures

Characteristics mentioned by various participants in different World Café discussion groups include to first ask "what is the purpose?" and "what measures fit the purpose?"; meaningful, accessible, and tangible to the community and representative of the community; capture the complexity of people's lived experiences; motivational, asset driven, and able to highlight the positive aspects of a community; understandable by members of the community so that they can be motivational, aspirational, and empowering; more granular, local; culturally,

linguistically appropriate and sensitive; resonant, fit the context and pressing needs of a community, and be actionable, easy to measure, and inexpensive to measure; easy to understand, important to the community, and generating data that can be linked to other sectors (e.g., social work, transportation, education, criminal justice).

Sample Measures That May be Useful to Communities

Measures mentioned by various participants in different World Café discussion groups include measures of political will, the extent of cross-sector interaction already existing in a community, the availability of leadership and on-the-ground providers, and the willingness of a community to engage; measures of isolation, social support, and connectedness could be important but may be difficult to find; investment metrics that communities could use to benchmark against one another (e.g., data on the costs to scale up and leverage funds); measures that provide social, environmental, and demographic information at the local or neighborhood level; measures that generate data on social capital, connectivity, and engagement; measures that show the types of resources available to the community; and workforce metrics, including relevant to equity (e.g., how well the "helping" workforce in a community reflects the population it is serving).

Barriers to Measurement

Barriers mentioned by various individual participants in different World Café discussion groups include: mistrust of the data, of the people or organizations presenting data or metrics; institutional inertia or resistance or devotion to maintaining the status quo; past accountability or feedback about data collected leading to community mistrust and burnout; high-profile validated metrics sets are not always relevant or flexible to meet community need; lack of granularity/local relevance; resource limitations; technical difficulties with integrating data in different formats; competing interests in a multi-sector environment.

A host assigned to each table took notes during the discussion and reported back to the workshop after all four rounds were completed. These reports summarized a few key points from the discussions and were not intended to be all-encompassing or to infer that there was any consensus among the discussants in these small groups. The hosts included: Alina Baciu, senior program officer at the Institute of Medicine (IOM); Amy Geller, senior program officer at the IOM; Mary Lou Goeke, executive director of the United Way of Santa Cruz County; Marthe Gold, visiting scholar at the New York Academy of Medicine; Lyla Hernandez, senior program officer at the IOM; Katherine Papa, director of Public Health Initiatives at AcademyHealth; Steven M. Smith, clinical assistant professor of pharmacotherapy and translational research at the University of Florida and the IOM Anniversary Fellow in Pharmacy; Brenda Sulick, policy outreach director at AARP Public Policy Institute; Darla Thompson, associate program officer at the IOM; Matthew Trowbridge, associate professor at the University of Virginia School of Medicine; Julie Willems Van Dijk, co-director of the County Health Rankings and Roadmaps Program, University of Wisconsin Population Health Institute; and Kelly Warden, project manager at the U.S. Green Building Council. An open discussion among the reassembled workshop participants, moderated by Steven Teutsch, followed the table reports.

HIGHLIGHTS FROM WORLD CAFÉ DISCUSSIONS: THOUGHTS ABOUT HELPFUL MEASURES[1]

Alina Baciu started the reports from the four rounds of discussions at her table. The first point she shared was that some participants suggested new or novel methods to collect data to complement non-real time data from various surveys. One idea along those lines was to involve neighborhood residents, and perhaps middle and high school students in gathering information, such as on the food environment in schools. Another point raised by a few participants in the discussions was that language and communication are important factors to mind when collecting data and relaying the results to the community given that data collection tools can fail because they ask the wrong questions for a particular ethnic or racial group or they are ask them in a language that people do not understand, either literally or figuratively.

One idea that Amy Geller recounted from the discussions at her table was how useful it would be to have more granular data. Often, however, such data are proprietary and must be purchased or they must be collected through oversampling. The exchange among participants about this point included the importance of first talking to the community to select a problem for study before deciding on whether and how much granular data are needed, but even taking that step may require funding. A second set of points raised at this table was the importance of sustaining efforts and the challenges of securing stable funding to collect data over the long term and provide ongoing feedback to the community and to provide tools with which the community can take action based on that data-driven feedback. One participant suggested that hospital community benefit funds could be a source of sustainable funding if hospitals and health systems were shown meaningful measures that would enable them to take actions relevant to their goals and mission regarding public health. A participant suggested that it might be useful to have data on investment metrics that communities could use to benchmark against one another. An example given was a metric based on data on the costs of scaling up and leveraging funds.

Mary Lou Goeke reported that some participants at her table noted that the measures that have proven most useful were those that had purpose and relevance to the daily lives of the people involved, at least in part because the community had been engaged in selecting the measures and believed they could use them to make a change in areas important to them. A few participants also raised the point that measures of isolation, social support, and connectedness could be important but may be difficult to find.

Marthe Gold listed the many characteristics of helpful measures proposed by various participants at her table. For example, participants suggested one or more of the following: that helpful measures would be resonant, fit the context and pressing needs of a community, and be actionable, easy to measure, and inexpensive to measure. Helpful measures would also be understandable by members of the community so that they can be motivational, aspirational, and

[1] This section is based on the reports by Alina Baciu, Senior Program Officer at the IOM; Amy Geller, Senior Program Officer at the IOM; Mary Lou Goeke, Executive Director of the United Way of Santa Cruz County; Marthe Gold, Visiting Scholar at the New York Academy of Medicine; Lyla Hernandez, Senior Program Officer at the IOM; Katherine Papa, Director of Public Health Initiatives at AcademyHealth; Steven M. Smith, Clinical Assistant Professor of Pharmacotherapy and Translational Research at the University of Florida; Brenda Sulick, Policy Outreach Director at AARP Public Policy Institute; Darla Thompson, Associate Program Officer at the IOM; Matthew Trowbridge, Associate Professor at the University of Virginia School of Medicine; Julie Willems Van Dijk, co-director of the County Health Rankings and Roadmaps Program, University of Wisconsin Population Health Institute; and Kelly Warden, Project Manager at the U.S. Green Building Council. These reports were not meant to infer a consensus from the discussions, and the statements are not endorsed or verified by the National Academies of Sciences, Engineering, and Medicine.

empowering. They would show economic potential, because health alone is not always a motivating factor for action, and they would be able to serve different kinds of narratives and be useful in different contexts to tell stories to support those narratives.

Lyla Hernandez reported that various participants at her table described the type of measures that communities would find useful: those that provide social, environmental, and demographic information at the local or neighborhood level; generate data on social capital, connectivity, and engagement; and show the types of resources available to the community. Other characteristics of useful measures enumerated by participants included: easy to understand, important to the community, and generating data that can be linked to education, health, criminal justice, and transportation systems in the community. Various participants noted that workforce data for health, social work, and other kinds of professions would be important for communities to have. For example, a useful measure might show how well the "helping" workforce in a community reflects the population it is serving. Also mentioned during the discussion was the desire for qualitative data to help inform quantitative data.

Reporting on what he called the robust discussions at his table, Steven Smith listed several ideas that the various discussants raised with regard to helpful measures. One idea was that measures of community capacity would be useful, including measures of political will, the extent of cross-sector interaction already existing in a community, the availability of leadership and on-the-ground providers, and the willingness of a community to engage. Other potentially useful measures included those that might break through stereotypes or assumptions made by people in a community; those for which data can be gathered quickly and used to take action quickly, as opposed to those for which data are gathered and published on an academic time-frame; and those with cross-cutting measures that link different sectors of a community. Smith also listed two measures that he characterized as out-of-the-box measures: a measure of the extent of community engagement in developing metrics and another one measuring the extent to which a community understands how its data are being used to inform change (e.g., to inform health improvement efforts).

Brenda Sulick, first noting that many of the points raised at her table had already been mentioned, reported that the discussion at her table raised the importance of putting purpose before measurement and of thinking of how measures will be meaningful, accessible, and tangible to the community and representative of the community. "Sometimes, we start with the research and do not think about the community until later," said Sulick. Various participants in this group also pointed out the importance of producing narrative stories to which community members can relate and of linking data to the level of the family as a unit of health so that users might believe they are doing something meaningful for their children, not just the community.

Katherine Papa reported that framing was a topic of discussion at her table and that useful measures are ones that are motivational, asset driven, and able to highlight the positive aspects of a community. The discussants also noted the importance of using communication to drive public support and of community will and a common agenda that together can serve as a rallying point around the data and the actions suggested by the data.

