

Infodemiology to improve public health situational awareness: An investigation of 2010 pertussis outbreaks in California, Michigan and Ohio

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Abstract: As a disease emerges, one of the greatest challenges for public health practitioners is to differentiate between a normal event and a serious outbreak. Typically, information from official sources and surveillance systems had been the only resource. More recently, the field of infodemiology has emerged with a focus on the distribution and determinants of health information on the internet. This research compared official reports of whooping cough with infodemiology sources, specifically news articles, search engine patterns, and Twitter, to assess the timeliness, accuracy, and correlation of these content sources. Within California, Michigan and Ohio, internet search patterns identified the outbreak of pertussis in 2010 four to eleven weeks in advance of official sources, and there was strong correlation between the epidemic curve and search pattern in Michigan and Ohio. Twitter also provided an indicator in advance of official sources in all three states, but only with a single Tweet. Using all three sources to identify indicators was better than any single source used independently. While understanding the data utility is important, it is equally critical to understand the attitudes and perceptions amongst public health leaders regarding infodemiology data to improve situational awareness. A survey of such leaders showed that infodemiology content had the most value in the first stage of situational awareness for identifying early indications of disease outbreaks. News media and internet search were moderately to highly valuable for 70% of respondents, while social media was moderately to highly valuable to 60% of respondents. For both strengthening comprehension of an outbreak and informing future predictions, beliefs were split regarding the level of potential value (if any) that exists. This led to a framework on how to include infodemiology content in public health situational awareness strategies going forward, so limited resources are used as effectively as possible.

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