Population Health: The New Convergence Science in Health

Victor J Dzau, MD
President, National Academy of Medicine

September 16, 2016
HPM 80th Anniversary Celebration
The Population Health Perspective

“the health outcomes of a group of individuals, including the distribution of such outcomes within the group” (Kindig and Stoddard, 2003).

Additionally such population health outcomes are the product of multiple determinants of health, including medical care, public health, genetics, behaviors, social factors, and environmental factors.

(IOM Roundtable on Population Health Improvement’s Working Definition, 2011)
“Convergence goes beyond collaboration … it is the integration of historically distinct disciplines and technologies into a unified whole that creates fundamentally new opportunities….”

-Massachusetts Institute of Technology, 2016
Population Health: The New Convergence Science

- Traditional notion of public health
  - Epidemiology
  - Surveillance
  - Acute intervention
  - Sanitation
  - Public education

- Health care: diagnosing and treating disease and secondary prevention.

- Public health and health care have traditionally operated in separate silos.

- Non-health factors such as housing, environment, transportation, influence health

- Population health is the convergence of public health, socioeconomic and environmental determinants and healthcare influencing health outcomes.
Determinants of Health

Factors outside healthcare play a large part in determining health.

Figure 1. Determinants of Health and Their Contribution to Premature Death.
Adapted from McGinnis et al.\textsuperscript{10}
Vision for Public Health


- 2 critical definitions:
  - 1) **the mission** of public health, defined as “fulfilling society’s interest in assuring conditions in which people can be healthy”
  - 2) **the substance** of public health, defined as “organized community efforts aimed at the prevention of disease and promotion of health. It links many disciplines and rests upon the scientific core of epidemiology
Healthy Communities New Partnerships for the Future of Public Health (1996)

• *Follow up report updates*:
  – the relationship between public health agencies and the public's health and managed care, and the role of the public health agency in the community

• *Focuses on how governmental public health agencies can develop partnerships with*:
  – managed care organizations, and with public and private community organizations

• Proposes community process (CHIP) for health improvement efforts in which performance monitoring for meaningful stakeholder accountability.

• Proposes a set of indicators
  – Sociodemographic characteristics
  – Health risk factors
  – Health care resource consumption
  – Functional status
  – Quality of life
The Future of the Public’s Health in the 21st Century (2002)

FIGURE 1-1 The intersectoral public health system.
For the Public’s Health (2011-2012)

- Three part series looking at public health in the context of measurement, law, and financing
- These reports provide an opportunity to revisit public health in light of changes in health status in the United States since the IOM’s 1988 report was published.
Evolution of Public Health Practices

Public Health 1.0
- Breakthroughs in medicine, epidemiology & lab sciences
- Vaccines, antibiotics
- Uneven access to care & public health agency capacity

Public Health 2.0
- Preventive services
- Chronic disease prevention
- Accreditation
- Surveillance
- Access to care

Public Health 3.0
- Health Equity
- Social determinants
- Cross-sector actions
- Accountable health communities

Late 1800s
1988 IOM Future of Public Health Report
Recession 2007-9
ACAHITECH
IOM For the Public’s Health reports

DeSalvo et al. (2016) Public Health 3.0: Time for an Upgrade. AJPH
Advancing Population Health

• Collaborative, multisectoral public health system
• Measurement and performance monitoring
• Law, policy, and financing
• Health equity
  – Addressing social risk factors
• Community partnerships
• Applying a health lens to non health sectors
NAM/IOM’s enduring commitment to population health

• Board on Population Health and Public Health Practice
  – Roundtable on Population Health Improvement
  – Roundtable on the Promotion of Health Equity and the Elimination of Health Disparities
  – Roundtable on Environmental Health Sciences, Research, and Medicine

• Board on the Health of Select Populations
  – Medical Follow-up Agency

• Board on Health Care Services

• Board on Global Health
Roundtable on Population Health Improvement

• Brings together individuals and organizations that represent different sectors in a dialogue about what is needed to improve population health

• The Roundtable will engage roundtable members and outside experts, practitioners and stakeholders on three core issues:
  – supporting fruitful interaction between primary care and public health,
  – strengthening governmental public health, and
  – exploring community action in transforming the conditions that influence the public’s health.
Integrate public health & health care delivery

Core principles for successful integration:

