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# Redefining Public Health

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**T**hank you. This is a lecture to honor Gene Matthews. You don't have to have many ideas if they are good...and asking Gene Matthews to work at CDC was a good idea...no, a great idea.

It is with a certain amount of relish that I return to Georgia where the Department of Education tried to remove evolution from the dictionary, to discuss...evolution.

We often equate evolution with biological phenomenon. But, the idea of evolution, or changes over time, applies to many things with different time scales. Darwinian changes in a species may take place over centuries. Darwinian changes in our cells, causing cancer, might be seen in just a few years or months. For instance, if a smoker causes an increase in the reproduction of cells, it increases the reproduction rate of cells and increases the chance of one cell having an advantage. Then you get lung cancer. Or if the hepatitis virus stimulates liver cells to the point that they reproduce more often, that one cell gets an advantage and becomes cancer. That may take place over a short time scale. In the case of geology, we're talking about thousands and millions of years, and tectonic plates and how they formed the continents. But, a fast and observable part of evolution is social evolution. This is true whether we talk about the rise of democracy in the past 200 years, communications, transportation, marketing, or medicine. The last decades have seen such changes in medicine, that people my age don't even recognize the vocation as compared to what we were taught a half-century ago. The same thing is true of public health, and that is what I would like to focus on—the evolution of public health.

While references to prevention, public health, and people in the aggregate are old, there were tipping points that suddenly caused things to move at a very

fast rate. The second public health tool might well be the law. And you, at this conference, would ask, "Why the second?" Well, the old rules, from religion and from cultural perspectives of "thou shalt not," were actually based on the first tool of public health—epidemiology. Epidemiology is simply a tool to measure the difference in rates between one group and another, and because people were observing differences in rates, we had the commandments, the "thou shalt not." So, the law became the second tool. Then the law evolved to the things we know about, like quarantine, but quarantine must go back a very long way.

I remember a smallpox outbreak in Nigeria, one of the first that I had seen, and people automatically, without asking what the rules were, moved their smallpox patients out of town where they built a separate little suburb for them. They were cared for by people who had already had smallpox in the past. Modern public health did not form until we had a person-made tool. And that tool came 208 years ago when Edward Jenner did the first vaccination to deliberately provide immunity against smallpox. Now there was a tool, and a campaign quickly formed around the world.

In this country, Thomas Jefferson took the lead. And even though Jenner's paper wasn't published until 1798, Thomas Jefferson already had smallpox vaccine by 1801. So three years after the first paper, he vaccinated his family and neighbors around Monticello, and gave vaccine to Lewis and Clarke to use on their trip to the West. Several hundred years ago, we saw the scattered use of epidemiology; Jenner looking at what happened when milkmaids got cowpox. Then, Benjamin Franklin actually concluded that colds were contagious from one person to another, before there was ever a germ theory. Oliver Wendell

Holmes, the father of the jurist, wrote a paper on hand washing and how that could reduce the deaths in women if doctors would practice it. Later, Semmelweis wrote a similar paper. Then, John Snow in 1854, reached the conclusion that cholera was being caused by one water supply. So, epidemiology was being used. Early in the last century, it made a quantum leap. It became institutionalized when the Public Health Service seconded Wade Hampton Frost to the new School of Public Health at Johns Hopkins to start the first Department of Epidemiology. And then, of course, we had Alex Langmuir, who brought epidemiology to CDC, to institutionalize it in public health practice.

My point is, it was used for a long time, but then we saw leaps, evolutionary leaps, where it suddenly went to a new level. Since then, evolution has accelerated. When I came into public health, it was pretty straightforward; it was almost synonymous with infectious diseases. It used epidemiology as a science tool. It used health equity as the moral compass. But the tools kept changing: new vaccines, polio vaccine, then measles, then the first vaccine against cancer, hepatitis B vaccine. And as the tools expanded, so did the scope of public health—from infectious diseases to occupational exposures, environmental health, chronic diseases, heart disease, cancer, and then even into the areas of intentional and unintentional injuries. It doesn't stop. We're now looking at mental health as a public health problem. At Emory, there is actually a Chair on Mental Health and Public Health. Is there no limit to the dimension of public health? Yemi Ademola was the president of my class when I got my MPH. He was murdered a few years after we graduated, but part of his immortality comes from the fact that I continue to quote him. In our yearbook, he wrote, "There is no area of knowledge beyond the interest or use of public health practitioners."

