BAILING OUT HEALTH CARE THROUGH INNOVATION:
What can we learn from one another?

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I. FIRST, A LITTLE *ECONOMICS 101*

An exasperated President Harry Truman once exclaimed:

Give me a one-handed economist. All my economists say, 'On the one hand, on the other!'

Health economists follow this *duo-manual* tradition.

At cocktail parties or in testimony before legislators, we will say with a straight face:

1. **On the one hand, society gets *on average* very high value for the money it spends on health care.**

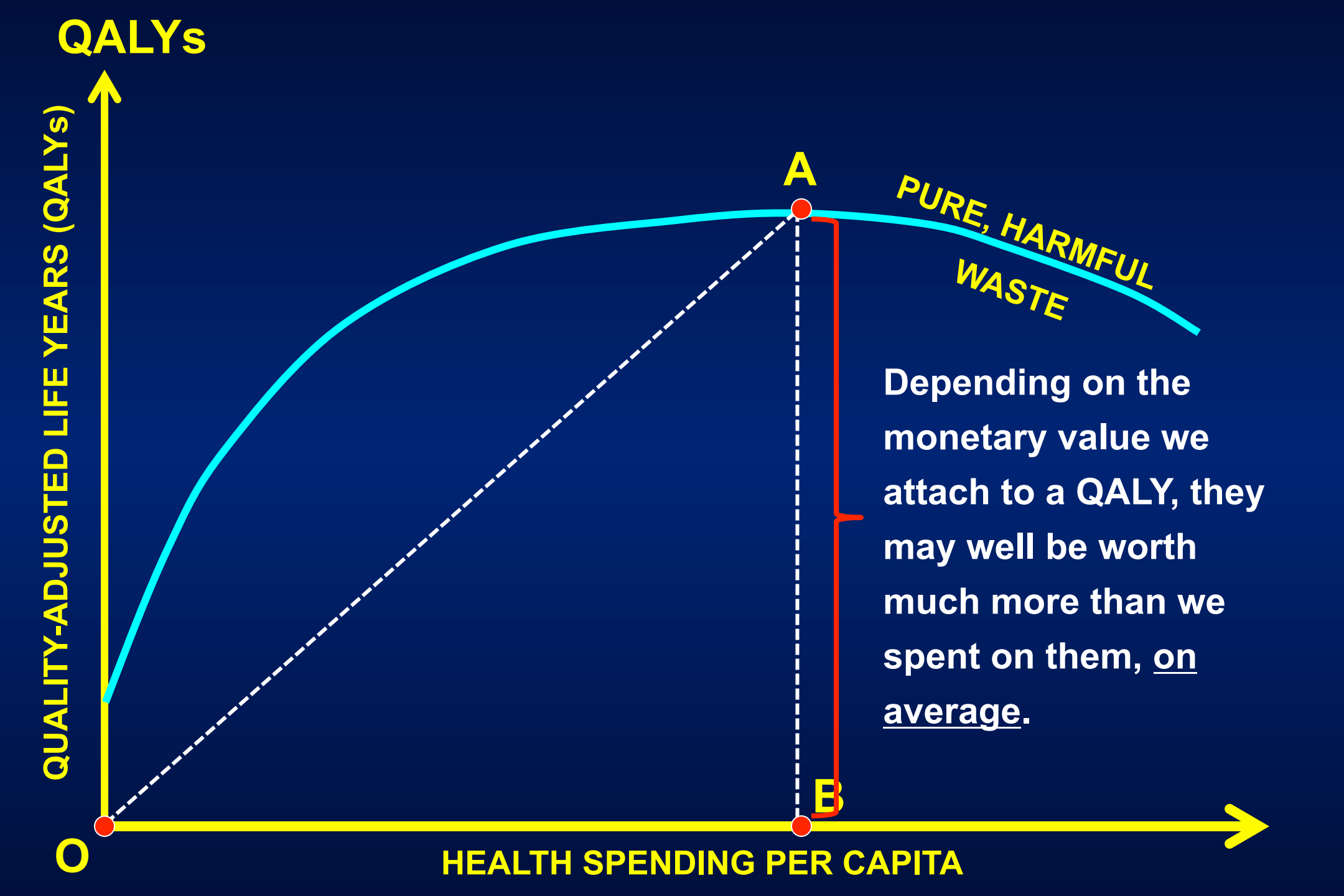
2. **On the other hand, there is much waste in most health systems. In the U.S., that waste probably is as much as 30% of total health spending.**

How could both be true?

In their own unique prose, economists explain it thus:

Well, the second derivate of the twice-differentiable input-output relationship in health care is negative.

Economists expect that any taxi driver or journalists can easily understand that.


QALYs
QUALITY-ADJUSTED LIFE YEARS (QALYs)
A
PURE, HARMFUL WASTE
Depending on the monetary value we attach to a QALY, they may well be worth much more than we spent on them, on average.
B
O
HEALTH SPENDING PER CAPITA

Here is what prominent economists have said about the average value contributed by health care – especially by medical innovations.

Measuring the Gains from Medical Research

An Economic Approach

EDITED BY Kevin M. Murphy AND Robert H. Topel

In 1998, health expenditures in the United States accounted for 12.9% of national income—the highest share of income devoted to health in the developed world. The United States also spends more on medical research than any other country—in 2000, the federal government dedicated $18.4 billion to it, compared with only $3.7 billion for the entire European Union. In this book, leading health economists ask whether we are getting our money's worth.

