Aspiring to die healthy
On preventing disease and producing health

Sandro Galea
We all know the problem
Non-communicable diseases mortality rate in selected countries, 2015

U.S. vs. median mortality rates, age 0-75

Mortality rate per 1,000

Age group

<1 year | 1-14 years | 15-19 years | 20-24 years | 25-29 years | 30-34 years | 35-39 years | 40-44 years | 45-49 years | 50-54 years | 55-59 years | 60-64 years | 65-69 years | 70-74 years

U.S. vs. Median of other OECD countries
FIGURE 1-6 U.S. female life expectancy at birth relative to 21 other high-income countries, 1980-2006.
NOTES: Red circles depict newborn life expectancy in the United States. Grey circles depict life expectancy values for Australia, Austria, Belgium, Canada, Denmark, Finland, France, Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and West Germany.
SOURCE: National Research Council (2011, Figure 1-4).
The US saw limited gains in average life expectancy at birth over the past 60 years.

In the same time period, Japan, Singapore, Costa Rica and Chile experienced tremendous gains, so much so that all of them surpassed the US by 2000.

Author: GRAPH Team  Published: December 11th, 2013
Tagged: life expectancy, high-income countries, oecd


http://cugraph.org/databytes/surpassing-the-us-in-life-expectancy
Throwing money at the problem
Average spending on health per capita ($US PPP)

US
SWIZ
NOR
NETH
GER
CAN
FRA
SWE
AUS
UK
NZ

$8,508

$3,182

Note: $US PPP = purchasing power parity.

Figure 1
U.S. Prescription Drug Spending Estimates and Projections by Source, 2010-20

Note: Figures in the billions of dollars.

Sources: The Altarum Institute, Department of Health and Human Services’ Office of the Assistant Secretary for Planning and Evaluation, the Centers for Medicare & Medicaid Services’ National Health Expenditures Accounts, and IQVIA

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National Trends in Per Capita Pharmaceutical Spending, 1980–2015

Notes: Final expenditure on pharmaceuticals includes wholesale and retail margins and value-added tax. Total pharmaceutical spending refers in most countries to “net” spending, i.e., adjusted for possible rebates payable by manufacturers, wholesalers, or pharmacies. Data from all countries include only the portion spent on retail prescription medications, except for the Netherlands and the United Kingdom, where spending on pharmaceuticals includes prescribed medicines, over-the-counter medications, and other medical nondurable goods. Pharmaceuticals consumed in hospitals and other health care settings are excluded.


Monthly Price of Six Top-Selling Prescription Drugs

Note: Data not available for the Netherlands, Norway, or Sweden, nor for Australia in the case of Sovaldi.


And yet, we are not succeeding
Exhibit 6
Adults Who Cited Cost as a Reason for Skipping Prescriptions or Doses, 2016

Data: 2016 Commonwealth Fund International Health Policy Survey of Adults in 11 Countries.


Exhibit 7
Adults Who Cited Cost as a Reason for Skipping Prescriptions or Doses, by Health Status, 2016

Data: 2016 Commonwealth Fund International Health Policy Survey of Adults in 11 Countries.

Drug Overdose Deaths Are Outpacing Other Public Health Epidemics

Deadly overdoses per year compared to past epidemic death peaks.

- Car crashes (1972)
- HIV (1995)
- Firearm homicides (1993)
- Drug overdoses

64,070

Source: CDC, NHTSA

ALISSA SCHELLER/HUFFPOST

Obesity trends* among U.S. adults, 1990

(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)
Obesity trends* among U.S. adults, 2000

(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)
Obesity trends* among U.S. adults, 2010

(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)
Life expectancy vs. health expenditure over time (1970-2014)

Health spending measures the consumption of health care goods and services, including personal health care (curative care, rehabilitative care, long-term care, ancillary services and medical goods) and collective services (prevention and public health services as well as health administration), but excluding spending on investments. Shown is total health expenditure (financed by public and private sources).

