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9. Improving Population Health, Well-Being, and Equity

This chapter presents an overview of the Culture of Health outcome measures, which are intended to track improvements in population health and well-being, as well as the pursuit of equity in achieving these outcomes. If there is progress in each of the four action areas of the Culture of Health framework, the result should be improvements in overall population health and well-being. The definition of *health* that we use is intentionally broad, and it is important that this definition be fully taken into account as measurement of a Culture of Health evolves. As such, the selected outcomes consider the full continuum of health and well-being, including the following outcome areas: (1) enhanced individual and community well-being, (2) managed chronic disease and reduced toxic stress, and (3) reduced health care costs. In the next sections, we describe the vision behind the outcome areas, define these areas, and offer illustrative measures for each one.

Envisioning and Defining Outcomes

The selected outcomes of a Culture of Health are intended to account for the broad definitions of *health* and *well-being*, so they require indicators that are more complex than the simple indicators that traditionally track health and clinical outcomes. The overall goal of the outcomes for the Culture of Health action framework is to capture system-level change and potentially complex interactions within and across the four action areas. As such, the outcome areas described in the next section are intended to summarize what a Culture of Health yields over time.

Widespread dissemination of a Culture of Health in the United States is expected to result in improvements in population health and well-being occurring equitably across communities. Health and well-being are interrelated, and sometimes inextricably so, as exemplified by the WHO definition of health: “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (World Health Organization, 1948). But some health initiatives, such as Healthy People 2020 and the HHS Strategic Plan, are now making the effort to distinguish well-being from health in their measures. The definition of well-being as linked to the establishment of a Culture of Health is the realization of a population that is *flourishing*. In

their conceptual framework for defining well-being, Huppert and So (2013) describe flourishing as “the experience of life going well” and as something that can itself be nurtured and grown, as opposed to a state that is reached. Having greater levels of well-being is beneficial for both individuals and society overall. Well-being is associated with effective learning, productivity and creativity, good relationships, pro-social behavior, and good health and life expectancy (Chida and Steptoe, 2008; Diener et al., 2010; Dolan, Peasgood, and White, 2008; Huppert, 2009; Lyubomirsky, Sheldon, and Schkade, 2005).

A Culture of Health is also predicated on the idea that the health and well-being of individuals is interconnected, which suggests that *community-level* investments in health and well-being are a key mechanism to influence *individual-level* health. We should expect to see advancements in the attitudes and practices of individuals, organizations, and communities around health promotion and policy. Equally important in achieving equity in these outcomes is that the access to and use of health-related resources does not significantly differ due to income level, age, race/ethnicity, region, or culture. There are well-documented disparities along these factors, indicating that the United States has not yet achieved a Culture of Health. Low-resourced communities often have fewer parks that are safe to use (Babey, Hastert, and Brown, 2007; Sallis et al., 2011) and fewer venues for physical activity (Panter and Jones, 2008). Residence in low-income neighborhoods is associated with lower levels of well-being than in wealthier neighborhoods (Ludwig et al., 2012). Research has shown that higher neighborhood walkability levels are associated with more walking/biking (Built Environment Health Research Group at Columbia University, n.d.), but because more than half of blacks live in poor neighborhoods (Bishaw, 2014), there are likely to be significant racial disparities in walkability. In an urban study using nontraditional walkability measures, poor communities were found to have fewer and less clean streets and more public safety issues than communities that were not poor (Neckerman et al., 2009). Looking at neighborhood racial distribution, predominantly black neighborhoods were more likely to have poor walkability indicators—uneven sidewalks, obstructions, and physical disorder—when compared to predominantly white neighborhoods (Kelly et al., 2007).

Outcome Areas and Definitions

Based on the environmental scan of where the nation is in terms of achieving RWJF's ten principles of a Culture of Health, we identified three outcome areas in which we will track observed impact if progress is made in the four action areas and the related drivers. Given that the drivers are in the action areas, we use the term "outcome areas" to distinguish from "drivers."

Enhanced Individual and Community Well-Being

The action framework for establishing a Culture of Health is unique, given the emphasis on well-being. There are several reasons why this outcome area is included. First, the establishment of a Culture of Health is, by definition, a transformation in the way society thinks about health, a result that can only happen when complex, system-level change occurs. Therefore, looking at only traditional health outcomes, particularly ones that track specific disease conditions, is not comprehensive enough in scope. Second, well-being acknowledges imperfect health (or that illness can exist)—that people with chronic conditions or other illnesses can still thrive and still lead a healthy life. One of the anticipated goals of establishing a Culture of Health is to have a lower incidence of preventable disease. However, some conditions are not preventable, and about half of all Americans have at least one chronic condition (Ward et al., 2014). The Culture of Health action framework focuses on what is preventable and on improving care management of existing and nonpreventable conditions so that all Americans can live their best lives.

