

SUMMARY

This multi-country study aims to track and analyse online conversations related to immunisation on social media and mainstream media in India, Kenya, Nigeria and Pakistan. Findings from the study showed that in social media, Nigerian and Pakistani politicians are active and influential in the vaccination debate and the political dimension is often referred to when discussing the failure to eradicate diseases such as polio. However, in Kenya, religious and ideological aspects were more frequently discussed. Twitter activity is primarily driven by sharing of news stories in all countries whereas Facebook focuses on the 'distrust' and 'ideals' categorisation. Finally it was found that mainstream media related different actors and entities than social media. The project shows how methods including sentiment analysis, topic classification and network analysis can be used to support public health workers and communication campaigns.

BACKGROUND

Health workers face many challenges when it comes to child immunisation. Vaccinating children is often challenging work, requiring knowledge of caregivers, travel to hard to reach areas and communication with caregivers, parents and children. Additionally, a lack of information or the spread of misinformation poses a challenge for health workers.

The dissemination of internet-mediated, misleading information about immunisation has proven devastating for control efforts in recent years. Globally, challenges for immunisation programs "have ranged from isolated episodes of non-acceptance (due to religious, ethical or medical considerations) to active political mobilisation against immunisation programs"¹. As immunisation uptake is mediated by socio-cultural and political influences, locally appropriate communication responses are required to meet and sustain coverage goals.

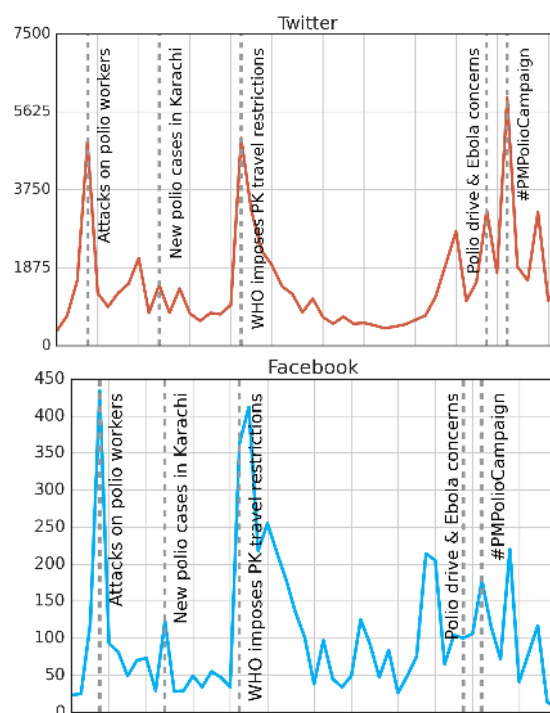
MINING SOCIAL & MAINSTREAM MEDIA FOR IMMUNISATION CONVERSATIONS

Public, English language content relating to vaccination from two social media platforms (Twitter and Facebook) was analysed along with mainstream media. The time period was January-December 2014 and the geographies were India, Pakistan, Nigeria and Kenya. Relevant content was first extracted by filtering for one of a comprehensive set of terms (a taxonomy) directly related to immunisation such as

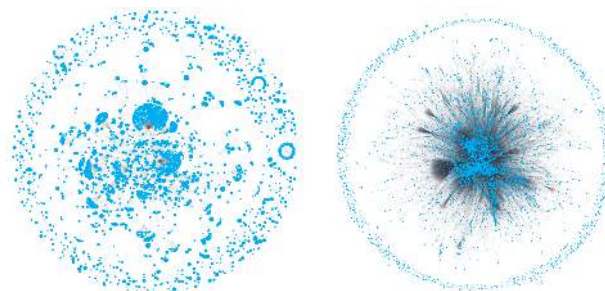
→ **"vaccine"** OR **"antivaccine"** OR **"anti-immunisation"** OR **"anti-vax"**

Additional taxonomies were used to categorise each message into the following categories: "Religion/Ideals", "Distrust/Refusal", "News/Events", "Side-effects", "Safety", and other topics.

Spikes in content were strongly driven by specific events such as attacks on polio workers and polio campaigns in Pakistan.



The figures above show weekly number of vaccine related posts on Twitter and Facebook in Pakistan.



