

The Oil Drum: Campfire

Discussions about Energy and Our Future

Medical Dark Matter

Posted by [Nate Hagens](#) on February 7, 2010 - 7:10am in [The Oil Drum: Campfire](#)

Topic: [Environment/Sustainability](#)

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Below the fold is a guest essay from a friend of mine who is an internal medicine M.D. practicing in East-central Minnesota. (He posts on The Oil Drum as 'Rock climber'). The post is a shortened version of a longer essay on the interrelationships between health care, human health, human happiness and resource use. As the healthcare sector makes up fully 17% of the GDP of the USA and therefore represents a significant fraction of our resource throughput, this is a very important topic in discussions of more sustainable systems. If medical care is as inefficient as Rock climber thinks, healthcare policies focusing on basics might save considerable energy and other resources.



Abstract

I've been working on problems completely removed from Peak Oil, but the ignorance of big problems and the solutions turned out much the same. "Medical Dark Matter" is my metaphor for ignoring the causes of our relatively poor health.

Astronomers looked right past most of reality (96% invisible "dark matter") until recently. Doctors looked only inside the body and thereby missed about 85% of what really makes people sick or healthy.

Although doctors can save some sick people, they have no power to make most people live longer. Despite over \$2 trillion a year of modern medical care, US life expectancy has dropped to 50th in the world (CIA 2009) behind all of Europe and behind some very poor countries. It seems to me that societal factors account for about 85% of differences in life expectancy, with genetics and individual health care accounting for the remainder.

Social factors- differences in our artificially created everyday living conditions- are the real keys to human health. Health is improved by money, social status, healthy early childhood, education and a good job. Poverty and lack of control hurt health. Chronic stress boosts hormones that may harm health. Health choices (diet, exercise, and smoking) are shaped by the neighborhoods we live in, which are influenced by powerful business interests. Income equality is an interesting and controversial factor influencing health. The health of the wealthy may depend in part on the well being of the rest of society.

Money buys health for individual rich Americans, but has failed to make average Americans healthier. What we decide about healthcare reform will have no effect on US life expectancy, since doctors have so little influence on health.

Our American lifestyle takes years off our lives and cannot be sustained indefinitely by available energy resources.

IMPORTANT DISCLAIMER: POPULATION HEALTH IS not *individual* health I practice conventional medicine; you should keep seeing your doctor.

Introduction: Biology doesn't determine health

I am an internal medicine doctor and on really good days I save someone's life. But in the past 20 years I discovered two facts:

1. On the whole medical care has little effect on average lifespan.
2. Social factors can produce 5 year differences in life expectancy.

At first I thought this had nothing to do with Peak Oil. But I realize the different questions have much the same answers. Unless we realign our lives toward healthy sustainability we'll continue to wreck both our health and the planet. Individuals and societies are largely blind to both our unhealthy lives and our dangerous oil dependence for much the same reasons. We think the status quo is fine and industry "experts" are happy to tell us to keep giving medical and oil corporations trillions of dollars. Like everything else in our artificial modern world, healthcare and energy problems are really economic and social policy issues.

Science is the most powerful way to look at the world. But science once missed the biggest part of reality. In grade school we learned everything in the universe is made of atoms. But in the 20th century astronomers discovered invisible, exotic 'dark matter' and 'dark energy' actually make up 96% of the universe. (At least science corrects itself; "experts" may not.)

American medicine might be the best in the world. We buy more drugs and spend far more money than anyone else. Then why is our life expectancy (according to CIA statistics) 50th in the world, behind every other industrialized country and some poor ones?

My paper is about **life expectancy** and **population health**. Lifespan is more accurate to measure than how well you feel, and usually correlates well with general health. Population studies allow us to figure out average effects (but "your mileage may vary").

Population statistics explain how I save lives at the hospital, and yet doctors can't do much for our national health. There are big differences between your individual health and national population health. Consider smoking as an example. If you are really lucky you can smoke cigarettes and still live to be 101. If you get unlucky you might drop dead from a heart attack at age 50. When we look at a large group of smokers, we find smoking takes 5 years (60 months) of life away from the average individual pack a day smoker. Consider a country where 10% of people smoke a pack a day. The national average effect of smoking would be 6 months (10% of 5 years). All these numbers describe smoking risks.

Our very best drugs reduce the fatal heart attack risk in very sick patients from about 6% to 4% over 5 years. That's a relative 33% less (4/6) or 2% absolutely less (6-4), or a 1 in 50 ($100/2\% = 50$ = number needed to treat to save one) chance of being saved in 5 years, or up to 2 months average life extension. All these different numbers are accepted estimates for our best cholesterol drugs.