Ideas around measuring well-being have been advanced since the 1960s. The direct measurement of experienced well-being has made an important contribution to this area, with academics and think tanks calling for "National Accounts of Well-Being" (e.g., Kahneman et al., 2004; Shumacher Center for a New Economics, 2011). Early pioneers of well-being measurement include the Jacksonville Council on Citizen Involvement quality of life indicators project in Florida, which launched in 1985. More recently, policymakers are using well-being data to drive policy decisions. One example of a government beginning to integrate well-being into policymaking is the City of Santa Monica, which developed and launched its Wellbeing Index in April 2015 to assess the well-being of its residents, using survey, administrative, and social media data (City of Santa Monica, 2015). Santa Monica intends to use this information to set priorities and make decisions in ways that will improve residents' well-being.

Research distinguishes between individual and community well-being because the measurement of each differs. Both subjective and objective measurements of well-being are possible. Individual well-being measures are generally operationalized through a range of action areas, including life satisfaction (Diener and Suh, 1997; Duncan, Spence, and Mummery, 2005; Seligman, 2002), happiness (Inglehart and Klingemann, 2000; Smith, 2004), and quality of life (which is more often used in the context of patients; Molassiotis et al., 2011; Zatzick et al., 2014). The Behavioral Risk Factor Surveillance System (BRFSS) conducted by CDC includes some items related to well-being, such as questions on life satisfaction (e.g., “In general, how satisfied are you with your life?”) and health-related quality of life (e.g., “Would you say that in general your health is excellent/very good/good/fair/poor?”) (BRFSS, 2013). The U.S. National Academy of Sciences has established a panel called *Measuring Subjective Well-Being in a Policy Relevant Framework*, which provides a template for how subjective data can be leveraged with these other data. Well-being research also focuses on certain key populations that are subject to high levels of stress. Examples include caregivers (Gitlin et al., 2003; Pinquart and Sörensen, 2003; Raina et al., 2005), the unemployed (Flatau, Galea, and Petridis, 2000; Friedland and Price, 2003; Warr, 1988), and neglected children (into adulthood) (Buehler et al., 2000; Carpenter and Clyman, 2004; National Survey of Child and Adolescent Well-Being, 2013; Whetten et al., 2009). Research has revealed disparities in well-being by race, sex, and income, which is particularly problematic because healthy individuals tend to be happy individuals and healthy communities tend to be happy communities (Subramanian, Kim, and Kawachi, 2005). Measuring well-being, and understanding the drivers of well-being and how they interact, can help create a more holistic and informed policymaking approach (Kahneman et al., 2004). Moreover, well-being measures can provide important insight for health policymaking beyond economic indicators (Diener and Seligman, 2004).

In terms of operationalizing the concept of community well-being in research, subjective measurement may be the aggregation of responses to questions about individual well-being up to the community level. However, objective community well-being measurement domains include community health, resilience, resource access, educational capacity, and environmental adaptation (Chandra et al., 2013; Wiseman and Brasher, 2008; World Health Organization, 2005). In urban settings, community well-being is nested in an extensive body of neighborhood research (Diez Roux and Mair, 2010; Galea and Vlahov, 2005; Sampson, 2003). It is also

important to recognize and address differences in individual well-being over the life span and across communities and cultures (Deaton, 2007; United Nations Development Programme, 2014). It should therefore be important to consider how community well-being differs by context. For instance, life satisfaction declines with age more in poorer countries than in richer countries (Deaton, 2007).

Managed Chronic Disease and Reduced Toxic Stress

Chronic disease is the leading cause of mortality in the world, and as the population ages, the complexity of those chronic conditions only magnifies (Yach et al., 2004). Approximately half of all Americans suffer from one or more chronic diseases (Ward et al., 2014). In 2020, the number of people with chronic conditions is expected to grow to 157 million. By 2023, the number of people with chronic mental disorders is projected to increase from 30 million to 47 million (Ward et al., 2014). In addition, there are significant disparities, with the burden of chronic conditions disproportionately experienced by low-income people and ethnic minorities (Bodenheimer, Chen, and Bennett, 2009). The human and economic toll of chronic disease on society is significant, including lost productivity (DeVol et al., 2007), reduced quality of life (Alonso et al., 2004; Saarni et al., 2006; Sprangers et al., 2000), and increased health care costs (Schneider, O'Donnell, and Dean, 2009; Tinetti, Fried, and Boyd, 2012). The Culture of Health action framework focuses on reducing preventable disease but also on improving the care and management of existing disease, knowing that many are burdened. Observed improvement in chronic disease burden will likely occur through multiple mechanisms, including health care access, primary care, health education, and improvements in self-efficacy, all of which are integrated into the drivers noted in the action framework.

