

Opportunity Knocks: Population Health in State Innovation Models

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**Participants in the activities of the IOM Roundtable on Population Health Improvement*

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Opportunity Knocks: Population Health in State Innovation Models

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These are historic times for health care and health. The Affordable Care Act (ACA) has unleashed novel initiatives such as the Health Care Innovation Awards and State Innovation Models (SIMs), and we applaud Congress and the Center for Medicare and Medicaid Innovation (CMMI) for their foresight in creating such learning opportunities. Our country's National Quality Strategy focuses our efforts on the Triple Aim² of improving population health, improving the experience of care and lowering per capita costs of care. And this is matched with growing on-the-ground experience striving to achieve the laudable goals of the Triple Aim, spurred in part by CMMI's funding in this area.

Nevertheless, our current health care payment system rewards medical care for individuals, neglecting rewards for changing the factors that make people healthy, e.g., the places outside the doctor's office where people live, learn, play, and work. One clear need is to develop models that reward making the population healthy. We believe that the SIMs developed by states provide a unique opportunity to test new alignments, payments, and incentives that focus our current delivery system on achieving health for all. Unless we start now to develop such tools and models and accelerate their use, an orientation toward population health will always be underrepresented and underresourced. Furthermore, we are unlikely to achieve the goal of health care reform until we address the underlying drivers of increased prevalence of chronic disease such as tobacco use and obesity.

The major models currently being tested are focused primarily on the aims of controlling total costs of care delivery and improving the patient experience and do not significantly reward improvements in population health. They include measures of population health that focus on clinical preventive services but do not track "upstream" or higher-level determinants of health, such as school days missed, patient-reported health statuses, or health outcomes for a community as defined by a geographic region. Although clinical care contributes to population health, we have learned that other factors, such as healthy behaviors and the local built environment, are much more important. Another issue with the current payment models is that the time horizon for improvements is determined by the annual cycle of changes in medical spending, which precludes interventions with longer-term impacts and a wider range of benefits, such as interventions in the realms of employment and education. The unfortunate reality is that we have a relatively poor understanding of how to pay for population health in a sustainable way.

This creates the opportunity, no, the imperative, that the states receiving Centers for Medicare & Medicaid Services (CMS) funding to test and implement SIMs dedicate a portion of their resources to pilots and experiments that are focused on the third aim of improving population health. With input from and ownership by the community and providers, we believe these pilots should be structured with goals and actions at the community level and integrate

¹ Participants in the activities of the IOM Roundtable on Population Health Improvement.

² A concept developed by the Institute for Healthcare Improvement in 2006 (see Berwick et al., 2008) and forming the basis for the Three-Part Aim described in CMS and other Department of Health and Human Services programs.

clinical services, public health programs, and community-based initiatives targeting the upstream determinants of health. They should include the implementation of a core set of metrics for tracking changes in population health for both program improvement and accountability (see, for example, the recommendations in the 2013 IOM report *Toward Quality Measures for Population Health and the Leading Health Indicators*). They should also include aligned payment models for key stakeholders that reward and incentivize demonstrated improvements in the health of the community.

Where could these models start? An optimal approach would involve a portfolio of measures paired with financial incentives that are balanced in the following dimensions:

- substantively balanced to meet the prioritized needs of the community;
- designed to capture and link both clinical and community-wide measures for process and outcome; and
- intended to produce both short- and long-term impacts.

For example, a balanced portfolio might include both practice- and community-wide measures and intentionally seek ones with relatively quick positive and measurable health benefits and/or cost-saving outcomes, such as effective prevention interventions (e.g., influenza vaccinations, alcohol screening/brief counseling), asthma intervention measures (which decrease emergency room visits and hospitalizations), and behaviors responsive to city- or state-wide interventions (e.g., tobacco use levels). Mental health measures could be included (e.g., Patient Health Questionnaire-9 for depression, which can be used for screening and follow-up). Alternatively, there might be complementary metrics for which significant benefits may be seen over a longer period of time, such as the prevalence of risk factors (e.g., obesity) and illness (e.g., diabetes, HIV), and/or summary measures of population health (e.g., Centers for Disease Control and Prevention healthy days or health-adjusted life-years [see, for example, IOM, 2011]).

In addition, a balanced approach might incentivize proven or promising process measure goals best achieved by large provider systems such as accountable care organizations. Examples of process measures that could be constructed to focus on population health outcomes include (1) evidence of meaningful partnerships between health care organizations and state and local public health departments, (2) systematic use of community-based health workers in underserved communities and among racial and ethnic minority populations to assist in care transitions and reduce environmental risk factors, and (3) active participation in community-wide efforts to improve conditions affecting health.

We encourage states and CMMI to take advantage of this historic opportunity to fully realize the Triple Aim. Both should push the limits of innovation, recognizing that population health initiatives are unlikely to achieve the understandably aggressive cost-saving goals being pursued in health care over a 6-month, 12-month, or even 3-year period. *Intentionality* is the operative word for states and CMMI. States will need to be intentional about including population health community partners and agencies and focusing their grants in this area, even though the perceived financial payoff seems uncertain. The complexities of improving the health care system alone often result in population health being treated as a last-step add-on or being addressed only superficially or not at all. Similarly, CMMI will need to be intentional and realistic about population health outcomes and the costs-saving goals that can be achieved. CMMI will need to consider different criteria for success in evaluating interventions that include population health, including allowing for longer time frames for achieving results. Finally, let us

not let the risk of failure and the difficulty of achieving cost savings and improved outcomes in the short term discourage states and CMMI from taking advantage of this opportunity to focus on population health.

We believe that there is no better time for innovation in population health than now. CMMI opportunities, supplemented by complementary initiatives supported by other sponsors, have the potential to accelerate the growth of innovative approaches. Harnessing the lessons learned through state collaborative networks offers the potential for further acceleration and advancement in the field, but first we need to build strong proposals, together with continued support and flexibility from CMMI. Current investment by states and CMMI in this area have the potential to reap even greater rewards in the future as CMMI focuses on dissemination and spread.

We urge states and CMMI to open the door and step through quickly as opportunity knocks for population health.