• A shared goal of population health improvement
• Community engagement in defining and addressing population health needs
• Aligned leadership that
  – bridges disciplines, programs, and jurisdictions to reduce fragmentation and foster continuity,
  – clarifies roles and ensures accountability,
  – develops and supports appropriate incentives, and
  – has the capacity to manage change
• Sustainability, key to which is the establishment of a shared infrastructure and building for enduring value and impact
• Sharing and collaborative use of data and analysis
Roundtable on the Promotion of Health Equity and the Elimination of Health Disparities

• The Roundtable will enable dialogue and discussion of issues related to:
  – the visibility of racial and ethnic disparities in health and health care as a national problem;
  – the development of programs and strategies to reduce disparities; and
  – the emergence of new leadership.
Health Equity
Committee on Community-Based Solutions to Promote Health Equity in the United States

• A consensus committee was formed to examine the evidence on solutions to promote health equity. The committee will:
  – Review the state of health disparities in the U.S. and explore the underlying conditions and root causes contributing to health inequity.
  – Identify and examine 6 examples of community-based solutions that address health inequities.
  – Identify the major elements of effective or promising solutions and their key levers, policies, stakeholders, and other elements that are needed to be successful.
  – Recommend elements of short- or long-term strategies and solutions that communities may consider to advance health equity.
  – Recommend key research needs.
Major Healthcare Trends & Implications for Population Health

- Policy-driven advances:
  - 1. Increased insurance coverage
  - 2. Moving towards paying for value and quality
  - 3. Focus on population health outcomes
  - 4. Digitizing health and healthcare

- Implications for public-population health
  - 1. Easing demand on safety net care
  - 2. Emphasis on outcomes and cost
  - 3. Incentivizing prevention & whole-person care
  - 4. Increasing primary care and public health collaboration
  - 5. Big data & partnership opportunities

Slide modified from Claire Wang
Current Health Policy Landscape

Patient Protection and Affordable Care Act (2010)

• Expanded Medicaid coverage and introduced mandatory health insurance in an effort to increase coverage and slow the rise in health care costs
• Value-based purchasing
• Care Continuum
• Population Health
• Prevention
• Health IT, Data Transparency
Increased Access

- 20 million Americans have gained health care coverage since 2010
  - 17.7 million nonelderly adults (ages 18 to 64)
  - 2.3 million young adults (ages 19 to 25)
- The uninsured rate for non-elderly adults declined by 43 percent between October 2013 and early 2016 (from 20.3 percent to 11.5 percent).

![Figure 1: Quarterly Uninsured Rate Estimates for Nonelderly Adults (Ages 18 to 64) Using the Gallup-Healthways Well-Being Index, 2012 to 2016](image)

Source: The Office of the Assistant Secretary for Planning and Evaluation’s (ASPE) analysis of the Gallup-Healthways Well-Being Index survey data through February 22, 2016.
Change in Healthcare Delivery: ACA

**Current State**
- Producer-Centered
- Volume Driven
- Unsustainable
- Fragmented Care
- FFS Payment Systems

**Future State**
- People-Centered
- Outcomes Driven
- Sustainable
- Coordinated Care

**New Payment Systems and Policies**
- Value-based purchasing
- ACOs, Shared Savings
- Episode-based payments
- Medical Homes and care mgmt
- Data Transparency
ACA: Population Health Provisions

- Established CMMI and PCORI
- Expansion of primary health care training
- Expansion of preventive services
- Established National Prevention, Health Promotion and Public Health Council, which has already produced the mandated National Prevention Strategy
- Established Prevention and Public Health Fund (authorized at $1 billion in fiscal year 2012)
- Provided funding for Community Transformation Grants
- Requires hospitals to conduct a Community Health Needs Assessment (CHNA) once every three years
**HHS**

