



UNDERSTANDING PUBLIC PERCEPTIONS OF IMMUNISATION USING SOCIAL MEDIA

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PLANNING, INDONESIAN MINISTRY OF HEALTH, UNICEF AND WHO
PROGRAMME AREA: PUBLIC HEALTH**



SUMMARY

This project examined how analysis of social media data could be used to understand public perceptions on immunisation. In collaboration with the Ministry of Development Planning (Bappenas), the Ministry of Health, UNICEF and World Health Organisation (WHO) in Indonesia, Pulse Lab Jakarta filtered tweets for relevant conversations about vaccines and immunisation. Findings included identification of perception trends including concerns around religious issues, disease outbreaks, side effects and the launch of a new vaccine. The results built on Global Pulse's previous explorations in this field, confirming that real-time information derived from social media conversations could complement existing knowledge of public opinion and lead to faster and more effective response to misinformation, since rumours often spread through social networks.

BACKGROUND

Around the world, children continue to suffer and die from vaccine-preventable diseases. There are numerous barriers to universal immunisation, including misinformation and misperceptions about vaccines.

Dissemination of incorrect information has contributed to low vaccine coverage and high dropout rates in some countries, which means patients are not completing their doses and therefore not receiving full immunisation. This severely impacts preventable disease control, elimination and eradication efforts.

Understanding public perceptions and taking immediate actions to counteract misinformation are core elements of UNICEF's global strategy to increase and sustain high immunisation coverage. UNICEF research in Eastern Europe showed that parents actively use social networks and blogs to inform their decisions on whether to submit their children for vaccinations. The study also revealed that social media monitoring and sentiment analysis could provide key insights for developing engagement and education strategies.

Such findings are particularly relevant in Indonesia, a country with over 74 million Internet users and, in particular, high penetration of Twitter engagement. Meanwhile, only 66 percent of Indonesian children ages one to two years old receive full basic immunisation. (DHS, 2012) The vaccine dropout rate¹ of DTP vaccine coverage, which includes diphtheria, tetanus and pertussis (whooping cough), was at 23 percent in Indonesia in 2011. (UNICEF 2013) Increasing routine immunisation coverage among Indonesian children is a national priority, as well as a core interest of UNICEF and its collaboration with the Government of Indonesia (Bappenas).

In this context, Pulse Lab Jakarta conducted this study with Bappenas, the Ministry of Health, WHO and UNICEF to explore how Twitter could be used to understand public perception on immunisation.

ANALYSING PUBLIC TWEETS ABOUT VACCINES & IMMUNISATION

A technical team of public health experts from the government and UN agencies helped refine the project scope, methodology and provided feedback during implementation.

The project focused on four sub-topics chosen for their relevance to the immunisation program, and more broadly to the public health context: (1) religious concerns on immunisation, (2) conversations around disease outbreaks, (3) symptoms or health conditions discussed as vaccine side effects, and (4) the launch of a new Pentavalent vaccine.

The project extracted 88,368 relevant public tweets from January 2012 to December 2013 in the Bahasa Indonesia language. These tweets were filtered using combinations of keywords and phrases that cover the most frequently used terms relevant to each immunisation sub-topic. For example, tweets containing the word *sakit* ("sick") and either *dpt* (DPT vaccine) or *vaksin* ("vaccine") could be relevant for the sub-topic about side effects. The extracted tweets were refined further to limit the amount of irrelevant content, such as jokes, and then mined for insights. Tweets were analysed for the following:

- **Overall trends** by examining daily, monthly and yearly volumes of tweets from January 2012 to December 2013 (this is one of simplest ways to capture sudden changes in topical engagement and infer causes of significant spikes in volume)
- **Word clustering** or grouping words frequently in the same tweet in order to find patterns in tweet content
- **Shared content** by analysing what content people share from external sources (e.g., news sites) or from their followers as a proxy for public interest
- **Influencers** by identifying the top Twitter accounts that tweet about immunisation (with significant numbers of followers) and the Twitter accounts mentioned most often

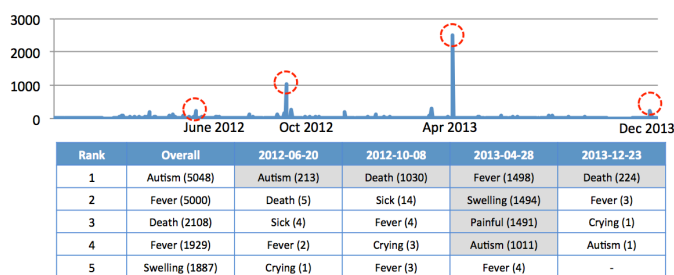
¹ The percentage of children who do not receive all three doses of DTP after receiving an initial dose, compared with all children who receive the initial dose of DTP.