Thoughts on Potential Next Steps Toward a Balanced Portfolio of Measures in the SIMs and Beyond

Although the specific parameters of the ideal balanced portfolio are not currently known, the SIMs and Innovation Awards offer opportunities to contribute to the knowledge base. However, even though these CMS initiatives are an important resource, they will not be sufficient by themselves to develop the tools and models needed to pay for improvements in population health, as many of the “population health” initiatives being proposed are focused targeted high utilizers (super-utilizers) to achieve medical cost savings in the short term as CMS requires. Commercial payers and large self-insured employers have greater flexibility to test models and have advanced payment reform in the past through the development of innovations such as the Alternative Quality Contract designed by Blue Cross of Massachusetts. Private foundations also have a role, as exemplified by the social impact bond for asthma that was sponsored by The California Endowment (Social Finance, 2013) and the exploration of the role of Community Development Financial Institutions sponsored jointly by the Federal Reserve, the Kresge Foundation, and the Robert Wood Johnson Foundation (see, for example, Erickson, 2013). Ideally, potential sponsors will look to the SIM states as fertile ground for testing and spreading new approaches to creating a sustainable balanced portfolio for improving population health. Ultimately, public- and private-sector collaboratives deploying innovative approaches with a focus on shared learning and harnessing and spreading what works would help to move the field even further.

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<http://nam.edu/wp-content/uploads/2015/06/OpportunityKnocks>.

REFERENCES

- Erickson, D. 2013. *Linking community development and health*. Testimony Prepared for the Robert Wood Johnson Foundation Commission to Build a Healthier America, June 2013. Available at <http://www.rwjf.org/content/dam/farm/reports/reports/2013/rwjf406408> (accessed August 16, 2013).
- Berwick, D.M., T.W. Nolan, and J. Whittington. 2008. The triple aim: care, health, and cost. *Health Aff* (Millwood) 27(3):759-69.
- IOM (Institute of Medicine). 2013. [*Toward quality measures for population health and the Leading Health Indicators*](#). Washington, DC: The National Academies Press.
- IOM. 2011. [*For the public's health: The role of measurement in action and accountability*](#). Washington, DC: The National Academies Press.

Social Finance. 2013, March 25. *The California Endowment awards grant to social finance and collective health.* News release, March 25. Available at http://payforsuccess.org/sites/default/files/fresno_asthma_demonstration_project_press_release.pdf (accessed August 16, 2013).

What Is Population Health?

David Kindig, MD, PhD, and Greg Stoddart, PhD

Population health is a relatively new term that has not yet been precisely defined. Is it a concept of health or a field of study of health determinants?

We propose that the definition be “the health outcomes of a group of individuals, including the distribution of such outcomes within the group,” and we argue that the field of population health includes health outcomes, patterns of health determinants, and policies and interventions that link these two.

We present a rationale for this definition and note its differentiation from public health, health promotion, and social epidemiology. We invite critiques and discussion that may lead to some consensus on this emerging concept. (*Am J Public Health*. 2003;93:380–383)

ALTHOUGH THE TERM

“population health” has been much more commonly used in Canada than in the United States, a precise definition has not been agreed upon even in Canada, where the concept it denotes has gained some prominence. Probably the most influential contribution to the development of the population health approach is Evans, Barer, and Marmor’s *Why Are Some People Healthy and Others Not? The Determinants of Health of Populations*,¹ which grew out of the work of the Population Health Program of the Canadian Institute for Advanced Research. No concise definition of the term appears in this volume, although its authors state the concept’s “linking thread [to be] the common focus on trying to understand the determinants of health of populations.”^{1(p29)}

The idea that population health is a field of study or a research approach focused on determinants seems to have evolved from this work. Early discussions at the Canadian Institute for Advanced Research also considered the definition and measurement of health and the processes of health policymaking, but the dominant emphasis evolved to the determinants themselves, particularly the non-medical determinants. John Frank, the scientific director of the recently created Canadian Institute of Population and Public Health, has similarly called population health “a newer research strategy for understanding the health of populations.”² T.K. Young’s recent book *Population Health* also tends in this direction; he states

that in Canada and the United Kingdom in the 1990s, the term has taken on the connotation of a “conceptual framework for thinking about why some populations are healthier than others as well as the policy development, research agenda, and resource allocation that flow from this framework.”^{3(p4)}

However, Young also indicates that in the past, the term has been used as a “less cumbersome substitute for the health of populations,” which is of course its literal meaning. Evans and Stoddart, while supporting an emphasis on “understanding of the determinants of population health,” have also stated, however, that “different concepts [of health] are neither right or wrong, they simply have different purposes and applications. . . . [W]hatever the level of definition of health being employed, however, it is important to distinguish this from the question of the determinants of that definition of health.”^{1(p28)} The Health Promotion and Programs Branch of Health Canada has recently stated that “the overall goal of a population health approach is to maintain and improve the health of the entire population and to reduce inequalities in health between population groups.”^{4(p1)} They indicate that one guiding principle of a population health approach is “an increased focus on health outcomes (as opposed to inputs, processes, and products) and on determining the degree of change that can actually be attributed to our work.”^(p11)

Dunn and Hayes, quoting the definition of the Canadian Fed-

eral/Provincial/Territorial Advisory Committee on Population Health, write that “population health refers to the health of a population as measured by health status indicators and as influenced by social, economic, and physical environments, personal health practices, individual capacity and coping skills, human biology, early childhood development, and health services. As an approach, population health focuses on interrelated conditions and factors that influence the health of populations over the life course, identifies systematic variations in their patterns of occurrence, and applies the resulting knowledge to develop and implement policies and actions to improve the health and well being of those populations.”^{5(p57)} Kindig has suggested a similarly broad definition: population health is “the aggregate health outcome of health adjusted life expectancy (quantity and quality) of a group of individuals, in an economic framework that balances the relative marginal returns from the multiple determinants of health.”^{6(p47)} This definition proposes a specific unit of measure of population health and also includes consideration of the relative cost-effectiveness of resource allocation to multiple determinants.