Darla Thompson reported that some of the discussion at her table centered on how to create measures that capture the complexity of people's lived experiences. Another topic discussed was how to measure cultural sensitivities. Along the same lines, this group discussed the importance of using language that reflects the cultural sensitivities of the community in the design and execution of a measure.

Matthew Trowbridge said one thing he concluded from listening to the discussions at his table was that the public health community would benefit from recognizing that it is at a fundamental moment of transition from simply measuring health outcomes to measuring and understanding the social and environmental determinants, and using them as project outcome measures. Some discussion at his table focused on the idea that current measures are geared toward the average (i.e., at the national or local level) and are not illustrating any particular point of view. In that case, measures that identify outliers might be useful. As an example, it was suggested that useful measures could assess attributes of a community that would "work" for both an 8-year-old and an 80-year-old. With regard to health care, one idea raised was that if the health care system was designed to serve the 5 percent of the population that uses the biggest share of health care resources, perhaps a delivery system designed to serve those 5 percent optimally would be a better system for everyone.

Julie Willems Van Dijk said that she was struck by an idea voiced at her table about the centrality of the community voice in thinking about measures and how different that is from what the conversation would have been about even 5 years ago. In terms of what to measure, ideas around her table included the importance of ensuring that measures have community relevance and both language and cultural sensitivity, and the question of how to present measures in a way that reflects the motivation and inspiration of the community and its individual members. The group discussed whether to start with measures or priorities and how to merge these two approaches. She said there was a rich conversation about whether one should look at measures first and decide what is important or vice versa, to better understand the issue.

One of the themes that Kelly Worden noted at her table was that measures should be human-centric and patient oriented. One comment that struck her addressed the difference between functional and clinical measures when framing measures when interacting with patients. There was also discussion at her table about presenting data in an actionable manner and in ways that enable conversations with both scientists and community members.

HIGHLIGHTS FROM WORLD CAFÉ DISCUSSIONS ABOUT BARRIERS[2]

A barrier that was mentioned by several participants at Baciu's table was the difficulty of aligning data with action when the evidence is thin. In that regard, various participants noted that more research is needed in areas such as inter-sectoral social determinants of health, though there are not enough funds available to support research that spans sectors.

Geller reported that participants at her table made the point that because funding is not always available, it may not be possible to always have the perfect measure that everyone desires, but that should not stop researchers from collecting data or communities from taking action. It was also suggested that the field develop innovative methods for collecting and using

[2] This section is based on the reports by Alina Baciu, senior program officer at IOM; Amy Geller, senior program officer at IOM; Mary Lou Goeke, executive director of the United Way of Santa Cruz County; Marthe Gold, visiting scholar at the New York Academy of Medicine; Lyla Hernandez, senior program officer at IOM; Katherine Papa, director of public health initiatives at AcademyHealth; Steven M. Smith, clinical assistant professor of pharmacotherapy and translational research at the University of Florida; Brenda Sulick, policy outreach director at AARP Public Policy Institute; Darla Thompson, associate program officer at the IOM; Matthew Trowbridge, associate professor at the University of Virginia School of Medicine; Julie Willems Van Dijk, co-director of the County Health Rankings and Roadmaps Program, University of Wisconsin Population Health Institute; and Kelly Warden, project manager at the U.S. Green Building Council. These reports were not meant to infer a consensus from the discussions, and the statements are not endorsed or verified by the National Academies of Sciences, Engineering, and Medicine.

data from new sources such as social media. One comment made during the discussion was that politics can get in the way of funding streams and compelling data do not always promote change, suggesting there may be a need for alternative approaches to framing data to make a more compelling case for change. Along the same lines, a participant noted the importance of documenting and sharing examples of how measures have been used successfully to help address the sense that change is always difficult and that population health outcomes take a long time to improve.

One of the barriers discussed at Goeke's table was the difficulty of turning metrics into convincing stories that people could use for change. Another barrier mentioned was the lack of trust that a community might have regarding the accuracy of the data and the motivation or ideology of the people presenting data for action.

Gold reported that one of the barriers cited at her table included institutional resistance to measurement that shows itself as defensiveness or the attitude that an institution wants to do what it has always done. Another barrier discussed at this table was that big measures—the validated metric sets that are being promulgated—may not be sufficiently relevant or flexible with regard to what communities want. As a result, there may be a lack of buy-in from the community with regard to such metric sets, communities may voice concerns about the sensitivity of the questions being raised, and they may experience burnout from being asked the same questions repeatedly with little accountability or feedback. The discussion at this table also raised the issue of a lack of necessary resources.

Among the barriers enumerated at her table, Hernandez reported that the participants discussed the challenges of defining measures, having the resources to collect and analyze data, and then taking action. It was pointed out during the discussions that data can be rejected as being an accurate picture of the community when it does not fit with the ideology of the group to whom the data are being presented. Some participants voiced the concern that members of a community can have the attitude of blaming the victim and that health outcomes are inevitable, making them resistant to data that could enable change.

Smith said there was some discussion regarding barriers around the idea that excess measurement coupled with a lack of action or a lack of feedback to the community can erode trust within the community. Inadequate marketing of the importance of metrics was also noted as being a barrier, as was the challenge of getting communities to internalize data and buy into data-driven ideas for change.

Barriers listed by the discussants at Sulick's table included the challenge of making measures meaningful for different audiences and understandable by the community; the difficulty of linking datasets; and the struggle to help stakeholders see the value of metrics and be in a position to make decisions based on the data the metrics produce. An example that was discussed was how the real estate website Zillow cuts its data by neighborhood, walkability, and schools to make its data more meaningful, appealing, and personalized for users. One point raised during the discussion of barriers was that it might be useful to create a clearinghouse of datasets and metrics to avoid duplicating what others have already developed.

Papa reported that the discussions at her table produced a list of three barriers: politics, lack of capacity, and poor data quality and data hoarding. Politics can be a barrier to action, she reported. With regard to capacity, some participants noted that there are not enough epidemiologists involved who would know what to do with the data these measures generate. Other participants suggested that the metrics community does not have a good enough understanding of what policy and systems changes these data can be used to drive.

At Thompson's table, the challenge of getting data that are granular enough so that people think the data apply to their community was listed as a barrier. Competing interests in a multisector environment was also noted as a barrier, as was the challenge of identifying who would take action when the time comes to translate data into purpose. Issues of trust in the data when there is no sense of collective ownership in a community was also noted as a barrier, as was the lack of good measures for social impact and the difficulty of integrating data from various measures that may be in different formats. Other barriers enumerated during the discussions included the time and resources needed to get data to the right people, connect data to stories with which community members can identify, and package data with stories that are compelling to different audiences.

One barrier that Trowbridge noted from the discussions at his table was the tension between the goal of fundamental change and the intransience of the existing infrastructure. Another barrier noted at his table is the relatively short duration of the grant funding cycle, with even the 20-year commitment on the part of Robert Wood Johnson Foundation (RWJF) being relatively short given the types of change that are the goal of these efforts.

At Willems Van Dijk's table, some discussions on barriers turned into thinking about action items. She reported that there were good conversations about building trust with other sectors to enable multisector collaborations, building ownership, and building common stewardship. The realities of limited resources were noted as a barrier, and the discussions at her table listed the challenges of dealing with the cost of data and the dependence on grants and resources that are not permanent. One opportunity the discussion mentioned was for the research community to do better cost/benefit analyses that can inform its work and to conduct research to identify effective strategies for change.

One barrier that Kelly Worden noted from the discussions at her table was the difficulty in collecting data across sectors and then having to involve those different sectors when acting on the data given that there is often a lack of communication among different sectors. One way in which this manifests itself is that data collected by the public health sector may not be actionable by another sector.

DISCUSSION

Steven Woolf observed that although he expected the workshop to be heavily weighted toward technical and methodological issues, datasets, and statistics, the conversation has instead been dominated by talk about the importance of community and stakeholder engagement. He noted that the same thing happened at a workshop earlier in the year on modeling and its role in population health (NASEM, 2015). Steven Teutsch agreed, adding that the common message he heard throughout the day was the importance of putting a human face on the data to make data meaningful and impactful.

George Flores from The California Endowment pointed out that little was said about using metrics to make a business case for population health or about the kind of cost data that would satisfy not only cost/benefit analysis, but industry profit-making economic sustainability. "The community may not care as much about those things, but economic viability is what drives a great deal of decision making and policy," said Flores, who wondered if the roundtable should to be doing more exploration of the factors that drive economic viability. Teutsch noted the difficulty in capturing the social benefits that matter to most people in financial calculations.

