Optimizing Health for All: Science, Systems, Sanity

Massachusetts Department of Public Health Partnership Summit
January 16, 2014

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Deputy Chief Medical Officer
American Heart Association
Shorter Lives, Poorer Health

- **Obesity and diabetes:** US has the highest obesity rate among high-income countries. U.S. adults have among the highest prevalence rates of diabetes among peer countries.

- **Heart disease:** The US death rate from ischemic heart disease is 2nd highest among peer countries. *Americans reach age 50 with a less favorable cardiovascular risk profile than their peers in Europe,* and adults over age 50 are more likely to develop and die from CVD than are older adults in other high-income countries.

- **Chronic lung disease:** Lung disease is more prevalent and associated with higher mortality in the US than in the United Kingdom and other European countries.

- **Disability:** Older U.S. adults report a higher prevalence of arthritis and activity limitations than their counterparts in the United Kingdom, other European countries, and Japan.
10 most costly medical conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>National Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart disease</td>
<td>$90.9 B</td>
</tr>
<tr>
<td>Cancer</td>
<td>71.4</td>
</tr>
<tr>
<td>Trauma-related</td>
<td>67.3</td>
</tr>
<tr>
<td>Mental disorders</td>
<td>59.9</td>
</tr>
<tr>
<td>Osteoarthritis</td>
<td>56.2</td>
</tr>
<tr>
<td>Hypertension</td>
<td>47.3</td>
</tr>
<tr>
<td>Diabetes</td>
<td>45.5</td>
</tr>
<tr>
<td>COPD, Asthma</td>
<td>44.5</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>38.5</td>
</tr>
<tr>
<td>Back problems</td>
<td>34.6</td>
</tr>
</tbody>
</table>

Top 10 risk factors for health loss in 2010 and the number of deaths attributable to each

1. Dietary risks 678,282
2. Smoking 465,651
3. High blood pressure 442,656
4. High body mass index 363,991
5. Physical inactivity 234,022
6. High blood sugar 213,669
7. High total cholesterol 158,431
8. Ambient air pollution 103,027
9. Alcohol use 88,587
10. Drug use 25,430

Institute for Health Metrics and Evaluation (IHME), 2013
"Insanity: doing the same thing over and over again and expecting different results." - Albert Einstein
Patient Protection and Affordable Care Act of 2010
### Public Health Spending Linked to Declines in Preventable Deaths

<table>
<thead>
<tr>
<th>Mortality rate</th>
<th>Percent decrease per 10% spending increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infant deaths per 1000 live births</td>
<td>6.85</td>
</tr>
<tr>
<td>Heart disease deaths per 100,000</td>
<td>3.22</td>
</tr>
<tr>
<td>Diabetes deaths per 100,000</td>
<td>1.44</td>
</tr>
<tr>
<td>Cancer deaths per 100,000</td>
<td>1.13</td>
</tr>
<tr>
<td>Influenza deaths per 100,000</td>
<td>0.25</td>
</tr>
</tbody>
</table>

Mays and Smith, Health Affairs. Aug 2011;30(8).
The Health System

Public Health

Medical Care
Prevention and Public Health Fund

• Improve health and help restrain the rate of growth in private and public sector health care costs
• Expand and sustain national investment in prevention and public health programs
• First year $500m to $2b annually
• Prevention, wellness, and public health activities including prevention research, Health screenings, Immunizations

(From Rein, Berger; CDC)
The incredible shrinking Prevention Fund

- **2010:** $250 million to increase the number of clinicians and strengthen the primary care workforce. (hhs.gov)
- **2012:** The US Congress cut $6.5 billion (37%) of Prevention fund and used the funds as part of fixing SGR
- **2013:** The administration announces that it will use $454 million of the $1 billion 2013 the Prevention Fund for the federal health insurance exchange
Challenges Associated with Establishing and Maintaining Population Health Initiatives

• Public health benefits are dispersed and delayed, and success is when “nothing happens”
• Unlike Meredith Grey or Dr. Oz, public health practitioners are not well known and public health programs are taken for granted (think indoor plumbing, water quality, food safety)
• Approaches can involve regulation or fees or taxes and can generate fierce opposition
• Public health sometimes clashes with moral values (think HPV or needle exchange)
• Population health improvement requires actions and resources outside of public health

Mayes and Oliver, Journal of Health Politics, Policy and Law, Vol. 37, No. 2, April 2012
The Chronic Care Model

Community
- Resources and Policies
- Self-Management Support

Health Systems
- Organization of Health Care
  - Delivery System Design
  - Decision Support
  - Clinical Information Systems

Improved Outcomes

Informed, Activated Patient

Productive Interactions

Prepared, Proactive Practice Team

Developed by The MacColl Institute
® ACP-ASIM Journals and Books
Relationship between Social Determinants and Mortality (2000)

- Low education level
- Racial segregation
- Low social support
- Individual poverty
- Income inequality
- Area level poverty

Deaths (1000s)
Neighborhood Effects on the Long-Term Well-Being of Low-Income Adults

• Moving from a high-poverty to lower-poverty neighborhood leads to long-term (10- to 15-year) improvements in adult physical and mental health and subjective well-being, despite not affecting economic self-sufficiency.
  – Lower levels of obesity, diabetes, and depression
• A decline in neighborhood poverty (13 percentage points) increases subjective well-being by an amount equal to the gap in subjective well-being between people whose annual incomes differ by $13,000—a large amount given that the average control group income is $20,000.