Recently, even in the United States, the term is being more widely used, but often without clarification of its meaning and definition. While this development might be seen as a useful movement in a new and positive direction, increased use without

precision of meaning could threaten to render the term more confusing than helpful, as may already be the case with “community health” or “quality of medical care.” For this reason, we propose a definition that may have a more precise meaning for policymakers and academics alike; our purpose is to stimulate active critiques and debate that may lead to further clarification and uniformity of use.

DEFINITION AND CONCEPT

As indicated above, the primary tension or confusion at present seems to be between defining population health as a field of study of health determinants or as a concept of health. The Group Health Community Foundation has recently stated that “some observers see population health as a new term that highlights the influential role of social and economic forces in combination with biological and environmental factors, that shape the health of entire populations . . . others interpret population health primarily as a goal—a goal of achieving measurable improvements in the health of a defined population.”^{7(p7)}

We think that there are 3 general possibilities: population health (a) is only concerned with the independent variables (the multiple determinants), (b) is only concerned with the dependent variables (health outcomes), or (c) is concerned with both the definition and measurement of health outcomes and the roles of determinants. While none of the three is normatively correct or incorrect, we believe that the latter is more appropriate, primarily because the concept and measurement of health and health

outcomes focuses attention and research effort on the impact of each determinant and their interactions on some appropriate outcome. It also allows one to consider health inequality and inequity and the distribution of health across subpopulations, as well as the ethical and value considerations underpinning these issues.⁸

While the original Evans and Stoddart “field model” did not discuss a population health concept in these terms, the idea is implicit in the evolution of the dependent variable from “health care” to “health and function” to “well being.”^{1(pp33–53)} The Institute of Medicine has given serious attention to measuring population health, thereby encouraging some kind of summary measure that includes mortality and health-related quality of life.⁹

Given these considerations, we propose that *population health as a concept of health* be defined as “the health outcomes of a group of individuals, including the distribution of such outcomes within the group.” These populations are often geographic regions, such as nations or communities, but they can also be other groups, such as employees, ethnic groups, disabled persons, or prisoners. Such populations are of relevance to policymakers. In addition, many determinants of health, such as medical care systems, the social environment, and the physical environment, have their biological impact on individuals in part at a population level.

Defining population health this way requires some measure(s) of health outcomes of populations, including their distribution throughout the population. We chose the broader term “health

outcomes” rather than the more narrow term “health status”; we believe the latter refers to health at a point in time rather than over a period of years. We do not believe that there is any one definitive measure, but we argue that the development and validation of such measures for different purposes is a critical task for the field of population health research.

Our definition does imply the necessity of one or more broad summary measures capable of being a dependent variable for the spectrum of all determinants (generally including length of life and health-related quality and function of those life years), along with a family of other submeasures for different policy and research purposes. For example, the Health Utilities Index is being used in the Canadian National Population Health Survey,¹⁰ Years of Healthy Life have been used in Healthy People 2000,¹¹ and the EuroQuol has been recently added to the Medical Expenditure Panel Survey.¹²

We support the idea that a hallmark of *the field of population health* is significant attention to the multiple determinants of such health outcomes, however measured. These determinants include medical care, public health interventions, aspects of the social environment (income, education, employment, social support, culture) and of the physical environment (urban design, clean air and water), genetics, and individual behavior. We note with caution that such a list of categories can lead to a view that they operate independently; population health research is fundamentally concerned about the interactions between them, and we prefer to refer to “patterns” of determinants.

Population health researchers tend to use a set of methods and approaches that have the following important characteristics: examination of systematic differences in outcomes across populations, complexity of interactions among determinants, biological pathways linking determinants to population health outcomes, and the influence of different determinants over time and throughout the life cycle.^{13–15}

In our view, a population health perspective also requires attention to the resource allocation issues involved in linking determinants to outcomes. Part of the study of population health involves the estimation of the cross-sectoral cost-effectiveness of different types and combinations of investments for producing health.¹⁶ Because improvement in population health requires the attention and actions of multiple actors (legislators, managers, providers, and individuals), the field of population health needs to pay careful attention to the knowledge transfer and academic-practice partnerships that are required for positive change to occur.^{17,18} Figure 1 shows how we view the field of population health. The field investigates each of the components shown in the figure, but particularly their interactions.

CRITIQUES

We expect and welcome critiques of the definition presented here. As noted above, one critique will be that the tasks of defining and measuring concepts of health are large enough to constitute a subject of their own, rather than being combined with the study of determinants of health. We have already given our rationale for including them

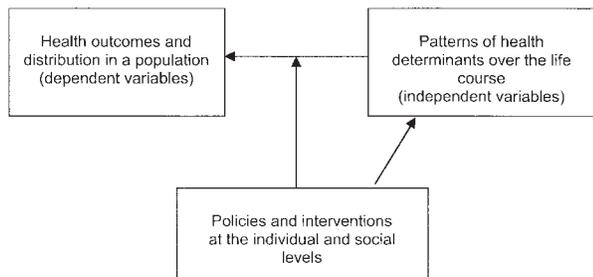


FIGURE 1—A schematic definition of the field of population health.

in population health as a field of study, but we would add that the need for accountability argues strongly for the inclusion of outcome and distributional considerations if a population health approach is to be useful in guiding policymaking regarding resource allocation across determinants and sectors. Without such a framework, advocacy and financial incentives for individual determinants can proceed independently of their impact, as some would argue is now the case for some medical care expenditures in the United States.

A second critique is that such a definition and concept is so broad that it includes everything and is therefore not useful to guide either research or policy. We understand this concern but do not agree with it. We believe that a guiding synthesis is essential for considering both the relative impacts of the pattern of determinants and their interactions. Integration of knowledge about health and its multiple determinants seldom occurs. Policy managers typically have responsibility for a single sector; advocacy groups typically have an interest in only one disease or determinant. No one in the public or private sectors currently has responsibility for overall health

improvement. We suggest that the importance of a population health perspective is that it forces review of health outcomes in a population *across* determinants. For population health research, specific investigations into a single determinant, outcome measure, or policy intervention are relevant, and may even be critical in some cases, but they must be recognized as only a part and not the whole.