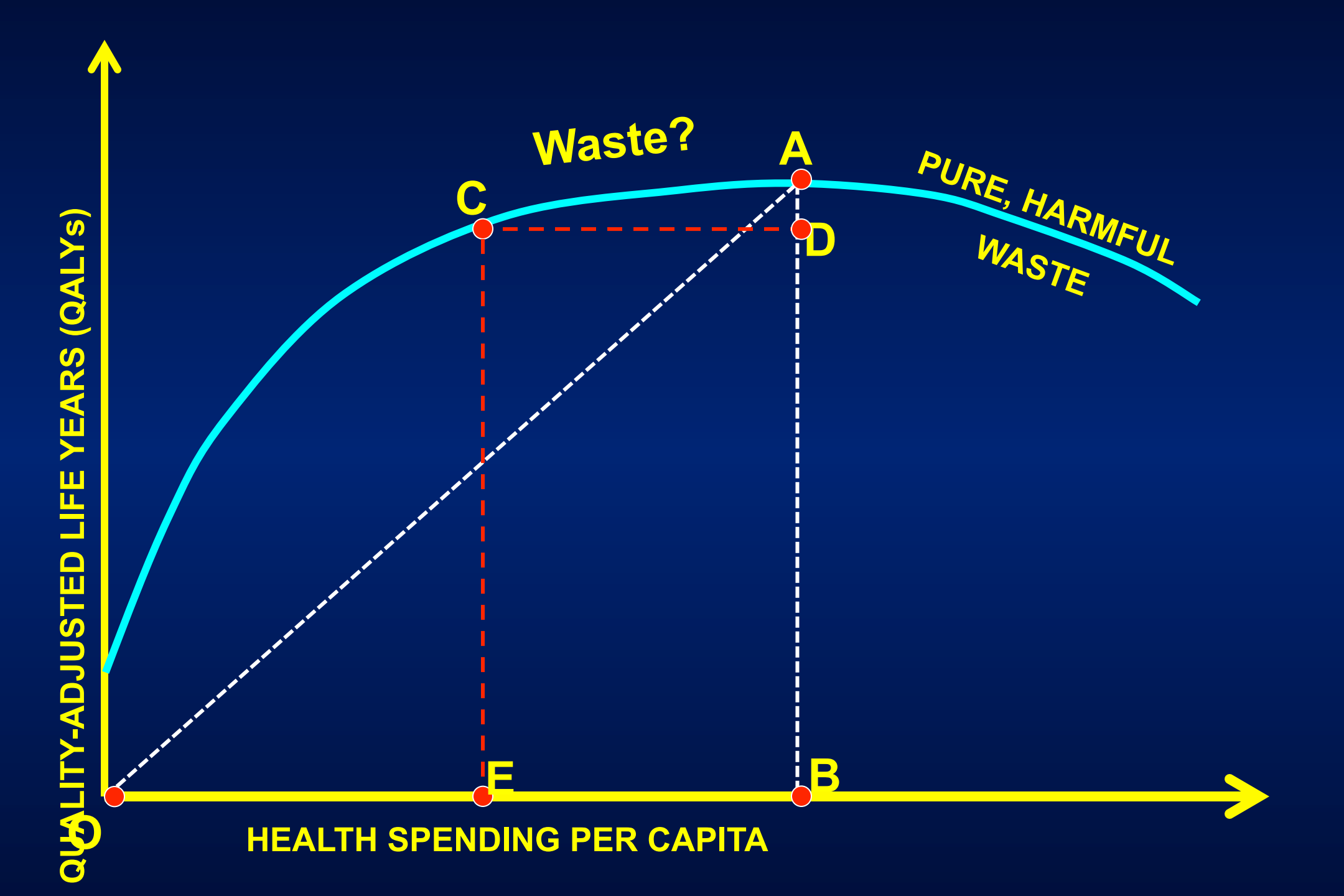
From an economic perspective, they find, the answer is a resounding "yes": in fact, considering the extraordinary value of improvements to health, we may even be spending too *little* on medical research. The evidence these papers present and the conclusions they reach are both surprising and convincing: that growth in longevity since 1950 has been as valuable as growth in all other forms of consumption combined; that medical advances producing 10% reductions in mortality from cancer and heart disease alone would add roughly $10 trillion—a year's GDP—to the national wealth; or that the average new drug approved by the FDA yields benefits worth many times its cost of development.

In their thinking and teaching, economists make an important distinction between

1. **Average productivity in terms of value produced, and**

2. **Marginal productivity, that is, the added value produced by added inputs (speak: spending).**

If the input-output relationship is non-linear (which it hardly ever is), these two metrics are not the same thing.


Waste?
A
C
D
PURE, HARMFUL
WASTE
QUALITY-ADJUSTED LIFE YEARS (QALYs)
O
E
B
HEALTH SPENDING PER CAPITA

There have always been two distinct views on health care:

1. **VIEW I: As long as an innovative medical procedure (or any other) yields positive benefits to patients at all, it should be done.**

2. **VIEW II: Even if the benefits from a medical procedure are positive, the intervention should be done only if the value of those benefits covers their opportunity costs.**

For many decades after WW II, VIEW I drove health policy in many developed countries, certainly in the U.S.

In no other sector of the economy do we look only at the value created by an activity, but not its opportunity cost – that is, the things we must give up to get that value

Why was medicine made an exception?

It is because doctors, hospitals, pharma etc persuaded us to that they claimed was

EINSTEIN'S VALUE THEORY OF HEALTH CARE

$$V_i = \ln\{\lim_{\delta \to \infty}(1+1/\delta)^{\delta}\} \cdot C_i^{\ln(1)} \cdot M_i^{\left\{\int_{-\infty}^{\infty} \frac{1}{(2\pi)^{1/2}\sigma} e^{-1/2([v_i - \mu]/\sigma)^2} dv_i\right\}}$$

where

V_i = the value of health care produced in in country i

M_i = health spending per capita in country i

C_i = a country-specific real number that translates money (M_i) into quality (V_i)

v_i = the deviation of average physician visits per capita in country i from the world average -- a random variable distributed with mean μ and standard deviation σ

δ = a real number that varies over time

This complicated equation can be simplified a bit, as follows:

$$V_i = \ln\{\lim_{\delta \to \infty}(1+1/\delta)^{\delta}\} \cdot C_i \cdot M_i \left\{\int_{-\infty}^{\infty} \frac{1}{(2\pi)^{1/2}\sigma} e^{-\frac{1}{2}([v_i - \mu]/\sigma)^2} dv_i\right\}$$

2.718282…

e

$\ln e = 1$

0

$\ln(1)$

1

Because the power to which *e* has to be raised to result in *e* is 1, that is, $e^1 = e$.

This is the normal probability density function of variable v_i .

Because v_i must have <u>some</u> value between $-\infty$ and ∞, the <u>integral</u> of this function must always equal **1**