Israel Nieves-Rivera said that from his perspective from the San Francisco Department of Health, which is a health delivery system, a nexus of population health initiatives, and a research

organization, the problem is not that there is a lack of measures, but rather deciding what measures to use to answer a given question and how to decide what data to share with the community so that he and his colleagues can bring the right partners to the table. If a question is germane to the health care delivery system, measures on meaningful use and how the population of a specific clinic is doing are appropriate, while if the goal set is to bring partners to the table, a different set of metrics would be germane. Regardless of the question and specific measures, Nieves-Rivera he believes health systems need to move away from data ownership and toward using data in the best way possible to address specific community goals. In his opinion, what is important is for all of the partners to agree on goals and vision because enough metrics are available to serve whatever purposes the community decides are important. He acknowledged that this might not be true in every jurisdiction.

A participant commented that much of what is being discussed involves looking for new ways for people with different perspectives to work together on a common goal. She noted that while challenging, this can happen if those involved are all focused on making change happen in a community. Often, this participant said, those involved in multidisciplinary efforts need to be taught new leadership skills to merge these different perspectives, pose questions differently, and look for new ways to merge different datasets in a way that enables cross-sector approaches to analysis. She noted, too, that this type of cross-sector collaboration is not how most people working in public health or medicine, including herself, were trained to work or think.

David Kindig wondered about the tension between local purpose and the responsiveness to local need and energies on the one hand, and some standardization and synergy on the other hand. "You lose something when you go towards more standardization, but I am not sure that it is the most efficient approach for each community to create its own wheel," said Kindig. "I think there may be some opportunities for thinking not necessarily about a single approach but of a set of approaches that communities can learn from without having to reinvent the wheel."

Rajiv Bhatia noted the tension that exists between top-down and ground-up approaches, and said these two approaches can exist with a healthy tension and inform each other. Centralized measures, he added, can be used in combination with localized measures that inform the central core set. He then wondered how it was going to be possible to connect the rich set of data generated within the health care world and community-level data produced outside of what he called the "HIPAA firewalls," referring to data collected under the regulations of the Health Insurance Portability and Accountability Act. One possibility he suggested was to start asking questions on the HIPAA side about social determinants and collect data on which those outside of health care would act. In this scenario, health care would merely be the data producer. "I think we are not leveraging the power of the health care system and all of the health outcomes data in that system," said Bhatia.

Teutsch reminded the workshop attendees about a recent IOM report on incorporating specific social metrics into the electronic health record (IOM, 2014). Bhatia replied that this was a milestone report that was, in part, about standardizing the doctor's social history, but he did not think that the set of behavioral and social measures proposed in that report reached the scope of social determinants of health, nor that the electronic health record was the place to collect those data. In Bhatia's opinion, social determinant–related questions, such as on food security, should be asked of every member of a health plan at enrollment. "If every member in a plan was asked about their level of food security, you would then be able to easily look prospectively at differential health outcomes and health care costs related to different levels of food security," said Bhatia. "Then you have an economic argument for the public sector for making investments

in food systems." He suggested that the same could be done for social isolation, housing instability, difficulty paying for daily living expenses, and similar questions. In this way, he added, the attributable burden of disease to unmet social needs could be collected in the health care system and translated to those who are trying to control health care costs in the long run by making investments in other systems.

Daniel Gallagher from the San Diego Association of Governments voiced his opinion that it is important to form partnerships in the emerging areas of public health and the built environment. His organization, for example, partners closely with the County of San Diego Health and Human Services Agency, with his group providing data on mobility and the built environment and the Health and Human Services Agency providing health data. He also noted the importance of working with partners that complement one another, and he gave an example of how public health, community design, and economic development groups worked together to implement traffic calming measures, including roundabouts, in the Bird Rock area of La Jolla, California. A study conducted after the roundabouts were installed showed that these traffic calming measures helped stitch the community together so that more people were walking and biking and were frequenting local businesses more often.

Stiefel offered the final comment that he said could be construed to be more about consternation than insight, and it had to do with perspective and bias. This workshop, sponsored by the IOM, is focused on the social determinants of health, but he imagined that there are people in other meetings talking about education who think of health as a determinant of educational outcomes or in economic development meetings who think of health as a determinant of economic vitality. "We are in this web of means and ends, and we have selected this one end that we think trumps the others," said Stiefel. "It is just a bias we come with, and I think there is some benefit about reframing to think of health as one of the components of this complex system that produces some higher level end, whether that is individual, societal, or community well-being." What that reframing would do, he explained, would make the discussion about public health be part of the multi-stakeholder collaborations that this workshop has noted are so important.

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Reflections on the Workshop

In the workshop's final session, George Isham, Senior Advisor at HealthPartners and Senior Fellow at HealthPartners Institute for Education and Research, asked the roundtable members, as well as the workshop's other participants, to think about what they had heard over the course of the day and to consider the implications of those observations. He started the discussion by agreeing with the statement Matt Stiefel made at the end of the last session about reframing the conversation to make a broader impact on health and health care. "Is health the input? Does that foster engagement? Does it help with the rationale for why we think health is important?" asked Isham. "I heard some examples over the course of the day that made the point that economic development or education might be a better way to frame the discussion to get those factors that produce health into the conversation."

The discussions of the day, said Isham, led him to think about the systems and the relationships purpose, measurement, data resources, and infrastructure required to capture data, and results and how all of those systems components will form an effective feedback loop to those who are on the ground working to change the system. How these components interact with one another, rather than thinking about each individually, is not something that has been described adequately in terms of the measurement system, he said. "Maybe there is more work we need in terms of thinking about how our fragmented, multilevel system with multiple stakeholders knits together and works more as a system," said Isham.

A third point he took from the day's discussions was that there is a fundamental conundrum between centralized and local data collection. On the one hand, he said, data and data collection systems are hard to invent and fund locally. On the other hand, the point was made throughout the day that metrics and data need to be relevant to the people in a particular community and that data collection systems need to engage local community members. Isham wondered if population health could borrow successful methods for what he called mass customization from industry, where there are standards for creating things that are then modified at the point of delivery to give customers exactly what they need. Assets and resources are built into this type of system to take advantage of the economies of scale of mass production.

Another aspect of this issue of standardization versus customization that struck Isham involved parsimony. "Does parsimony mean that you only get six measures for the country, or does it mean that any one project can pick six measures drawn from a set of 600 in order to engage all of the different perspectives to get the desired results?" asked Isham. Addressing that point, Meg Guerin-Calvert noted one approach to addressing parsimony, which was discussed at

one of the tables during the World Café session, would be to identify the locally relevant data that most communities want and then identify gaps in that data that could be filled with community-specific measures. She recounted that several World Café participants noted that high-quality Behavioral Risk Factor Surveillance System (BRFSS) data does not go below the larger metropolitan areas in terms of yielding robust and reliable data, and that perhaps be some specific metrics in a set of hundreds would be useful to extend those data to the level of community when needed.

José Montero from Cheshire Medical Center/Dartmouth Hitchcock Keene commented that he found the World Café session to be "an incredible event" that enabled a broader set of ideas about the importance of bottom-up approaches to metrics to emerge from the workshop. He said that although the epidemiologist in him believes the top-down approach is the right way to design metrics, the politician in him realizes that measures need to be designed with input from the community to produce data that respect local values and meet local needs. "That does not mean that you are going to change a measure or completely redesign it, but you will transform it to a level where communities can then use those data," said Montero. He also wondered if the academic community, himself included, was taking so long to design the perfect measure that change will never happen. What he hoped, based on the workshop's discussions, was to have some sets of advice on how to modify centralized measures to be useful at the local level and that can enable connections between public health and other sectors of the community. "From the discussions today, this call to action make data and measures actionable by engaging the community so they are empowered to take them as their measures and act on them, is something that we need to get to fairly soon," said Montero.

He also recounted remarks at a prior roundtable workshop about how "health in all policies" language could be interpreted as health imperialism by other fields, and that perhaps the concept of well-being was a more inclusive one. "We need to acknowledge that there are many other tables out there and it is not that we are bringing other people to the health table. We should be building a bigger table where we can talk about these issues with other sectors, and we need to do that soon," said Montero.

Julie Caplan, who leads California's Health in All Policies Taskforce and thinks about the concept of a culture of health and making health a shared value, said a big question that she would like to see explored has to do with whose job it is to gather data and how to develop cross-sectoral systems for using metrics and indicators. An example of how this comes up in her work, she said, is that she hears from stakeholders that they would like to know how many children walk or bike to school. California, said Caplan, does not have a statewide system for tracking how children get to school, and the schools that do track this do it in a variety of ways. Her team is now forming a multiagency task force to look at this question and identify who holds the data, and if nobody holds the data, to determine how to develop a system that spans education, public health, transportation, land use planning, and other sectors and is useful to all of them. This activity, said Caplan, leads to bigger questions: "How do we finance this kind of work, how do we lead it, and how do we build the relationships to make such a system a reality," she asked.