American exceptionalism
Difference between average American life expectancy, and OECD average life expectancy, 1960–2015

Source: OECD, U.S. Census Bureau
Life expectancy in America has declined for two years in a row. That's not really meant to happen in developed countries.

Life expectancy declines seen in U.S. and other high-income countries.

What the dip in US life expectancy is really about: inequality. While poor Americans are dying earlier, the rich are enjoying unprecedented longevity.

Dying younger: U.S. life expectancy 'a real problem'

Fueled by drug crisis, U.S. life expectancy declines for a second straight year.
Our options
The wonder drug
A digital revolution in health care is speeding up
Telemedicine, predictive diagnostics, wearable sensors and a host of new apps will transform how people manage their health

Diagnostics Without Borders: Innovations in Telehealth

How the EMR Is Increasing Innovation and Creativity in Health Care
by A. James Bender and Robert S. Mecklenburg
OCTOBER 10, 2017

Business Model Innovation for Inclusive Health Care Delivery at the Bottom of the Pyramid
Federica Angeli, Anand Kumar Jaiswal,
How do we create a healthier world?
1. Focus on health not healthcare
The spending mismatch: Health determinants vs. health expenditures

**Determinants**

- Access to care: 6%
- Genetics: 20%
- Socioeconomic and physical environments: 22%
- Healthy behaviors: 37%
- Interactions among determinants: 15%

**National health expenditures:**

- Medical services: 90%
- Healthy behaviors: 9%
- Other: 1%

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Bostonfoundation.org
National Center for Health Statistics

Leading Causes of Death

Number of deaths for leading causes of death

- Heart disease: 633,842
- Cancer: 595,930
- Chronic lower respiratory diseases: 155,041
- Accidents (unintentional injuries): 146,571
- Stroke (cerebrovascular diseases): 140,323
- Alzheimer's disease: 110,561
- Diabetes: 79,535
- Influenza and pneumonia: 57,062
- Nephritis, nephrotic syndrome, and nephrosis: 49,959
- Intentional self-harm (suicide): 44,193

Source: Health United States, 2016 Table 19

Related FastStats

- Deaths and mortality
# Actual causes of death in the United States in 1990 and 2000

<table>
<thead>
<tr>
<th>Actual Cause</th>
<th>No. (%) in 1990</th>
<th>No. (%) in 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobacco</td>
<td>400 000 (19)</td>
<td>435 000 (18.1)</td>
</tr>
<tr>
<td>Poor diet and physical inactivity</td>
<td>300 000 (14)</td>
<td>365 000 (15.2)*</td>
</tr>
<tr>
<td>Alcohol consumption</td>
<td>100 000 (5)</td>
<td>85 000 (3.5)</td>
</tr>
<tr>
<td>Microbial agents</td>
<td>90 000 (4)</td>
<td>75 000 (3.1)</td>
</tr>
<tr>
<td>Toxic agents</td>
<td>60 000 (3)</td>
<td>55 000 (2.3)</td>
</tr>
<tr>
<td>Motor vehicles</td>
<td>25 000 (1)</td>
<td>43 000 (1.8)</td>
</tr>
<tr>
<td>Firearms</td>
<td>35 000 (2)</td>
<td>29 000 (1.2)</td>
</tr>
<tr>
<td>Sexual behavior</td>
<td>30 000 (1)</td>
<td>20 000 (0.8)</td>
</tr>
<tr>
<td>Illicit drug use</td>
<td>20 000 (&lt;1)</td>
<td>17 000 (0.7)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1 060 000 (50)</strong></td>
<td><strong>1 159 000 (48.2)</strong></td>
</tr>
</tbody>
</table>

