



When Fake News Causes Real Suffering

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The growing influence of social media alongside a shift in how people obtain and consume news has led to the rapid spread of misinformation about the origins of the COVID-19 virus. What impact will this have on public health and the acceptance of a vaccine?

More information is not a new phenomenon — especially when it comes to infectious disease, vaccination and public health. The roots of the anti-vaccination movement can be traced back to the 18th Century, when smallpox inoculations were outlawed after being blamed for a severe outbreak of the disease in Paris.¹ Thankfully, vaccination techniques have since improved, and the public health case for widespread vaccination has become stronger, better understood and more widely accepted.

However, the anti-vaccination movement persists, and is having a significant effect on public health. In 1998, for example, British physician Andrew Wakefield authored a study published in [The Lancet](#) claiming to identify a link between the Measles, Mumps and Rubella (MMR) vaccine and the onset of symptoms of autism. The Wakefield study was eventually debunked, found to be fraudulent and revoked entirely² — but the damage was done. The study received widespread publicity at the time and was blamed for contributing to a sharp fall in MMR vaccination coverage rates and a resurgence of the disease in Western countries.³

The proliferation of anti-vaccination misinformation on social media had led to a statistically significant reduction in “vaccination coverage”

In more recent years, and despite significant pro-vaccine efforts by health practitioners and policy makers, the false link between the MMR vaccine and autism identified in the Wakefield study lives on. In fact, it has found a new lease of life: through social media. Posts spreading misinformation continue to pervade online discussions to this day, fueled by content created and shared by ordinary individuals, celebrities, politicians and organizations interested in propagating the myth.

Measuring Misinformation

To truly assess the effect of misinformation, one must be able to measure it first. The FTI Consulting team used the MMR vaccine and measles as a “test case” to demonstrate how machine learning and statistical analysis could be combined to first sift through Tweets in order to identify fake news, and to then isolate and measure the scale of its impact.

The team focused on the spread of misinformation through Twitter because that it is one of the most popular social networking platforms, and because Twitter makes its data publicly available for detailed analysis.⁴ The FTI Consulting team used machine learning techniques to sift through thousands of Tweets related to the MMR vaccine in order to identifying ones which contained misinformation.

They found a general increase in misinformation over time, but with ‘surges’ around particular events – such as Donald Trump linking vaccination and autism during a Presidential candidate debate in late 2015⁵ or actor Robert De Niro appearing on television to debate the vaccine-autism link in early 2016.⁶

However, correlation does not necessarily imply causation. To measure the causal effect of this increase in misinformation, the FTI Consulting team used a standard statistical methodology called “multiple regression analysis” which allowed them to remove the effect of multiple confounding factors in order to isolate and measure that of anti-vaccination misinformation.

In doing so, the FTI Consulting team arrived at a conclusion: that the proliferation of anti-vaccination misinformation on social media had led to a statistically significant reduction in “vaccination coverage” (a measure of the proportion of individuals eligible for vaccination who actually receive vaccine). This has harrowing implications for public health, as populations with lower rates of vaccination coverage are

generally understood to be likely to experience more frequent and more widespread outbreaks of infectious disease.

Fake News; Real Consequences

The data obtained by the FTI Consulting team suggests that of the 3 percentage-point fall in vaccination coverage in the 5-year period from 2014-2018, over half was caused by misinformation. There is a knock-on effect on public health, as on average, a 1% decrease in vaccination coverage is associated with a 2% increase in the measles incidence rate.⁷ This is the impact misinformation can have. The research from the FTI Consulting team has led to the following key findings:

Misinformation can affect human behavior

Discussion on social media can have a “real world” impact on human behavior which can affect public health. This raises important questions that are at the forefront of the current debate for social media users, social media companies and policy makers alike. For instance, should social media companies be held accountable for the content shared on their platforms? Should policy makers regulate social media content, and if so how should such regulation be designed, implemented and enforced?

Steps toward regulation are already being taken. The European Commission published its action plan to counter misinformation in Europe in 2018⁸ and has very recently proposed a number of policy actions for countering misinformation, which are intended to feed in to the EU’s European Democracy Action Plan program, and Digital Services Act.⁹ At the same time, the US Government is currently conducting a review of Section 230 of the Communications Decency Act, which is relevant to whether social media companies should be treated as publishers or distributors of content created by their users.¹⁰

Social media will play a crucial role in combatting COVID-19

Quickly achieving high levels of vaccination coverage will be essential in order to reduce the economic and social burden of the disease.

A flood of misinformation on social media around this vaccine will have a serious effect on its acceptance, and ultimately, on economic and social wellbeing. Social media users, companies and policy makers should anticipate this impact

and start work to mitigate it now. The largest social media networks are already doing so: for example, Twitter has already updated its approach to address misinformation on its network — including for content relating to COVID-19 — and has started to provide labels, warnings or to remove posts altogether depending on the form of the misinformation, and its propensity to cause harm.¹¹

The research from the FTI Consulting team demonstrates how social media data, machine learning techniques and traditional statistical analysis may be combined to examine important issues of causation – in this case, the effect of fake news on public health. The same techniques can provide clarity in other complex and important areas, such as economic policy, business and marketing strategy and commercial disputes.

Misinformation can certainly have real life consequences. But while it may be a part of our past, there's no reason it has to be a part of our future.

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Footnotes:

1. [The anti-vaccination movement](#), Measles & Rubella Initiative; [History of Anti-Vaccination Movements](#), The College of Physicians of Philadelphia, 10 January 2018
2. [Research fraud catalyzed the anti-vaccination movement. Let's not repeat history.](#), Vox, 5 May 2019
3. [Measles cases spike globally due to gaps in vaccination coverage](#), World Health Organization, 29 November 2018
4. [Evaluate Twitter data to inform business decisions](#), Twitter
5. [The origins of Donald Trump's autism/vaccine theory and how it was completely debunked eons ago](#), Washington Post, 17 September 2015
6. [Robert De Niro Defends Anti-Vaccine Doc: 'There's More To This Than Meets the Eye'](#), Time, 13 April 2016
7. Measles incidence refers to the number of reported measles cases divided by the total population in any given time period. Our data suggests that for every one percent reduction in the 2-year MMR1 vaccination coverage percentage, there is on average a two percent increase in the measles incidence rate
8. [Tackling online disinformation](#), European Commission, last updated 13 September 2019
9. [Coronavirus: EU strengthens action to tackle disinformation](#), European Commission, 9 June 2020
10. [Donald Trump orders legal review targeting social media groups](#), Financial Times, 29 May 2020
11. [Updating our Approach to Misleading Information](#), Twitter, 11 May 2020

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