James Knickman from the New York State Health Foundation noted that he thought the Robert Wood Johnson Foundation's (RWJF) approach to metrics was sound and that it could be an asset to the population health field. After sitting at a number of tables during the World Café session, he concluded there is a need for collaboration on metrics to make them affordable and common. "We need an affordable health interview survey that can be done at the community level so that we can find out from people what is going on there. We need sensors and other

approaches to more efficiently measure physical activity, purchases of healthy food, and those types of activities," said Knickman. He also said he believes that choosing which outcomes are important can be community-driven using a menu of factors that can be affordably measured. As a final comment, he noted that he had been struggling with the question of whether the field should be pushing forward with new population health approaches now or if it is still in a learning phase that needs to be informed and driven by metrics to ensure that right approaches will be taken. "All of this will take energy at the community level, and if we do it once in 10,000 communities and it is not the right thing, are we going to be able to do it a second time in 10,000 communities?" asked Knickman, who said he vacillates on this issue. As a funder of programs in nine communities in New York State, he said that it is important to learn from all the efforts that others are funding and to develop common methods of assessing the effectiveness of these programs.

Steven Woolf said, "our ideas of what metrics are available are stilted by the ways we are accustomed to collecting data." Social media, for instance, provides an alternative to the traditional methods of collecting data using surveys and other traditional instruments. "We need to modernize our thinking about the menu of data sources available to us," said Woolf. As an example, a smartphone app exists in many communities to tell commuters when the next bus will arrive; he wondered if these apps could provide data on access to other public transportation, a domain that can be approximated only through conventional household surveys. Woolf discussed an example he heard recently from a colleague of how technology could be used in a new way. Most ambulances, when idle, sit outside hospital emergency departments or at the fire station, and most 911 call centers know the exact location of each ambulance. "Why not position those vehicles in locations where the highest number of trauma cases are, but also where the greatest medical needs are?" asked Woolf. "Not only would that reduce transport time, but also allow ambulance crews to stabilize people, perhaps without even needing to go to the hospital." That kind of creative thinking, he said, builds on the existence of new sources of data that are not being used to their fullest potential. "You do not need a traffic survey to tell you which streets are busy because Google Maps now tells you that. Those types of datasets could liberate us to pull metrics that we think are important to our goals rather than being constrained by the traditional ways in which we have collected data," he said.

Isham noted that there are now apps that can provide wait times at urgent care centers, information that is likely to be useful in other ways. Flores added that collaborating with the technology industry offered many opportunities to change the way data are collected and improve the timeliness with which those data are collected. A participant endorsed the idea that there is great promise and potential in the current technology ecosystem to offer data that can provide information on context about what drives health in communities. She also cautioned that the technology sector is characterized by an extraordinary amount of hype, sometimes without much substance behind it.

Trowbridge stated that population health needs to engage the technology community with regard to its focus on what is called quantified self-movement, the drive to use technology to gather data on individual health parameters. The current emphasis in the technology industry is on individual health, he said, and thus there has not been much thought about how to use these tools or the data coming from them at a population health level. However, he emphasized the need to recognize that the technology community has almost unlimited potential when it comes to developing tools, but it needs guidance to know what to make. He noted that tools such as the Apple Research Kit were not developed overnight. "It is going to be difficult to guess the exact

right tool to develop because technology moves too fast. Instead, I think it is best to think about what you want to do with a sensor and then tools will evolve rapidly."

Providing a perspective on the goals of the technology industry, Bhatia said it is not interested in health, but is interested in an irreplaceable, scalable business model with a 10-fold or 100-fold return. "Health care is a $2 trillion beast, and the opportunity is there." He believes that harnessing the power of the technology community is a challenge the public health community should accept.

Veronica Shepherd wanted the population health community to start thinking about which people are not yet at the table, particularly when talking about disparities. "I would like to suggest that there are stakeholders that are doing very hard work creating their own measurements to help shift how people live healthy and well, and they need to be at these conversations on creating shifts in measurements," said Shepherd. What she has found most important with members of her community is that when she and her colleagues from public health approach them humbly and with respect to the local culture, they learn so much more about how to help people live better. Isham noted that having this workshop in Oakland, rather than in Washington, DC, and using the World Café approach to dialogue gave the conversations a different character than usual.

Steven Teutsch commented that some of the ideas that he heard throughout the day on how communities want to use data were of the "low-hanging fruit" variety, "but the evidence base about what moves the needle in social and environmental health is unbelievably poor." The reason for that, he said, is the underinvestment in the trans-disciplinary research that would provide communities with information on how to raise high school graduation rates or reengineer the transportation system to reduce disparities and improve access. Studies to produce data that would enable those kind of systems changes are costly and complicated, said Teutsch, and he does not want the nation to look back in 10 or 15 years and say that "We gave it a good a shot, but we acted on an insufficient base of knowledge." Population health, he said, is going to have to struggle with the issue of deciding when there is enough information to help communities move forward, which in turn, will take an investment in looking at how the interventions that are being taken work in practice. Isham noted that the next roundtable workshop would be on research and he asked the participants to send examples of where research is needed to the roundtable staff.

In response to Teutsch's concern that population health may act before it has enough data, Bhatia said the problem is that population health does not have a business model for health, only for sickness. Pharmaceutical companies can take risks with the drugs they develop because they have a business model that accounts for failure. "We are going to have to experiment and evaluate, experiment and evaluate," said Bhatia, much the way that the technology industry operates. "I think there are principles on how technology operates and startups operate that we should bring into the practice of health," he added. Mary Pittman from the Public Health Institute agreed there is not a good business model for health and suggested a few components for such a model: equity, policy drivers to improve equity, and measures of the cost of inequities; quality; reorganization of health care to reduce the costs of the current chaotic approach to health; and investments to improve population health with a return on investment metric.

Kelly Worden, responding to Bhatia's comment about the lack of a business model for health and Teutsch's concern about acting without a sufficient knowledge base, pointed to the need for process metrics that was mentioned in the morning's discussions. From her work developing tools that architects and real estate developers can use to assess the health

implications of their activities, Worden learned that traditional population health and health care industry metrics are not appropriate for built environment settings. "It might be easier to measure the actual process to determine if we are going down the right path instead of waiting for that ultimate health outcome," said Worden.

Marthe Gold agreed with earlier comments that the discussion has to be broader than one about a culture of health and that involving other sectors could help attenuate some local problems resulting from resource starvation. She added, "I think the roundtable needs to begin to hear the messages we have been hearing over the last couple of years to change our terminology, maybe even change our name." Pittman noted that there is a World Happiness Report (Helliwell et al., 2015) that frames these concepts much differently and that can provide lessons for the population health community. A good idea, she added, might be to see what other countries are doing well with respect to well-being and see what might be applicable to the United States. Israel Nieves-Rivera added that hopefulness could be a good concept to add to any expended idea of health.

Gold then suggested that it may be time for a foundational demonstration that would take a set of indicators that are largely viewed as being useful to different sectors, ask many different communities to use this indicator set, and see what the communities do with them and the resulting data. If the results are good, these indicators could then be taken to scale. Gold also thought there are opportunities for collecting data on social determinants and community health needs under the provisions of the Affordable Care Act and in the community benefit provisions of the tax code. Nieves-Rivera noted that the population health community has not done a good enough job developing performance measures to determine how well interventions meet the needs of a community, and he suggested that the roundtable might want to drill down more on the connection between performance measures and interventions at the community level.

Abigail Kroch voiced her concern that the dialogue about population health metrics is centered largely on clinical measures and data sources, such as the electronic medical record, even though the clinical population is not the general population. In the same way, the population that uses technologies is not the general population or representative of the population that experiences the biggest disparities. "I would caution that as the idea of population health moves into the clinical setting, we are going to be moving away from the populations that need us most," said Kroch. She suggested that where the field needs to be moving is toward an ability to demonstrate change in communities.

Judith Monroe from the Centers for Disease Control and Prevention (CDC) commended RWJF's 20-year commitment to its Culture of Health initiative, but noted as a point of reference that Native American tribes make decisions on a seven-generation timescale. She said she agreed with the idea of looking at ways of using the data coming from smartphone apps and other personal technologies and she supported the idea of a Zillow-like app, mentioned during the World Café discussions, that would parse data by neighborhoods. Monroe then proposed that public health needs marketing metrics, relationship metrics, and measures for unintended consequences, such as the poor health outcomes seen today in Eastern Kentucky that are the consequence of policy decisions made decades earlier.