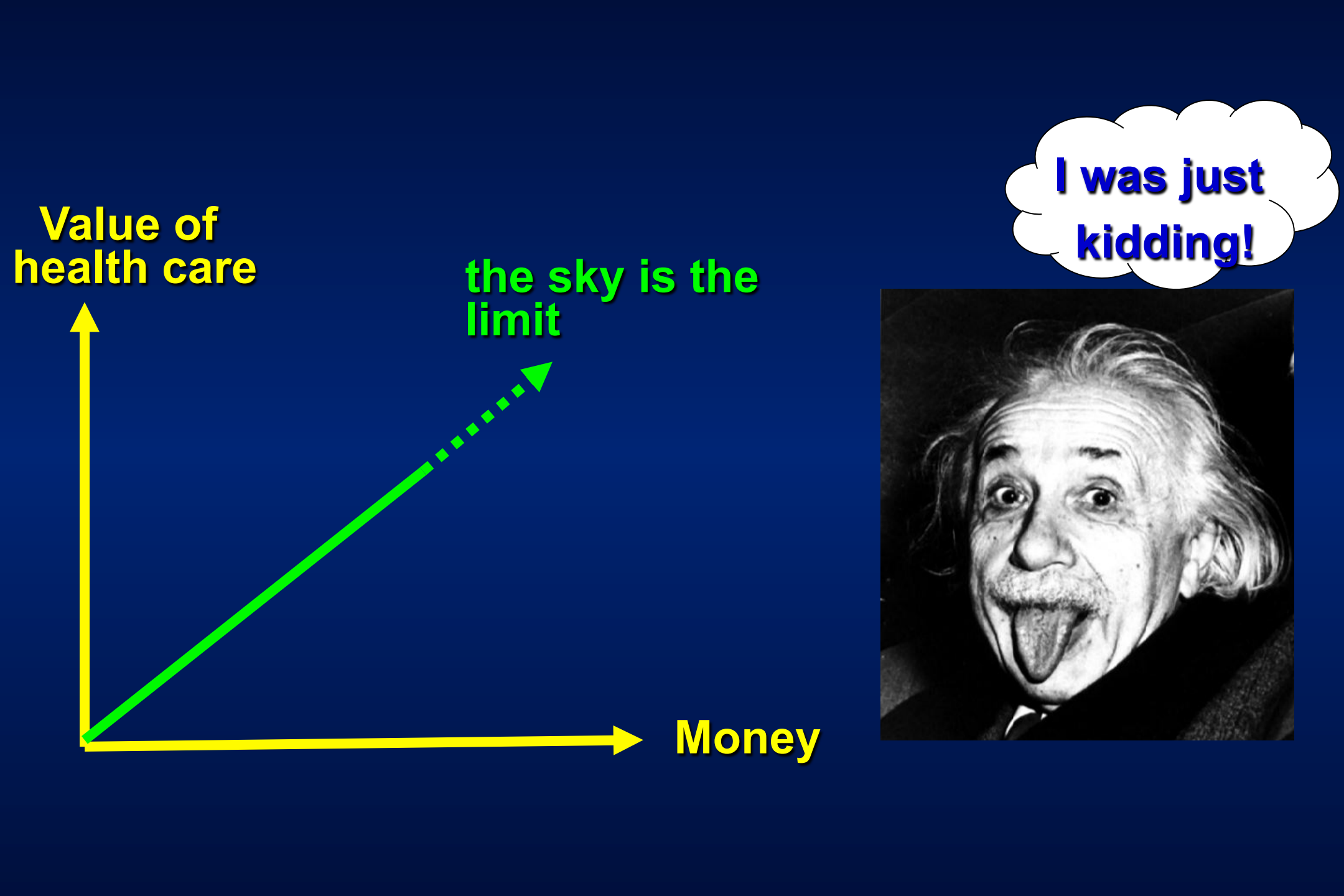
Raising a real number to the power 1 is doing nothing to the number, and if you don't do nothing to a number it stays the same – as it were.

So in practice Einstein's theory of modern medicine reduces to

$$V = M$$

It is now immediately apparent why Einstein is rumored to have been awarded the Nobel Prize in Medicine for this cosmic equation.

If we plot it in a graph, it looks like the next slide.


Value of health care
the sky is the limit
Money
I was just kidding!

I recall the head of the *American Medical Association (AMA)* once telling a commission on physician payments (on which I served) that:

"Whenever you take money out of health care, some patient gets hurt."

I think he actually believed it.

Several macro-economic factors are now rendering the V = M theory obsolete:

1. Recessions and sluggish general economic growth;

2. Growing income inequality that imperils the Principle of Solidarity in health care;

3. Reckless public or private fiscal mismanagement in the U.S. and in many European countries.

Health spending cannot be expected to grow as rapidly year-to-year as it once did.

Increasingly health policy will be guided by a more sophisticated value equation in health care, namely:

Net Social Value Added by the Health System = **Gross Value Added by Health Care to Patients** − **The Opportunity Costs of that Care for Society**

Among these opportunity costs are:

- Neglecting the education of our young
- Neglecting basic science and R&D
- Neglecting the nation's public infrastructure
- Giving up other enjoyable things that households enjoy

Europe has been years ahead of the U.S. in thinking this way. But the U.S. is learning from the European experience and cannot avoid thinking that way in the future.

In particular, it will guide the way we will think about ***innovation*** in health care.

III. INNOVATIONS NEEDED TO BAIL OUT HEALTH CARE

Many critics of health care believe that technological innovations in health-care products – drugs, biologicals, devices, etc. – are the main culprit behind rising health care costs and therefore should be discouraged.

Are we sure that is the right approach?

We are talking here of potentially amazing new technology in

1. Biologicals
2. Next generation genomics
3. Material science
4. Neuromodulation
5. Nano technology
6. Bio mathematics
7. Computer technology and IT
8. Other

Even if they were expensive, we could afford many of these probably great technological innovations if we eliminated health spending now wasted on

1. Needlessly cumbersome administrative and regulatory processes, and
2. Outdated organizational forms in health care – e.g., the archaic division of ambulatory and inpatient care,
3. Expensive acute care that could have been avoided through prevention and early diagnosis.
4. Unhealthy behavior and nutrition by individuals.

REPORT BRIEF SEPTEMBER 2012

INSTITUTE OF MEDICINE
OF THE NATIONAL ACADEMIES

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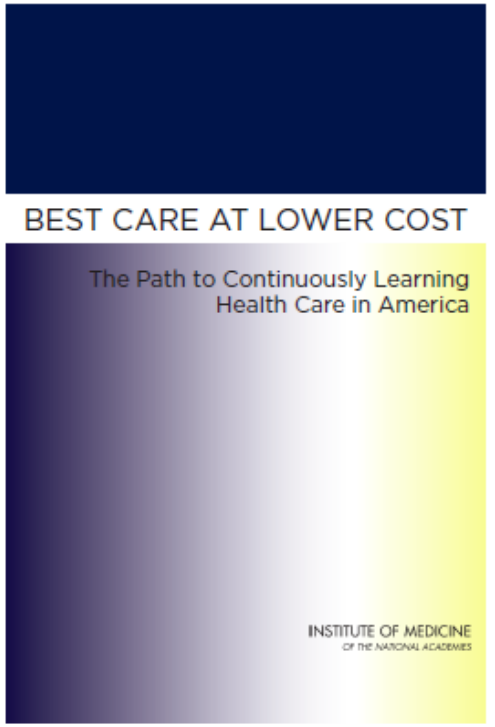
Best Care at Lower Cost

The Path to Continuously Learning Health Care in America



SOURCES OF ESTIMATED EXCESS COSTS, U.S. 2009

31% of Total Health Spending of $2.5 trillion

1. Unnecessary services	$210 billion
2. Inefficiently delivered care	$130 billion
3. Excess administrative costs	$190 billion
4. Excessively high prices	$105 billion
4. Missed prevention opportunities	$ 55 billion
4. Fraud	$ 75 billion
TOTAL	$ 765 billion

SOURCE: Institute of Medicine, Best Care at Lower Cost (2013) Table 3-1.

III. INNOVATIONS NEEDED TO BAIL OUT HEALTH CARE

A. Simplifying administration

We need not only evidence-based clinical practice, but also evidence-based administrative practice.

Here the U.S. could learn something from the much more streamlined European health systems.

In a commentary (on another paper) published in the *New England Journal of Medicine* (August 21, 2003) Brookings economists Henry Aaron has called this healht insurance system

"an administrative monstrosity, a truly bizarre mélange of thousands of payers with payment systems that differ for no socially beneficial reason."

Americans pay a heavy price for this monstrosity.