**Better Care. Healthier People. Smarter Spending**

From current FFS to FFS linked to quality to APM to population based payment

<table>
<thead>
<tr>
<th>Payment Taxonomy Framework</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category 1:</strong> Fee for Service - No Link to Quality</td>
</tr>
<tr>
<td><strong>Category 2:</strong> Fee for Service - Link to Quality</td>
</tr>
<tr>
<td><strong>Category 3:</strong> Alternative Payment Models Built on Fee-for-Service Architecture</td>
</tr>
<tr>
<td><strong>Category 4:</strong> Population-Based Payment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Medicare FFS</th>
<th>Hospital value-based purchasing</th>
<th>Accountable care organizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Limited in Medicare fee-for-service</td>
<td>- Physician Value-Based Modifier</td>
<td>- Medical homes</td>
</tr>
<tr>
<td>- Majority of Medicare payments now are linked to quality</td>
<td>- Readmissions/Hospital Acquired Condition Reduction Program</td>
<td>- Bundled payments</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Comprehensive primary care initiative</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Comprehensive ESRD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Medicare-Medicaid Financial Alignment Initiative Fee-For-Service Model</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Eligible Pioneer accountable care organizations in years 3-5</td>
</tr>
</tbody>
</table>
HHS Value-Based Payment Goals

- Alternative payment models (Categories 3-4)
- FFS linked to quality (Categories 2-4)
- All Medicare FFS (Categories 1-4)

**2011**
- Historical Performance: 68%
- Goals: 0%

**2014**
- Historical Performance: 85%
- Goals: 22%

**2016**
- Historical Performance: 85%
- Goals: 30%

**2018**
- Historical Performance: 90%
- Goals: 50%
Importance of Alignment & Accountability

• The need for integration comes in the sharing of responsibility for outcomes

• Drivers of Success:
  – EHR & Data
  – Alignment & Accountability: Shared incentives & risks

• How do all parts of the ecosystem get the expected outcomes?
  – Must manage patients together through the continuum
  – A focus on disease management is a shared responsibility (payer, provider, industry)
  – Patient accountability

• What are the financial tools needed?
  – Incentivize quality and patient satisfaction
  – Share in savings
  – Share in risks

The emerging model is Accountable Care Organizations
Accountable Care Organizations (ACOs)

N~ 800

CMS offers several ACO programs
• Medicare Shared Savings Program
• Advance Payment ACO
• Pioneer ACO

Commercial ACOs
• Cigna, UnitedHealth, Aetna, and others
• Account for 54% of accountable care payment arrangements

Leavitt, 2015
Medicare ACOs 2015 Performance Year
Quality and Financial Results

• Over 400 Medicare ACOs generated more than $466 million in total program savings
  – Pioneer ACOs generated total model savings of over $37 million
  – Shared Savings Program ACOs generated total program savings of $429 million.

• Quality performance improved considerably in 2015
  – The mean quality score among Pioneer ACOs increased to 92.26 percent in 2015 from 87.2 percent in 2014
  – Shared Savings Program ACOs that reported quality in both 2014 and 2015 improved on 84 percent of the quality measures that were reported in both years

https://www.cms.gov/Newsroom/MediaRel easeDatabase/Fact-sheets/2016-Fact-sheets-items/2016-08-25.html
Accountable Health Communities

• First CMMI pilot to test improving patients’ health by addressing their social needs.
• Provides up to $157 million in funding to bridge clinical care with social services
• Award recipients under this model, referred to as “bridge organizations,” will oversee the screening of Medicare and Medicaid beneficiaries for social and behavioral issues, such as housing instability, food insecurity, utility needs, etc
Advancing Population Health

- Advancing and applying the science
  - Research
  - Measures
  - Data and Evidence
  - Context Informed Care
- Health care
  - Bridging primary care and public health
  - Care coordination
  - Team based care
  - Social Risk Adjustment
- Addressing the social determinants through collaboration and policy across all sectors
  - Clinic Community integration
  - Health in all policies
  - Building healthy communities
Population Health Research

• Need to address issues about how population health research is conducted
  – Multidisciplinary
  – Informed by local context

• Research demonstrating potential cost savings can truly influence policy makers.

• Effective communication and dissemination of research findings
Measurement

• Best measures drive action
• The greatest opportunities to improve population health reside outside the traditional health sector – metrics must reflect this
• Measures be informed by context and connected to action at the local level
Importance of Data for Population Health

• Need for EHR & an operational health information exchange throughout the community of providers.