Deaths attributable to social factors

<table>
<thead>
<tr>
<th>Social Factor</th>
<th>No. (%) in 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Individual-level factors</strong></td>
<td></td>
</tr>
<tr>
<td>Low education</td>
<td>193 626 (8.3)</td>
</tr>
<tr>
<td>Poverty</td>
<td>102 672 (4.4)</td>
</tr>
<tr>
<td>Low social support</td>
<td>179 937 (7.7)</td>
</tr>
<tr>
<td><strong>Area-level factors</strong></td>
<td></td>
</tr>
<tr>
<td>Area-level poverty</td>
<td>39 553 (1.7)</td>
</tr>
<tr>
<td>Income inequality</td>
<td>145 388 (6.2)</td>
</tr>
<tr>
<td>Racial segregation</td>
<td>153 796 (6.6)</td>
</tr>
</tbody>
</table>
Comparing deaths from social factors to other causes

<table>
<thead>
<tr>
<th>Social Factor</th>
<th>No. (%)</th>
<th>Cause of Death</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low education</td>
<td>193,626 (8.3)</td>
<td>Acute MI</td>
<td>192,898 (8.0)</td>
</tr>
<tr>
<td>Low social support</td>
<td>179,937 (7.7)</td>
<td>Stroke</td>
<td>167,661 (7.0)</td>
</tr>
<tr>
<td>Racial segregation</td>
<td>153,796 (6.6)</td>
<td>Lung cancer</td>
<td>155,521 (6.5)</td>
</tr>
<tr>
<td>Income inequality</td>
<td>145,388 (6.2)</td>
<td>Chronic lower resp. dis.</td>
<td>122,009 (5.1)</td>
</tr>
<tr>
<td>Poverty</td>
<td>102,672 (4.4)</td>
<td>Unintentional injuries</td>
<td>97,900 (4.1)</td>
</tr>
<tr>
<td>Area-level poverty</td>
<td>39,553 (1.7)</td>
<td>Renal failure</td>
<td>36,471 (1.5)</td>
</tr>
</tbody>
</table>

Change in Massachusetts State Government spending, FY01-FY14, adjusted for inflation

* Health care expenditure is Group Insurance Commission spending plus MassHealth (Medicaid)

"Healthy People/Healthy Economy: An Initiative to Make Massachusetts the National Leader in Health and Wellness." 2015. Data from Massachusetts Budget and Policy Center Budget Browser. [http://www.tbf.org/tbf/56/hphe/Health-Crisis](http://www.tbf.org/tbf/56/hphe/Health-Crisis)
2. Demand health from our politics
ARSENAL FOUND IN LAS VEGAS GUNMAN’S ROOM AS DEATH TOLL GROWS TO 59; MORE THAN 520 HURT

Suspect Found Dead After One of Worst U.S. Mass Shootings
By THE NEW YORK TIMES
7:12 PM ET

- The police identified the suspect as Stephen Paddock, 64, and said he had killed himself.
- In his hotel room, the suspect had at least 17 firearms, including a handgun, and some were rifles equipped with scopes, an official said.

OPINION

OP-ED CONTRIBUTOR
Nothing Will Change After the Las Vegas Shooting
By STEVE ISRAEL 7:33 PM ET
I used to hope that tragedy would inspire my colleagues in Congress to take action about gun violence. It never does.

98 Comments

OP-ED COLUMNIST
Preventing Mass Shootings Like the Vegas Strip Attack
By NICHOLAS KRISTOF 4:47 PM ET
What we need most of all isn’t mourning, but action.

2020 Comments

CONTRIBUTING OP-ED WRITER
In Las Vegas, We Take Care of People
By BRITTANY BRONSON 5:30 PM ET
But hospitality and prayers can do only so much to prevent another shooting.