III. INNOVATIONS NEEDED TO BAIL OUT HEALTH CARE

A. Simplifying administration

B. More efficient “industrial” processes

- Integrated delivery of care (e.g. a la Kaiser in the US)
- Greater transparency of cost and quality
- Payment Reform: from fee-for-service to payment per case or capitation.

Nations all over the world are now experimenting with these innovations.

Obamacare in the U.S. explicitly encourages such innovations.

I believe that the rest of the world can learn much from the U.S. in this regard.

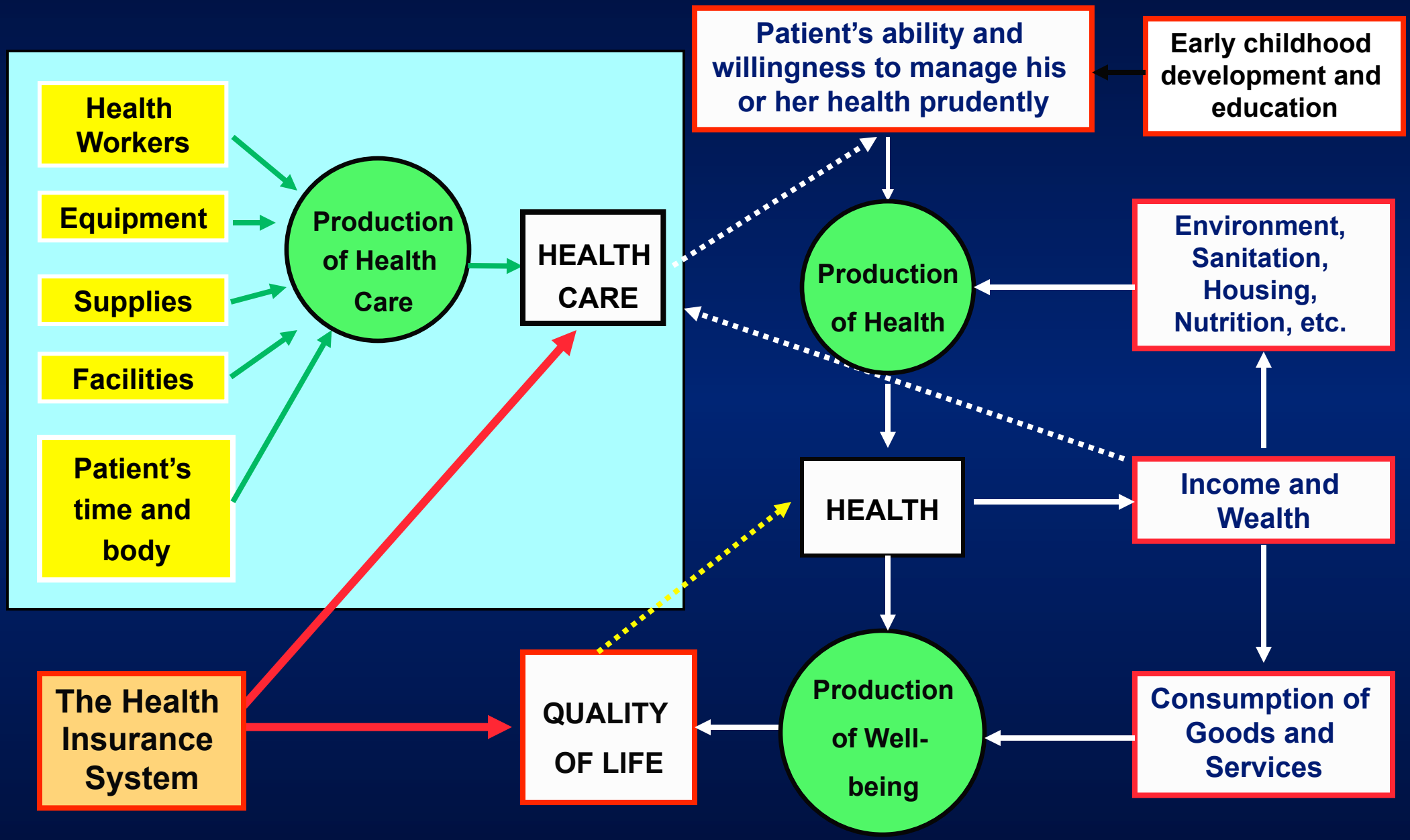
III. INNOVATIONS NEEDED TO BAIL OUT HEALTH CARE

A. Simplifying administration

B. More efficient “industrial” processes

C. Better health management by individuals

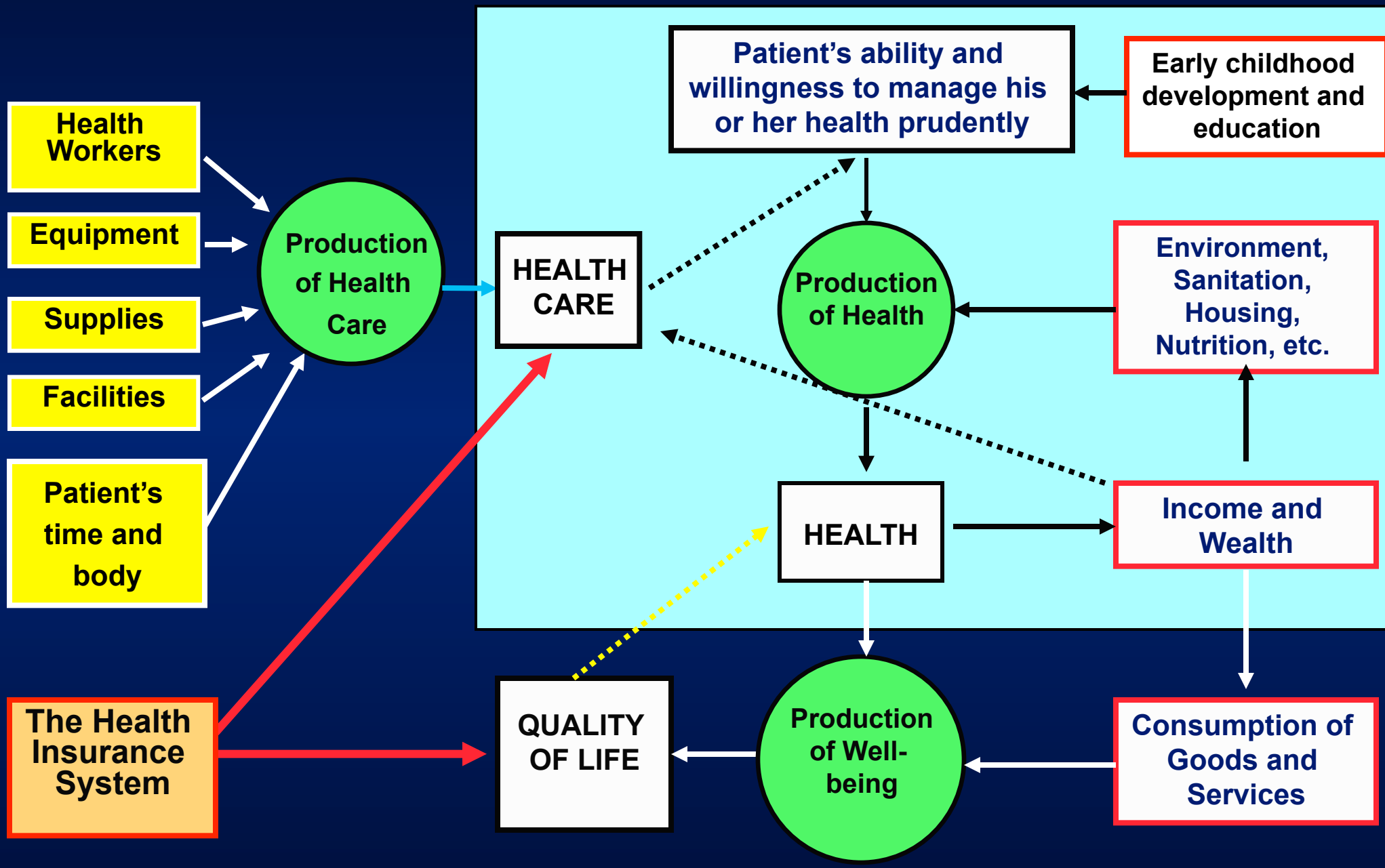
FIGURE 1 -- THE PRODUCTION OF HEALTH CARE, HEALTH AND HAPPINESS

