Investigation of outbreaks records and contributing conditions in Unites States

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Dear Editor,

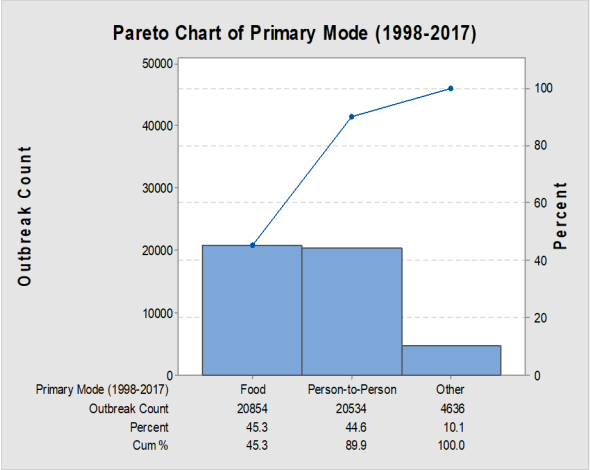
Outbreaks are considered a source of national concern worldwide due to their impact on human health and possibly life with great financial loss due to ceased productive activities of citizens in addition to time, efforts, money and other resources directed to save and recover affected populations [1]. Accordingly, many regulatory agencies perform strict monitoring of outbreak cases and provide comprehensive records to derive corrective and preventive actions [2, 3].

Center of Disease Control and Prevention (CDC) provide and continuously update outbreaks data through National Outbreak Reporting System, available in the web site (https://wwwn.cdc.gov/norsdashboard/). Outbreak monitoring source was the National Center for Emerging and Zoonotic Infectious Diseases (NCEZID). National outbreak public record was analyzed using statistical process control (SPC) software Minitab® 17.1.0 which was used as previously reported in other works for data analysis [4, 5]. Outbreak dataset was rearranged and analyzed from the year 1998 to 2017 without any limitations or restrictions to cover different types of modes and infections regardless of the sources or locations.

Pareto charts were used to determine the major contributors at different analysis levels as could be demonstrated in Figures 1 and 2. About 90% of the outbreaks were mediated through food then person-to-person contact. Thus, areas of high population densities are showing relatively higher rates of outbreaks as could be seen from Figure 3 and include the 12 states that contribute to 60 % of the total outbreak observed in Figure 2. Interestingly, more than 65 % of the recorded outbreaks occurred between December and May (Figure 1) and from years 2010 to 2017 (Figure 2).

It could be concluded that states with high number of populations are prone to the greatest risk of outbreaks which may be due to high rates of food consumption from greatly divergent sources which increase probability of food poisoning where the quality and safety may be highly impacted by high demand pressure in the market, in addition, the difficulty of the monitoring and control [6, 7]. A person-to-person factor as a mode of transmission is another crucial factor that influences disease spreading and dissemination [8, 9]. States with low population densities usually show a relatively lower incidence of the outbreaks.

The lesson learned from this analysis is that communities with high population densities require greater control, monitoring and awareness about hygiene, quality in food processing and handling. In addition, personal contacts and communications should be contained during suspect outbreaks, especially at early stages. Nevertheless, people perception programs should be set regularly to enhance their commitment correctly which will minimize the damage encountered from an outbreak .



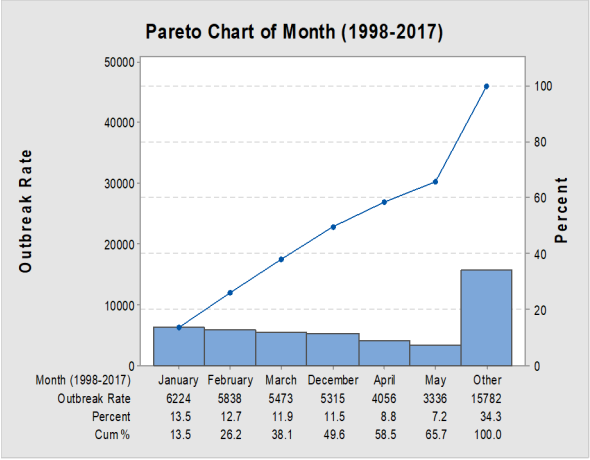


Figure 1. Vertical bar graphs showing major months and primary modes of outbreaks between years 1998 and 2017 in USA