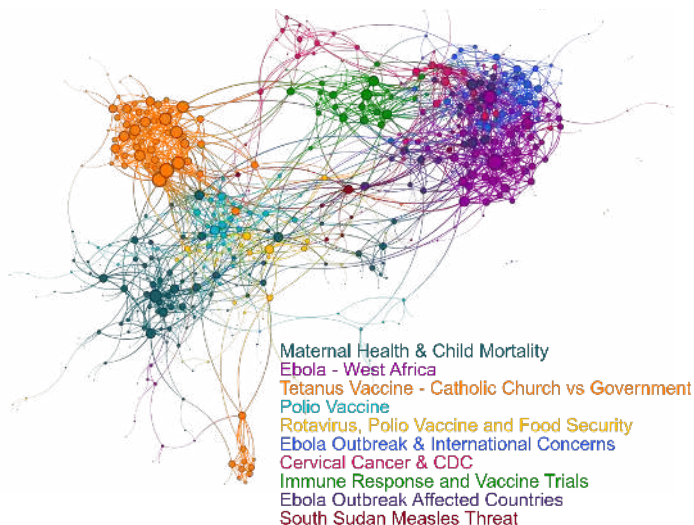
Comparison of the density of retweet networks between Twitter users. Nigeria (left) and India (right). Each blue dot is a Twitter user. Users are connected if one retweets a vaccine related message produced by the other. The size of the dot signifies the user's number of followers.

¹ Goldstein S, MacDonald N, Guirguis S and the SAGE Working Group on Vaccine Hesitancy (2015) Health Communication and Vaccine Hesitancy, Vaccine (in press)

Using network analysis and demographic classification of users, key influencers and their audiences were identified. By mapping out users who retweeted each other, we obtain a 'birds-eye' view of the vaccine debate and compare the nature of the conversation between countries.

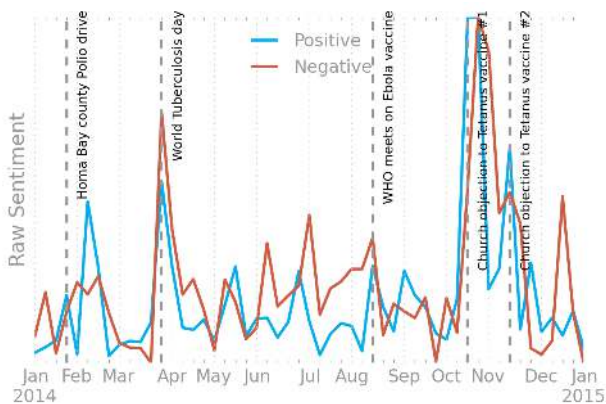
The India influencer network contains more users who are more active, with a more strongly defined core of users with large audiences. Such a scenario implies that the narrative is dominated by a few individuals or organisations; conversely the Nigerian network is more diffuse with fewer individual users who can be easily identified as important or dominating the immunisation conversation.

The news narrative in each country was analysed by clustering together articles with related content into distinct topic clusters. This revealed the structure of the news narrative and how key events and organisations were discussed.



Network of news articles in Kenya (using the news analysis software Quid). Each dot represents a news story and is sized by degree (number of connections it shares with others), and is coloured depending on the topic cluster. Stories with related content are linked. We also looked at the sentiment for each article and saw that news about Ebola were the most negative while the Catholic Church vs. Government debate also saw a number of negatively phrased articles.

Sentiment analysis is a method to automatically analyse a piece of text and extract a measure of how positive or negative that text is.



The plot above shows the sentiment expressed via Twitter over time.

This was applied to online conversations related to vaccination and tracked over time. For example, strong negative sentiment to a tetanus vaccine was driven by the Kenyan catholic church. Conversely, events such as the official announcement of India's polio-free status were met with many messages with positive sentiments.

INSIGHTS & OUTCOMES

This work demonstrated the ability of social media monitoring to better understand public opinion about immunisation. Twitter was primarily used to share news stories while Facebook allowed for longer discussions touching upon many different sub-topics at once. The mainstream news in turn often reflected different narratives to user generated social media content. Key differences in the debate were observed between and within countries. For example, in Kenya and Nigeria the vaccine debate centered more on ideals and politics than in Pakistan and India. Within India, the conversation activity was sensitive to specific events unique to certain regions of the country. Beyond the content of the vaccine discussion, the type of platform (e.g. feature phone, smart phone, blogging platform) used to share content differed between countries.

It was found that the majority of social media users were comfortable with English, using English either to write their user description or as the language used to display content internally within the platform. This was true even if they produced content in their primary non-English language.

IMPLICATIONS & RECOMMENDATIONS

- Campaigning for vaccination efforts should be targeted to a sub-national level and responsive to local events.
- Twitter and Facebook differed in several ways: Twitter responded quickly to events and allowed sharing of news.
- Users of Facebook and Twitter seem comfortable with English, suggesting that campaigns may reasonably be conducted only in English if resources are limited.
- For listening purposes it could be important to target local platforms and new audiences to established platforms who may not share the same knowledge of English. Therefore it is important that investment is made in software libraries to analyse non-European languages such as Urdu and Hindi.

REFERENCES

Tracking Anti-Vaccination Sentiment in Eastern European Social Media Networks (2013) UNICEF
 UN Global Pulse, 'Understanding Public Perceptions of Immunisation Using Social Media,' Global Pulse Project Series no.9, 2014

HOW TO CITE THIS DOCUMENT:

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