So, the tools accumulated. The skills continued to increase. The social science, always important in public health, became even more important when we recognized—with AIDS—the importance of anthropologists, and sociologists, and psychologists, and then the lawyers. All the while, the law was working quietly. We are surprised when we look back by how pervasive and persuasive the law has become in improving the health of the public—quiet, without fanfare—and not just quarantine laws. Look at vaccines. The list of laws and regulations that apply to vaccines is long—everything from the research, the manufacturing, the testing, FDA, consent forms, school entry requirements, and so forth. Chlorination, fluoridation, seat belt laws, speed limits, helmet laws, lead levels, asbestos, food laws, tobacco control, micronutrients—it goes on and

on. And still, no matter how long the list gets, there is still this feeling of an *ad hoc* approach—each time we have a problem, figuring out how the law applies, rather than looking at things generically.

With all of this involvement, you might ask, "How do we measure?" Perhaps the amount that this is recorded in public health literature would be worth looking at, but I'm not sure. One would think that newspaper inches for instance, would be the measure of priority of a subject to society. But, if that would be the case, then many newspapers would show us that horoscopes are more important than science. And if you looked at the news inches in 1938 for this entire country, number four on the list was Mussolini. Number three was Hitler. Number two was Franklin Roosevelt. Number one was Seabiscuit, a horse. And so, you get my point. The amount of attention given in the literature might not indicate the importance of the subject.

Like epidemiology or surveillance, the law has always been a tool, but not always in a consistent way. It is now reaching a point of institutionalization, not just for reconciling inconsistencies, getting rid of redundancies or ambiguities, not just revising the federal quarantine laws. Although that is all a part of it, it is not the total picture. Just as epidemiology moved from *ad hoc* to being an academic subject, to being used in public health practice, so we see the same thing happening with the law in public health. Some schools are now making this part of the academic curriculum. And I think of Steve Teret in injuries and what he has done over the years. The power of the law continues to amaze poor public health practitioners. It became my awakening when I saw how long we in public health had been working on tobacco, and then the lawyers got involved and overnight, it all changed. And I began asking students, "What else should we be asking the lawyers to do?"

So, the challenge for public health is to better use this arrow in our quiver. But, the challenge for lawyers may be different. We've seen how evolutionary changes in public health, epidemiology, surveillance, and so forth, come together at a moment and then do a great leap forward. This is what happened with democracy. There were many fits and starts, many lessons, and then a group of people asked if it was possible to put the wisdom learned into a concise framework. The Constitution of the United States became that draft of a unified field theory for democracy—giving the guidelines, but saying, "We will let evolution provide the midcourse corrections." We marvel at how well that small genius cluster did. It wasn't perfect by any means and 125 years later when my mother was born in this country, women couldn't vote and only a

minority of the population could vote even if they wanted to. But it changed, because the Constitution was drawn up in such a way that midcourse corrections were possible.

A professor at Cal Tech in physics was once asked, "If you had been God, how would you have created the universe?" Without hesitation he said, "Much bigger." And so, that is my challenge: Think much bigger when it comes to the law and public health. What if you imagined yourselves to be the Jeffersons, and Washingtons, and Adamses, and Franklins, figuring out how to develop a constitution for global public health law—not in a textbook, but a ten- or twenty-page document with the vision, the guidelines for balancing individual and social needs when it comes to freedom, and health, and equity, and social good, a document that articulated universal rules as well as the spectrum. And then, you must make it understandable to non-lawyers and to other public health people. You became the translators.