Those in public health or health promotion may legitimately feel that population health is simply a renaming of what has been their work or legacy. Hamilton and Bhatti have attempted to show the complementarity and overlap between population health and health promotion,¹⁹ building on the Canadian Achieving Health for All Framework for Health Promotion²⁰ and the World Health Organization Ottawa Charter on Health Promotion.²¹ Frank has indicated that historic concepts of public health were similarly broad, until the biomedical paradigm became dominant. Those who define public health as the “health of the public” would not disagree with the definition of population health proposed here; in the words of Frank, the “shift in thinking entailed in population

health should be a small one for public health workers . . . in fact it is not so much a shift as a return to our historical roots encompassing all the primary determinants of health in human populations.”^{22(p163)}

However, much of public health activity, in the United States at least, does not have such a broad mandate even in the “assurance” functions, since major determinants such as medical care, education, and income remain outside of public health authority and responsibility, and current resources do not even allow adequate attention to traditional and emerging public health functions. Similarly, we believe that the emerging prominence of social epidemiology is a very important development for population health but does not have the breadth, or imply all of the multiple interactions and pathways, of the definition proposed here for population health.

CONCLUSION

We believe that the time has come for a clarification of the meaning and scope of the term “population health.” We have offered a clarification of the term that combines the definition and measurement of health outcomes and their distribution, the patterns of determinants that influence such outcomes, and the policies that influence the optimal balance of determinants. We welcome discussion and debate regarding these suggestions as a way of moving toward some consensus on this important and emergent concept. ■

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References

1. Evans R, Barer M, Marmor T. *Why Are Some People Healthy and Others Not? The Determinants of Health of Populations*. New York, NY: Aldine de Gruyter; 1994.
2. Frank J. Canada Institute of Population and Public Health. Message from: Dr John Frank, scientific director, Institute of Population and Public Health. Available at: http://www.cihr-irsc.gc.ca/institutes/ipph/about_ipph/ipph_message_director_e.shtml. Accessed December 23, 2002.
3. Young TK. *Population Health: Concepts and Methods*. New York, NY: Oxford University Press; 1998.
4. Health Canada. *Taking Action on Population Health*. Ottawa, Ontario: Health Canada; 1998.
5. Dunn JR, Hayes MV. Toward a lexicon of population health. *Can J Public Health*. 1999;90(suppl 1):S7–S10.
6. Kindig DA. *Purchasing Population Health: Paying for Results*. Ann Arbor: University of Michigan Press; 1997.
7. Kreuter M, Lezin N. *Improving Everyone's Quality of Life: A Primer on Population Health*. Atlanta, Ga: Group Health Community Foundation; 2001.
8. Williams A. Conceptual and empirical issues in the efficiency-equity trade-off in the provision of health care or, if we are going to get a fair innings, someone will need to keep the score! In:

Maynard AJ, ed. *Being Reasonable About the Economics of Health*. Cheltenham, England: Edward Elgar; 1997:322–349.

9. *Summarizing Population Health Directions for the Development and Application of Population Metrics*. Washington, DC: Institute of Medicine, Division of Health Care Services; 1998.

10. Wall R, Foster R. Beyond life expectancy. *Health Policy Res Bull*. 2002; 1:32–33.

11. Erickson P, Wilson R, Shannon I. *Years of Healthy Life*. Bethesda, Md: National Center for Health Statistics; 1995. Statistics note no. 7.

12. Gold MR, Muenning P. Measure-dependent variation in burden of disease estimates. *Med Care*. 2002;40: 260–266.

13. Berkman L, Kawachi I. *Social Epidemiology*. New York, NY: Oxford University Press; 2000.

14. Keating DP, Hertzman C. *Developmental Health and the Wealth of Nations: Social, Biological, and Educational Dynamics*. New York, NY: Guilford Press; 1999.

15. Adler N, Marmot M, McEwen B, Stewart J. Socioeconomic status and health in industrial nations: social, psy-

chological, and biological pathways. *Ann N Y Acad Sci*. 1999;896.

16. Drummond M, Stoddart G. Assessment of health producing measures across different sectors. *Health Policy*. 1995;33:219–231.

17. Lavis JN, Ross SE, Hurley JE, et al. Examining the role of health services research in public policy making. *Milbank Q*. 2002;80:125–154.

18. Lomas J. Using “linkage and exchange” to move research into policy at a Canadian foundation. *Health Aff*. 2000;19(3):236–240.

19. Hamilton N, Bhatti T. *Population*

Health Promotion: An Integrated Model of Population Health and Health Promotion. Ottawa, Ontario: Health Promotion Development Division; February 1996.

20. Epp J. *Achieving Health for All: A Framework for Health Promotion*. Ottawa, Ontario: Health and Welfare Canada; 1986.

21. World Health Organization (WHO). *Ottawa Charter on Health Promotion*. Copenhagen, Denmark: WHO Regional Office for Europe; 1986.