Luckily, having a truly life threatening problem is very rare. Most people see doctors for aches or colds, or a chronic problem like cholesterol. Over half my 3000 HMO patients never saw me for years. (Most healthcare is received by "frequent fliers"). Since most people seldom see doctors, the number of lives saved by modern medicine turns out to be far lower than I (and everyone else) once assumed. (**Population health is not individual health!** If you die it's tragic, but just a 1 in 300 million statistical fluke).

Medical journals since the 1980's show that social factors are the real keys to human health. The Whitehall study of British civil servants reported doormen at the bottom **died an average 7 1/2 years earlier** than the bosses at the top. 60% of that gap persists when adjusted for "medical factors": smoking, obesity, exercise, and blood pressure. More studies followed with similar results.

Social factors produce big differences in life expectancy:

- 50 plus year gaps between some poor and rich nations**
- 4 years gaps between US counties, 6 years between US states**
- 7 1/2 years span from the janitor to the top boss**
- 6 year gap between high school dropouts and college educated**
- 5 or 6 year differences between different developed nations**
- 5 year gap from black race in US, or from male gender**
- 5 years individual smoking status; few months population average**

Medical factors produce very small differences in lifespan:

- Up to 3 month average individual effect of our very best drugs**
 - few days or no average effect of common preventive healthcare**
 - I estimate less than 2 months average from all health care effects**
- The basic circumstances of daily life are the main causes of health and disease.**

Is it so surprising people living in tin shack ghettos have different health than inhabitants of Hollywood mansions? Anthropologists know undisturbed hunter gatherers (now extinct) had lifespans in the 70's. We are genetically identical to our hunter gatherer ancestors, but our cultures (the sum of all beliefs and material goods) are very different. Our genes confirm **we are all the same inside but live very differently**. Social factors make up our everyday lives: food, shelter and the computer I sit at tonight (and the open sewers of Monrovia's ghettos).

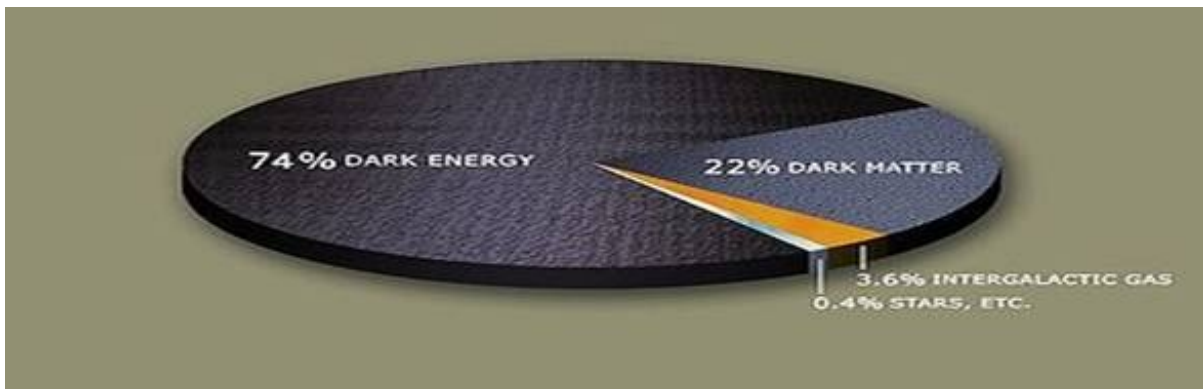
No research is published about how much total medical care affects our lives. I estimate the effect is probably less than 2 months average. If we had no advanced medical care we might live to an average of 78 years instead of 78.1. I estimate 45% social factors (money, education, work and geography), 40% neighborhood shaped choices (exercise, diet and smoking), 12% 'fixed' biology (gender and genetics), and no more than 3% healthcare determine average health in rich countries. Society, not biology, underlies 85% of human health. Healthcare may make a 2 month difference, while social factors make 5 year differences in lifespan.

Doctors looked only inside our bodies, when they could have looked outside. "Medical dark matter" points out our blindness:

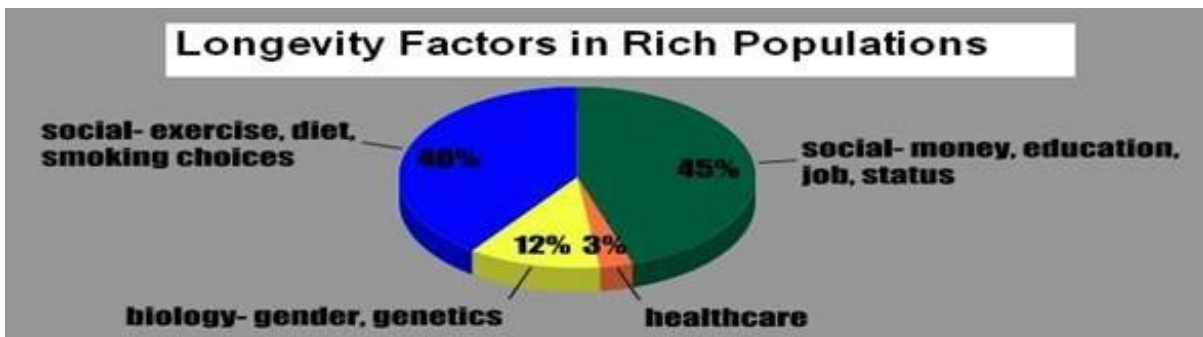
Only 4% of the universe is made of visible atoms- DARK MATTER is 96% of total reality