Letters: Pleas for Gun Control
Annual gun lobbying expenditures for different groups, 2008 to 2017

$Millions


Gun control  Gun rights  Gun manufacturing

Mass shooting at Sandy Hook Elementary School

Adjusted prevalence ratio of obesity by subsidy score quartiles, National Health and Nutrition Examination Survey from 2001 to 2006

3. Think of health as a public good
…things [that] do not lend themselves to [market] production, purchase, and sale. They must be provided for everyone if they are to be provided for anyone, and they must be paid for collectively or they cannot be had at all.”
DONATE WATER HERE FOR FLINT
Big Blue’s heartbreak
Star running back’s career over at 23

EBOLA!
Man tested for disease in NYC

By JAME SCHRAM

Fears of an Ebola outbreak in New York City were heightened Monday when a man who recently returned from West Africa was treated at a Manhattan hospital for symptoms of the deadly disease. The unidentified patient, complaining of high fever and gastrointestinal distress, was placed in “strict isolation” at Mount Sinai Hospital. While he underwent a battery of tests for the virus (right), The hospital expects to receive the results either See EBOLA Page 4

Page Six
Minnesota's measles outbreak is what happens when anti-vaxxers target immigrants

A new study found Minnesota children with foreign-born parent were 25 percent less likely to have their vaccines.

By Julia Belluz  |  @juliofotronto  |  julia.belluz@voxmedia.com  |  Oct 26, 2017, 12:59pm EDT
10% of children killed by motor vehicles were pedestrians killed by an alcohol-impaired driver

https://www.cdc.gov/motorvehiclesafety/impaired_driving/impaired-driv-factsheet.html
https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812281
True compassion is more than flinging a coin to a beggar; it comes to see that an edifice which produces beggars needs restructuring.
Marco Rubio
@marcorubio

Saddened by the deadly shooting in Virginia this morning. My thoughts and prayers are with the family and friends of the victims.
11:29 AM - 26 Aug 2015

John Faso
@RepJohnFaso

This senseless shooting in Las Vegas is absolutely heart breaking. My thoughts and prayers go out to all of the victims and their families.
6:06 AM - Oct 2, 2017

Marco Rubio
@marcorubio

Our prayers are with those injured and killed early this morning in horrifying act of terror in Orlando.
8:15 AM - 12 Jun 2016

Speaker John Boehner
@SpeakerBoehner

Prayers for the victims, families, students, & faculty at Umpqua Community College, & the community of Roseburg, Oregon.
11:47 AM - 1 Oct 2015
Racial segregation is associated with lower life expectancy
4. Recognize health as a means, not an end
"Health is a state of complete physical, mental, and social well being, and not merely the absence of disease or infirmity."

THIS BABY COULD LIVE TO BE 142 YEARS OLD
Dispatches From the Frontiers of Longevity
Personalized medicine: inevitable

The Path to Personalized Medicine
Margaret A. Hamburg, M.D., and Francis S. Collins, M.D., Ph.D.

Major investments in basic science have created an opportunity for significant progress in the NIH and the FDA will invest in advancing translational and clinical medicine. This perspective highlights the need for a plan to ensure that the promise of personalized medicine is realized.

The Case for Personalized Medicine
Edward Abrahams, Ph.D., and Mike Silver, Ph.D.
Potential gain in survival peaks at ~100; then rapid decline till ~115

88% of Americans die before the age of 94

98% of Americans die before the age of 100

Mean life expectancy: 79

Prevention, keeping us from getting sick

Treatment, curing us once we get sick

<http://www.tbfo/tbf/56/hpfe/Health-Crisis>
Exhibit 1

Excess And Averted Breast Cancer Deaths In The United States, Compared To Western Europe, 1982-2010

Source: Authors' analysis of data from the World Health Organization Cancer Mortality Database and the Human Mortality Database (see Note 13 in text).

Soneji S, Yang JW. New analysis reexamines the value of cancer care in the United States compared to Western Europe. Health Affairs, 34, no.3 (2015):390-397
5. Choose the freedom to be healthy
In Congress, July 4, 1776.

DECLARATION,

By the REPRESENTATIVES of the
UNITED STATES OF AMERICA,

In GENERAL CONGRESS Assembled.

WHEN in the course of human events, it becomes necessary for one people to dissolve the Political Bands which have connected them with another, and to assume among the powers of the earth, the separate and equal Station to which the Laws of Nature and of Nature's God entitle them, a decent Respect to the Opinions of Mankind requires that they should declare the Causes which impel them to the Separation.