Thomas LaVeist, commenting on the concern that population health puts too much emphasis on health care in the clinical setting, said the reality is that health care is where the United States allocates significant financial resources and the way those resources are deployed has a disproportionate impact on population health. In his opinion, there has not been enough discussion about how to infuse the health care model with a population health perspective. For

example, he noted that the way in which the concepts of personalized medicine are rolling out in the United States is largely pharmaceutically centered, even though there is another piece that has a population health component. “Patients come into the system from a context, a community environment in which they are living, and there are pieces of data that come with them from a social determinants framework that impact their ability to respond to medical treatment” said LaVeist. The problem today, he explained, is that adding data from population health measures to the electronic medical record will not help the clinicians make decisions relevant to a specific individual because not enough is known yet about the connection between the data generated by population health measures and how a patient will respond to therapy. “That is where we need to start developing protocols,” said LaVeist. “How do we get that information about community context into the healthcare system? How do we then educate the healthcare provides about what to do with that information?” On a practical matter, research to address those kinds of questions could draw on the financial resources being devoted to the personalized medicine enterprise.

Isham, in the workshop’s concluding comment, agreed with the idea that those working to improve population health need to develop new ways of tapping into the enormous resources. “We need to think about how to do that and how to emphasize, ultimately, that action pathway and those interventions that lead to a more appropriate allocation of resources so we can create this better health in our community.” Following that remark, Isham adjourned the workshop.

Appendix A

References

AARP. 2015. *Livability index*. https://livabilityindex.aarp.org (accessed September 3, 2015).

Berwick, D. M., T. W. Nolan, and J. Whittington. 2008. The triple aim: Care, health, and cost. *Health Affairs* 27(3):759-769.

Brown, J., D. Isaacs, and World Café Community. 2005. *The world café: Shaping our futures through conversations that matter.* San Francisco, CA: Berrett-Koehler Publishers.

Cingano, F. 2014. *Trends in income inequality and its impact on economic growth.* OECD Social, Employment, and Migration Working Papers No. 163. Paris, France: OECD Publishing.

Dabla-Norris, E., K. Kochhar, N. Suphaphiphat, F. Ricka, and E. Tsounta. 2015. *Causes and consequences of income inequality: A global perspective.* Washington, DC: International Monetary Fund.

Evans, B. F., E. Zimmerman, S. H. Woolf, and A. D. Haley. 2012. *Neighborhood characteristics and health in Baltimore, Maryland: Technical report.* Richmond, VA: Virginia Commonwealth University.

Harper, S., J. Lynch, S. C. Meersman, N. Breen, W. W. Davis, and M. E. Reichman. 2008. An overview of methods for monitoring social disparities in cancer with an example using trends in lung cancer incidence by area–socioeconomic position and race–ethnicity, 1992-2004. *American Journal of Epidemiology* 167(8):889-899.

Harper, S., J. Lynch, S. C. Meersman, N. Breen, W. W. Davis, and M. C. Reichman. 2009. Trends in area–socioeconomic and race–ethnic disparities in breast cancer incidence, stage at diagnosis, screening, mortality, and survival among women ages 50 years and over (1987-2005). *Cancer Epidemiology, Biomarkers and Prevention* 18(1):121-131.

Harper, S., N. B. King, S. C. Meersman, M. E. Reichman, N. Breen, and J. Lynch. 2010. Implicit value judgments in the measurement of health inequalities. *Milbank Quarterly* 88(1):4-29.

Healthways. 2015. *Gallup-Healthways Well-Being Index*. http://www.well-beingindex.com (accessed September 3, 2015).

Helliwell, J. F., R. Layard, and J. Sachs. 2015. *World happiness report 2015*. New York: Sustainable Development Solutions Network.

Herrin, J., J. St. Andre, K. Kenward, M. S. Joshi, A. M. Audet, and S. C. Hines. 2015. Community factors and hospital readmission rates. *Health Services Research* 50(1):20-39.

IOM (Institute of Medicine). 2009. *State of the USA health indicators: Letter report.* Washington, DC: The National Academies Press.

IOM. 2012a. *For the public's health: Investing in a healthier future*. Washington, DC: The National Academies Press.

IOM. 2012b. *Toward quality measures for population health and the leading health indicators.* Washington, DC: The National Academies Press.

IOM. 2014. *Capturing social and behavioral domains and measures in electronic health records: Phase 2.* Washington, DC: The National Academies Press.
IOM. 2015. *Vital signs: Core metrics for health and health care progress.* Washington, DC: The National Academies Press.
LaVeist, T. A., D. J. Gaskin, and P. Richard. 2009. *The economic burden of health inequalities in the United States.* Washington, DC: Joint Center for Political and Economic Studies.
Lee, L. M., S. M. Teutsch, S. B. Thacker, and M. E. St. Louis. 2010. *Principles and practice of public health surveillance*, 3rd ed. New York: Oxford.
McMillan, D. W., and D. M. Chavis. 1986. Sense of community: A definition and theory. *Journal of Community Psychology* 14(1):6-23.
National Quality Forum. 2014. *Risk adjustment for socioeconomic status or other sociodemographic factors: Technical report.* Washington, DC: National Quality Forum.
NCI (National Cancer Institute). 2013. *Health disparities calculator (hd*calc).* http://seer.cancer.gov/hdcalc (accessed September 9, 2015).
NIDA (National Institute on Drug Abuse). 2015. *Monitoring the future results.* http://www.drugabuse.gov/related-topics/trends-statistics/monitoring-futures (accessed September 4, 2015).
Office of Disease Prevention and Health Promotion. 2015. *Leading health indicators.* http://www.healthypeople.gov/2020/Leading-Health-Indicators (accessed September 4, 2015).
Office of Justice Programs. 2015. *Census of state and local law enforcement agencies.* http://www.bjs.gov/index.cfm?ty=dcdetail&iid=249 (accessed September 4, 2015).
PolicyLink. 2014. *National equity atlas.* http://nationalequityatlas.org (accessed September 10, 2015).
PolicyLink. 2015. *National equity atlas.* http://nationalequityatlas.org (accessed September 3, 2015).
RAND. 2015. *American life panel.* https://alpdata.rand.org (accessed September 4, 2015).
Ross, C. E., R. K. Masters, and R. A. Hummer. 2012. Education and the gender gaps in health and mortality. *Demography* 49(4):1157-1183.
Satcher, D., G. E. Fryer, Jr., J. McCann, A. Troutman, S. H. Woolf, and G. Rust. 2005. What if we were equal? A comparison of the black–white mortality gap in 1960 and 2000. *Health Affairs* 24(2):459-464.
Tavernise, S., and A. Sun. 2015. *Same city, but very different life spans.* http://www.nytimes.com/interactive/2015/04/29/health/life-expectancy-nyc-chi-atl-richmond.html (accessed September 9, 2015).
Think Health LA. 2015. *Think health LA.* http://www.thinkhealthla.org (accessed September 3, 2015).
Treuhaft, S., A. G. Blackwell, and M. Pastor. 2011. America's tomorrow: Equity is the superior growth model. Oakland, CA: PolicyLink.
UnitedHealth Foundation. 2015. *America's health rankings.* http://www.americashealthrankings.org (accessed September 3, 2015).
University of Wisconsin Population Health Institute. 2014. *County health rankings & roadmaps: Our approach.* http://www.countyhealthrankings.org/Our-Approach (accessed September 3, 2015).
University of Wisconsin Population Health Institute. 2015. *County health rankings & roadmaps.* http://www.countyhealthrankings.org (accessed February 16, 2016).
U.S. National Center for Health Statistics. 2003. *Health, United States, 2003.* Hyattsville, MD: U.S. National Center for Health Statistics.
U.S. National Center for Health Statistics. 2011. *National vital statistics report.* Hyattsville, MD: U.S. National Center for Health Statistics.
WHO (World Health Organization). 2010. A conceptual framework for action on the social determinants of health. Geneva, Switzerland: WHO.
Woolf, S. H., R. E. Johnson, R. L. Phillips, Jr., and M. Philipsen. 2007. Giving everyone the health of the educated: An examination of whether social change would save more lives than medical advances. *American Journal of Public Health* 97(4):679-683.

