

# Ebola Crisis in the United States: A Glimpse of Its Larger Shadow

Avinash Raghunath Patwardhan, M.D.<sup>1</sup>

## Abstract

This article is about readiness of the U.S. health care system to deal with crises. Using the Ebola crisis as a reference, first it examines the response to the current challenge. However, that is the smaller objective of the article. Lately, we are also being challenged to deal with other kinds of epidemics like obesity, mental health diseases, and violence. These crises are not dramatic like the Ebola crisis. However, these are no less insidious than Ebola. If we are not ready for them, then these crises have the potential to undermine the long-term health and prosperity of our society. In this context, and therefore mainly, this article is about two major long-standing systemic problems in the U.S. health care system that the unfolding of the Ebola crisis has bared. One is about how the inherent problem in the design of American federalist system regarding state autonomy on health matters is creating a dysfunctional health care system. The other is about the inertia of the research industry in the health care system in clinging to an archaic outdated inefficient mind-set and methodology that fails to generate the right information required for an appropriate decision making in matters of health care delivery, including crises. These problems are not small, nor their solutions easy. However, no matter how uncomfortable and tedious, facing them is necessary and inevitable. The discussions and arguments in this article are to outline their nature broadly and to make a call to further a dialogue.

## Keywords

Ebola, crisis, epidemics, preparedness, complexity science, state autonomy, decision science, health care research, U.S. health care

This article is about readiness of the U.S. health care system to deal with crises. Using the Ebola crisis as a reference, first it examines the response to the current challenge. However, that is the smaller objective of the article. Lately, we are also being challenged to deal with the other kinds of epidemics like obesity,<sup>1</sup> mental health diseases,<sup>2</sup> and violence.<sup>3</sup> These crises are not dramatic like the Ebola crisis. However, these are no less insidious than Ebola. If we are not ready for them, then these crises have the potential to undermine the long-term health and prosperity of our society. In this context, and therefore mainly, this article is about two major long-standing systemic problems in the U.S. health care system, that the unfolding of the Ebola crisis has bared. One is about how the inherent problem in the design of American federalist system regarding state autonomy on health matters is creating a dysfunctional health care system. The other is about the inertia of the research industry in the health care system in clinging to an archaic outdated inefficient mind-set and methodology that fails to generate the right information required for an appropriate decision making in matters of health care delivery, including in crises.

Presently, Ebola came to the U.S. shores somewhere around September 20, 2014. Within 10 days, it evoked a

nationwide crisis response. Ten cases and two deaths later, the sense of heightened anxiety has abated. “Were we or are we ready for Ebola” was a question repeatedly asked early on. However, without clarity about the definition of readiness, and with diverse and mixed responses from various stakeholders, the answer eludes us.

As of today, American Ebola response is as follows:

- America has pledged/contributed \$3 billion to battle the Ebola crisis (Ebola Virus Outbreak, West Africa, April 2014: Total Humanitarian Funding).<sup>4</sup> President Obama has proposed another \$6.18 billion pending approval from the legislature.<sup>5</sup>
- Approximately 150 American volunteers have gone to West Africa to provide health aid to fight Ebola.<sup>6</sup>

<sup>1</sup>George Mason University, Fairfax, VA, USA

### Corresponding Author:

Avinash Raghunath Patwardhan M.D., Room 423, Robinson Building B, George Mason University, MS: 5B7, 4400 University Drive, Fairfax, VA 22030-4444, USA.