22. Frank JW. Why “population health”? *Can J Public Health*. 1995;86: 162–164.

Contributors

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References

1. International Energy Agency. Key world energy statistics. 2012. Available at: <http://www.iewa.org/publications/freepublications/publication/kwes.pdf>. Accessed August 1, 2012.
2. Colborn T, Kwiatkowski C, Schultz K, Bachran M. Natural gas operations from a public health perspective. *Hum Ecological Risk Assess*. 2011;17(5):1039–1056.
3. DiGiulio DC, Wilkin RT, Miller C. *Investigation of Ground Water Contamination near Pavilion, Wyoming*. Draft. Ada, OK: Office of Research and Development, National Risk Management Research Laboratory; 2011.
4. Energy Policy Act of 2005, Pub. L. 109-58, 119 Stat 594, § 322.1(B)(ii). (2005). Available at: <http://www.gpo.gov/fdsys/pkg/PLAW-109publ58/pdf/PLAW-109publ58.pdf>. Accessed July 7, 2012.
5. New York State Department of Environmental Conservation. *Revised Draft Supplemental Generic Environmental Impact Statement on the Oil, Gas and Solution Mining Regulatory Program: Well Permit Issuance for Horizontal Drilling and High-Volume Hydraulic Fracturing to Develop the Marcellus Shale and Other Low-Permeability Gas Reservoirs*. Albany, NY: New York State Department of Environmental Conservation; 2011: Section 6.11.1.1, p. 810.
6. Howarth RW, Santoro R, Ingraffea A. Methane and the greenhouse-gas footprint of natural gas from shale formations. *Clim Change*. 2011;106(4):679–690.
7. Howarth RW, Ingraffea A, Engelder T. Should fracking stop? *Nature*. 2011;477(7364):271–275.
8. Tollefson J. Methane leaks erode green credentials of natural gas. *Nature*. 2013;493(7430):12.
9. Steinzor N, Subra W, Sumi L. Gas patch roulette: how shale gas development risks public health in Pennsylvania. Earthworks. Available at: http://www.earthworksaction.org/library/detail/gas_patch_roulette_full_report#.UOwyQeOhTKG. Accessed December 20, 2012.
10. Witter R, Stinson K, Sackett H, et al. Potential exposure related human health effects of oil and gas development: a literature review (2003–2008). 2008. Available at: http://docs.nrdc.org/health/hea_08091702.asp. Accessed August 3, 2012.
11. Bamberger M, Oswald RE. Impacts of gas drilling on human and animal health. *New Solut*. 2012;22(1):51–77.
12. Meyer JL, Frumhoff PC, Hamburg SP, de la Rosa C. Above the din but in the fray: environmental scientists as effective advocates. *Front Ecol Environ*. 2010;8(6):299–305.
13. Reed S. With controls, Britain allows hydraulic fracturing to explore for gas. *New York Times*. December 14, 2012: B3. Available at: <http://www.nytimes.com/2012/12/14/business/energy-environment/britain-approves-fracking-for-shale-gas-exploration.html>. Accessed December 20, 2012.
14. Centers for Disease Control and Prevention. CDC/ATSDR hydraulic fracturing statement. May 3, 2012. Available at: http://www.cdc.gov/media/releases/2012/s0503_hydraulic_fracturing.html. Accessed August 5, 2012.
15. Finkel ML, Law A. The rush to drill for natural gas: a public health cautionary tale. *Am J Public Health*. 2011;101(5):784–785.

Achieving Population Health in Accountable Care Organizations

| Karen Hacker, MD, MPH, and Deborah Klein Walker, EdD

Although “population health” is one of the Institute for Healthcare Improvement’s Triple Aim goals, its relationship to accountable care organizations (ACOs) remains ill-defined and lacks clarity as to how the clinical delivery system intersects with the public health system.

Although defining population health as “panel” management seems to be the default definition, we called for a broader “community health” definition that could improve relationships between clinical delivery and public health systems and health outcomes for communities.

We discussed this broader definition and offered recommendations for linking ACOs with the public health system toward improving health for patients and their communities. (*Am J Public Health*. 2013;103:1163–1167. doi:10.2105/AJPH.2013.301254)

WITH THE PASSAGE OF THE Affordable Care Act (ACA),¹ the United States has turned its attention to improving the quality of health care while simultaneously decreasing cost. As we move toward alternative and global payment arrangements, the need to understand the epidemiology of the patient population will become imperative. Keeping this population healthy will require enhancing our capacity to assess, monitor, and prioritize lifestyle risk factors that unduly impact individual patient health outcomes. This is especially true, given that only 10% of health outcomes are a result of the medical care system, whereas from 50% to 60% are because of health behaviors.^{2,3} To change health behaviors, it will be necessary to engage in activities that reach beyond the clinical setting and incorporate community and public health systems.⁴

The Institute for Healthcare Improvement (IHI), a leading

not-for-profit organization dedicated to using quality improvement strategies to achieve safe and effective health care, has developed the Triple Aim initiative⁵ as a rubric for health care transformation. The three linked goals of the Triple Aim include improving the experience of care, improving the health of populations, and reducing per capita costs of health care.⁶ However, although two of the three aims—experience of care and cost reduction—are self-explanatory, there is little consensus about how to define population health. Words like “panel management,” “population medicine,” and “population health” are being used interchangeably. Berwick et al.⁶ describe the care of a population of patients as the responsibility of the health care system and use broad-based community health indicators as evidence of improvement. Other recent publications have attempted to describe population health from the hospital,^{7–10}

primary care,¹¹ and community health center perspectives.¹² The “clinical view” identifies the population as those “enrolled” in the care of a specific provider, provider or hospital system, insurer, or health care delivery network (i.e., panel population).⁷ Alternatively, from the public health perspective,⁸ population is defined by the geography of a community (i.e., community population) or the membership in a category of persons that share specific attributes (e.g., populations of elderly, minority population). In either case, the context of a community and the existing social determinants of health, ranging from poverty to housing, are known to have substantial impact on individual health outcomes. Thus, ensuring the health of a population is highly dependent on addressing these social determinants and requires collaborative relationships with community institutions outside the health care setting.^{13,14}

Two key concepts that will greatly influence the definition and actualization of population health in the post-ACA era include the accountable care organization (ACO)¹⁵ and the patient-centered medical home (PCMH).¹⁶ The ACO represents an integrated strategy at the delivery system level to respond to payment reform.¹⁵ These integrated systems of care are poised to manage a population of patients under a global payment model. The PCMH is focused on transforming primary care to better deliver “patient-centered” care and to address the whole patient, including their health and social needs.^{17,18} Both models will need to identify, monitor, and manage their “population” of patients. However, their ability to extend their definition of population health to encompass the entire community will depend on resources, market share, and the strength and capacity of collaborating community and public health organizations. As integrated delivery systems are asked to do more than focus on their own patients, they will require additional resources. These may come from a realignment of existing programs (community benefits), a return on investment from effective preventive care, or collaborative relationships with existing community and public health organizations.

In this article, we discuss two major points regarding ACOs and their approach to population health. First, ACOs should be committed to serving the health of the people in the communities from which their population is drawn, and not just the population of patients enrolled in their care to achieve the population health goal. Second, to achieve this expanded definition of population health, ACOs will need to

engage in collaborative efforts with community agencies and the public health system. We describe a “community” definition of population health to be used in lieu of the “panel” definition and then outline the resources needed and strategies for collaboration. Finally, we offer recommendations to assist ACOs in realizing their population health goal.