In addition to estimating the prevalence and burden of adult chronic disease, more research has focused on the life span production of disease and, in particular, the relationship between the toxic stress of childhood trauma (e.g., abuse, neglect; see Center on the Developing Child, 2010, 2016a, 2016b; National Scientific Council on the Developing Child, 2010, 2012) and the risk for physical and mental illness in adulthood. A study of BRFSS data in five states found that a sizeable 59 percent of respondents reported one or more adverse child experiences (ACEs) (Centers for Disease Control and Prevention, 2010). The Adverse Child Experiences study led by CDC and Kaiser Permanente (CDC, 2014b) identified a strong, graded relationship between the

level of traumatic stress in childhood and poor physical, mental, and behavioral outcomes later in life (e.g., depression, liver disease) (Felitti et al., 1998). Almost two-thirds of the study participants reported at least one ACE, and more than one of five reported three or more ACEs. Given the significant and potentially lasting influence of ACEs on adult diseases over the life span, reducing these events during childhood is an important goal to achieve.

Reduced Health Care Costs

Rising U.S. health care costs affect virtually everyone because costs are borne by employers, governments, and individuals alike. As such, progress on this driver will require improving efficiency in care delivery, changing payment models (noted in more detail in Chapter Eight), and fostering an individual-level impetus to improve health behaviors. Although the growth in health care spending (rate of change) has slowed in recent years, it is unclear how much of this is due to changing economic conditions (recession) or to structural changes in the health care marketplace as a result of the ACA. Early evidence, however, suggests that changes in the delivery of care, for example, that focus on prevention and better care coordination may result in significant improvements in population health if those changes are able to reduce duplication of services and prevent avoidable hospitalizations. Some of these changes, however, may take time to yield cost savings. More broadly, policies and programs that encourage improvements in health behaviors at the individual level have the potential to yield significant long-term savings, including, for example, reducing tobacco use and obesity, both of which are linked to circulatory conditions that the United States spends nearly \$234 billion per year treating. Thus, reducing U.S. health care costs will require both improvements in our health care delivery system—some of which the ACA and other policies are aiming to do—and changes in individual health behaviors. As such, progress in the four action areas should result in reductions in unnecessary health care costs.

Measures

The following measures were identified as capturing key aspects of each outcome area. We describe each measure in further detail below and then summarize them in Table 9.1.

Enhanced Individual and Community Well-Being Measures

Well-being rating in three areas: health, life satisfaction, and work-life balance. This measure focuses on three components of the OECD Better Life Index (BLI). Part of the mission of the BLI is to develop statistics to capture aspects of life that contribute to the quality of people's lives. OECD has identified 11 action areas as being essential to well-being: housing, income, jobs, community, education, environment, civic engagement, health, life satisfaction, safety, and work-life balance. OECD relied on best practices to build composite indicators from multiple sources of underlying data. For instance, the health component is based on the OECD Health Database, life satisfaction is based on the Gallup World Poll, and work-life balance is based on the American Time Use Survey. While the BLI is updated annually, the underlying data sources are not necessarily from the current or previous year. According to OECD, comparisons over time should not be made, given that the methodology is being revised and that the indicators may not change enough to show meaningful movement. The BLI is, however, available across multiple countries, which provides information on social inequalities, as well as useful comparisons as benchmarks of progress toward a Culture of Health in the United States. Well-being rating in the three OECD BLI areas selected for monitoring the Culture of Health action framework focus on indicators that capture whether populations are flourishing and the relationship of flourishing to health. Given the interest in capturing well-being outcomes and the interest in flourishing specifically as part of that well-being development, these three measures (health, life satisfaction, work-life balance) were chosen within the BLI. Furthermore, these indicators were considered to have population-level data that would be more responsive to progress in achieving a Culture of Health, in comparison to more static indicators, such as educational attainment or air pollution.