Healthcare determines about 3% of longevity in rich countries- Social Factors (MEDICAL DARK MATTER) are 85%

This is dark material. Some doctors have trouble believing what we do is as powerless as I believe. Medical journals present convincing evidence that our profession ignores. It's hard to admit what we do does so little good. But our tests and medicines might be undone if the patient is poor, stressed out at work, and has no chance to get fresh fruit or walk in fresh air. After hard questioning, I have come to believe the scientific data presented here.



Dark Matter in the Universe: 96% invisible, 4% atoms NASA



Medical Dark Matter: 85% social, 12% biology, 3% healthcare (Author estimate)

Healthcare's 2 months is 3 % of the 5 year lifespan gaps from social causes in rich nations.

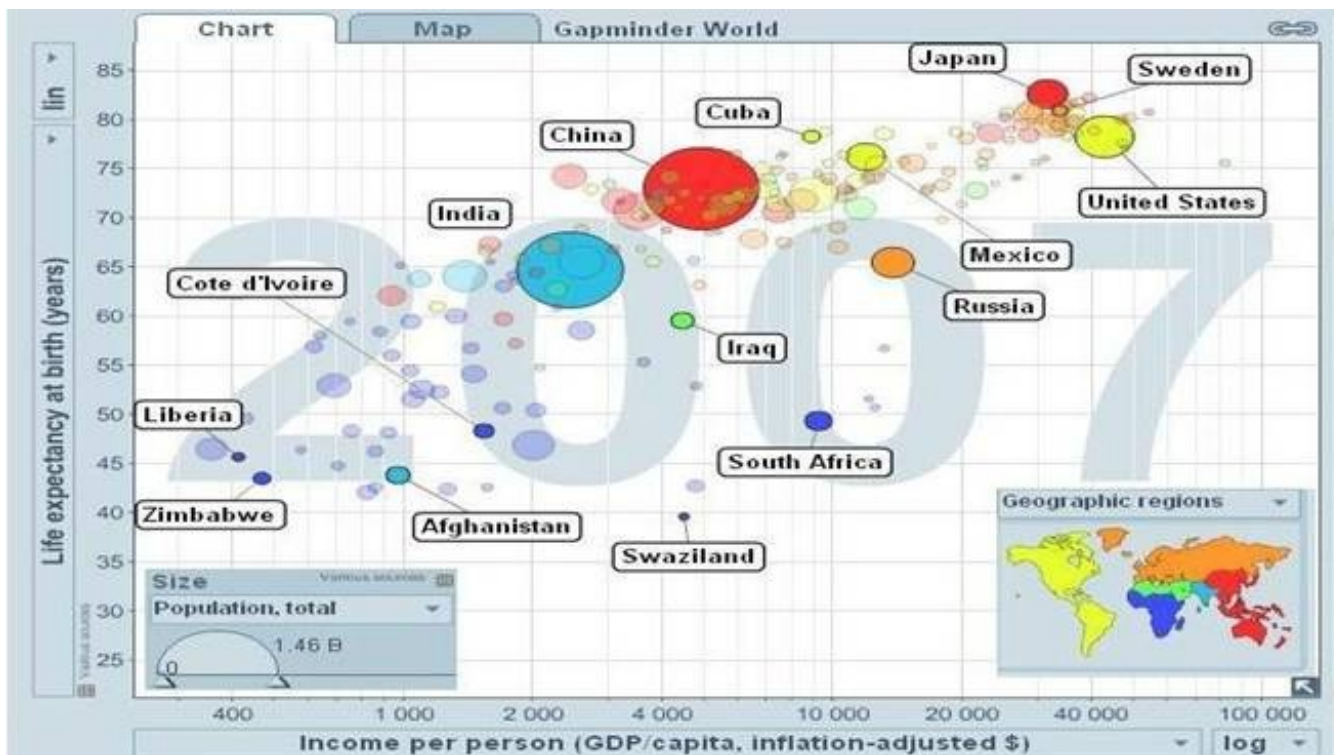
DISCLAIMER: This paper is not about the overall relative merits of American medicine or of American society. Health is shaped mostly by other factors, irrespective of the inherent quality of medical care. Social factors likely excuse our poor outcomes. America leads the world in individual freedom and prosperity, which may trump years of lost life expectancy.

