

EDITORIAL

How Do We Move Beyond Regression to the Mean?

Improving Health and Health Care

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Editor-in Chief
Spine

His pain got worse, he went to a doctor, and the pain subsided a little.

Therefore the doctor made his pain better.

Oops! Regression to the mean.

In Medicine as in life, we often attribute improvements in well-being to a specific event, treatment, procedure, or drug. We suggest any given treatment effect is the result of our medical decision making, informed by one's diagnostic acumen. In many cases, it is appropriate to take some credit for the effectiveness of a given treatment. However, in nearly all cases, we recognize as scientist and students of statistical methods, there are reasons "why" a specific treatment yields a given result. There are always confounders, factors we often adjust for in measuring outcomes: age, sex, race, education level, and or income. For these known variables we can statistically adjust, allowing for comparisons of one treatment *versus* another. Similarly, we can't ignore the potential, "placebo effect," and regression to the mean, in one's overall interpretation. We are aware of the many human biological processes associated with "watchful waiting," the natural history of any ailment, and independent of treatment. In many clinical trials we compare treatment A, some intervention to, treatment B, watchful waiting. In the watchful waiting group, heal-thy-self, the natural history of healing for a given malady, has a measureable outcome or effect. Not all maladies require intervention, many require supportive therapy as our normal biological, injury and repair processes, do their job. Think of a simple cut or bruise, watchful waiting, often wins the day.

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So given we agree there is a normal distribution for a given treatment and there are often many confounders for which we must adjust, how might we think about moving that normal bell-shaped curve, to the right, wherein society as a whole improves its health and health care? There are likely many ways to achieve such an audacious goal. All require, a structure and governance, a focused strategy, tactics and resources, financial and non-financial, to make the necessary changes needed. The ultimate success requires dedicated leadership, with a clear vision, the courage to lead towards a better place for all and patience, as it will take time, a variable we cannot always control for, decades in this case, to achieve.

This goes way beyond payment and insurance reform. Just as some believe, lowering the "corporate tax rate" will improve the lives of many, corporations investing in new jobs and innovative solutions for the future, I believe, addressing the "social determinants of health," will narrow the coefficient of variation and inequities. By so doing we will have moved the mean of the whole country to the right. This, in and of itself is not enough but will provide a much needed win and impetus to do more. Tax reform is likely part of the solution. Regressive taxes often impact those who can least afford them, this too must be addressed.

As a nation, we continuously struggle to make meaningful change necessary to create a more sustainable health system. The federal deficit in the United States is approaching \$20 trillion, much of which is related to our health care cost of nearly \$4 trillion. Notice, I did not say Health Care system. There are no real mysteries here. As a society we have not adequately addressed many of the variables needed to actually move the curve to the right, to alter our current regression to the mean.

At this time in our history, let's not lay fault or blame, let us, together move the ball down the field moving the normal distribution to the right. Each of us has to do our part and we all need to take some responsibility. After all health care cannot and will not improve many of the problems responsible for our nations' health. Actually, health care is not where the solutions sit. Health care is the end result of a failed public health system. We have, for too long, relied on

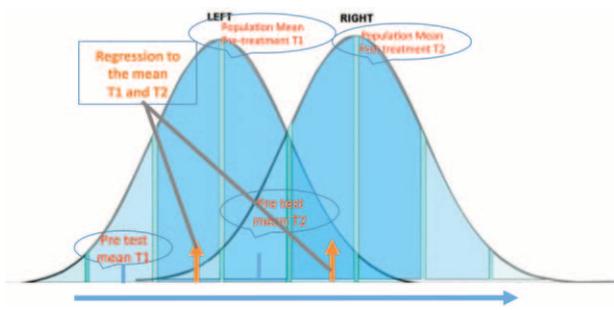


Figure 1. Regression to the mean toward (or to) the mean is the phenomenon that if a variable is extreme on its first measurement, it will tend to be closer to the average on its second measurement—and if it is extreme on its second measurement, it will tend to have been closer to the average. By addressing the social determinants we can move the whole population mean to the right. We can all get better! .

the health care system to improve health, when in fact most of our health related issues lay in the socioeconomics of our society. Here too are the opportunities to move the curve to the right (Figure 1).

Miracles in health care will continue and we should renew our commitments to those pursuits but not without taking the real challenges to make the greatest improvements for those who need it the most. Challenges of children who are from dysfunctional homes, have poor nutrition, limited educational opportunities, and less than adequate food, housing, and parental guidance. Challenges of obesity, growing numbers on social security, and a lack of job training programs for the society we must build for economic stability into the future. Moreover, the health system can surely provide care but, who is responsible for compliance with that care; what are the consequences and who pays the price for our own bad habits and failure to care for oneself. We, too, must look in the mirror and ask the hard questions.

While Congress continues to have debate after debate, they tend to avoid or skirt these uncomfortable truths. Absent clear and realistic dialogue, we all suffer the consequences of continually kicking, the proverbial can, down the road. Unfortunately, I believe, we will do so again this year.

The President of the United States campaigned on making America great again. He spoke of repeal and replace “Obama Care.” Why not simply “Rethink” what might work and advance the cause of health and health care as major components to his plans for rebuilding America’s infrastructure. If we continue our regression to the current mean, America, won’t achieve what is possible. Addressing the major social, economic drivers of health inequities, provides a real opportunity to move the current bell shaped curve to the right, allowing America, on average, to be better! It is time to “Rethink” the vital role of social determinants. They are an integral part of investments if we are to rebuild America’s infrastructure. The social determinants will have a multiplier effect unlike anything we have ever seen. Absent such planning we will miss this incredible opportunity to advance a nations trillion dollar infrastructure commitment from simply things to actual

people, shifting the absolute mean of the country’s health and well-being to the right. Attention to the social determinants will advance America’s greatness.