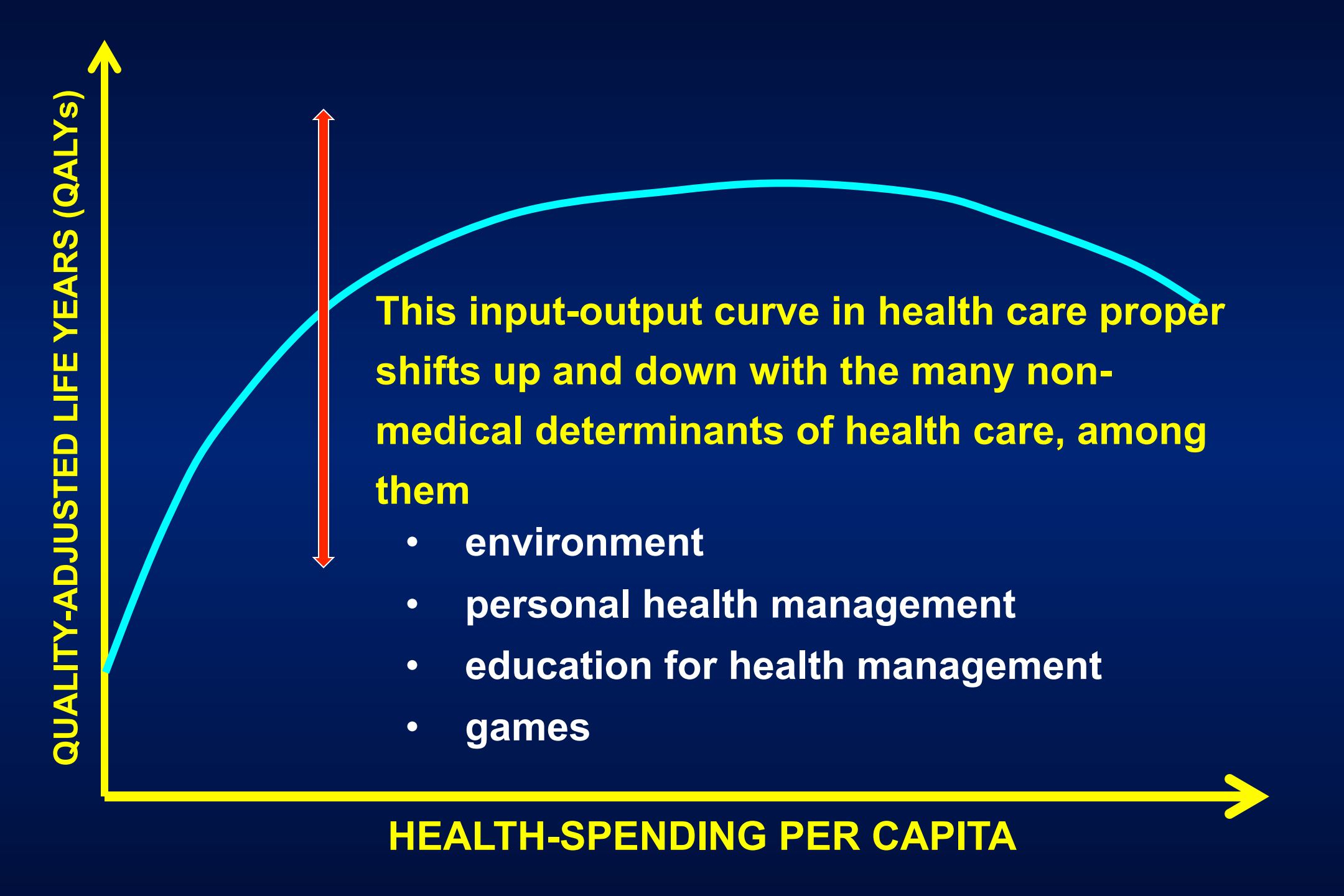


In the past, we have focused much too much on the *health-care* sector.

In the future, the emphasis should shift more towards the production of health, for which health-care is but one of many inputs.