II. Social Determinants of Health

1. Social Status: Money, Education, Work

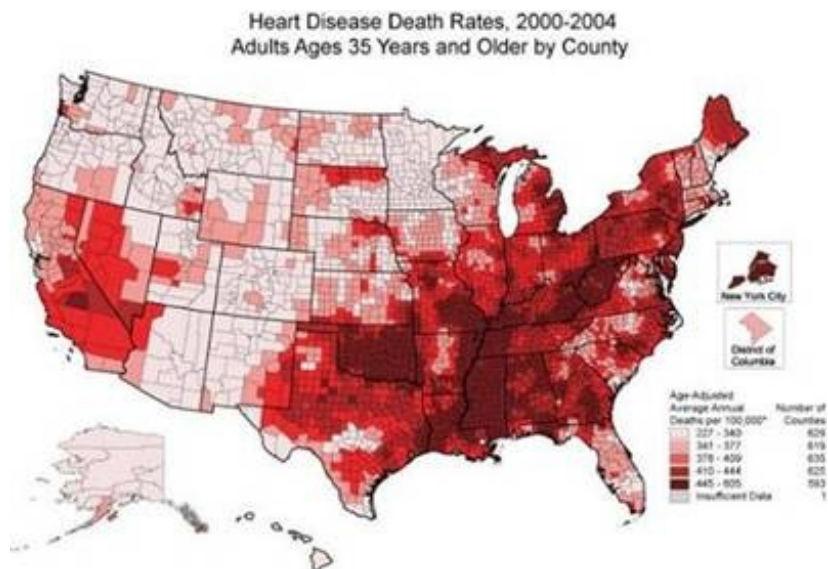
-Money (Poverty)

Simple income is the biggest determinant of average life expectancy. Differences between poor and rich countries can be over 50 years and show the importance of basic living conditions to human health.



Health vs. Money is a 'Preston Curve'. In 2009 there is a 52 year gap between Swaziland (31.9 years) and Macau (84.4 years).

Poverty inside rich countries also harms health. Average people in the worst US county (a South Dakota Indian reservation) die 16 years before those in the longest living county. These maps show poor counties (top) are usually healthier (bottom):



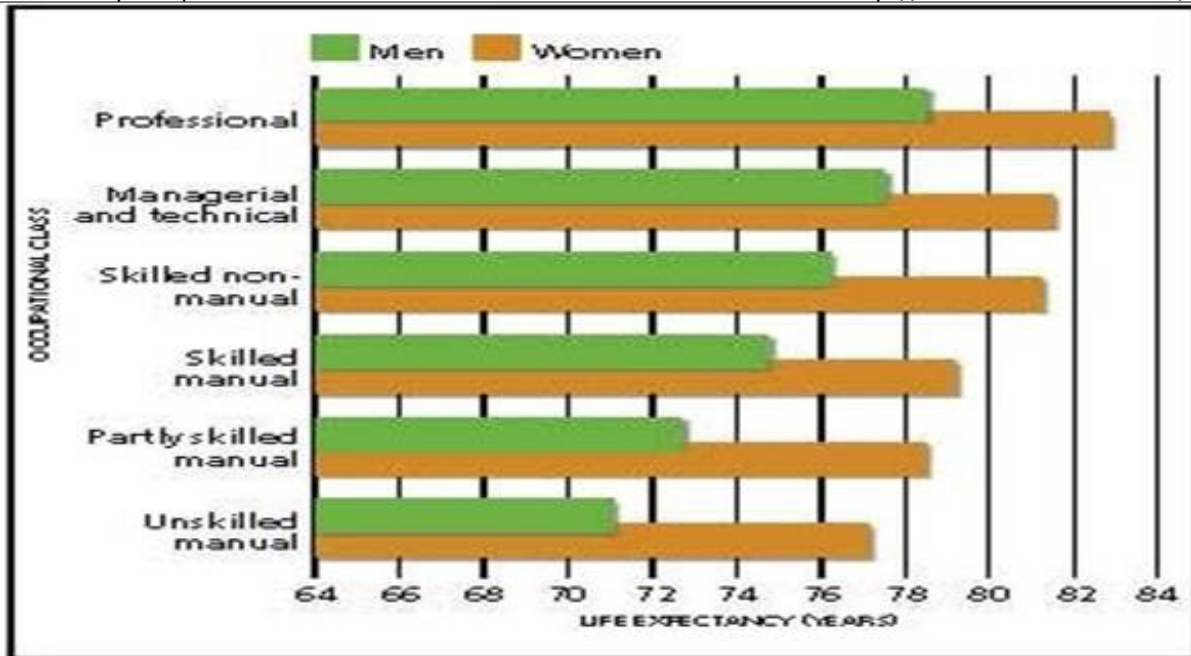
-Education

Graduating from college **doubles income** (to \$56,118) and **adds 5.9 years** to life compared to high school dropouts. Educated people tend to have and make better choices in life. School dropouts are prone to smoking, dead end jobs, and poor health.