DEFINING POPULATION HEALTH

Population health connotes a high-level assessment of a group of people.⁹ This epidemiological framework is often in direct opposition to the manner in which the health care system has cared for patients in a fee-for-service model: one individual at a time. Currently, population health is being seen in two distinct ways: (1) from a public health perspective, populations are defined by geography of a community (e.g., city, county, regional, state, or national levels); and (2) from the perspective of the delivery system (individual providers, groups of providers, insurers, and health delivery systems), population health connotes a “panel” of patients served by the organization.

In the post-ACA world, as payment models shift from fee-for-service to global payment, ACOs will necessarily reorient from a disease focus to a wellness focus to improve quality and contain costs. Although they will have an ethical and contractual obligation for the patients for which they care, their engagement in the larger community may be highly dependent on which members of the community population actually end up being part of a particular ACO or PCMH panel. The larger the overlap between an

ACO panel and the community population, the more the overall health of the community will contribute to the ACOs’ ability to keep their patients healthy. Similarly, the larger the overlap between community population and ACO panel, the more ACO health outcomes will drive community health indicators. Table 1 displays how an ACO might address a variety of characteristics, depending on the chosen definition of population health (none, panel of patients in the delivery system, all members of a community).

Resources

As provider organizations are asked to embrace the broader community definition of population health, resources will be needed to support this role. These resources include access to data, funding, and collaborative relationships.

Data. With the emergence of the electronic medical records, ACOs should become more facile at viewing their population as a whole and identifying trends across their panel’s health (age, gender, race, chronic conditions). The data needed for this endeavor are largely collected at the visit level by registration and clinical staff. With adequate health information technology, systems can now examine issues such as risk for future disease, comorbidities, and quality metrics across a defined population. Using these data, the ACO can also determine the zip codes and communities where a majority of their patients reside and compare their health indicators to the community health indicators for the same geography.

Data on community health indicators (e.g., preventive services use, infectious disease rates, lead paint exposure, occupational health issues, cancer rates, births,

and deaths from vital statistics) are more accessible than ever before. The National Prevention Strategy¹⁹ and the Healthy People 2020 goals for the nation²⁰ include health indicators for population health at the community level. Much of community health information resides with state and county or city health departments, some of which have online interactive data tools that are available to the public (MassCHIP-Massachusetts²¹). New tools, such as the County Health Rankings²² and the Community Health Status Indicators,²³ are publicly available and allow users to obtain county-level health data. In some jurisdictions, provider organizations are identifying ways to share de-identified data with community health leaders to jointly identify priority prevention strategies.²⁴

Funding. ACOs will also need to identify financial resources to achieve population health goals. The current fee-for-service structure does not support population health efforts, and although demonstration grants may help, they cannot sustain ongoing work. Today, nonprofit hospitals are required to provide some support for community programs through the recently revised community benefit in the ACA.²⁵ Realigning hospital community benefit programs with population health efforts can help support the expanded role.

Simultaneously, ACOs need to assess which preventive strategies will yield the best return on investment (ROI) for their patients. Evidence-based services that demonstrate ROI and improved health outcomes can help in this endeavor. Nationally, two sets of evidenced-based prevention services have been identified: clinical preventive services, such as mammography, immunizations, and

TABLE 1—Characteristics of Various Approaches to Population Health in Accountable Care Organizations

Approach	Focus on Individual Patients in Primary Care Settings	Panel Population = Population Health	Community ^a Population = Population Health
Medical home Care coordination	May or may not have medical home Focuses on coordination within primary care setting	Medical home implemented Focuses on coordination within delivery system and potentially some community resources	Medical home implemented Focuses on coordination within delivery system and all community resources
Clinical prevention services Community prevention services Health indicators monitored	Implement all clinical prevention services in primary care No implementation of community prevention services Measures for provider settings, but no alignment with delivery or community or public health systems	Implement all clinical prevention services in primary care Limited implementation of community prevention services Measures for patients in the delivery system, but no alignment with community or public health systems	Implement all clinical prevention services in primary care Full implementation of community prevention services Measures for delivery system include measures at the community population level
Needs assessment	No attention to community needs assessment—focus only on primary care settings	May have some joint needs assessment but focuses on decisions within the delivery system	Joint needs assessment related to community population outcomes and joint selection of target areas for action
Relationship to public health system	No relationship	Coordinating structure may exist with public health	Governance and coordinating structures in place with public health agencies to improve community population health
Relationship to community agencies	No relationship	Coordinating structure may exist with some agencies to promote health for patients in delivery system	Formal coordinating relationships with community agencies to share community population health goals
Use of community health workers	Use within primary care system with little link to community resources	Use to coordinate across delivery system and some community resources	Use in clinical and community settings to improve community population health for all individuals in the community.
Financing for population health initiatives	None within a fee-for-service system	Limited financing within fee-for-service system; community benefits supports limited activities with community, special grants and demonstrations but no dedicated source	Increased financing for public health entities through state or federal streams or Prevention Trusts; global fee systems for delivery systems commit 5% to community population health outcomes
Governance to promote population health	None in place in primary care setting	Limited governance structures in delivery system; might participate on community coalition or in informal partnerships	Formal governance structures in place with community and public health agency; delivery system has a designate senior lead for population health and dashboard measures on population health

^aCommunity can also equal geographic area.

smoking cessation²⁶; and community preventive services, such as fluoridation, lead testing, and community screening.²⁷ Many of the clinical preventive measures are considered quality measures by major accrediting systems (e.g., Healthcare Effectiveness Data and Information Set or the National Committee for Quality Assurance) and are also included in health coverage under the ACA. Assuming an ROI is realized, dollars saved can shift to support community and public health initiatives. Additionally, the federal public health trust fund provides a new revenue stream to support prevention strategies directly tied to health improvement and cost containment.²⁸ This was recently replicated in Massachusetts with the passage of Chapter 224.²⁹