Let’s be clear the United States overconsumes health care and often underperforms in many of the key metrics by which national health care is measured. Despite spending nearly twice as much as any other industrialized country, we rank below the 50th percentile in the world in several categories: infant mortality, life expectancy at birth: quality of primary care; specifically, unmanaged asthma. We rank near the bottom in unmanaged diabetes; and in quality of acute care; as exhibited by, safety during childbirth.

Recently, I was privileged to Chair a committee for the National Academies of Sciences, Engineering, and Medicine: Communities in Action, Pathways to Health Equity. The conceptual Model developed is seen below. In my preface I referred to our founders who wrote:

...that all people are created equal with the right to “life, liberty and the pursuit of happiness...”

Equality and equal opportunity are deeply rooted in our national values, wherein everyone has a fair shot to succeed with hard work.

That said, there remain unacceptable disparities and inequities in our society and around the world. Until we deal with the social economic determinants of health we will not move the curve to the right and we will remain below the 50th percentile in many national health indicators (Figure 2).

In this model we address the current structural inequities and biases as well as, socioeconomic and political drivers of health inequities. The unaddressed persistence of racism, might allow parts of a nation to move our current health equity distribution to the right, but only for some of the people, not all of the people.

Can we have equality without equity? Yes. We can provide everyone with a size “8” shoe, equal in size and shape but, not equitable. We don’t all wear the same size shoe, nor do we see the world and its solutions equally. To have equity we must appreciate the differences and narrow those differences towards a more equitable state of affairs.

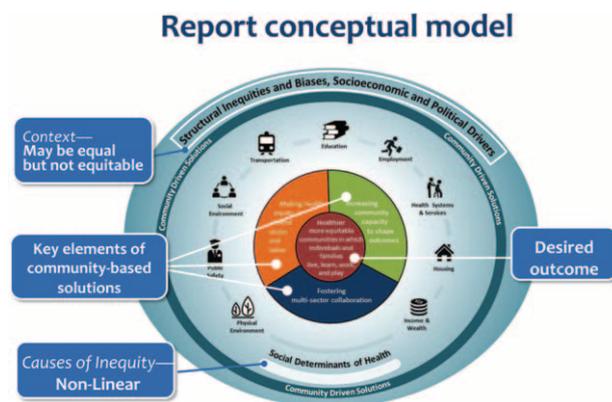


Figure 2. Report conceptual model. Source: www.nationalacademies.org/healthequityhub.

Most all of the “social determinants” are very pragmatic and easily understood but have been more difficult to implement than need be. Being educated is essential on a journey to health equity. Food and housing, which many take for granted, is simply not so, especially for those who live in the shadows of our great society. Safe places, ones’ physical environment, and housing are essential components for a healthy, equitable society. Growing up next to a factory where sulfur dioxide levels that exceed environmental protection agency (EPA) requirements, absent open spaces to play, and the inability to walk to school without fear of being shot; obviously have immeasurable negative, lifelong consequences. Fortunately, most of us fail to appreciate the consequences of such inequities, as they aren’t part of our normal environment. Having decent health services, decent wages, are simply not available in many of our nation’s largest and best known cities, as many rural parts of this great nation.

As we’ve rebuilt, re-gentrified our cities, we’ve increased the tax base for any given city, all-the- while, simultaneously moving those less fortunate into diaspora. In so doing we displace those who can least afford to be moved to remote areas; lacking the necessary transportation to even consider jobs, now located at distances far from their place of housing. Therefore, the committee added, transportation to the traditional, eight “social determinants.” Absent new bus/train routes there is no chance these communities have equitable opportunities.

Our future is our children. Growing up in structurally inadequate areas with few safe spaces to play, nor accessible routes to walk or bike paths to school have a devastating long-term impact. Similarly, their neighborhoods may be food deserts; having small food outlets and fast-food restaurants that sell unhealthy food and sugar drinks. They lack fresh and healthy foods at affordable prices. Thus, addressing our country’s obesity epidemic is also a fight for health equity.

Obesity costs our nation more than \$150 billion in healthcare costs annually and billions of dollars in lost productivity. It is a national security issue that directly impacts our nation’s military readiness. Being overweight

or obese is the leading cause of medical disqualification, with nearly one-quarter of service applicants rejected for exceeding the weight or body fat standards and cost the military about \$1 billion every year in healthcare costs and lost productivity. Alarming, more than 70% (26 million people) of today’s youth are unfit to serve due to being overweight, criminal records, drug misuse, or educational deficits. Obesity is a community safety issue. Childhood obesity is correlated with poorer educational performance and increased risk for bullying and depression.

If all children have the opportunity to grow up at a healthy weight—a lifestyle that includes nutritious food and plenty of time for active play—they are more likely to reach their full potential. Obesity is an equity issue. Obesity disproportionately affects low-income and rural communities as well as certain racial and ethnic groups, including Blacks, Latinos, and Native Americans.

As the President and congress try to solve our national debt, our health care non-system and global peace, a good place to start is with the social determinants of health. We have incredible resources and an unwavering American spirit. If we can capture the imagination of the all the people, with a plan to move the whole curve to the right, the spirit of the country and the world will change and empower all of us with hopes and dreams our forefathers had when they came to America.

Let’s not miss the opportunity to move the whole of America and the world forward.

Our pain got worse, we went to the doctor, and the pain subsided a lot.

As a nation we all got better.

Progression to a new mean will yield much improvement for all!

Thank you and Happy New Year!
Jim