Place Matters

**Predictors of upward mobility**

- Metropolitan areas where poor families were more dispersed in mixed income neighborhoods
- More two-parent households
- Better elementary and high schools
- More civic engagement, including membership in religious and community groups

NYT, 7/22/2013
The American Healthcare Paradox

- Experts puzzle over why the U.S. spends more on health care but suffers poorer outcomes than other industrialized nations.
- In the US, health is conceived of quite narrowly - as an output of health care services and medical care. The US invests aggressively and spends exorbitantly in health care services to build hospitals and pay physicians, buy medical technology, under the assumption that this will create health for the population.
- The authors get to the root of this paradox: We've left out of our tally the most impactful expenditures countries can make to improve their citizens' health—investments in social services.
- Narrow definitions of "health care," archaic divisions in the distribution of health and social services, and the US’s allergy to government programs combine to create preventable suffering and cost.
- There are health status problems the ACA of 2010 won't solve.

The Massachusetts Prevention & Wellness Trust Fund

- Passed into law in August 2012 as a part of health care cost containment legislation (Chapter 224)
- Will invest $60 million over 4 years in evidence-based community prevention activities through competitive grants.
- The Department of Public Health (DPH) with Wellness and Prevention Advisory Board input, will administer the funds, 75% will be spent on competitive grants to reduce rates of preventable health conditions, reduce health disparities, increase healthy behaviors, increase the adoption of workplace-based wellness programs, build the evidence-base of effective prevention programs.

Massachusetts Public Health Association, October 2012.
The Massachusetts Partnership for Health Promotion and Chronic Disease Prevention

Massachusetts Coordinated Health Promotion and Chronic Disease Prevention Plan – Communities of Practice

• Healthy eating
• Physical Activity
• Built environment
• Tobacco-free living
• Clinical preventive services and population health management
• Community and healthcare linkages
• Access to state and local data

Massachusetts Public Health Association, October 2012.
By 2020, to improve the cardiovascular health of all Americans by 20%, while reducing deaths from cardiovascular disease and stroke by 20%.
Health at 50: Predictive of Healthy Aging

• The absence of established risk factors at 50 years of age is associated with very low lifetime risk for CVD... and markedly longer survival. These results should promote efforts aimed at preventing development of risk factors in young individuals.

• Given the high lifetime risks and lower survival in those with intermediate or high risk factor burden at 50 years of age, these data may be useful in communicating risks and supporting intensive preventive therapy.

Defining and Setting National Goals for Cardiovascular Health Promotion and Disease Reduction

The American Heart Association’s Strategic Impact Goal Through 2020 and Beyond

Donald M. Lloyd-Jones, MD, ScM, FAHA, Chair;
Yuling Hong, MD, MSc, PhD, FAHA;‡; Darwin Labarthe, MD, MPH, PhD, FAHA;‡;
Darshil Mozaffarian, MD, DrPH, FAHA; Lawrence J. Appel, MD, MPH, FAHA;
Linda Van Horn, PhD, RD, FAHA; Kurt Greenland, PhD; Stephen Daniels, MD, PhD, FAHA;
Graham Nichol, MD, MPH, FAHA; Gordon F. Tomaselli, MD, PhD, FAHA; Donna K. Arnett, PhD, FAHA;
Gregg C. Fonarow, MD, FAHA; P. Michael Ho, MD, PhD; Michael S. Lauderdale, MD, FAHA;
Frederick A. Masoudi, MD, MPH; Rose Marie Robertson, MD, FAHA; Véronique Roger, MD, FAHA;
Lee H. Schwamm, MD, FAHA; Paul Sorlie, PhD; Clyde W. Yancy, MD, FAHA;
Wayne D. Rosamond, PhD, FAHA; on behalf of the American Heart Association Strategic Planning Task Force and Statistics Committee.
AHA 2020 Strategic Impact Goals