Average amount of out-of-pocket spending on caregiving; impact on caregiver financial and emotional health. Caregivers fill an essential need for many people in need of assistance, including the elderly, the chronically ill, children with special needs, and injured or wounded military personnel and veterans. Caregiving enables the recipients to live better-quality lives and can result in faster and better rehabilitation and recovery. Yet playing this role can impose a substantial physical, emotional, and financial toll on caregivers, potentially resulting in indirect health effects on the caregivers themselves and lower-quality care for the recipients. Using data from the 2008 panel of the National Health and Retirement Survey (HRS), the MetLife Study of

Caregiving Costs to Working Caregivers (MetLife, 2011) has shown the following: “Adult children 50+ who work and provide care to a parent are more likely to have fair or poor health than those who do not provide care to their parents.” Moreover, the impact of caregiving may also be disproportionate for those with fewer other resources. For instance, the MetLife study (MetLife, 2011) indicated that a larger amount of lost wages due to caregiving occurs for women than for men.

The caregiving burden may fall disproportionately on different population groups for several possible reasons. Informal caregiving may be more likely if formal caregiving is unaffordable. Some groups or communities may also prefer or call for caregiving (rather than formal health care) based on cultural expectations. Measuring the amount of burden or commitment for these caregivers can illustrate how much informal health care these caregivers shoulder as chronic disease patterns change in the United States. Policies and programs can reduce the cost of caregiving, but that research is evolving. For example, for seniors, the presence of senior villages or other age-friendly initiatives may reduce the burden on caregivers while improving health outcomes.

Managed Chronic Disease and Reduced Toxic Stress Measures

Percentage of parents or guardians reporting that their child had two or more family-related ACEs. Early life experiences that are stressful or traumatic can have continuing health consequences over the life span. ACEs include a broad range of traumatic or stressful experiences that can induce a toxic stress response, and, thus, they encompass a number of potential factors or drivers. ACEs are associated with premature mortality (Brown et al., 2009) and serious health conditions (e.g., ischemic heart disease, stroke, cancer, diabetes; Center for Youth Wellness, 2014). In addition, ACEs are associated with higher allostatic load (i.e., wear and tear on the body) for both men and women after adjustment for early life factors and childhood pathologies. Early psychosocial stress has an indirect but lasting impact on physiological wear and tear via health behaviors, BMI, and socioeconomic factors in adulthood (Solís-Vivanco et al., 2014). Individuals reporting low levels of love and affection and high levels of abuse in childhood report the highest multisystem risk in adulthood (Taylor, Doane, and Eisenberg, 2013). A number of studies show associations between ACEs and neurological conditions (Mehta and Partin, 2007; Teicher, Anderson, and Polcari, 2012). Measuring ACEs for

children (as opposed to adults) allows us to target interventions and allocate mental health resources to children to improve the likelihood of a successful adulthood.

For this measure, we use a modified version of nine adverse childhood experiences: (1) socioeconomic hardship, (2) divorce/separation of parent, (3) death of parent, (4) parent served time in jail, (5) witness to domestic violence, (6) victim of neighborhood violence, (7) lived with someone who was mentally ill or suicidal, (8) lived with someone with alcohol/drug problem, and (9) was treated or judged unfairly due to race/ethnicity. A response of “somewhat often” or “very often” is coded as an adverse family experience.

There are a number of recommended interventions to prevent adverse childhood experiences and the trauma that may result. WHO recommends interventions to prevent child abuse and its mental health consequences, such as home visits, parent education, and school-based programs. These recommendations are based on evidence regarding the impact of these interventions on direct outcome measures, as well as risk factors (World Health Organization, 2006). The Institute of Medicine also describes similar, evidence-based components of successful interventions to prevent child abuse and neglect (Institute of Medicine, 2013).

Number of disability-adjusted life years (DALYs) of the top ten U.S. chronic diseases. DALYs are a universal metric that allows researchers to broadly compare health across multiple chronic diseases and potentially help decisionmakers and researchers to target funding and interventions (Institute for Health Metrics and Evaluation [IHME], 2016). This metric, first reported as part of the Global Burden of Diseases, Injuries, and Risk Factors Study 2010 (Feigin et al., 2014), stems from a worldwide project that employed cross-discipline researchers and techniques to produce comprehensive estimates and publicly available data visualization tools. IHME provides a list of published evidence using global burden of disease as an outcome for various health interventions (see IHME, 2016).

