

Data Guided Public Healthcare Decision Making

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INTRODUCTION

This chapter raises a serious issue which the healthcare organizations are facing currently and addresses a resolution for it. First, the chapter discusses fundamental challenge on how to discover bioterrorism soon enough to avoid catastrophic disaster and in an event, if it does happen then how the healthcare organization could address a flood of patient care needs. Secondly, the chapter builds a new model to address the issue.

To be specific, note that the healthcare industries in general and public health agencies in particular are more concerned and worried to make the best optimal decision than other businesses because of its essentialities and quasi-nonprofit goals of public health safeties. The healthcare related decision making is therefore very sensitive to the patients' dire demand during emergencies due to (bio) terrorism events. The seriousness is amplified more when the service operations are surrounded by several uncertainties.

In this chapter, the concepts and methodologies to prepare data guided public healthcare decisions to attain efficient services in terms of several criteria are discussed. What are those criteria? How are the criteria measured and evaluated? This chapter compiles and illustrates existing definition of terminologies, meritorious nature of the useful decision making methodologies using hospital data. New approaches are developed and discussed which strengthen the data guided healthcare decision making process. These new approaches are quite suitable in other businesses also as much in healthcare operations as they are pointed in the end.

BACKGROUND

One of the major perils in 21st century is terrorism. The terrorism should be preventable but is quite scary challenge to the law enforcement and other public agencies. In particular, the health agencies are more worried about their ability to handle any dire situation of its occurrence. Among the terrorisms, the bioterrorism stands out as a nightmare to the agencies including the public health agencies. In spite of the necessities of being prepared to tackle any undesirable bio-terroristic event, the public health agencies in developing as much as in developed nations including the United States of America (USA) are worried and alert. With respect to displaying the alert level of 51 states in USA, the United States General Accounting Office (2003) prepared a report for the US Congressional Committee.

To make this report, the General Accounting Office sent a survey of relevant questions to 2,021 hospitals in 51 states (including Washington, DC) in USA. Only 73% of the hospitals responded with a pattern (See Figure 1). The response rate of the states ranged from 44% to 100% and it was higher in states with more hospitals. There was a state with one hospital to a state with 189 hospitals with an average of 40 hospitals per state in the nation. Unusually large number of hospitals existed in *California, Florida, New York, Ohio, Pennsylvania and Texas*. Interestingly, the response rates were higher in the states: *Delaware, Idaho, Nebraska, Tennessee, Vermont and Wyoming* while lower response rates occurred in states: *Louisiana and Rhode Island*. The random response rates were approximately *normally distributed* as indicated

by the *probability-plot* (PP) in Figure 2. The configuration in Figure 2 hints that there are different groups of states in USA and it will be explored later in the article. Among the responded states, only 34 states in USA are prepared to deal with bioterrorism (See Figure 3 for their *normally distributed* trend). However, the frequency trend of the percent of hospitals in 34 states to deal effectively the *emergency medical service* (EMS) is *not normally distributed* with a lower percent in states *California* and *Oregon*.

Realizing the deficiency to deal with the EMS operations, a percent of the hospitals in those states became worried and their frequency trend is normally distributed. The least worried states are *Kentucky* and *Mississippi*. Such worry alerted a percent of the hospitals to periodically drill to handle bioterrorism event with a normally distributed frequency trend. In this scenario, one may wonder: How many hospitals are secured from terrorism itself? The frequency trend of percent secured hospitals in 34 states in USA and the trend is not normally distributed. In the midst of these frightening scenarios, what percent of urban hospitals in 34 states of USA are equipped to treat patients in an outbreak of *botulisms* or *anthrax*?

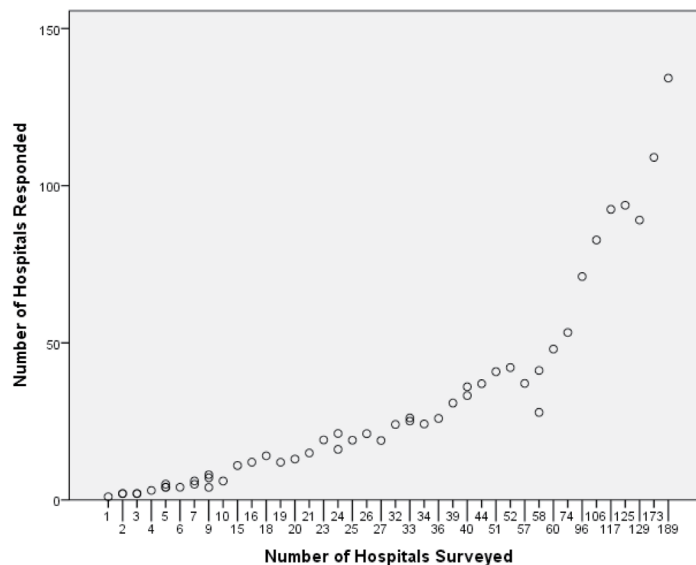
An interesting contrast is that the frequency trend for botulisms is normally distributed while for anthrax is not normally distributed. The lowest prepared states for anthrax treatment are *Arizona* and *Virginia*.

A distinction is noticed that the percent of urban hospitals who can handle a large influx of patients in 34 states in USA is not normally distributed while the percent of urban hospitals can manage massive fatality is normally distributed. Anomalies like these increase the curiosity to understand and decode data information to secure optimal public health decision making. The urban hospitals in USA are expected to make efficiency oriented organizational decisions and effective public health oriented external decisions. The concept and tools of decision making ideas would help. What and how are they helping are discussed in the next section.

MAIN FOCUS OF DECISION MAKING

What is *decision making*? It is a collective process of selecting an option over others based on a value system. What is a value? The *value* is an

Figure 1. Number of urban hospitals responded versus surveyed in 51 states in USA



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