Defining cardiovascular health

<table>
<thead>
<tr>
<th>HEALTH BEHAVIORS</th>
<th>HEALTH FACTORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking</td>
<td>Glucose</td>
</tr>
<tr>
<td>Diet</td>
<td>Cholesterol</td>
</tr>
<tr>
<td>Physical Activity</td>
<td>Blood Pressure</td>
</tr>
<tr>
<td>Body Weight</td>
<td></td>
</tr>
</tbody>
</table>

• 39% of Americans think they are in ideal CV health

• Prevalence of ideal cardiovascular health in adults is actually less than 1%!
## Cardiovascular Health Definitions

### LIFE’S SIMPLE 7

<table>
<thead>
<tr>
<th>Smoking Status</th>
<th>POOR</th>
<th>INTERMEDIATE</th>
<th>IDEAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults &gt;20 years of age</td>
<td>Current Smoker</td>
<td>Former ≤ 12 mos</td>
<td>Never /quit ≥ 12 mos</td>
</tr>
<tr>
<td>Children (12–19)</td>
<td>Tried prior 30 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Former ≤ 12 mos</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Former ≥ 12 mos</td>
<td></td>
</tr>
<tr>
<td>Physical Activity</td>
<td>None</td>
<td>1-149 min/wk mod or</td>
<td>150+ min/wk mod or 75+ min/wk vig or</td>
</tr>
<tr>
<td>Adults &gt; 20 years of age</td>
<td>None</td>
<td>1-74 min/wk vig or 1-149 min/wk mod + vig</td>
<td>150+ min/wk mod + vig</td>
</tr>
<tr>
<td>Children 12-19 years of age</td>
<td></td>
<td>&gt;0 and &lt;60 min of mod or vig every day</td>
<td></td>
</tr>
<tr>
<td>Healthy Diet</td>
<td>0-1 components</td>
<td>2-3 components</td>
<td>4-5 components</td>
</tr>
<tr>
<td>Adults &gt;20 years of age</td>
<td>0-1 components</td>
<td>2-3 components</td>
<td>4-5 components</td>
</tr>
<tr>
<td>Children 5-19 years of age</td>
<td>0-1 components</td>
<td>2-3 components</td>
<td>4-5 components</td>
</tr>
<tr>
<td>Healthy Weight</td>
<td>≥30 kg/m² or more</td>
<td>25-29.9 kg/m² 85th-95th percentile</td>
<td>&lt;25 kg/m² &lt;85th percentile</td>
</tr>
<tr>
<td>Adults &gt; 20 years of age</td>
<td>&gt;95th percentile</td>
<td>85th-95th percentile</td>
<td></td>
</tr>
<tr>
<td>Children 2-19 years of age</td>
<td>≥30 kg/m² or more</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood Glucose</td>
<td>126 mg/dL or more</td>
<td>100-125 mg/dL or treated to goal</td>
<td>Less than 100 mg/dL</td>
</tr>
<tr>
<td>Adults &gt;20 years of age</td>
<td>126 mg/dL or more</td>
<td>100-125 mg/dL or treated to goal</td>
<td></td>
</tr>
<tr>
<td>Children 12-19 years of age</td>
<td>126 mg/dL or more</td>
<td>100-125 mg/dL or treated to goal</td>
<td></td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>≥240 mg/dL or more</td>
<td>200-239 mg/dL or treated to goal</td>
<td>&lt;170 mg/dL</td>
</tr>
<tr>
<td>Adults &gt;20 years of age</td>
<td>≥240 mg/dL or more</td>
<td>200-239 mg/dL or treated to goal</td>
<td></td>
</tr>
<tr>
<td>Children 6-19 years of age</td>
<td>≥240 mg/dL or more</td>
<td>200-239 mg/dL or treated to goal</td>
<td></td>
</tr>
<tr>
<td>Cholesterol</td>
<td>≥240 mg/dL or more</td>
<td>200-239 mg/dL or treated to goal</td>
<td>&lt;170 mg/dL</td>
</tr>
<tr>
<td>Adults &gt;20 years of age</td>
<td>≥200 mg/dL or more</td>
<td>200-239 mg/dL or treated to goal</td>
<td></td>
</tr>
<tr>
<td>Children 12-19 years of age</td>
<td>≥200 mg/dL or more</td>
<td>200-239 mg/dL or treated to goal</td>
<td></td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>SBP ≥140 or DBP ≥90 mm Hg or</td>
<td>SBP120-139 or DBP 80-89 mm Hg or</td>
<td>&lt;120/&lt;80 mm Hg</td>
</tr>
<tr>
<td>Adults &gt;20 years of age</td>
<td>treated to goal</td>
<td>treated to goal</td>
<td></td>
</tr>
<tr>
<td>Children 8-19 years of age</td>
<td>&gt;95th percentile</td>
<td>90th-95th percentile or SBP ≥120 or</td>
<td>&lt;90th percentile</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DBP ≥80 mm Hg</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
More Means Less:
Heart Health Factors and Mortality

• No Tobacco use
• Physical activity
• Healthy eating
• Healthy Weight
• Normal Blood pressure
• Normal Cholesterol
• Normal Hemoglobin A1c (normal blood glucose levels)

More heart health means less cancer

- Risk of cancer dropped in stepwise fashion as a greater number heart health factors were met.
- Persons with 5-7 factors had an adjusted risk 38% less than that of individuals with no factors.
- Among 4 major cancers – lung, colon, prostate, breast,– the inverse relationship between the number of heart health factors and cancer risk was strongest for lung cancer, significant for colon and prostate cancer, but not breast cancer.