To compare burdens of disease, calculations of DALYs consider the age at death and the life expectancy of persons affected by each disease and take into account the degree of disability (e.g., discomfort, pain, or functional limitations) imposed by each condition on those who live with the disease. The selected measure describes disease burden from the ten chronic diseases that have the most serious consequences or impacts on the U.S. population in 2010. Understanding and projecting how the most onerous diseases affect people’s lives can help

determine where to make investments or conduct research that will have the greatest benefit to quality of life.

Average health care expenditure by family. Affordable and high-quality health care fosters positive child development, a healthy environment, and livelihoods that are not significantly jeopardized by health care costs. As its health care spending burden increases, a family has fewer available resources to devote to healthy behaviors.

This measure is intended to capture how increases in health care costs affect the finances of a typical American family. It combines data from multiple sources to depict the effects of rising health care costs on a median-income married couple with two children covered by employer-sponsored insurance (Auerbach and Kellermann, 2011). The measure contains four components: employee premium contribution, employer premium contribution (a hidden cost that indirectly reduces wages and, thus, family income), out-of-pocket spending, and taxes devoted to health care. Using this measure, Auerbach and Kellerman (2011) showed increases in family health care costs over time, comparing this growth to changes in income gains over the same period.

This measure is unique in describing health costs in terms of the household or family unit, as opposed to most measures that focus either on individuals or larger population groups. Further, this measure captures the impact of several types of health care costs, as opposed to others (e.g., the Milliman Medical Index) that inventory only insurance-related costs. The measure is calculated using several assumptions, such as using the same out-of-pocket costs for all individuals younger than 65, even though out-of-pocket costs for children may be much lower, and using the same tax rate across geographic regions.

Overall U.S. hospitalization rates for chronic and acute conditions per 100,000 population, (potentially preventable hospitalization rates). Potentially preventable hospitalizations are hospital visits that could be avoided with better access to high-quality outpatient care, such as care provided in doctors' offices, clinics, or other settings outside the hospital. This measure includes rates of such hospitalizations related to the acute conditions of urinary infections, pneumonia, and dehydration and the chronic conditions of diabetes, congestive heart failure, hypertension, angina, chronic obstructive pulmonary disease, and asthma.

This measure can be used with hospital inpatient discharge data to describe the quality of health care for *ambulatory care-sensitive conditions*. These are conditions for which good

outpatient care can potentially prevent the need for hospitalization or for which early intervention can prevent complications or more severe disease.

A study from AHRQ (Davies et al., 2009) evaluated the use of individual indicators but not of the composite measures. In this report, several interventions are listed that could reduce admission rates by area, provider, and payer. In addition to tracking quality of outpatient care, this measure can be considered a proxy for health (specifically, well-managed illness) among patients with acute and chronic conditions. Interventions targeting improved outpatient care might move the needle on these measures, which would be treated as outcomes.

This measure is particularly useful as a measure of health that focuses on individuals living with chronic disease. However, these measures are typically used for benchmarking hospital quality of care for ambulatory care-sensitive conditions and not explicitly intended as a national measure for health. Using the measure in this way is therefore novel, but further investigation of the primary factors influencing diversion away from hospitalization (e.g., better preventive care versus more lifestyle changes in diet and exercise) is still needed.

Annual average Medicare payment per decedent in the last year of life. Most people who die in America are elderly Medicare beneficiaries, and the program is grappling with its long-term financial viability. For Medicare, spending on care at the end of life is far greater than its spending on a typical beneficiary. The Centers for Medicare & Medicaid Services estimate that over 25 percent of Medicare spending goes toward the 5 percent of beneficiaries who die each year (CMS, n.d.).

End-of-life care continues to be characterized by aggressive medical intervention and extremely high costs. In 1995, the Study to Understand Prognosis and Preferences for Outcomes and Risks of Treatment (SUPPORT) (Connors et al., 1995) found a pattern of end-of-life treatment decisions not based on timely discussion of the goals of care. Persons in their last year of life require Medicare payments that are six times greater than the cost for a survivor. In 2006, Medicare spent an average of \$38,975 per decedent, compared to \$5,993 for other beneficiaries (Riley and Lubitz, 2010). Teno et al. (2013) found that among Medicare beneficiaries who died in 2009 and 2005, compared with those who died in 2000, a lower proportion died in an acute care hospital, although both intensive care unit use and the rate of health care transitions increased in the last month of life.

There is a great deal of room for improvement on closing the gap between people's wishes for how and where to die and where people actually end up dying. Earlier research (e.g., SUPPORT) indicates a disconnect between decisions on end-of-life care and previous discussions of care goals. However, between 1989 and 2007, there was a shift in the places where Americans die, with more people dying at home and fewer dying in institutional settings (Heath, Romero, and Reynolds, 2013). In addition, race and ethnicity have been identified as factors that affect end-of-life care and place of death. A much higher proportion of whites are dying at home or in a nursing home compared to all other races (Heath, Romero, and Reynolds, 2013).