Appendix B

Workshop Agenda

Institute of Medicine Roundtable on Population Health Improvement

Metrics That Matter for Population Health Action: A Workshop

July 30, 2015

OPEN SESSION

The California Endowment Conference Center, 1111 Broadway, 7th Floor, Oakland, CA

WORKSHOP OBJECTIVES:

1. Highlight existing and emerging population health metrics sets and explore their purposes, areas of overlap, and gaps.
2. Highlight population health metrics with attention to equity/disparities.
3. Discuss characteristics of metrics necessary for stakeholder action.
4. Highlight population health metrics useful to addressing health beyond health care and engaging total population.

8:15 a.m.	**Welcome and overview of the day** *David Kindig, professor emeritus of population health sciences, emeritus vice chancellor for health sciences, University of Wisconsin, School of Medicine and Public Health; co-chair, Roundtable on Population Health Improvement*
8:25 a.m.	**The metrics landscape** *Context setting: Steven Teutsch, senior scholar, Leonard D. Schaeffer Center for Health Policy and Economics, University of Southern California; senior fellow, Public Health Institute; and adjunct professor, University of California, Los Angeles Fielding School of Public Health* *Robert Wood Johnson Foundation Culture of Health: Alonzo Plough, vice president, Research-Evaluation-Learning, and chief science officer, Robert Wood Johnson Foundation* *Multisectoral metrics: Rajiv Bhatia, executive director, The Civic Engine*
9:25 a.m.	**Q&A/Discussion**
9:45 a.m.	**Break**

10:00 a.m.	**Using metrics locally** *Moderator: Julie Willems Van Dijk, associate scientist, co-director of the County Health Rankings and Roadmaps Program, University of Wisconsin* *Community example: Megan Joseph, director of community organizing, United Way of Santa Cruz County, California* *Health system example: Michael Bilton, senior director, Community Health and Benefit Dignity Health*
10:45 a.m.	**Q&A/Discussion**
11:05 a.m.	**Measurement and health equity** *Moderator: Steven Woolf, director, Center on Society and Health, and professor of family medicine and population health, Virginia Commonwealth University* *Landscape, challenges, debates: Thomas LaVeist, professor and director, Hopkins Center for Health Disparities Solutions, Johns Hopkins University* *National Equity Atlas: Sarah Treuhaft, director of equitable growth initiatives, PolicyLink*
11:50 a.m.	**Q&A/Discussion**
12:15 p.m.	**Lunch and metrics demos/Mini-poster session** *AARP Livability Index: Brenda Sulick, policy outreach director, strategic initiatives, AARP Public Policy Institute* *PolicyLink's National Equity Atlas: Sarah Treuhaft, director of equitable growth initiatives, PolicyLink* *Contra Costa County climate change metrics: Abigail Kroch, director of epidemiology, Planning & Evaluation at Contra Costa Health Services* *Live Well San Diego measures: Dale Fleming, director of strategy and innovation; San Diego Public Health; and Dan Gallagher, senior regional planner, San Diego Association of Governments*
1:45 p.m.	**World Café Session (2 questions, 2 rounds)** *Hosts: Alina Baciu, Institute of Medicine; Amy Geller, Institute of Medicine; Mary Lou Goeke, United Way of Santa Cruz County, California; Marthe Gold, New York Academy of Medicine; Lyla Hernandez, Institute of Medicine; Kate Papa, AcademyHealth; Steven M. Smith, University of Florida; Brenda Sulick, AARP; Darla Thompson, IOM; Matthew Trowbridge, University of Virginia; Julie Willems Van Dijk, University of Wisconsin; Kelly Worden, U.S. Green Building Council* Question 1: What kinds of measures are helpful to communities working to improve health? (two rounds of discussion) Question 2: What are barriers in your community to using measures to inform action? (two rounds of discussion)
3:15 p.m.	**Break**

3:30 p.m.	**Report back** *Moderator: Steven Teutsch, senior scholar, Leonard D. Schaeffer Center for Health Policy and Economics, University of Southern California; senior fellow, Public Health Institute; and adjunct professor, University of California, Los Angeles Fielding School of Public Health*
4:30 p.m.	**Reflections on the day** *George Isham, senior advisor, HealthPartners; senior fellow, HealthPartners Institute for Education and Research; co-chair, Roundtable on Population Health Improvement*
5:00 p.m.	**Adjourn**

For more information, visit iom.nationalacademies.org/pophealthrt *or e-mail* pophealthrt@nas.edu.

Appendix C

Speaker, Moderator, and Invited Guest Biographical Sketches

Rajiv Bhatia, M.D., M.P.H., is the founder and director of The Civic Engine. Dr. Bhatia is a physician and health innovator who pioneered several practice innovations, including health impact assessments of public policies, neighborhood health indicators for monitoring urban growth and development, and open data for environmental regulation. His work has demonstrated new roles for the public health sector in solutions to complex social problems and has brought health information and arguments to successful legislative campaigns for higher minimum wages, universal paid sick days, pedestrian safety, and environmental protection. Prior to his creation of The Civic Engine, Dr. Bhatia worked at the San Francisco Health Department, where he created and led the Program on Health Equity and Sustainability, which became a valuable resource for community health advocates and a national model for Health in All Policies. At The Civic Engine, Dr. Bhatia is leading work with health care systems to apply holistic understanding of health and human needs to support new population health improvement strategies. He received his M.D. from Stanford University. He served on the Institute of Medicine Committee on Health Impact Assessment.

Michael Bilton, M.P.P., is senior director, community health and benefit, at Dignity Health, a health system with 38 not-for-profit hospitals in Arizona, California, and Nevada. He is responsible for developing and leading system-wide community health improvement initiatives, providing guidance and consultation on community health needs assessments and implementation strategies, and ensuring the reporting of community benefit programs. He also serves on the team responsible for overall community health strategy. Immediately prior to joining Dignity Health, Mr. Bilton served as vice president at Verité Healthcare Consulting with a focus on needs assessments, implementation strategies, and community benefit reporting. During 14 years at the American Hospital Association, he co-founded and led the Association for Community Health Improvement professional membership group and served as director of community health programs. Bilton also directed a national “healthy communities” project at the Healthcare Forum in San Francisco, and an ambulatory care safety net initiative in Chicago and Cook County, IL. He holds a Master of Public Policy with a concentration in Health Administration and Policy from the University of Chicago.

Dale Fleming is the strategy director for the County of San Diego's Health and Human Services Agency. In this role, she coordinates and supports the implementation of Live Well San Diego, a collective impact effort to realize healthy, safe, and thriving communities and residents throughout the county. In addition, she is the executive director of the county's Community Action Partnership, which provides services to strengthen economically disadvantaged communities and citizens who reside there. With nearly 30 years' experience in administering health and social services programs, Ms. Fleming has led various strategic planning, policy development, community indicators, and performance measurement initiatives. In addition, she provided executive leadership over the county's public assistance and health coverage eligibility programs and policies for 6 years.

Dan Gallagher, M.U.P., AICP, is currently a senior regional planner at the San Diego Association of Governments (SANDAG) and a public health planning specialist. He coordinates implementation of regional activities aimed at integrating public health into regional plans, projects, and programs and serves as a liaison between SANDAG and the County of San Diego Health and Human Services Agency. He staffs quarterly meetings of the Public Health Stakeholder Working Group at SANDAG and serves as a resource to member agencies working to integrate public health in local plans, projects, and programs. Mr. Gallagher also serves as project manager for the Border Health Equity Transportation Study, the Regional Bike Counter Network Program, and the Healthy Communities Atlas online tool. He has 18 years of experience in transportation and land use planning, working for both state and regional government, including the California Department of Transportation, California High Speed Rail Authority, and California Energy Commission. He has a B.S., cum laude, in Landscape Architecture from Arizona State University, and a Master's Degree in Urban Planning from the University of Virginia.

Mary Lou Goeke, M.S.W., is the executive director of the United Way of Santa Cruz County, California, a position she has held for 20 years. The organization helps residents achieve good health by advocating for children's health coverage and raising funds for the local Healthy Kids program and other providers of health care to underserved and uninsured individuals. As executive director, she is responsible for the organization's strategic planning, new program development, and financial oversight, and she serves as a liaison with funded community agencies, the business community, and government partners. Prior to joining the United Way, Ms. Goeke held positions with Catholic Charities of the Archdiocese of San Francisco, the American Society of Aging, and the State of Missouri Department of Aging. She currently serves as a member of the National Academies of Sciences, Engineering, and Medicine Roundtable on Population Health Improvement and has served on Institute of Medicine planning committees, including the Planning Committee for Resources for Population Health Improvement: A Workshop. She received both her Bachelor's and Master's Degrees in Social Work from the University of Missouri.