Collaboration. Many of these evidence-based prevention practices fall within the purview of community agencies and the public health system outside of ACO responsibility. For example, smoking bans promulgated by public health authorities have affected smoking rates and second-hand smoke exposure and have led to lower risk of hospitalization for cardiac and pulmonary conditions.³⁰ Therefore, ACOs that strive to improve population health within geography will need to develop partnerships to support prevention activities while integrating complementary efforts into clinical settings. In particular, the ACO's relationship with the local public health authority or authorities is essential. Although the public health authority is not the only organization with which an ACO will need to collaborate, it is the only agency that has legal authority and mandates to protect, promote, and assure the health for every individual in the

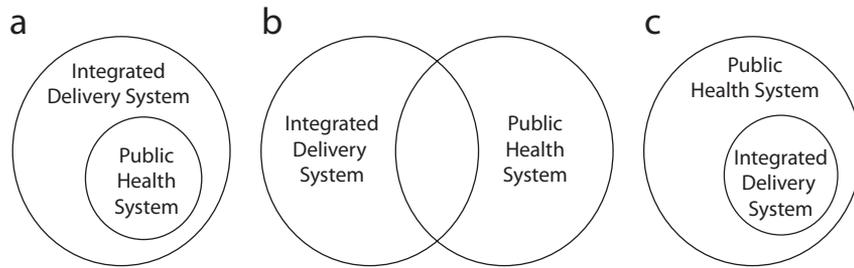


FIGURE 1—Relationships between integrated delivery system and public health system.

community.³¹ Despite the logic of this partnership, integrating public health and the delivery system has proven difficult.^{32,33} Today, the ACA poses an unprecedented opportunity to refocus these efforts. While ACOs are contemplating the best strategies for population health improvement, public health authorities are also recognizing their changing roles^{34,35} and their need to effectively align with providers.³⁶ As health insurance expands, public health clinical services are likely to decrease, and core functions including surveillance, regulation, and quality assurance will be more important than ever before. States such as Massachusetts, Minnesota, Washington, and Vermont have already evolved from delivering direct services to providing “wrap around” services (e.g., outreach, care coordination) and maintaining the core public health functions. Under global payment models, ACOs will depend on public health authorities to address regulatory and policy issues that have wide-reaching health impact.³⁷

Figure 1 presents three possible relationships between health delivery and public health systems. When a community is served by one health system and one public health authority, integration efforts may be more easily achieved. However, in

other cases, the delivery system will need to work with a number of public health authorities or the public health authority will need to work with numerous delivery systems.

Strategies to Overcome Obstacles

To achieve alignment between provider organizations and community and public health agencies, strategies are needed to overcome multiple obstacles. For example, in highly competitive environments with multiple providers, a strategy of cooperation between clinical delivery systems and community and public health agencies is required to jointly improve population health. The Institute of Medicine report, *Improving Health in the Community*³⁸ presented a method for multiple stakeholders in a community coming together to “share accountability” for population health outcomes. Weak public health infrastructure is another obstacle, and in these cases, the delivery system may need to shore up core public health functions (assurance, assessment, policy).³¹ In communities with strong public health systems, public health can address health from a policy and regulatory perspective while the health care system provides individual

clinical prevention and treatment.^{37,39} ACOs may lack the appropriate skills and resources to achieve population health goals, posing another challenge. A strategy that identifies and connects an ACO to community and public health resources can enhance population health efforts. For example, many community and public health agencies have extensive experience and programs serving vulnerable populations and can assist ACOs in their outreach efforts. Overall, ACOs and public health systems can play complementary roles in improving population health goals as seen in the following examples.

1. An urban ACO serving a large city works with a local public health authority to identify geographic pockets of patients with diabetes. The ACO focuses on improved diabetes management in the clinical setting while linking to community resources for patients requesting exercise and physical activity options. Public health can lead a campaign to improve access to fresh fruits and vegetables and change policies related to menu labeling.
2. An ACO serving a number of suburban communities identifies high use of the emergency room

from alcohol-related issues in young adults as a focus for improvement. Working with the public health authority, local schools, and substance abuse agencies, the collaboration creates a safe rides program and develops policies to monitor underage liquor sales.

3. An ACO serving a large rural population has trouble providing enough access for immunizations to elders. Community-wide access to immunizations is provided by working with the public health authority and local pharmacies. Communication strategies that link pharmacies and public health to the ACO are developed, along with an immunization registry for public health population-level surveillance.

Recommendations

It will take time for newly emerging ACOs to develop meaningful collaborative relationships with public health entities. We recommend the following steps for ACOs:

- Determine in which geographic communities patients reside and what the overlap is between the ACO panel and the community population.
- Compare the health of the population served by the ACO with that of the community.
- Decide what level of overlap in any geographic area merits collaboration. The more market share an ACO has in the area, the more investment in collaboration might be made, and the more impact that investment will have on health outcomes.
- Engage in collaboration with public health and key community agencies, including conducting a joint needs assessment.
- Collaboratively select health outcomes for focus.

- Set up a formal agreement with the public health authorities to share data and monitor progress toward goals in clinical and community settings.
- Identify population health indicators to be included on the ACO dashboard.
- Use a portion of global payment fee to support community public health activities.

CONCLUSIONS

To fully meet the goals of the Triple Aim, including improving the health of a population, ACOs must define “population health.” We recommend that they embrace the broad community definition of population health and take steps to work collaboratively with community and public health agencies. Future financing and value-based purchasing should reward collaborations that result in population health improvements at the community level. As health care moves toward alternative and global payment arrangements, the need to understand the epidemiology of the patient population is imperative. Keeping the population healthy will require enhancing capacity to assess and to monitor and prioritize lifestyle risk factors and social determinants of health that unduly affect health outcomes. ■

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Contributors

K. Hacker led the writing process and was involved in all aspects of the article from conceptualization to writing and editing. D. K. Walker was involved in all aspects of the article from conceptualization to writing and editing.