FIGURE 1 -- THE PRODUCTION OF HEALTH CARE, HEALTH AND HAPPINESS



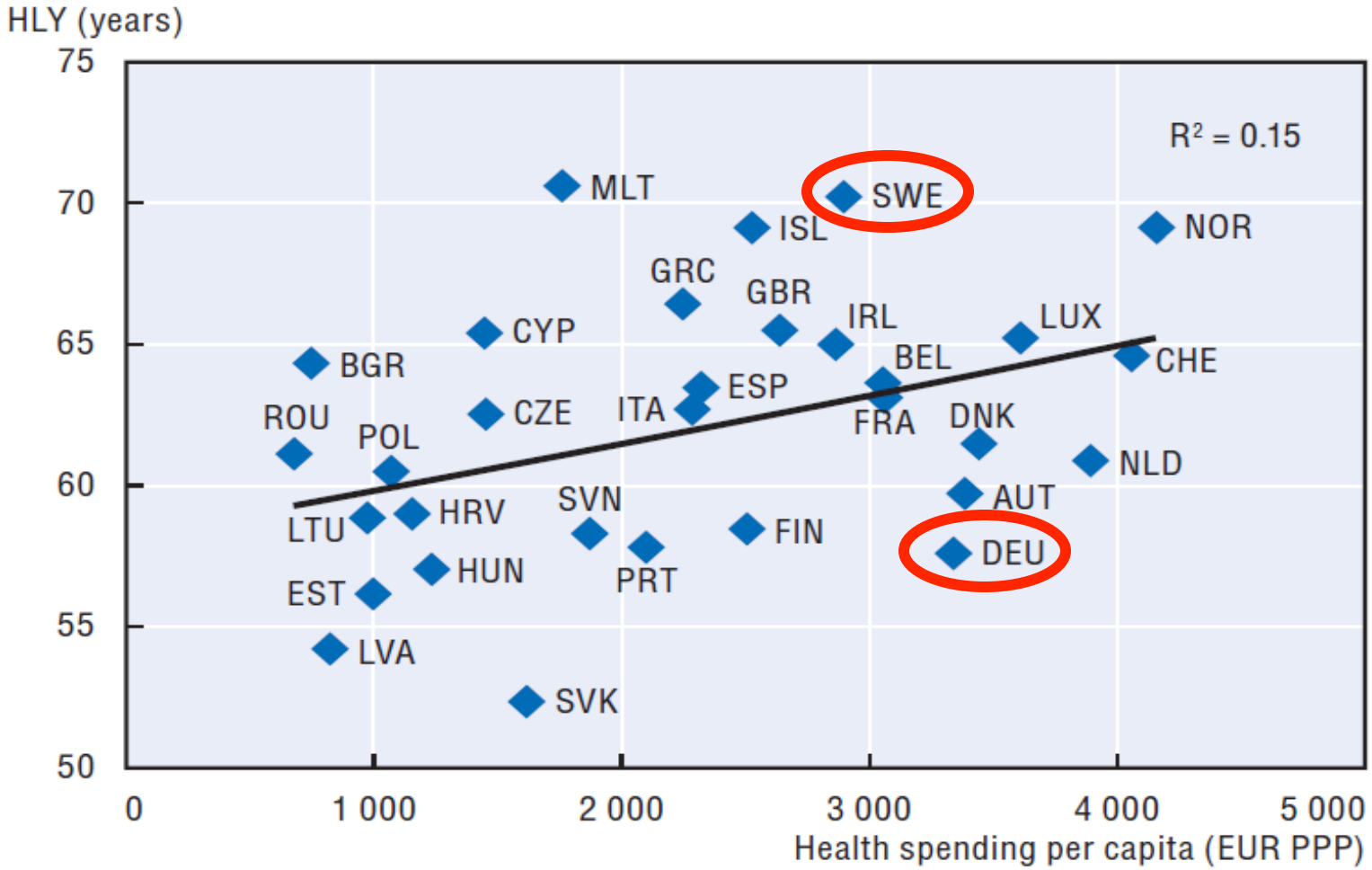

QUALITY-ADJUSTED LIFE YEARS (QALYs)
This input-output curve in health care proper shifts up and down with the many non-medical determinants of health care, among them
• environment
• personal health management
• education for health management
• games
HEALTH-SPENDING PER CAPITA

http://www.oecd.org/els/healthpoliciesanddata/HealthAtAGlanceEurope2012.pdf

Health at a Glance Europe 2012

OECD

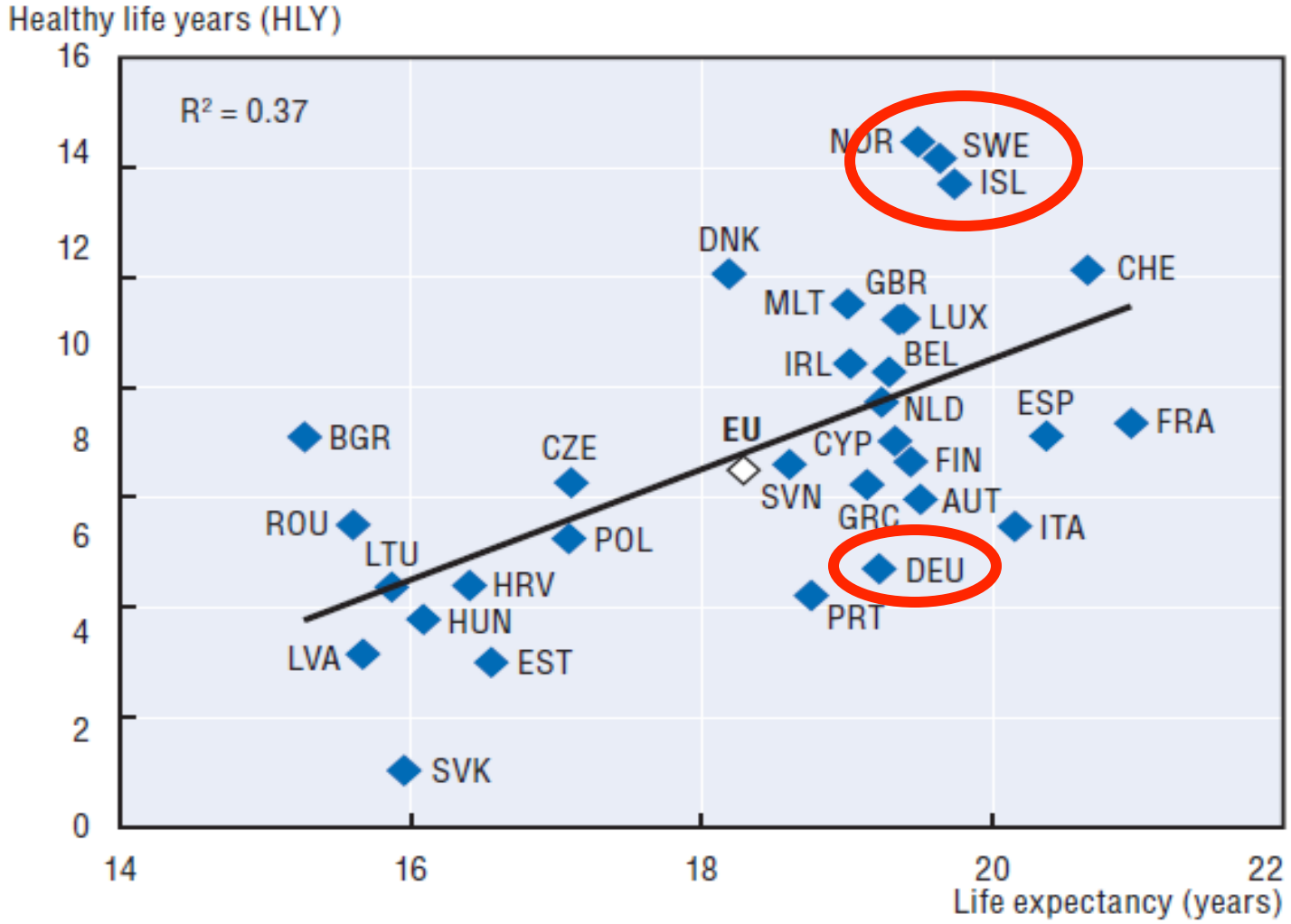
1.1.3. Healthy life years (HLY) at birth and health spending per capita, 2008-10 average



Source: Eurostat Statistics Database; OECD Health Data 2012; WHO Global Health Expenditure Database.