I like to tell the story of James Thurber going to a reception, and a woman introduced herself as an American now living in Paris and she said, "They actually translate your articles into French." And she said, "I think they're funnier in French." And James Thurber said, "Yes, they lose something in the original." And so all of these things we've done lose something in the original unless you translate them into action. It means asking what are the ultimates that you want in health where science and technology are available to everyone regardless of their place and condition of birth? It means not only that they get safe foods, and micronutrients, and safe water, and so forth, but that they have the freedom to do what will not hurt other people and to know what is their own personal freedom and where they have a social contract because they are part of society. Freedom to say "no" if it doesn't endanger or require sacrifices of others. It is one thing to decide if you are going to buy salt without iodine in it. By doing so, you don't cause your neighbor to have a goiter. It is quite a different thing to decide you will not immunize your children, because immunizing your children not only provides benefits to children, but it is also part of the social contract that says you will protect other people's children. And then figure out with all of this, what part of that vision is achievable by the application of laws, and statutes, and the political process?

I've often wondered why we have been so slow in solving the tobacco problem, for instance, where society pays for the health treatment of people who use tobacco. It seems to me it should be so straightforward to calculate about what tobacco costs the medical enterprise in this country and to figure out how

many packs of cigarettes are sold a year. Then you divide one into the other, add a surcharge to tobacco, and redistribute that money in the right amount to the funders such as Blue Cross/Blue Shield or Kaiser Permanente. The people who want to make a choice of smoking are then also the people who are paying for its consequences. Why should that be so hard to figure out?

And then, go on to figure out what part of that vision is achievable by applying the law and which things could be done to ensure that we have the resources. We really must figure out how to finance public health in a better way. The medical/ethical battleground of our day is not in the beginning of life and the end of life, it is on how resources are allocated. And we should come up with some rules for doing that, simple rules such as if you have a program with positive benefit-cost ratios, that is, you save more than a dollar for every dollar you invest, that should become an entitlement. It shouldn't compete with the rest of the budget, because if you don't do that, what you're saying is, "We're going to spend more and still have the problem." We should be able to figure out how to add surcharges to a vaccine in order to have a tracking system. We should be able to figure out how to index public health expenditures to total health expenditures so that we are not each year seeing a reduction in the percentage of total health expenditures going to public health. We should be more creative.

Back when the Injury Control Center was started at CDC, some of you may know, it wasn't Health and Human Services at all that made that possible. It was a Congressman by the name of Bill Leyman from Florida who said, "My authority is not in health. My authority is on a subcommittee of the Department of Transportation. But, I know what should be done." And so he put \$10 million into the Department of Transportation's budget on the condition that it go to CDC to start an injury center. That was creative. He had to do that three years in a row before Health and Human Services would finally pick it up.

And finally, you could then prioritize and help develop national and global model laws and model standards. And what if this small document became the standard for politicians to show what they were willing to do for public health as they were running for office? All of public health in the future could build on the constitution that you would write. Richard Feynmann, the physicist, pointed out that the arrow of time goes in only one direction and he illustrated this by saying, "It takes very little energy to scramble an egg, and all of our science is incapable of reversing that transaction." So, you can prevent a brain from being scrambled, but you can't put it back

together afterwards. That is the way it would be with a constitution for public health law. It would move in one direction, and things would continue to use that precedent as they developed. What you write will end up being used forever.

E.O. Wilson wrote a book called *Consilience*. It is a word that he defines as “the jumping together of knowledge.” And, the point of the book is that there is no gap between science and the humanities, between technology and religion, between art and science, between public health and law. And you are at the tipping point. You now have a coalition, a group of people that could provide the legal framework for the future, figuring out how to make equity in health a reality, developing the coalition of skills and interests to make this a movement, not just a conversation, to become interpreters, and not just archivists.

Another challenge, and I’ll do this in a few sentences, would be to develop methods to adequately

measure past, current, and future contributions of the law to public health. For example, certainly, school entry laws are crucial in making it possible to interrupt measles transmission in this country. How do we measure that? How do you show what that contribution meant in public health? So, it is important to highlight for every development of the past in public health, how the law was actually involved in order to make it a stronger tool for the future. And finally, while the past has been glorious, exciting, and even revealing as you probe the power of law in public health, the future will be even better because, to bring us back to the beginning, in this area, evolution will be exactly what you want it to be.

I thank Gene Matthews for the contribution he’s made at CDC, that he’s made in public health law in general, and I thank him for what he is going to do, what he better do, as his personal evolution enhances the evolution of public health law. Thanks, Gene.