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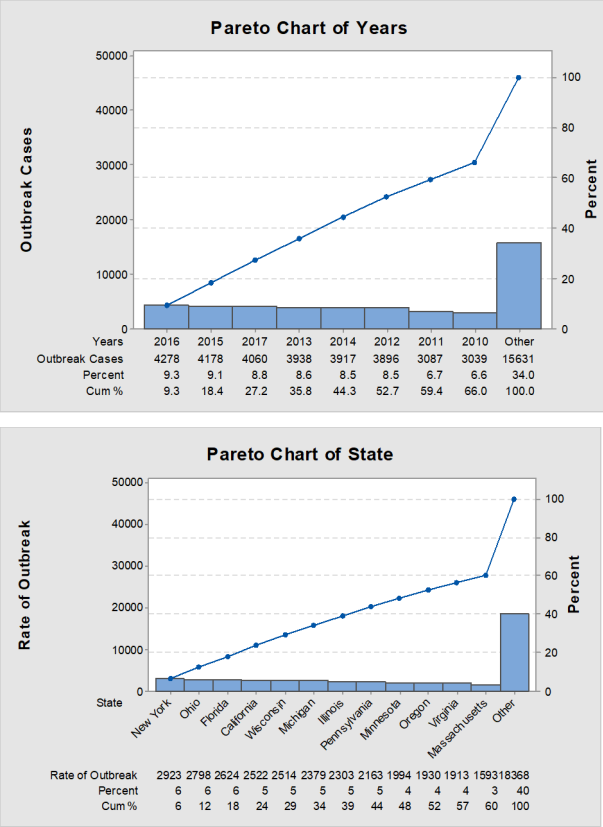

Figure 2. Pareto distribution diagram for major affected states by outbreaks accompanied with years of the highest incidence rates

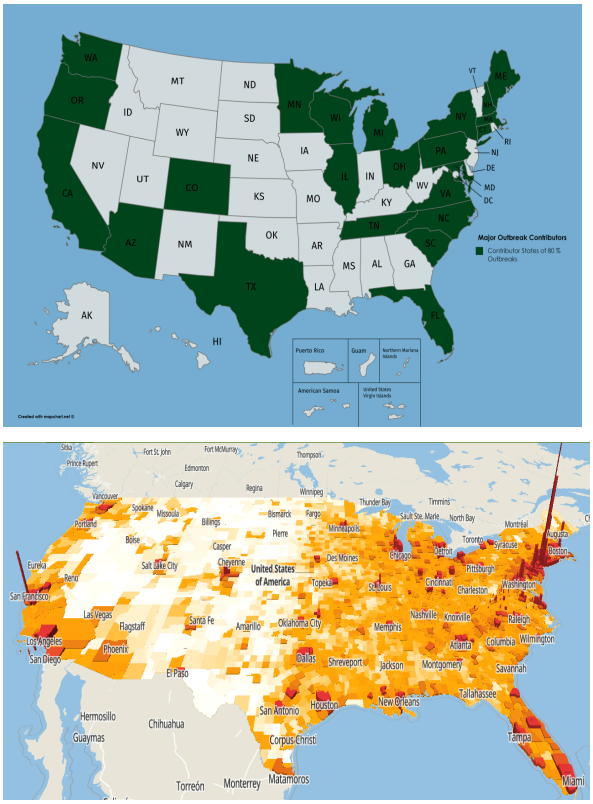

Figure 3. USA map showing main impacted states by outbreaks during 20 years of monitoring (A) and its apparent relation with population density (color intensity is proportional with the rise of population within the area) in the country (B)

Acknowledgments

N/A

Conflict of interest

None to declare.

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