Shifting end-of-life care away from hospitals and toward home or hospice may result in well-being benefits in the last year of life. This measure describes expenditures associated with annual end-of-life care using Medicare claims data. This measure only characterizes the cost of care for people in the last year of life but does not yet capture the quality of end-of-life care. The measure will evolve as the Culture of Health initiative progresses.

Table 9.1 summarizes the measures that have been identified for the outcome areas of the action framework. These measures demonstrate the underlying concepts of each outcome area.

Table 9.1. Population Health, Well-Being, and Equity: Measures by Outcome Area

Outcome Area	Measure	What It Means for Outcomes/ Culture of Health Overall
Enhanced individual and community well-being	Well-being rating on three sub-action areas: health, life satisfaction, work-life balance	Indicates how much communities and individuals are thriving and flourishing, a key set of indicators for well-being
Enhanced individual and community well-being	Caregiving burden: Average amount of out-of-pocket spending on caregiving; (<i>additional measure</i>) impact on caregiver financial and emotional health	Includes a substantial proportion of the population that is not routinely considered in health research. The well-being of nonprofessional care providers is often overlooked but also has implications for the overall health and well-being of those for whom they are caring
Managed chronic disease and reduced toxic stress	Adverse childhood experiences: Percentage of parents or guardians reporting that their child had two or more family-related ACEs	Provides information about events during a key period of life that may influence people over their entire life span and increase the chance of chronic disease and poor well-being

Outcome Area	Measure	What It Means for Outcomes/ Culture of Health Overall
Managed chronic disease and reduced toxic stress	Number of disability-adjusted life years (DALYs) of the top ten chronic diseases in the country	Indicates burden of chronic disease (asthma, cancer, chronic obstructive pulmonary disease, cardiovascular disease, diabetes, other) and the related quality of life
Reduced health care costs	Average health care expenditure by family	Offers a broader picture of how much families spend on health, which should reduce if progress is made
Reduced health care costs	Overall U.S. hospitalization rates for potentially preventable chronic and acute conditions per 100,000 population	Serves as a multilevel indicator of improvements in health care, including primary care, self-care, health education, and quality of life
Reduced health care costs	End-of-life expenditures: annual average Medicare payment per decedent in the last year of life	Tracks changes in the way people are dying (e.g., inside versus outside a medical setting, growth in end-of-life planning); a wellness indicator

Limitations

While the measures described above represent some options in each outcome area, it is important to note a few measurement challenges in the outcomes action area.

There is very little systematic collection of data on well-being. While communities are starting to track such well-being indexes as sense of community, flourishing, and opportunity, this is not nearly common practice. As such, we are limited in the sources of survey or administrative data that capture core well-being concepts. The Culture of Health effort should provide an opportunity to advance that discussion and encourage those conducting national and local data collection efforts to incorporate more of these well-being measures. Taking advantage of quantifiable, naturalistic data sources, such as social media, mobile devices, or other digital outputs, can help move the measurement of well-being beyond reliance on self-reported information. For instance, social media (e.g., Twitter) data may be used to estimate population-level measures that include life satisfaction (Schwartz et al., 2014), happiness (Mitchell et al., 2013), and heart disease mortality (Eichstaedt et al., 2015).

Not all the outcomes in the framework are collected routinely. For example, BRFSS used to collect information about ACEs among adults, but it stopped asking about ACEs in 2012. The Youth Behavioral Risk Survey collects only a subset of ACE-related questions, mainly about risky behaviors. Our data source, the National Survey of Children's Health, is fielded every four

years and will not capture accumulation of ACEs in the same panel or with the nuance of developmental transitions in ACE experience or exposure.

Chronic disease analyses require more investigation of social network and community impacts. While Murray et al. (2012) and other researchers have advanced our understanding of the global burden of chronic disease, we are still missing analyses to demonstrate the impact of disease on the wider social network of an individual (e.g., caregiver burden) or social impacts in the broader community. These data are critical if we are able to advance national dialogue about the interdependency of health and the value of community-level health investments. To date, these data are difficult to capture across all communities. Further, if we include adverse childhood experiences and toxic stress among other childhood stressors that predict disease burden later in life, we need far more systematic use of these measures across nationally representative surveys.