- **How information spreads** by analysing how users disseminate and receive tweets based on their social network relationships

INSIGHTS & OUTCOMES

This study revealed how information shared by Indonesians on social media about immunisation (121 tweets/day on average) can be used to gain real-time insights on public perceptions.

- The analysis showed how the four sub-topics (religious concerns, disease outbreaks, side effects, Pentavalent vaccine) were discussed over time, in terms of volume and content, and evidenced that health-related information spreads exponentially.
- Analysing trends through frequently used word clusters (multiple words used in the same tweet) helped to reveal when and why people expressed immunisation-related concerns. For example, Twitter users expressed concerns about vaccine side effects linked to autism and death on 20 July 2013 and 8 Oct 2012, respectively (see figure below).



The figure above shows a keyword analysis of daily tweets that perceive certain health conditions like “autism” and “death” as vaccine side effects.

This study identified a network of Twitter influencers (accounts with a large number of engaged followers) that could be leveraged for rapid response to public concerns and misinformation related to vaccines and immunisation.

For example, if there was a sudden spike in tweets about autism as a potential side effect of vaccination, public health officers could work with key influencers to spread accurate information through their own networks.

The volume of tweets about the launch of a new Pentavalent vaccine was low compared to the other sub-topics, with only 1,639 relevant tweets over one year.

This finding suggests that practitioners could improve public awareness by including Twitter-as a campaign tool for vaccine booster doses and complete immunisation.

CONCLUSIONS

Tracking Indonesians’ concerns about immunisation as expressed publicly on Twitter revealed the utility of social media to complement existing tools and knowledge of public opinion. This study demonstrated how public health practitioners could use real-time insights gained from social media for situation awareness and rapid response, particularly to address the spread of rumours and misinformation.

Perceptions expressed online on social media may not be equivalent to the opinions expressed offline, as sentiment and tone can shift from one medium to another. Comparative research is recommended to assess the representativeness and demographics of online sources. It would be also relevant to evaluate the utility of other communication channels, including other social media networks, blogs and online news.

IMPLICATIONS & RECOMMENDATIONS

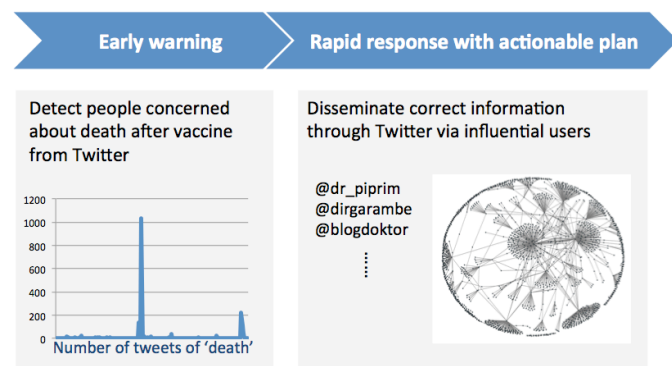
- This study demonstrated that monitoring social media conversations could provide real-time awareness about public perceptions on immunisation, improving rapid response to misinformation and concerns.
- It is recommended to replicate and validate this study, including with other online communication channels and relevant off-line data collection methodologies.
- It is recommended that a new framework be explored that integrates real-time social media monitoring into existing early warning and situational awareness tools and communication programs.

REFERENCES

- Tracking Anti-Vaccination Sentiment in Eastern European Social Media Networks (2013) UNICEF
- “Indonesia - the social media capital of the world.” (2014) OnDeviceResearch. <http://www.slideshare.net/OnDevice/indonesia-the-social-media-capital-of-the-world>
- “Geolocation analysis of Twitter accounts and tweets by Semiocast.” (2012) Semiocast. http://semiocast.com/en/publications/2012_07_30_Twitter_reaches_half_a_billion_accounts_140m_in_the_US
- Indonesia Demographic and Health Survey (2012) DHS Program. <http://dhsprogram.com/publications/publication-FR275-DHS-Final-Reports.cfm>
- Immunization Summary: A statistical reference containing data through 2011 (2013) UNICEF. <http://www.unicef.org/immunization/files/EN-ImmSumm-2013.pdf>

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The figure above shows how a spike in tweets expressing concern about death after vaccine could prompt rapid response to correct the spread of misinformation by leveraging a network of Twitter influencers.