Globally, educating girls may save the human race. In the developing world, literate women choose to have far fewer children (the demographic transition). This should continue to slow down the growth of the human population so it doesn't ruin all planetary resources and wipe out our species in 40 years.

-Work

Workers at the bottom have less control and face more hazards, then get a smaller check, fewer benefits and die 7 years sooner.

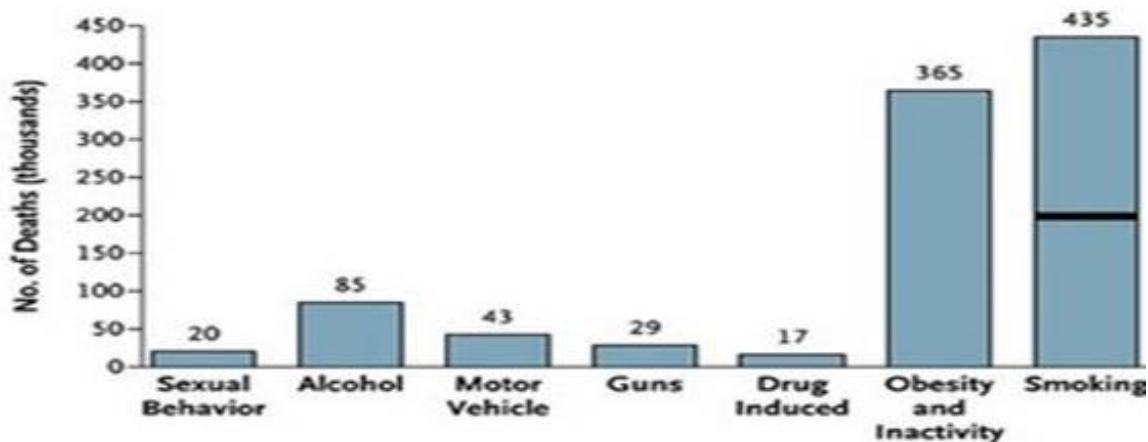


Occupational Class differences in Life Expectancy, England and Wales 1997-1999. Whitehall results.

2. Socially Influenced Choices: Smoking, Exercise, Diet

-Recreational Drugs

Smoking is the number one easily preventable cause of death. The poor, uneducated and mentally ill smoke and abuse drugs more. (Rich people drink more alcohol, but more poor people become alcoholic). Doctors' advice has not been proven to help. Powerful, politically connected businesses heavily promote the use of recreational chemicals, legal and otherwise.



Preventable causes of death in US. Data from McGinnis 1993

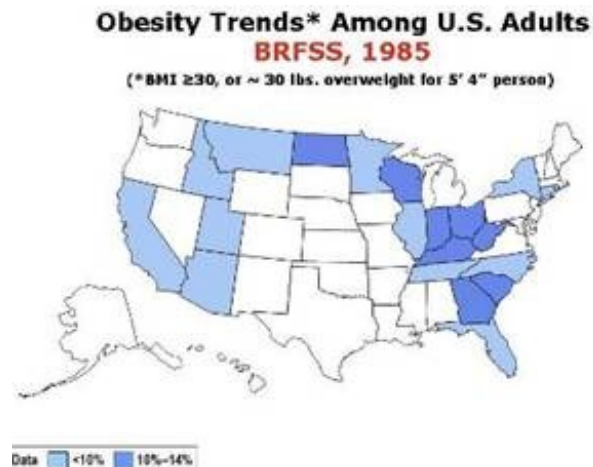
People with rich, fulfilling lives are probably less likely to abuse drugs, analogous to Alexander's 1970's animal experiments. A caged rat will repeatedly press a lever for a narcotic high until it starves to death. But if you put a bunch of rats in a big room with interesting toys, they'll ignore an open bowl of sugar flavored morphine. The #1 prescribed drug in America is now the narcotic pain killer hydrocodone (written 121 million times in 2008).

Opiates are now the opiate of the masses. Are our lives now like lone caged rats?

-Exercise, Diet, Obesity

76% of Americans are overweight or obese. Obesity is painful (arthritis) and shortens life (heart attacks, cancer, diabetes). Obesity cost the US \$147 billion in 2008, and diabetes cost \$174 billion. As bad as it is, obesity is not the biggest cause of Americans dying too early. Whitehall found job status was more important than obesity and other “medical” factors. Greeks are the second most obese people, but eat healthy food (the Mediterranean diet) and live long lives.