• This exchange would include clinical data that is collected from medical records and claims-based data, as well as clinical data collected from other sources:
  – mobile technologies
  – genomic technologies
  – patient-reported outcomes
  – geospatial (GIS) mapping

• All of these together will provide all providers with large amounts of clinical data, behavioral and psychosocial data that can be used to stratify patients, identify care gaps, measure outcomes, and properly engage with our patients.
Context-Informed Care: Data and Information Exchange

• “Community Vital Signs”
  – IOM recommended social behavioral domains for EHRs
  – PCORI-ADVANCE (Oregon)

• State information exchange & learning communities
  – Wrap-around services on human care
  – Connect non-health data: e.g. EPA safe drinking water information system, incarceration records, HUD

• Private-sector innovations
  – Consumer-mediated exchange

Capturing Social and Behavioral Domain Measures in EHRs

- In Capturing Social and Behavioral Domains in Electronic Health Records: Phase 1, the committee identified 17 domains that they considered to be good candidates for inclusion in EHRs.
- The second report, Capturing Social and Behavioral Domains and Measures in Electronic Health Records: Phase 2, pinpoints 12 measures related to 11 of the initial domains and considers the implications of incorporating them into all EHRs.
Candidate domains for inclusion in EHRs

**SOCIODEMOGRAPHIC DOMAINS**
- Sexual orientation
- Race/ethnicity
- Country of origin/U.S. born or non-U.S. born
- Education
- Employment
- Financial resource strain
  - (Food and housing insecurity)

**PSYCHOLOGICAL DOMAINS**
- Health literacy
- Stress
- Negative mood and affect
  - (Depression, anxiety)
- Psychological assets
  - (Conscientiousness, patient engagement/activation, optimism, self-efficacy)

**BEHAVIORAL DOMAINS**
- Dietary patterns
- Physical activity
- Tobacco use and exposure
- Alcohol use

**INDIVIDUAL-LEVEL SOCIAL RELATIONSHIPS & LIVING CONDITIONS**
- Social connections and social isolation
- Exposure to violence

**NEIGHBORHOODS & COMMUNITIES**
- Compositional characteristics
Systems Practices for the Care of Socially At-Risk Populations

**FIGURE S-1** Promising systems practices to improve care for socially at-risk populations.
Accounting for Social Risk Factors in Medicare Payment

The committee’s 4 goals in accounting for social risk factors in Medicare payment programs are:

• Reducing disparities in access, quality, and outcomes;
• Quality improvement and efficient care delivery for all patients;
• Fair and accurate public reporting; and
• Compensating providers fairly.
Creating Healthy Communities: Role of Partnerships

• Camdem NJ
• Quad City
• Durham
Camden, NJ: Link2Care

- Approx. 30 percent of costs come from just 1 percent of patients.
- Camden Coalition of Healthcare Providers (CCHP) developed a care management initiative, Link2Care
  - Enrolls high-utilizing patients while in hospital and aids connection with primary care to obtain the array of services necessary to reduce further unnecessary hospital utilization
- From launch of Link2Care in mid-2012 through early 2014
  - CCHP has decreased the average number of days to initial primary care visit from 22.21 at the start of the initiative to 8.00
  - 46% reduction in average hospital
Quad City Health Initiative

- Organizations and individuals interested in improving the health and quality of life of the Quad City area, a metropolitan area with over 317,000 people living in the cities of Davenport and Bettendorf, Iowa, and Rock Island, East Moline and Moline, Illinois.
- Created a community board they named the Quad City Health Initiative
- Excels at developing cross-sector partnerships and building collective impact as a region
  - Provides the planning and communications backbone to enable cross-sector community health improvement
  - Rooted in a model that acknowledges the social determinants of health
- Governance model that supports regional collaboration
Durham Health Initiative: Geospatial Mapping

Central Durham, Durham County, NC

Block Group Aggregated Duke Diabetes Patients
Percent HbA1c Lab > 7%, Quintiles
- 20% - 34.84%
- 34.85% - 37.38%
- 37.39% - 40.71%
- 40.72% - 43%
- 43.01% - 51.61%

- Physicians
- Pharmacies
- Grocery Stores
- Fast Food
- Parks

Spratt et al., 2015
Duke Center for Community and Population Health Improvement (CCPHI)

Multi-disciplinary, leveraging academic, health system, and community partnerships

– Established in 2015
– Four pillars
– Community engagement core

Sample Activities

• Healthy Durham multi-sector engagement
• Community Health Indicators
• Eugene Washington PCOR engagement program
• Carolinas Collaborative Health Equity Initiative
• Population Health Improvement Mapping (with IBMHealth)
• Seminar series
UNC Population and Value-Based Care

