NICH and the Future of Behavioral and Social Science Research

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Complex Systems, Health Disparities & Population Health: Building Bridges.

February 24, 2014
“Science in pursuit of fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to enhance health, lengthen life and reduce illness and disability.”
NIH  Turning Discovery into Health
How Did We Do It?

- Identify the mechanisms of disease in basic preclinical research
- In the clinic diagnose the problem (find it)
- Using evidence based interventions, treat the problem (fix it)
- FIND IT- FIX IT
But, how well are we doing in extending life span and improving life quality?
Source: Chapter 2, Diverging Trends in Life Expectancy at Age 50: A Look at Causes of Death, D. Glei, F. Mesle, J. Vallin
17 Peer Comparison Countries

- Australia
- Austria
- Canada
- Denmark
- Finland
- France
- Germany
- Italy
- Japan
- Norway
- Portugal
- Spain
- Sweden
- Switzerland
- The Netherlands
- United Kingdom
- United States
Mortality from Non-Communicable Diseases (NCD), 2008

Among the 17 peer countries, the US had 2nd highest NCD mortality rate in 2008 (418:100,000)

From IOM/NAS Report US Health in International Perspective: Shorter Lives, Poorer Health
Mortality from Communicable (Infectious) Diseases, 2008

Among the 17 peer countries:

- US had 4th highest infectious disease mortality rate in 2008 (34:100,000)
- US had the highest incidence of AIDS (3rd highest in OECD, exceeded only by Brazil and South Africa).
- AIDS incidence in the US (122 per million) was almost 9 times the OECD average (14 per million).

The problem is longstanding and worsening. In 1980, US life expectancy among females was about average, and was near the bottom for males, but by 2006 US life expectancy for both sexes had fallen to the bottom ranks.
US male and female newborns can expect to lose about 1.4 years and 0.8 years of life, respectively, before age 50.

The US losses before age 50 are double those of Sweden, the best performing country.
Probability of Survival to Age 50 in 21 High-Income Countries, 1980-2006

From IOM/NAS Report US Health in International Perspective: Shorter Lives, Poorer Health

For decades, American youth have been less likely to survive to age 50 than people in other rich nations.
Although the Mechanistic Model Works well for Acute Illness, Most Disease Burden Is from NCDs
Median Glycated Hemoglobin Levels at Each Study Visit ACCORD Trial (NEJM, 358:2545-2559)

No. at Risk

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Median Glycated Hemoglobin Levels at Each Study Visit ACCORD Trial (NEJM, 358:2545-2559)

Fixed
Kaplan-Meier Curves for the Primary Outcome and Death from Any Cause ACCORD Trial (NEJM, 358:2545-2559)
Angioplasty with Stent Placement
NHLBI website
COURAGE TRIAL
Kaplan-Meier Survival Curves

A
Survival Free of Death from Any Cause and Myocardial Infarction

Hazard ratio, 1.05; 95% CI (0.87–1.27); P=0.62

Years
0 1 2 3 4 5 6 7

No. at Risk
Medical therapy 1138 1017 959 834 638 408 192 30
PCI 1149 1013 952 833 637 417 200 35

B
Overall Survival

Hazard ratio, 0.87; 95% CI (0.65–1.16); P=0.38

Years
0 1 2 3 4 5 6 7

No. at Risk
Medical therapy 1138 1029 917 717 468 302 38
PCI 1149 1051 929 733 488 312 44

C
Survival Free of ACS

Hazard ratio, 1.07; 95% CI (0.84–1.37); P=0.56

Years
0 1 2 3 4 5 6 7

No. at Risk
Medical therapy 1138 1025 956 833 662 418 236 127
PCI 1149 1027 957 835 667 431 246 134

D
Survival Free of Myocardial Infarction

Hazard ratio, 1.13; 95% CI (0.89–1.43); P=0.33

Years
0 1 2 3 4 5 6 7

No. at Risk
Medical therapy 1138 1019 962 834 638 409 192 120
PCI 1149 1015 954 833 637 418 200 134
How Often?

It is not just that null results occur in some trials. In recent years, null results were obtained in most large trials that considered mortality.

From Kaplan & Irvin submitted
Much of the decline in heart disease preceded modern therapy. Statins emerged in 1987.
Both cigarette smoking and heart disease were relatively uncommon at the turn of the 20th Century. Both began to rise sharply after 1910 and continued their assent until about 1940. In both cases, the peak occurs around 1950 and the plateau continues until the mid-1960s. Since then, both deaths from heart disease and cigarette smoking have steadily declined.
Network on Inequality, Complexity & Health (NICH)

Meeting at Natcher Center, NIH
February 24-25, 2014
What is the return on $2.9 trillion?

Adapted from Rick Brush, Collective Health
What Makes us Healthy?

Health Determinants

Health Care 10%

Health Behaviors 50%

Other Factors 40%

Adapted from Rick Brush, Collective Health
What We Spend on Being Healthy

Health Spending

97% Health Care

3% Prevention

What We Spend on Being Healthy

Health Spending

Adapted from Rick Brush, Collective Health
Health Spending

97%

Health Care

10%

Health Determinants

Prevention

90%

(Health Behaviors & Other Factors)

3%

Adapted from Rick Brush, Collective Health
Quality-Adjusted Life Years By Risk Group

Data estimated from Whitehall 39 year follow-up: Clarke BMJ 2009;339:b3513
How do we produce a “ready for life” 18 year old?
Robert H. Dugger, Chairman of the ReadyNation Advisory Board and Invest in Kids Working Group
"Somebody has to do something, and it's just incredibly pathetic that it has to be us."