These maps show how much fatter we’ve become state by state in 24 years:





I worked in Africa with people who all wanted to be fat. It looks “rich and comfortable,” but they can’t afford enough food. When I explained that most Americans are fat but wish to be skinny, they asked if Americans have a lack of willpower. It’s not quite that simple. Obesity is a social problem, and especially affects poor and minority people inside rich countries. Powerful government subsidized industries including agribusiness (cheap sugar) and petroleum (cheap gas, compared to elsewhere) influence how easily people can find healthy food or walk in their neighborhoods. See HJ Kunstler’s *Big and Blue in the USA* to laugh and cry.

3. Social/Gene Interaction: Racism, Gender

Gender and race are social definitions. Gender is unique in the oppressed outliving the oppressor (rarely biology trumps society).

Racism is one of our oldest and most emotional social problems. 200 years ago we brought one fifth of our ancestors here as slaves in chains. We put them to work on a continent that was already inhabited. African Americans and Native Americans still don’t get their full shares of the American dream. Race rarely affects health, but racism, poverty and living conditions do.

4. Place, Environment

Our neighborhoods combine other social factors with soil, air and water that might be clean or polluted. 10,000 years ago humans were hunter gatherers living in pristine woods. Then we invented agriculture, towns and cities. Modern poor places have far more physical (lead,

cockroaches) and social cigarette billboards) hazards. “Choosing” a healthy life is hard if you live in a city of a million people with bad schools, no jobs (auto industry imploded), and not a single chain supermarket in town since 2007 (Detroit) and all but impossible during two decades of civil war (Liberia, where I worked in 2004).



The diplomatic neighborhood in Monrovia, Liberia. photo by author 2004

Consider how differently some peoples live, and how it affects health:

	Per capita <u>GDP</u>	people in Poverty	median age	fertility per woman	infant mortality	life expectancy	
World	\$10,400	50%	28.4	2.58kids	40.9/1000	66.6 years	6.8 billion people, richer north half
Liberia	\$500	80%	18	5.79	138	41.8 (218 th)	3.4 million, poor, war torn, young
USA	\$46,900	12%	36.7	2.05	6.3	78.1 (50 th)	307 million, most prosperous nation
Sweden	\$38,100	6.5%	41.5	1.67	2.8	80.9 (10 th)	9.1 million, world's lowest poverty

(click for larger image)

III. Income Inequality

“As I’ve often said, this (increasing income inequality) is not the type of thing which a democratic society- a capitalist democratic society- can really accept without addressing ”

What flaming liberal is so worried about income inequality?

-Fed Chairman Alan Greenspan, testifying before congress June 2005.

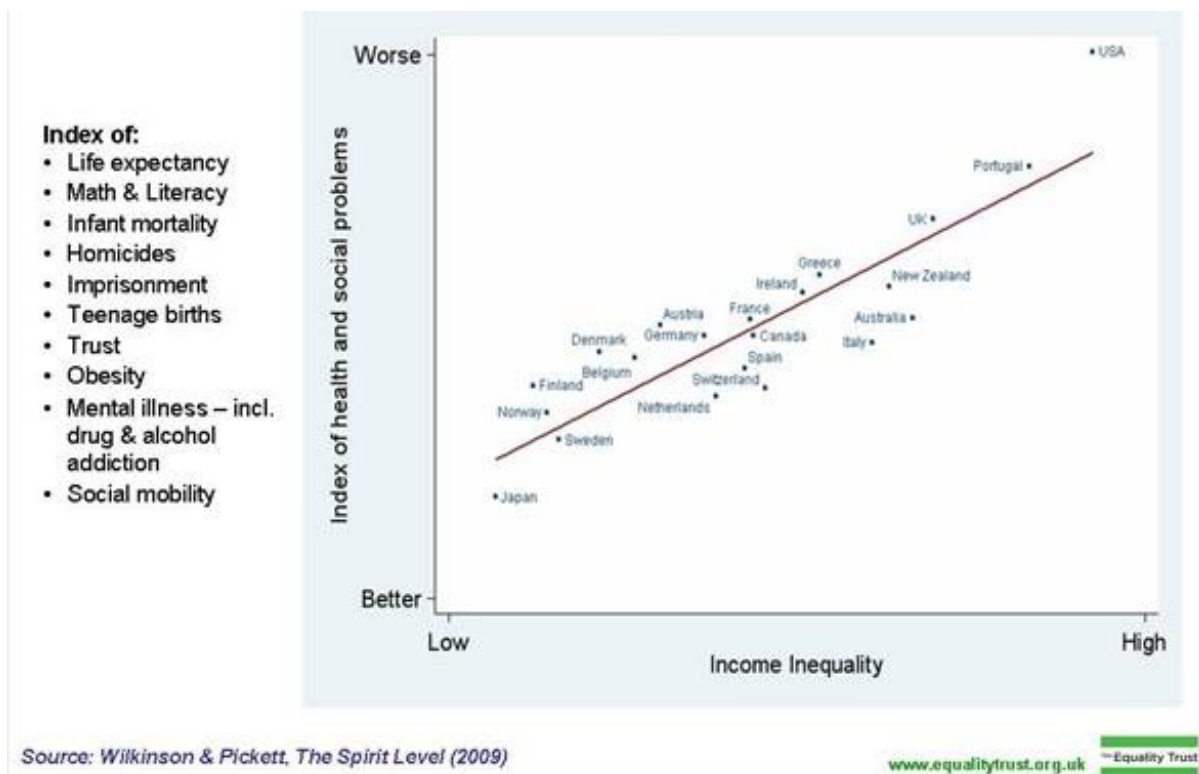
Countries (like Sweden) and US states (like Minnesota) that more evenly divvy up the money tend to be much healthier. Income inequality causes or correlates with many social evils:

Shorter life expectancy, high infant mortality, obesity, teen pregnancy, mental illness, imprisonment, crime, low educational scores and less social mobility are correlations noted in *The Spirit Level* published 2009 by Wilkinson and Pickett.

I note apparent correlations with military spending, pharmaceutical advertising and spending, rampant consumerism, corporate power, television watching, low voter turnout, absence of labor unions, automobile use, gun ownership, fast food, sedentary indoor lives, living alone, younger and more mixed populations, and non-denominational religion. A mix of factors including inequality may make some populations dysfunctional. Some societies will decide costs of inequality are worth the gains for those on top.

US inequality worsened in the past 30 years. **In 2008 the top 10% of the US population got 48.5% of total income, the top 1% got 23%, and just the top 1/100 of 1% (14,988 families) took 6% of it all.**

The authors of the following chart are liberal social scientists, but they might be right about income inequality. I'm uncertain.



Correlation does not equal causation, but there are plausible theories how position in social hierarchy could harm health. The 1.4 billion people living on less than \$1.25 daily have trouble getting water, food and shelter. The poor in rich countries are “only” relatively poor. Still the poor, minorities and low level workers have more stress and shorter lives. Stress and feeling lack

of control boost neuroendocrine hormones that could shorten life. Sapolsky found wild baboons have graded social stress too. Stress hormones (epinephrine and cortisol) levels fall and lifespans increase step wise up the social ladder to the alpha male, the CEO of baboons. He's cool as a cucumber, bosses every one else around, and outlives everyone else by years.



Sapolsky found baboon neuroendocrine stress hormone levels vary dramatically with rank in the social hierarchy

IV. The American Paradox: we spend so much for so little

The United States tries to have the best medical care in the world. Yet, in 2009 American life expectancy dropped again to **50th** in the world (CIA). **We were just surpassed by Wallis and Fatuna** (a terribly poor South Pacific territory).

This happened before:

A fable of total 2006 healthcare spending (public plus private):

-Cubans spent \$363 per person average (7.1% of GDP); life expectancy was **76 years** men and **80 years** women.

-Americans spent \$6714 per person (15.3% of GDP back then); life expectancy was **75 years** men and **80 years** women.

-statistics from the World Health Organization 2009.

American healthcare costs \$2.1 trillion and one year did not quite match the results of a tiny country that spent only 5% as much per person. This outdated fact is totally anecdotal and totally true.

Almost all other industrialized nations and some poor ones now outlive us. Since rich populations generally do better, this is particularly puzzling. Our lifespan has slowly increased to 78.1 years, but is about 3 or 4 years behind Sweden, Australia and Japan.

The social factors we've been discussing plus the fact medical care does not prolong life much on average explains our relatively poor health outcomes. It's not the fault of doctors. American medical care saves some sick people's lives, but is just overwhelmed by the negative bigger effects of social problems. The US is very rich, but near the bad end of many other social determinants including income inequality, education (ours kids have lower scores), and jobs (our workers work longer for less benefits). American lifestyle takes years off our lives (and cannot be indefinitely sustained by available energy resources).

V. Conclusion: Healthcare average effects are minimal

Medical Dark Matter is summarized in an outlandish true claim:

Only 4% of the universe is atoms, and healthcare causes only about 3% of health variation- a 2 month difference

Money helps individual rich Americans live longer, but it has not helped our relatively poor national health. We spend \$7000 a year per person on healthcare and live no longer for it. **Our annual \$2.1 trillion dollars is misdirected by believing health is determined inside our bodies.** Without modern doctors Americans would probably live to an average 78 years instead of 78.1. How long we live is instead determined by real living conditions: our schools, workplaces, neighborhoods and other social factors.

Disclaimer: My remarks apply only to populations, not to individual health. I share my findings only to help you think about choices our society will make about health and social policy (with or without you).