Email: apatward@gmu.edu



- The U.S.-funded global surveillance system called PREDICT is currently proactively tracking high-risk zoonotic disease emergence of a pandemic potential such as Ebola.<sup>7</sup>
- An Iowa-based biotech company is working to develop an Ebola vaccine called rVSV-ZEBOV.<sup>8</sup>
- Two California-based biotech companies in collaboration with the National Institutes of Health (NIH) and the Defense Threat Reduction Agency have already developed ZMapp, a potential new drug to treat Ebola.<sup>9</sup>
- The Centers for Disease Control and Prevention (CDC) Emergency Operation Center is ready to handle Ebola-like situations.<sup>10</sup>
- Four hospitals in the United States are top-level biocontainment facilities (Emory University Hospital, Georgia; NIH-Bethesda, Maryland; Nebraska Medical Center; St. Patrick Hospital, Montana).
- Across the country, hospitals are being designated and trained to handle Ebola (eg, Mount Sinai Hospital in Manhattan, New York-Presbyterian Hospital in Manhattan, Bellevue Hospital Center in Manhattan, North Shore/Long Island Jewish Health System in Nassau County, Montefiore Medical Center in the Bronx, SUNY Upstate University Hospital in Syracuse, Stony Brook University Hospital on Long Island, and University of Rochester Medical Center in Rochester).
- Overall 6% of the U.S. hospitals are deemed to be prepared to handle Ebola.<sup>11</sup>

The above facts lead one to conclude that the United States has demonstrated reasonable readiness, especially when one considers that there have been only 10 Americans diagnosed with Ebola and that the calculated risk of dying from Ebola in the United States is 1 in about 1.9 million.<sup>12</sup>

However, if we examine the landscape from the perspective of the public health system response, the picture does not look as heartening. An article (Gonsalves and Stanley, November 5, 2014) in the *New England Journal of Medicine* (NEJM) compared the management of the current Ebola crisis with the 1980s AIDS epidemic in the United States.<sup>13</sup> The authors point to the issue of quarantine and lament that the “history is repeating itself.” Another article in the same journal (Rosenbaum, November 13, 2014) spoke about the various aspects of risk communication and the public perception regarding the message.<sup>14</sup> Dr. Rosenbaum wrote that “fear can be a risk in itself” and can have consequences. One editorial of the NEJM (Dr. Drazen et al, October 27, 2014) attacks mandatory quarantine and declares that the “governors have it wrong.” It cautions, “We should be guided by the science and not the tremendous fear that this virus evokes.”<sup>15</sup> The sentiment of these NEJM articles suggests that our responses lack signs of a mature readiness. They give the impression that America is a “Band-Aid” response nation where quick palliative fixes to the problems are the norm.

However, what is more worrisome is a fact that the display of our wants, expectations, and actions in the context of Ebola also exposes some fundamental systemic cracks in our health care system at a deeper level. Our inadequacies regarding the handling of the Ebola crisis indicate that we may not be ready for other equally or more daunting health care challenges. The list of these faults is long. I intend to examine only two among them, which I feel are important.

### **Autonomy of States on Decisions Regarding Health Care Matters**

Regarding the autonomy of states related to health care matters, the issue is not so much as to whether or not the governors of 10 states understood the evidence-based science correctly or responded incorrectly. The issue is why there was not a single, synchronized, coordinated, national response, regardless what that specific response was. In many ways, an attack of a deadly virus is similar to a terrorist attack on the country. The attacker can opportunistically choose between thousands of ports of entry in the country. A dormant patient from West Africa, for example, can fly to Singapore and then, after a layover in Australia, arrive in the United States in Cincinnati, Ohio, in 24 to 48 hours. There are many cities in the United States that have international flights, and those international flights connect to even more cities, that directly or indirectly connect to those in the Ebola epicenter. Just one infected undetected patient can start an epidemic. The impact of selective quarantine in this scenario is reduced, due to the broader exposure of people to the infected carrier. With globalization, boundaries of space are becoming meaningless. A human, animal, plant, or virus/bacteria does not limit itself to the boundaries of the states in the United States. In addition, a flu virus does not infect a person much differently in California than it does in Maine. This truism is not news. Nonetheless, the Ebola crisis has magnified the anomaly of a 50-state fragmented American health care system. There is a body of literature concerning the problems associated with 50 states having potentially 50 different scopes of practices, practicing guidelines, and payment systems.<sup>16</sup> If it is one biology of humanity that we are treating, then why do we need 50 systems to handle it? State autonomy on the matters of health is anachronistic. It is long overdue to scrap it and have one national public health system.