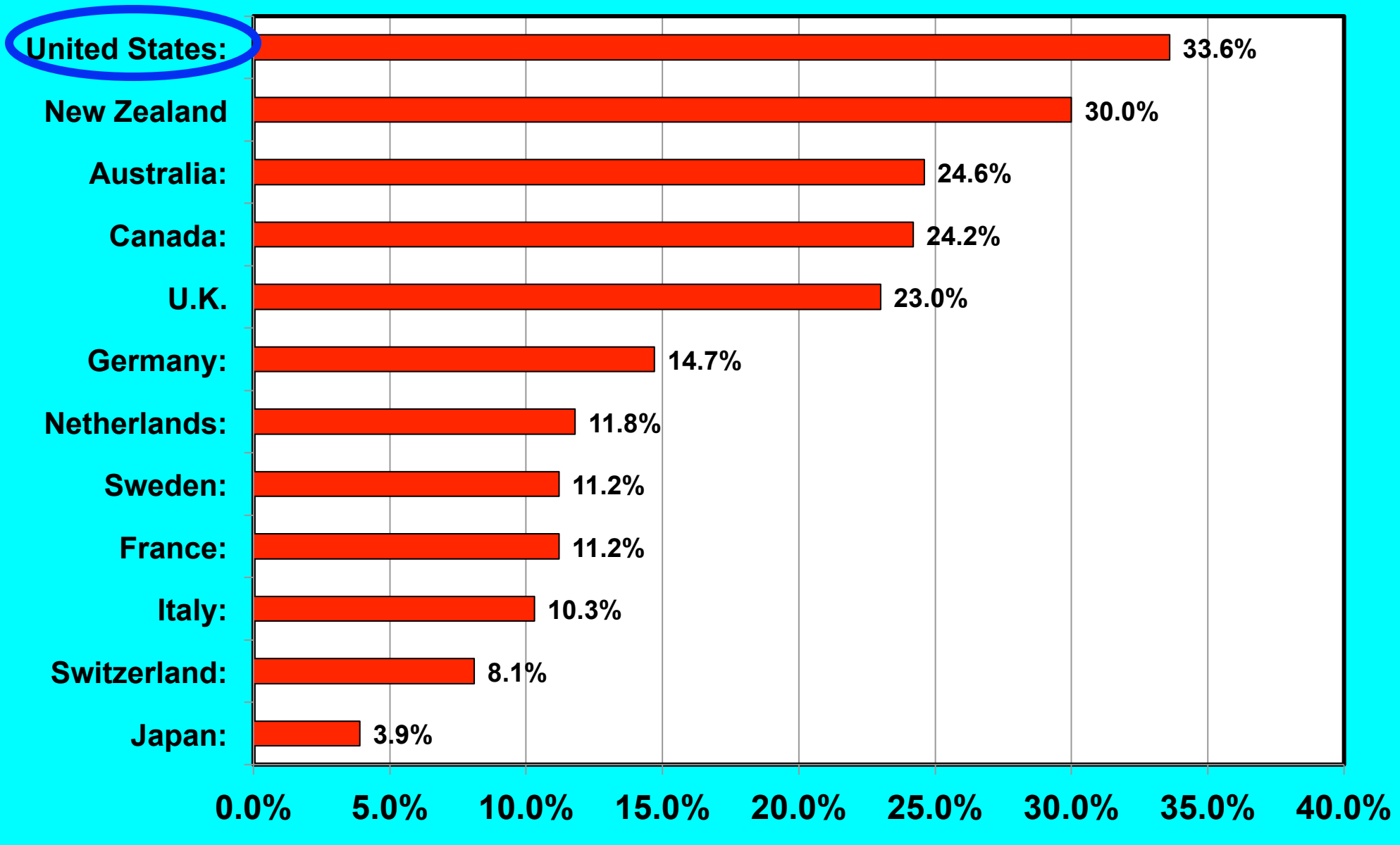
StatLink http://dx.doi.org/10.1787/888932702917

1.2.2. Relationship between life expectancy and healthy life years (HLY) at 65, 2008-10 average



But with regard to healthy life styles, the United States is the poster boy for poor behavior.

Obesity Rates by OECD Country, 2009



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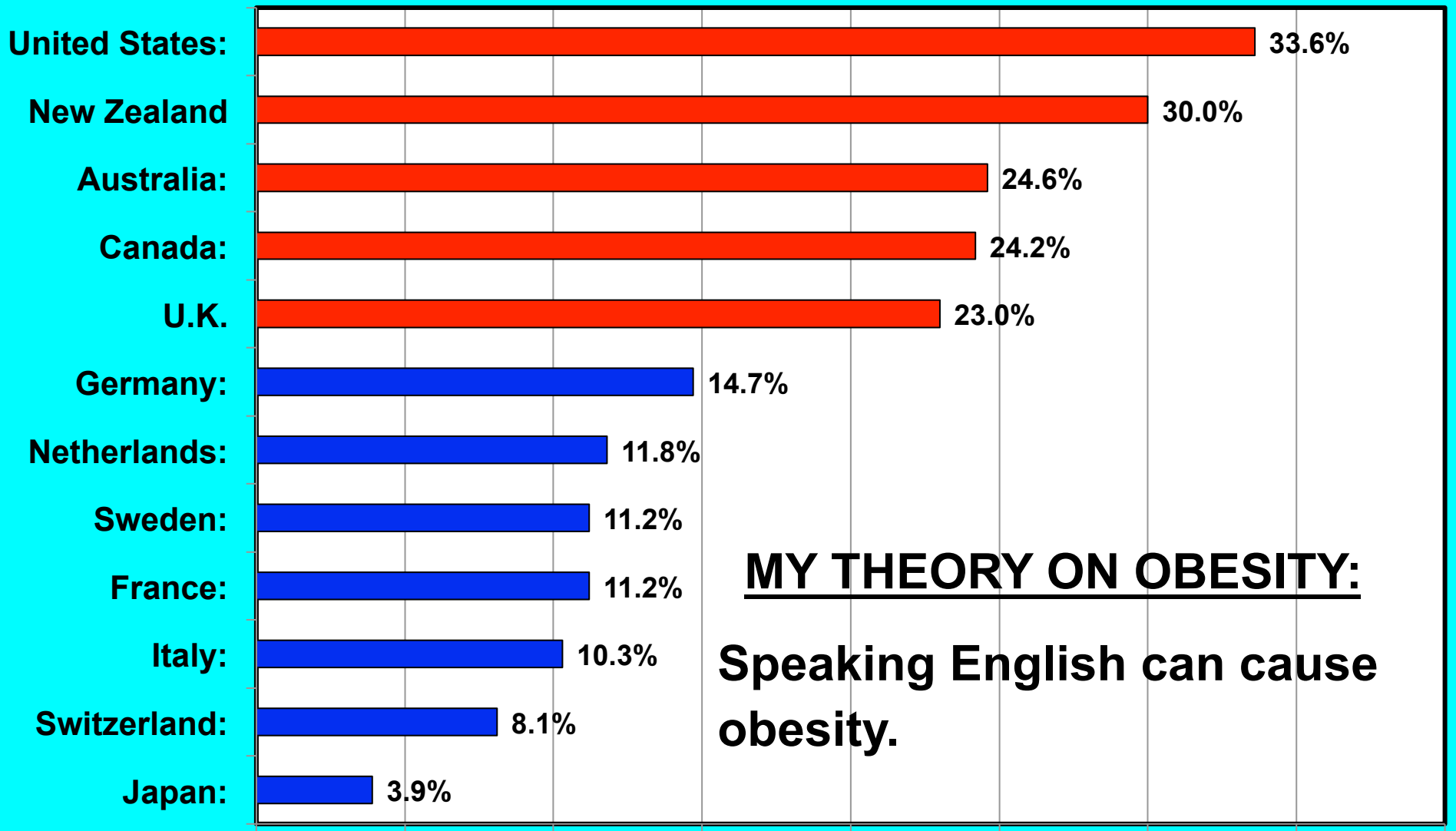

MY THEORY ON OBESITY:

Speaking English can cause obesity.