We hold these Truths to be self-evident, that all Men are created equal, that they are endowed by their Creator with certain inalienable Rights, that among these are Life, Liberty, and the Pursuit of Happiness.—That to secure these Rights, Governments are instituted among Men, deriving their just Powers from the Consent of the Governed, that whenever any Form of Government becomes destructive of these Ends, it is the Right of the People to alter or to abolish it, and to institute new Government, laying its Foundation on such Principles, and organizing its Powers in such Form, as to them shall seem most likely to effect their Safety and Happiness. Prudence, indeed, will dictate that Governments long established should not be changed for light and transient Causes; and accordingly all experience hath shown, that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. But when a long train of abuses and usurpations, pursuing invariably the same Object, evinces a Design to reduce them under absolute Despotism, it is the Right of the People to alter or to abolish it, and to institute new Government, laying its Foundation on such Principles, and organizing its Powers in such Form, as to them shall seem most likely to effect their Safety and Happiness.

He has unrestricted Government here, by declaring us out of his protection, and waging War against us.

He has plundered our seas, ravaged our Coasts, burnt our Towns, and destroyed the lives of our people.

He is at this time transporting large Armies of foreign Mercenaries to compleat the works of Death, Desolation and Tyranny already begun with circumstances of Cruelty, and Perfidy scarcely paralleled in the most barbarous Ages, and totally unworthy the Head of a civilized Nation.

He has constrained our fellow Citizens taken Captive on the high Seas to bear Arms against their Country, to become the Executioners of their Friends and Brethren, or to fall themselves by their hands.

He has excited domestic Insurrections amongst us, and has endeavored to bring on...
Adult Obesity Rates by State, 2017

SOURCE: BRFSS

New soda wars: infringement on freedoms?

June 06, 2012 | Daily News Editorial

OPEN WIDE! HERE COMES THE AIRPLANE!

NANNY STATE
<table>
<thead>
<tr>
<th>Food</th>
<th>20 Years Ago</th>
<th>Today</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bagel</td>
<td>140 calories</td>
<td>350 calories</td>
</tr>
<tr>
<td>(3” diameter)</td>
<td></td>
<td>(6” diameter)</td>
</tr>
<tr>
<td>Muffin</td>
<td>210 calories</td>
<td>500 calories</td>
</tr>
<tr>
<td>(1.5 oz)</td>
<td></td>
<td>(4 oz)</td>
</tr>
<tr>
<td>Cheeseburger</td>
<td>333 calories</td>
<td>590 calories</td>
</tr>
<tr>
<td>Pasta (Spaghetti &amp;</td>
<td>500 calories</td>
<td>1025 calories</td>
</tr>
<tr>
<td>Meatballs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>French Fries</td>
<td>210 calories</td>
<td>610 calories</td>
</tr>
<tr>
<td>(2.4 oz)</td>
<td></td>
<td>(6.9 oz)</td>
</tr>
<tr>
<td>Soda</td>
<td>85 calories</td>
<td>250 calories</td>
</tr>
<tr>
<td>(6.5 oz)</td>
<td></td>
<td>(20 oz)</td>
</tr>
<tr>
<td>Theater Popcorn</td>
<td>270 calories</td>
<td>630 calories</td>
</tr>
<tr>
<td>(5 cups)</td>
<td></td>
<td>(1 tub)</td>
</tr>
<tr>
<td>Turkey Sandwich</td>
<td>320 calories</td>
<td>820 calories</td>
</tr>
<tr>
<td>Pizza</td>
<td>500 calories</td>
<td>850 calories</td>
</tr>
<tr>
<td>(2 slices)</td>
<td></td>
<td>(2 calories)</td>
</tr>
</tbody>
</table>
FIGURE 1. Motor-vehicle–related deaths per million vehicle miles traveled (VMT) and annual VMT, by year — United States, 1925–1997
A concluding metaphor
twitter/@sandrogalea
sgalea@bu.edu