Dr. Allen Daugird, Chief Quality and Value Officer
PVC Executive Committee

Office for Population and Value Care
- Population and value care strategy
- Value program development, implementation support and evaluation
- CIN Development

Scope: “Value-Based” Programs, i.e.
- Commercial “ACOs”
- Medicare/Medicaid collaborations
- Bundled payment models

Population Health Clinical Programs
- Personal Health Advocate program
- UNC Department of Clinical Pharmacy Initiatives

Operations for:
- Care/Case management
- Practice quality and reporting
- Chronic disease management
- Care gap management /wellness
- Care coordination /access
- Population health IT/analytics
- Medication therapy management
- Formulary services
- Adherence programs

Clinically Integrated Network (CIN)
- Physician-led
- Health analytics
- Care management
- Care transformation
- Value contracting
- Large population/community focus
RWJF’s Sentinel Community Study

• To understand the evolution of collective action for health in all variations and to identify new measures using sentinel surveillance.

• Study best practices and the variety of practices drawn from the work of communities at different levels of development.

• Will track 30 communities with different geographic and sociodemographic characteristics and use mixed methods of data collection and monitoring.

• Data collected will show how different communities attempt to build a culture of health and the role that metrics play in those efforts.

• RWJF working with the U. Chicago to identify different ways Americans think about the factors that generate health and the role of market versus governmental forces
Building a Healthy Community through Collaboration and Policy Across all Sectors
<table>
<thead>
<tr>
<th>Unhealthy Community</th>
<th>vs</th>
<th>Healthy Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsafe even in daylight</td>
<td></td>
<td>Safe neighborhoods, safe schools, safe walking routes</td>
</tr>
<tr>
<td>Exposure to toxic air, hazardous waste</td>
<td></td>
<td>Clean air and environment</td>
</tr>
<tr>
<td>No parks/areas for physical activity</td>
<td></td>
<td>Well-equipped parks and open/spaces/organized community recreation</td>
</tr>
<tr>
<td>Limited affordable housing is run-down; linked to crime ridden neighborhoods</td>
<td></td>
<td>High-quality mixed income housing, both owned and rental</td>
</tr>
<tr>
<td>Convenience/liquor stores, cigarettes and liquor billboards, no grocery store</td>
<td></td>
<td>Well-stocked grocery stores offering nutritious foods</td>
</tr>
</tbody>
</table>
Our Neighborhood Affects Our Health

<table>
<thead>
<tr>
<th>Unhealthy Community</th>
<th>Healthy Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>Streets and sidewalks in disrepair</td>
<td>Clean streets that are easy to navigate</td>
</tr>
<tr>
<td>Burned-out homes, littered streets</td>
<td>Well-kept homes and tree-lined streets</td>
</tr>
<tr>
<td>No culturally sensitive community centers, social services or opportunities to engage with neighbors in community life</td>
<td>Organized multicultural community programs, social services, neighborhood councils or other opportunities for participation in community life</td>
</tr>
<tr>
<td>No local health care services</td>
<td>Primary care through physicians’ offices or health center; school-based health programs</td>
</tr>
<tr>
<td>Lack of public transportation, walking or biking paths</td>
<td>Accessible, safe public transportation, walking and bike paths</td>
</tr>
</tbody>
</table>
• Convening mechanism under the Roundtable on Population Health Improvement
• The Collaborative’s purpose is to catalyze and facilitate private sector partnerships and actions of business, health, community, and public sectors to work together to enhance the lives of workers and communities by improving the nation’s health and wealth.
Activities at the Intersection of Business and Healthy Communities: Examples

- **American Heart Association** - CEO Roundtable includes more than 20 CEO’s from large companies.
  - workplace wellness
  - a range of partnerships with organizations in the community as a way to create co-benefits to employees and the broader community.

- **Healthy Business Coalition** launched a website to provide resources related to articulating the business case for investing in population health including a communications guide.