Health, Medical, and Science Updates

← Who has more nightmares?

FDA-approved antidepressant may combat deadly form of lung cancer, Stanford study finds →

Girls who eat peanut butter may improve breast health later in life

Posted on September 29, 2013 by Stone Hearth News

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Here's some news worth spreading: Girls who eat more peanut butter could improve their breast health later in life.

That's according to a study from Washington University School of Medicine in St. Louis and Harvard Medical School. The research shows that girls ages 9 to 15 who regularly ate peanut butter or nuts were 39 percent less likely to develop benign breast disease by age 30. Benign breast disease, although noncancerous, increases risk of breast cancer later in life.

Harvard Medical School. The research shows that girls ages 9 to 15 who regularly ate peanut butter or nuts were 39 percent less likely to develop benign breast disease by age 30. Benign breast disease, although noncancerous, increases risk of breast cancer later in life.

Obesity in the U.S. has led directly to the

***Tragedy of David*.**

Michelangelo's famous sculpture "David" recently toured the United States and then returned to Italy.

As it left Italy

After U.S. Tour

We urgently need innovations to get individuals more engaged in the proper management of their own health.

And we have not fully exploited the use of education at al levels as platforms for teaching young people how to manage their health more effectively and efficiently.

It would be easy at Princeton to create a new course entitled "*Ramses II's Toothaches and their Implications for Egyptian Foreign Policy 1230-60 B.C.*"

A course entitled *"The Management of Your Health"* would never be approved by the Curriculum Committee (perhaps because it might be useful).

III. INNOVATIONS NEEDED TO BAIL OUT HEALTH CARE

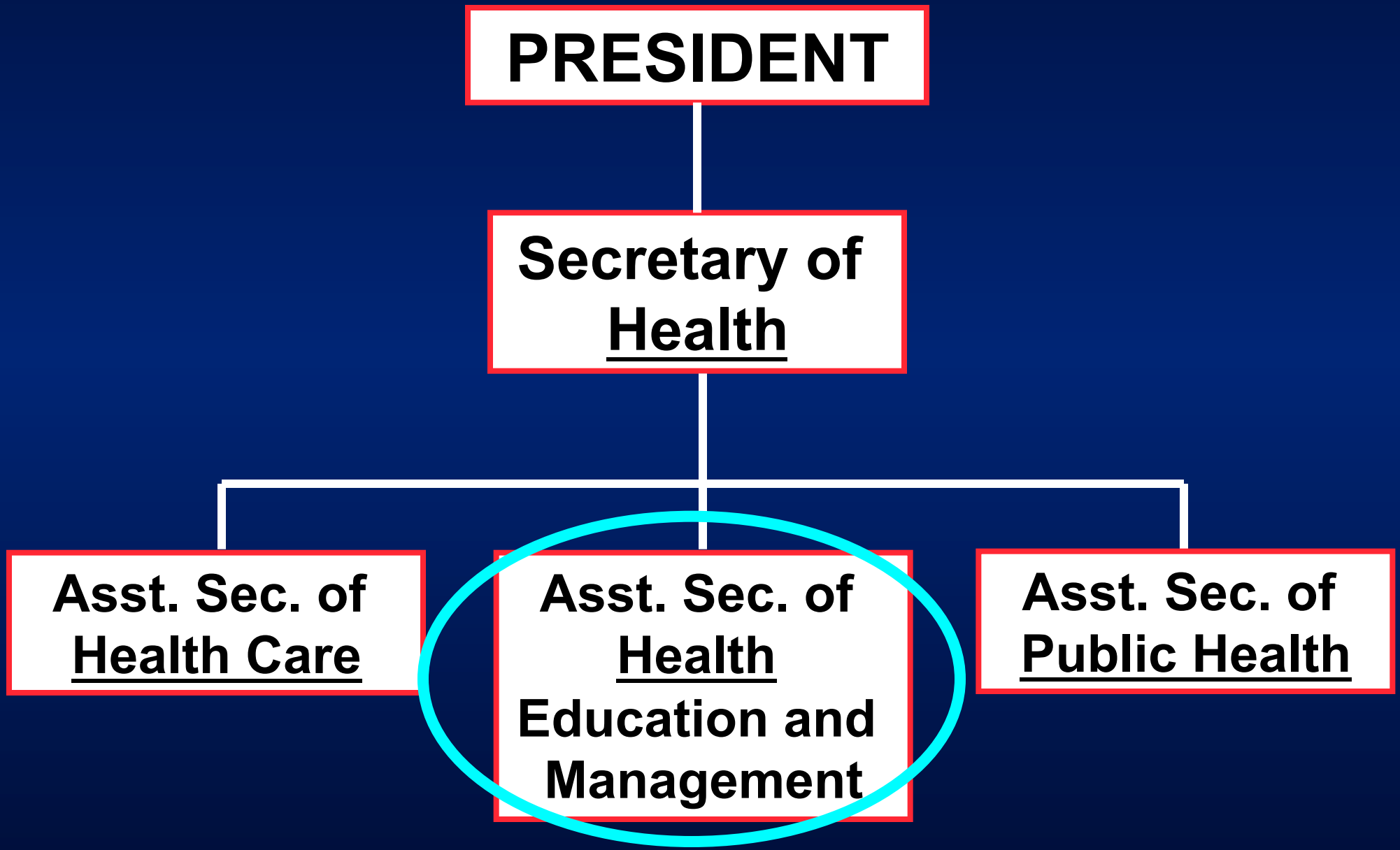
A. Simplifying administration

B. More efficient “industrial” processes

C. Better health management by individuals

D. Innovation in the structure of Health Ministries

IDEAL GOVERNANCE STRUCTURE FOR HEALTH



In conclusion, let me remind you of the Chinese word for "Crisis":

DANGER **OPPORTUNITY**

In the past decades following WWII, most nations have allowed their health systems to into something resembling cartels.

The cartels have done many good things for society and been quite innovative in one dimension: medical technology.

But the cartels have been too expensive for the rest of society to carry.

What is needed most urgently now is innovation in the administration of health care and in its industrial (organizational) processes.

This is the homework assignment for the younger people in this audience.

Thank you for you attention!