Marthe R. Gold, M.D., M.P.H., is the Logan Professor in the Department of Community Health and Social Medicine at the Sophie Davis School of Biomedical Education at City College, New York. She is also a Visiting Scholar at the New York Academy of Medicine. Her current academic research focuses on patient, public, and decision-maker views on using economic and comparative effectiveness information to inform health policy. Dr. Gold's clinical

training is in family medicine and she has been a primary care provider in both urban and rural underserved settings. Her prior positions include senior policy adviser in the Office of the Assistant Secretary for Health in the U.S. Department of Health and Human Services (1990 to 1996), where her focus was on the financing of clinical preventive services; the economics and outcomes of public health programs; and health care reform. Dr. Gold also directed the work of the U.S. Public Health Service's Panel on Cost-Effectiveness in Health and Medicine, an expert panel whose report remains an influential guide to cost-effectiveness methodology for academic and policy uses. She is a member of the National Academy of Medicine. She served as chair of the Institute of Medicine Committee on Public Health Strategies to Improve Health, which was convened in 2009, and whose three reports on measurement, law and policy, and funding were released between 2010 and 2012. Dr. Gold received her M.D. from the Tufts University School of Medicine and her M.P.H. from the Columbia School of Public Health.

George Isham, M.D., M.S., is senior advisor to HealthPartners, responsible for working with the board of directors and the senior management team on health and quality of care improvement for patients, members, and the community. Dr. Isham is also senior fellow, HealthPartners Research Foundation and facilitates forward progress at the intersection of population health research and public policy. Dr. Isham is active nationally and currently co-chairs the National Quality Forum–convened Measurement Application Partnership; chairs the National Committee for Quality Assurance's (NCQA's) clinical program committee; and is a member of NCQA's committee on performance measurement. Dr. Isham is chair of the National Academies of Sciences, Engineering, and Medicine's Roundtable on Health Literacy and has chaired three studies in addition to serving on a number of Institute of Medicine (IOM) studies related to health and quality of care. In 2003 he was appointed as a lifetime national associate of the Academies in recognition of his contributions to the work of the IOM. He is a former member of the Centers for Disease Control and Prevention's (CDC's) Task Force on Community Preventive Services and the Agency for Healthcare Research and Quality's U.S. Preventive Services Task Force. He currently serves on the advisory committee to the director of CDC. His practice experience as a general internist was with the U.S. Navy, at the Freeport Clinic in Freeport, Illinois, and as a clinical assistant professor of medicine at the University of Wisconsin Hospitals and Clinics in Madison, Wisconsin.

Megan Joseph, M.A., is the director of community organizing for the United Way of Santa Cruz County and a coach practitioner of Leadership for Community Transformation. She has more than 15 years of experience designing and implementing coalitions and collaboratives made up of multiple stakeholders to jointly act to address critical problems affecting the welfare of neighborhoods and communities. Based on careful data gathering, research, and strategic planning, these programs advocate for and implement policy and other significant changes to bring about lasting solutions to improve lives. Current projects include the Go For Health! Collaborative to reduce childhood obesity, the Criminal Justice Council's Youth Violence Prevention strategic plan, the Community Corrections Partnership's community education and engagement process and Proposition 47 outreach, the Smart Solutions to Homelessness Leadership Council working to end homelessness, and the Community Prevention Partners working to reduce youth access to alcohol and other drugs. Ms. Joseph has a B.A. in Criminology and Psychology from Indiana University of Pennsylvania, a Master's Degree in Consciousness and Transformative Studies from John F. Kennedy University, and a Master's

Degree in Criminology, Law and Society from the University of California, Irvine. She is also a certified trainer in Dialogue for Peaceful Change.

David A. Kindig, M.D., Ph.D., received a B.A. from Carleton College and an M.D. and a Ph.D. from the University of Chicago School of Medicine. He completed residency training in Social Pediatrics at Montefiore Hospital. Dr. Kindig served as a professor of Preventive Medicine/Population Health Sciences at the University of Wisconsin, where he developed a unique distance education graduate degree in medical management. He was vice chancellor for health sciences at the University of Wisconsin–Madison; director of Montefiore Hospital and Medical Center; deputy director of the Bureau of Health Manpower, U.S. Department of Health, Education, and Welfare; and the first medical director of the National Health Services Corps. He was national president of the Student American Medical Association. He served as chair of the federal Council of Graduate Medical Education; president of the Association for Health Services Research; Prospective Payment Assessment Commission (ProPAC) Commissioner; and senior advisor to Donna Shalala, former Secretary of Health and Human Services. In 1996 he was elected to the National Academy of Medicine. He received the Distinguished Service Award, University of Chicago School of Medicine. He chaired the IOM Committee on Health Literacy in 2002-2004, chaired Wisconsin Governor Doyle's Healthy Wisconsin Taskforce in 2006, and received the 2007 Wisconsin Public Health Association's Distinguished Service to Public Health Award.

Abigail Kroch, Ph.D., M.P.H., earned her B.A. in Biology, with honors, at the University of Chicago. Dr. Kroch completed her Master's in Public Health at the University of California (UC), Berkeley, concentrating on Epidemiology and researching the relationship of acculturation to nutrition and physical activity in school children. She received her Ph.D. from Johns Hopkins University, studying the biophysics of protein oligomerization. She joined the lab of Keith Yamamoto at the UC San Francisco (UCSF) for her postdoctoral studies, and was awarded the National Research Service Award Ruth L. Kirschstein Fellowship to fund her work on nuclear receptor biology. She served as director of the Office of Postdoctoral Education in the Dean's Office of the School of Medicine at UCSF. She led data collection and analysis efforts for two multimillion-dollar childhood obesity prevention programs in California at the Center for Weight and Health at UC Berkeley. She served as a California Epidemiology Intelligence Service Officer with the California Department of Public Health. She is now the director of epidemiology, planning, and evaluation for Contra Costa Health Services, Department of Public Health. Her work focuses on emerging health issues in the county, specifically on health inequities regarding chronic and infectious disease. Additionally, she supervises and carries out analysis of medical claims data for the Contra Costa County Health Plan and the Contra Costa County Regional Medical Center.

Thomas LaVeist, Ph.D., earned a Bachelor's Degree at the University of Maryland Eastern Shore and an M.A. and a Ph.D. in Sociology at the University of Michigan. He completed a Postdoctoral Fellowship in Health Policy at the University of Michigan School of Public Health. Dr. LaVeist is a former Fellow at the Institute of Gerontology and School of Public Health at the University of Michigan, where he participated in several studies, including a study of differences in adjustment to aging in four societies (Japan, mainland China, Taiwan, and United States) and the National Survey of Black Americans. Dr. LaVeist is also a former associate with the Program

for Research on Black Americans at the Institute for Social Research, University of Michigan. As a Brookdale National Fellow, Dr. LaVeist's work has focused on further understanding the social and behavioral factors that affect the length of human life. He has also conducted studies of social determinants of health, and research on determinants of disparities in health care access, use, and quality.

Katherine Froeb Papa, M.P.H., is the director of the Robert Wood Johnson Foundation–funded Public Health Systems Research (PHSR) project at AcademyHealth, which focuses on bridging the gap between public health and the health care system. The PHSR project seeks to build this new research discipline by supporting junior investigators, developing training opportunities for researchers, synthesizing research findings, and translating findings for policy makers. Ms. Papa's extensive experience in public policy and public health research, evaluation, and communications includes her previous experience as director of the Adolescent and School Health Project at the Association of State and Territorial Health Officials. In that capacity, she developed and promoted national policies and programs to improve child health and access to health care. She supported public health investments in youth related to the prevention of chronic diseases and sexually transmitted infections as well as the promotion of positive health behaviors. Her other relevant experience includes consulting with states on welfare reform policies and designing disease prevention and management campaigns for pharmaceutical companies and nonprofit organizations. Ms. Papa earned her M.P.H. and a certificate in Maternal and Child Health from Johns Hopkins University's Bloomberg School of Public Health. Currently, as a volunteer for the Arlington County, Virginia, Department of Public Health, she co-chairs the Chronic Disease Prevention committee, which aims to reduce obesity and tobacco use in the county's youth. Additionally, as a member of the board of the Virginia Foundation for Healthy Youth, Ms. Papa evaluates proposals to use Master Settlement Agreement Funds to prevent tobacco use among children in the Northern Virginia region.