References

1. A more secure future: what the new health law means for you and your family. The White House. Available at: <http://www.whitehouse.gov/healthreform/healthcare-overview>. Accessed June 18, 2012.
2. McGinnis JM, Foege WH. Actual causes of death in the United States. *JAMA*. 1993;270(18):2207–2212.
3. McGinnis JM, Williams-Russo P, Knickman JR. The case for more active policy attention to health promotion. *Health Aff (Millwood)*. 2002;21(2):78–93.
4. Walker DK. Time to embrace public health approaches to national and global challenges. *Am J Public Health*. 2008;98(11):1934–1936.
5. Institute for Healthcare Improvement Triple Aim Initiative. Available at: <http://www.ihl.org/offering/Initiatives/TripleAim/Pages/default.aspx>. Accessed November 4, 2012.
6. Berwick DM, Nolan TW, Whittington J. The triple aim: care, health, and cost. *Health Aff (Millwood)*. 2008;27(3):759–769.
7. Health Research and Educational Trust, American Hospital Association. *Managing Population Health: The Role of the Hospital*. Chicago, IL: American Hospital Association; 2012.
8. Institute of Medicine. *Primary Care and Public Health: Exploring Integration to Improve Population Health*. Washington, DC: Institute of Medicine; 2012.
9. Kindig D, Stoddard G. What is population health? *Am J Public Health*. 2003;93(3):380–383.
10. Lewis S. Creating incentives to improve population health. *Prev Chronic Dis*. 2010;7(5):A93.
11. Institute of Medicine. *Primary Care and Public Health: Promoting Integration to Improve Population Health*. Washington, DC: Institute of Medicine; 2012.
12. Cantor J, Cohen L, Mikkelsen L, Panares R, Srikantharajah J, Valdovinos E. *Community-Centered Health Homes*. Oakland, CA: Prevention Institute; 2011.
13. Evans RG, Stoddard GL. Producing health, consuming health care. *Soc Sci Med*. 1990;31(12):1347–1363.

14. Marmot M, Wilkinson RG. *Social Determinants of Health*. 2nd ed. Oxford, UK: Oxford University Press; 2006.
15. Fisher ES, Shortell SM. Accountable care organizations: accountable for what, to whom, and how. *JAMA*. 2010;304(15):1715–1716.
16. Barr MS. The patient-centered medical home: aligning payment to accelerate construction. *Med Care Res Rev*. 2010;67(4):492–499.
17. Andrews E, Toubman S. Patient-centered medical home: improving health care by shifting the focus to patients. *Conn Med*. 2009;73(8):479–480.
18. Cox JV, Kirschnner N. Patient-centered medical home: renewing primary care. *J Oncol Pract*. 2008;4(6):285–286.
19. National Prevention Council. *National Prevention Strategy*. Washington, DC: US Department of Health and Human Services; 2011.
20. US Department of Health and Human Services. *Healthy People 2020*. Washington, DC: US Department of Health and Human Services; 2012.
21. MassCHIP. Massachusetts Department of Public Health. Available at: <http://www.mass.gov/eohhs/researcher/community-health/masschip>. Accessed November 24, 2012.
22. County health rankings & road maps. County Health Rankings. Available at: <http://www.countyhealthrankings.org/#app>. Accessed November 4, 2012.
23. Community health status indicators. US Department of Health and Human Services. Available at: <http://wwwn.cdc.gov/CommunityHealth/homepage.aspx?j=1>. Accessed November 25, 2012.
24. Diamond CC, Mostashari F, Shirky C. Collecting and sharing data for population health: a new paradigm. *Health Aff (Millwood)*. 2009;28(2):454–466.
25. Internal Revenue Service. *Internal Revenue Bulletin: 2011-30. Notice 2011-52*. Washington, DC: Internal Revenue Service; 2011.
26. United States Preventive Services Task Force. *Recommendations for the US Preventive Services Task Force*. Washington, DC: Agency for Healthcare Research and Quality, Department of Health and Human Services; 2011.
27. Task Force on Community Preventive Services. *Guide to Community Preventive Services: What Works to Promote Health?* New York, NY: Oxford University Press; 2005.
28. Haberkorn J. *Health policy brief: the prevention and public health fund*. 2012. Available at: <http://www.healthaffairs.org/healthpolicybriefs/brief.php>

brief_id=63. Accessed February 27, 2012.

29. Massachusetts Public Health Association. Massachusetts Prevention and Wellness Trust Fund. Available at: <http://www.mphaweb.org/documents/PrevandWellnessTrustFund-MPHAFactSheetupdatedOct12.pdf>. Accessed November 30, 2012.
30. Meyers DG, Neuberger JS, He J. Cardiovascular effect of bans on smoking in public places: a systematic review and meta-analysis. *J Am Coll Cardiol*. 2009;54(14):1249–1255.
31. Institute of Medicine. *The Future of Public Health*. Washington, DC: Institute of Medicine; 1988.
32. Brandt AM, Gardner M. Antagonism and accommodation: interpreting the relationship between public health and medicine in the United States during the 20th century. *Am J Public Health*. 2000;90(5):707–715.
33. Stine NW, Chokshi DA. Opportunity in austerity—a common agenda for medicine and public health. *N Engl J Med*. 2012;366(5):395–397.
34. Jarris PE, Leider JP, Resnick B, Sellers K, Young JL. Budgetary decision making during times of scarcity. *J Public Health Manag Pract*. 2012;18(4):390–392.
35. Young J, Resnick B, Leider JP. Perceived and anticipated impacts of the Affordable Care Act on state public health practice. Paper presented at: American Public Health Association Annual Conference; October 27–31, 2012; San Francisco, CA. Available at: <https://apha.confex.com/apha/140am/webprogram/Paper260623.html>. Accessed February 27, 2013.
36. Benjamin GC. Transforming the public health system: What are we learning? Available at: <http://iom.edu/Global/Perspectives/2012/TransformingPublicHealth.aspx>. Accessed November 30, 2012.
37. Frieden TR. A framework for public health action: the health impact pyramid. *Am J Public Health*. 2010;100(4):590–595.
38. Institute of Medicine. *Improving Health in the Community: A Role for Performance Monitoring*. Washington, DC: Institute of Medicine; 1997.
39. Institute of Medicine. *The Future of the Public's Health in the 21st Century*. Washington, DC: Institute of Medicine; 2003.