### **Science of Evidence (Base)**

The methods of analysis of the scientific evidence are also suspect. Governors do not dare to go against evidence-based science on a whim. Whatever the decision, the bottom line is that they need analyses and they need numbers, and somebody provides them. Customarily, these numbers are measures of decision analysis (eg, risks and/or benefit analysis of the potential actions). However, the problem in the health

care field is that the generation, availability, and presentation of evidence are not balanced. Governors are provided the numbers they want to see. However, data are scant when alternative actions are considered. There are predictive models that tell us the count of Ebola cases if we do not impose quarantine. However, there are few models about if we imposed it. The editorial of the NEJM referenced above asks a question, “What harm can that approach do besides inconveniencing a few health care workers?” and then answers it with a classical heuristic of “Hundreds of years of experience.” There is a wise opinion here, but no quantified prediction. Appeals with heuristic like “Hundreds of years of experience” will not bring about a change of heart of executives. But if a predictive model showed that the number of Ebola cases after imposing quarantine could be same or higher than without it, it may. Unfortunately, such models are far and few in between. Not that there are no such data. Actually, there are. For example, in her NEJM article mentioned before, Dr. Rosenbaum quotes from a book by Nate Silver (2012): “mandatory vaccinations ordered in response to a single death from H1N1 influenza caused . . . about 25 deaths.” This statement appears almost nonchalantly in the article, without emphasis. We require this kind of evidence more. In health care research, quantitative data pertaining to collateral damage, opportunity cost, and negative externalities are suboptimal. The file drawer problem or publication bias<sup>17</sup> and incentive bias<sup>18</sup> are not unknown to scholars.

One more reason why evidence base is weak in health care research is that outdated archaic analytical methodologies mainly serve health care system research. Their value-yielding potential follows a sinusoidal curve that maxes out at the top end. Besides, they only marginally apply to non-linear complex systems. Most human health-related issues are complex and non-linear. Because of this, the standard analytical methods either do not tell much, or tell the same story again and again in different styles. Instead, using tools and techniques from complexity science should be applied. Today, formalisms of complexity science are advanced and well developed. Fundamental sciences, aviation science, space sciences, the military, and Wall Street have been using these tools for a while. It appears that the health care system in general has missed the bus. This author had made a presentation in November 2004 at the American Public Health Association (APHA) national conference urging the health care system research industry to embrace the non-linear dynamical systems paradigm. Ten years later, the landscape looks essentially unchanged. The complexity science methods can produce the kind of data that decision makers need. These sophisticated methods can quantify harm that can come out of a good deed, something impossible for the traditional methods. At their best, traditional methods can only compare the goodness/badness of one deed(s) with another.

Urging people to respect the evidence-based science is important. However, more imperative is to make evidence-based science respectable. Most of us do not understand how

a 735 000 pounds of steel flies safely on an autopilot eight miles above the ground. Yet most of us board a 747 Boeing routinely without hesitation, because we trust the programs and the algorithms based on complexity science that make that autopilot automation possible. Health care system needs complexity science now—for Ebola and for almost everything else.

The Ebola crisis will soon dissipate in the United States and in West Africa. However, now might be a good time to start a serious sustained dialogue on the issues raised in this article so that we are better prepared to tackle the challenges in the landscape of the emerging global health ecosystem.

Richard Feynman once said, “For a successful technology, reality must take precedence over public relations, for Nature cannot be fooled.”<sup>19</sup> In one of his lectures, Leon Megginson said, “It is not the smartest; it is not the strongest; but it is the species that is able best to adapt and adjust to the changing environment in which it finds itself that survives.” (This quote is often falsely attributed to Charles Darwin.) Louis Pasteur said, “Chance favors the prepared mind.”

The world today is drastically different from the world of half a century ago, and is likely to get more complex and complicated. Ebola is not the first, nor will it be the last disease to challenge us.<sup>20</sup> Mark Woolhouse, a professor of infectious disease epidemiology recently said (quoting a 2005 personal communication with L. King) that “21st century is a perfect storm of viral emergence.”<sup>21</sup> It is likely that he is right. As Megginson said, we must adapt and do so quickly. Ebola has awakened us to an opportunity to correct some of the wrongs at the foundation of our health care system, and we must not pass it.

### Acknowledgment

I want to thank Drs. Debra Moss, Robert Bilkovski, Somik Raha, Sharon Frazee, and my wife Swati Patwardhan for their comments and suggestions to make this article read better.

### Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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