Research by Shay using the Atherosclerosis In Communities (ARIC) study cohort; reported in Family Practice News 1 Feb 2012
# Diabetes Prevention Program (DPP)

<table>
<thead>
<tr>
<th></th>
<th>Placebo</th>
<th>Metformin</th>
<th>Lifestyle</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Incidence of diabetes</strong>&lt;br&gt;(percent per year)</td>
<td>11.0%</td>
<td>7.8%</td>
<td>4.8%</td>
</tr>
<tr>
<td><strong>Reduction in incidence</strong>&lt;br&gt;compared with placebo</td>
<td>–</td>
<td>31%</td>
<td>58%</td>
</tr>
<tr>
<td><strong>Number needed to treat</strong>&lt;br&gt;to prevent 1 case in 3 years</td>
<td>–</td>
<td>13.9</td>
<td>6.9</td>
</tr>
</tbody>
</table>

The DPP Research Group, NEJM 346:393-403, 2002
### Action Strategies

- **Activate** stakeholders to advance the **health environment** of communities through alignment of public policy and systems change efforts.

- **Activate** individuals in the health of their communities, the conversation about health, and changing their own health.

### GOAL

- Increase the percentage of all Americans who live in environments that support healthy eating, active lifestyles, smoke-free air, quality care and emergency response.

- Increase the percentage of all Americans who optimize their cardiovascular and brain health.

### EMPHASIS

- Emphasize no smoking, healthy diet and physical activity in children and younger adults.

- Emphasize no smoking, control of blood pressure and cholesterol in adults.

- Optimize outcomes and quality of life for those with chronic disease.

- Optimize early detection, acute event treatment, post-event outcomes and quality of life.
Community-Clinical Linkages

• A clinical system initiative to improve blood pressure control
• A community-based blood pressure control awareness and activation initiative
• A communications strategy to link the two
Blue Zones

**Five zones**
- Okinawa, Japan
- Sardinia, Italy
- Nicoya, Costa Rica
- Ikaria, Greece
- Loma Linda, California

**9 principles**
- Move naturally
- Know your purpose
- Down shift
- 80 percent rule
- Plant slant
- Wine at 5
- Family first
- Belong
- Right tribe

Dan Buettner
Community-Clinical Linkages

• Texas Health Resources (THR)
• Healthways: Blue Zone
The Right to Health

• The right of every person to enjoy the highest attainable standard of physical and mental health is an established international legal precept whose origins date back to 1946 in the constitution of the World Health Organization (WHO), which identified the “enjoyment of the highest attainable standard of health” as “one of the fundamental rights of every human being.”

• In 1948, the United Nations (UN) General Assembly adopted the Universal Declaration of Human Rights (UDHR), article 25 of which guarantees the right to “a standard of living adequate for the health and well-being . . . including food, clothing, housing and medical care.”
The Health System

Community Health

Medical Care
Sanity

Redefine health and healthcare.
Apply evidence-based community health, population health, and patient-centered clinical care
It is rocket science! Systems Engineering

- An interdisciplinary approach and means to enable the realization of successful systems, that
  - focuses on defining customer needs and required functionality, documents requirements,
  - proceeds with design synthesis and system validation while considering the complete problem
  - integrates all the disciplines and specialty groups into a team effort forming a structured development process that proceeds from concept to production to operation.

http://www.incose.org
6 Solutions for Changing Communities

INTEGRATE PHYSICAL ACTIVITY EVERY DAY IN EVERY WAY.

SMOKE FREE

MARKET WHAT MATTERS FOR A HEALTHY LIFE.

EAT WELL!

STRENGTHEN SCHOOLS AS THE HEART OF HEALTH.

ON THEIR OWN, ANY ONE OF THESE FIVE SOLUTIONS MIGHT HELP SPEED UP PROGRESS IN PREVENTING OBESITY, BUT TOGETHER, THEIR EFFECT WOULD BE REINFORCED, AMPLIFIED, AND MAXIMIZED.

ACTIVATE EMPLOYERS AND HEALTH CARE PROFESSIONALS.

MAKE HEALTHY FOODS AVAILABLE EVERYWHERE.