Alonzo L. Plough, Ph.D., M.P.H., M.A., joined the Robert Wood Johnson Foundation as vice president, research-evaluation-learning, and chief science officer in 2014. He leads the Foundation's long-standing focus on building the evidence base to foster innovation in health services and systems and to improve population health. He is responsible for Foundation-wide organizational learning and the two program areas that support those activities, the global and pioneer teams. Dr. Plough came to the Foundation from the Los Angeles County Department of Public Health, where he served as director of emergency preparedness and response. In that role, he was responsible for the management of the public health preparedness activities protecting the 10 million residents of Los Angeles County from natural disasters and threats related to disease outbreaks and other public health emergencies. He coordinated activities in emergency operations, infectious disease control, risk communication, planning, and community engagement. Prior to this position, Dr. Plough served as vice president of strategy, planning, and evaluation for The California Endowment. He led the Endowment's strategic planning and development, evaluation, research, and organizational learning activities. Dr. Plough also served 10 years as director and health officer for the Seattle and King County Department of Public Health, and professor of health services at the University of Washington School of Public Health in Seattle. He previously served as director of public health in Boston for 8 years. Dr. Plough earned his M.A. and Ph.D. at Cornell University and his M.P.H. at Yale University School of Medicine's Department of Epidemiology and Public Health. He did his undergraduate work at

St. Olaf College, where he earned a B.A. He has held academic appointments at Harvard University School of Public Health, Tufts University Department of Community Medicine, and Boston University School of Management. He has been the recipient of numerous awards for public service and leadership and is the author of an extensive body of scholarly articles, books, and book chapters.

Brenda Sulick, Ph.D., M.A., is the policy outreach director, strategic initiatives at AARP Public Policy Institute. In addition to serving as the vice president of congressional affairs and advocacy at the National PACE Association, which represents 80 Programs of All-Inclusive Care for the Elderly, Dr. Sulick was the national recipient of the John Heinz Senate Fellowship in Aging in 2006-2007. She worked for former U.S. Senator Blanche Lincoln (D-AR), a member of the Finance Committee and Special Committee on Aging. Previous positions include director of federal health policy at the Alzheimer's Association and senior program specialist and consultant for AARP in Washington, DC. She has taught in a number of undergraduate and graduate courses on health care and economic security issues. Dr. Sulick holds a Ph.D. in Public Administration and Policy/Gerontology from Portland State University. She also holds a B.A. in Political Science and Public Administration from York College and an M.A. in Public Policy and Gerontology from The George Washington University.

Steven M. Teutsch, M.D., M.P.H., is an independent consultant, adjunct professor at the Fielding School of Public Health, University of California at Los Angeles, and senior fellow, Schaeffer Center, University of Southern California. Until 2014 he was the chief science officer, Los Angeles County Public Health, where he continued his work on evidence-based public health and policy. He had been in the Outcomes Research and Management program at Merck since 1997, responsible for scientific leadership in developing evidence-based clinical management programs, conducting outcomes research studies, and improving outcomes measurement to enhance quality of care. Prior to joining Merck, he was director of the Division of Prevention Research and Analytic Methods (DPRAM) at the Centers for Disease Control and Prevention (CDC), where he was responsible for assessing the effectiveness, safety, and cost-effectiveness of disease and injury prevention strategies. DPRAM developed comparable methodology for studies of the effectiveness and economic impact of prevention programs, provided training in these methods, developed CDC's capacity for conducting necessary studies, and provided technical assistance for conducting economic and decision analysis. The Division also evaluated the impact of interventions in urban areas, developed the *Guide to Community Preventive Services*, and provided support for CDC's analytic methods. He has served as a member of The Task Force and the U.S. Preventive Services Task Force, which develops the *Guide to Clinical Preventive Services*. He has also been a member of America's Health Information Community Personalized Health Care Workgroup and the Evaluation of Genomic Applications in Prevention and Practice (EGAPP) Workgroup. He chaired the Secretary's Advisory Committee on Genetics Health and Society. He has served on and chaired Institute of Medicine panels and Medicare's Evidence Development and Coverage Advisory Committee, and served on several subcommittees of the Secretary's Advisory Committee on Healthy People 2020. When Dr. Teutsch joined CDC in 1977, he was assigned to the Parasitic Diseases Division and worked extensively on toxoplasmosis. He was then assigned to the Kidney Donor and subsequently the Kidney Disease Program. He developed the framework for CDC's diabetes control program. He joined the Epidemiology Program Office and became director of the

Division of Surveillance and Epidemiology, where he was responsible for coordinating CDC's disease monitoring activities. He became chief of the Prevention Effectiveness Activity in 1992. Dr. Teutsch received his undergraduate degree in Biochemical Sciences at Harvard University, an M.P.H. in Epidemiology from the University of North Carolina School of Public Health, and his M.D. from Duke University School of Medicine. He completed his residency training in Internal Medicine at Pennsylvania State University, Hershey. He was certified by the American Board of Internal Medicine and the American Board of Preventive Medicine, and is a Fellow of the American College of Physicians and American College of Preventive Medicine. Dr. Teutsch has published more than 200 articles and 8 books in a broad range of fields in epidemiology, including parasitic diseases, diabetes, technology assessment, health services research, and surveillance.

Sarah Treuhaft, M.A., is director of equitable growth initiatives at PolicyLink, a national research and action institute advancing economic and social equity. She coordinates the organization's work on demographic change and the economy, collaborating with local and national partners on research and action projects that aim to build a more equitable economy. She leads the All-In Cities initiative as well as the research partnership between PolicyLink and the Program for Environmental and Regional Equity at the University of Southern California, which maintains the National Equity Atlas data and policy tool. Ms. Treuhaft has been interviewed and cited for her research in local and national media outlets, including the *Washington Post*, *National Journal*, *Next City*, and *Sacramento Bee*. She holds an M.A. in City and Regional Planning from the University of California, Berkeley.

Matthew Trowbridge, M.D., is a physician, public health researcher, and associate professor at the University of Virginia (UVA) School of Medicine. Dr. Trowbridge's academic research focuses on the impact of architecture, urban design, and transportation planning on public health. Dr. Trowbridge leads the Green Health Partnership between the U.S. Green Building Council and the UVA School of Medicine. The partnership is supported by a grant from the Robert Wood Johnson Foundation and focused on leveraging green building market transformation tools to promote public health. Previously, Dr. Trowbridge was a senior advisor to the National Collaborative on Childhood Obesity Research on built environment and childhood obesity prevention. He also served 3 years as a senior advisor on built environment and childhood obesity prevention research at the National Cancer Institute. Dr. Trowbridge is board certified in both general pediatrics and preventive medicine and obtained his medical and public health training at Emory University.

Julie Willems Van Dijk, Ph.D., M.S.N., is an associate scientist and the co-director of the *County Health Rankings and Roadmaps* Program, a collaboration between the Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute. Her research focuses on community health improvement planning processes. Prior to joining the Population Health Institute, she worked in local public health for 21 years as a public health nurse, director of nursing, and a health officer. She has served on numerous community boards, including the Aspirus Wausau Hospital Board of Directors, the Wausau School District Board of Education, the Wausau Child Care Board of Directors, the Marathon County United Way's Local Initiatives for Excellence (LIFE) committee, and the Wausau/Marathon County Chamber of Commerce Leadership Wausau program. She received a Doctorate Degree in Nursing with an emphasis in

Public Health Leadership from the University of Wisconsin (UW) at Milwaukee. She also holds an M.S.N. from UW–Oshkosh and a B.S.N. from UW–Eau Claire. She is a graduate of the Robert Wood Johnson Foundation Nurse Executive Fellows program and the National Public Health Leadership Institute.

Steven Woolf, M.D., M.P.H., has served as director of the Virginia Commonwealth University (VCU) Center on Society and Health (formerly the VCU Center on Human Needs) since he established it in 2007. He is also professor of family medicine and population health at VCU. He has published more than 150 articles in a career that has focused on evidence-based medicine and the development of evidence-based clinical guidelines, with a special focus on preventive medicine, cancer screening, quality improvement, and social justice. His studies demonstrate that addressing poverty, education, and the causes of racial and ethnic disparities could accomplish far more to improve the health of Americans than investing predominantly in medical technological advances. In addition to scientific publications, he has tried to bring this message to policy makers and to the public through testimony in Congress, editorials in major newspapers, Web-based tools, and speeches.

Kelly Worden, M.P.H., is a public health researcher at the U.S. Green Building Council (USGBC). Her work aims to propel action-oriented research on the intersection between the built environment and public health. Worden manages activities related to the Green Health Partnership between USGBC and the University of Virginia School of Medicine. She received an M.P.H. with a focus on Global Environmental Health from The George Washington University Milken Institute School of Public Health. She earned a B.S. in Human Biology from the University of Texas in Austin. Prior to joining USGBC, Ms. Worden supported global advocacy and communications efforts at the World Heart Federation in Geneva, Switzerland.