VI. Consequences

Healthcare's impotence has consequences for doctors, society and individuals.

The bad health of Americans isn't doctors' fault. It would be nice to focus on what works best, but retired major journal editors confirm published research has often been skewed by profit interests. Basics like vaccines, sick care and trauma surgery might save more lives than giving more pills to diabetics, but who knows. Good schools and workplaces, and neighborhoods that assist good choices will improve health far more than medical care. It would be cheaper and more effective to treat many diseases as the social problems they really are. **Good societal living conditions are the ultimate preventive medicines.** Teach girls to read, thus saving the

world.

Americans pay to cling to life (average medicare cost \$46,412 in the last six months), but we don't buy anything that might really make us live longer. Why? The medical industry is 17% of GDP and rising. Doctors fail to do basic healthcare analysis and industry supported "experts" gladly fill the gap. Turning over medical care over to corporate interests had the expected results. Deciding whether we want longer lives or bigger profits could be a good start. Unfortunately healthcare reform may happen without any examination of whether medical care works and what it costs.

As a privileged American, I enjoy freedom (I can write this paper) and money. I think everyone should get affordable access to basic healthcare and we should also improve peoples living conditions. Some reasonable people will decide we should continue to maximize individual freedom and material prosperity over other values. The doctor has informed you of benefits and risks. You can decide whether what we get (more money overall) is worth the price (shorter average lives) of American lifestyle and healthcare.

Whatever we decide about healthcare is not very important for lifespan, which is determined by socially created living conditions. Don't worry (stress is unhealthy). Healthcare reform is an important political and economic issue, but it can't much affect the health of Americans.

For individuals, the biggest health factor is luck. In the ER I sometimes see a 95 year old man who hasn't seen any doctor in 30 years, still rides a horse and is healthier than all my other patients. There are no guarantees, but living right (good choices and good neighbors) can improve your odds. Being born to wealth and privilege helps. Working hard for money and an elusive CEO job may be counterproductive. Downsizing your life can be quite satisfying, healthy, and good for the planet. Whether your neighborhood is favorable or not, make yourself exercise a lot (outside if possible) and eat healthy (vegetables, grains, whole foods, not to excess). Working and playing outside with friends deeply satisfies my own hunter gatherer genome.

Please don't just buy a bunch of guns and hole up. I'm planning on some of you smart TOD people to realign our world financial system so I'll still have a 401K account in 20 years (and so all the people in Asia don't live just like us and kill the planet).

Optimists take heart: the global human lifespan probably grew 35 years last century. US life expectancy is also growing slowly, and in 20 years may be where Sweden's is today (they hit 78 years in 1989). Healthcare does little, but global human living conditions (outside Africa) are improving rapidly, and world population growth is slowing. I believe humans overall will do just fine.



Liberians lived on less than a dollar a day, but were happier than most Americans. Some things could be more important than health or money.

Final Disclaimer: Population Health is not Individual Health. Doctors save the lives of many people every day. I practice conventional medicine; keep seeing your doctor! You can decide if America's social policies are worth the costs.

Appendix

Ranked Life Expectancy in years, at birth (total both sexes)

Source: 2009 CIA World Fact Book

1	Macau (highest)	84.36	casinos 3X Las Vegas, lowest fertility
3	Japan	82.12	best large country, gini now 38, was 25
7	Australia	81.63	highest English speaking, gini 30.5
8	Canada	81.23	English/French speaking, gini 32.1
10	Sweden	80.86	high social functioning, gini low 23.0
22	Liechtenstein	80.06	richest, \$118,000 GDP per capita
36	United Kingdom	79.01	gini 34.0, ruled world 100 years ago
38	Jordan	78.87	gini 39.7, GDP per capita \$5200
49	Wallis and Futuna	78.20	GDP per capita only 8% of US
50	United States	78.11	3 rd largest, 1 st economy, gini 45.0
55	Cuba	77.45	no longer exceeds US, 2006 lucky?
71	Mexico	76.06	only 2 years behind US, gini 47.9
105	China	73.47	largest, low fertility (1.79), gini 47.0
145	India	69.89	2 nd largest nation, gini 36.8
162	Russia	66.03	once rivaled US militarily, gini 41.5
213	Zimbabwe	45.77	poorest (\$200), inflation 89.7 x 10 ²¹
214	Afghanistan	44.64	lowest life expectancy outside Africa, war
218	Liberia	41.84	poor, torn up by 14 -24 year civil war *
224	Swaziland (lowest)	31.88	highest HIV+, gini 50.4, \$5,100 GDP

You can start your own research here. Selected nations; comments mine. Higher gini means more unequal income distribution.

*depends on if you count from Doe (top) killing Tolbert (bottom) in 1980.



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