- **World Economic Forum**

- **Made In Durham** - Public Private Partnership addressing Education to jobs
  - CEO’s, DPS, Community Colleges, City & County leaders, Economic Development, Justices, NGO’s, Credit Union, Youth
Looking at All Policies Through a Health Lens

APPLYING A HEALTH LENS to DECISION MAKING in NON-HEALTH SECTORS

WORKSHOP SUMMARY

INSTITUTE OF MEDICINE

APPLYING A HEALTH LENS to BUSINESS PRACTICES, POLICIES, and INVESTMENTS

WORKSHOP SUMMARY

The National Academies of SCIENCES • ENGINEERING • MEDICINE
Future Directions
Next Generation Population Health Tools

• Data and analytics
• Internet of things
• Precision medicine
Next generation health IT tools

- Data mining and analytics
- Artificial intelligence: branch of computer science that aims to create intelligent machines, e.g.,
  - Machine learning
  - Machine perception: analyzing sensory, e.g., visual inputs
  - Natural language processing
  - Robotics
The Promise of Precision Medicine

The power of PM lies in its opportunity to guide health care decisions toward the most effective prevention of disease or treatment for a given patient, and thus, improve care quality, while reducing the need for unnecessary diagnostic testing and therapies.

When applied at the population level, PM holds immense promise for public health, particularly in disease prevention and risk assessment.
Precision Public health

• Genomics & biomarkers can identify at risk population
• Target early interventional & preventive strategies.
• Technology useful in point of care diagnosis of emerging infectious disease
• Useful for identification of pathogens, surveillance and intervention
Aligning incentives to fulfil the promise of personalised medicine

Victor J Dzau, Geoffrey S Ginsburg, Karen Van Nuys, David Agus, Dana Goldman

Personalised medicine has generated global policy interest in the past few years. In 2012, the European Union established the European Alliance for Personalised Medicine with the aim to accelerate the development, delivery, and uptake of personalised health care, broadly the Centers for Medicare and Medicaid Services, National Institutes of Health, and the MacArthur Foundation, and has been used to assess the long-term consequences of medical innovation in many settings, including cardiovascular disease, diabetes, cancer, and obesity.
Lancet: The Promise of Personalized Medicine

- The full promise of personalized and precision medicine extends beyond targeting therapies for patients who are already ill
- Enable prevention by identifying individuals at risk of disease

*Figure*: Value of health from hypothetical personalized and precision medicine prevention innovation at two levels of incidence reduction in six diseases in the USA ($ billions)
Genomics and Population Health Action Collaborative

- will convene key stakeholders with an interest in and commitment to integrating genomics in existing population health programs for health improvement
  - Co-led by state health department and evidence-based public health representatives, the Action Collaborative will seek to engage additional representatives with expertise in public/population health, health disparities, health literacy, implementation science, medical genetics, and patient advocacy

- Aims to develop a central resource for states looking to implement genomic medicine programs
Future Success for Population Health

- Alignment & Partnerships - public health, community, healthcare systems and all stakeholders.
- Address Social Determinants of Health & Equity
- Data, Metrics, Analytics, Technology
- Essential Infrastructure
- Sustainable Funding
- Mitigate risks for the most vulnerable
  - Geospatial hot spotting super-users (Camden)
- Contextualize data for local action
National Academy of Medicine

- NAM-RWJF Culture of Health
- Vital directions of Health & Healthcare
Vital Directions for Health and Health Care

• Mobilize expert opinions from trusted health and health care leaders to inform the next administration and the nation about the most pressing health issues for the future

• Identify areas of opportunity and explore national policies that are immediately actionable and hold promise for improving care quality, increasing access, lowering costs, and accelerating progress to achieving a healthy country

• Provide balanced, evidence-based policy recommendations
Vital Directions for Health & Healthcare

• **Better health and well-being**, e.g.,
  – Addressing health disparities and social determinants of health
  – Improving physical activity, nutrition, and other prevention programs
  – Integrating mental health and substance abuse services throughout care
  – Healthy communities, population health, and public engagement

• **High value health care**, e.g.,
  – Competencies and tools to shift payments from volume to value and outcomes
  – Tailoring complex care management, coordination, and integration
  – Precision medicine and advances in genomics, proteomics, and information
  – Patients, families, communities and the democratization of health care
  – Workforce for 21st century health and health care

• **Strong science and technology**, e.g.,
  – Information technology interoperability and use for better care and evidence
  – Data sharing, curation, and use for a continuously learning health system
  – Innovation in development, regulatory review, and use of clinical advances
  – Training the workforce for 21st century science
Thank You