Contagious Cities, Contagious Rumors

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The Vaccine Confidence Project

Goals and objectives:

• To build an information surveillance system for early monitoring and detection of rumors and public concerns around vaccines;

• Develop a new science for spatial and temporal analysis of the ecology of rumors and their impacts;

• To develop and apply a diagnostic tool to determine the risk level of public concerns in terms of their potential to disrupt vaccine programs;

• To generate evidence and provide analysis and guidance for early response and public engagement.

www.vaccineconfidence.org

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The 1854 Cholera Outbreak - London

Original John Snow map - 1854
Ebola situation reports: Democratic Republic of the Congo

On 1 August 2018, the Ministry of Health of the Democratic Republic of the Congo declared a new outbreak of Ebola virus disease in North Kivu Province.

Latest numbers as of 11 December 2018

- Total cases: 505
  - Confirmed cases: 457
  - Probable cases: 48
- Deaths: 298
  - Confirmed: 250
  - Probable: 48


https://www.cdc.gov/vhf/ebola/history/distribution-map.html

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Rumours are fuelled by uncertainty
Rumor confounds aid workers' efforts. The Red Cross has noted several: It's a plot to influence voters before Congo's December elections; health workers can't be trusted; the disease doesn't exist; aid groups are out to make money.

"Some are thinking that the Ebola response is a scam," Nafo-Traore said.
“... scientists of the Ghana Food and Drugs Authority (FDA) blithely authorised Ghanaian scientists, working for a foreign pharmaceutical company to carry out trials of an Ebola vaccine, without so much as a word to the Ghanaian public, to prepare their minds for the trials.” (Ghanaian Times, 30.06).

A lot of people are confused. The youth are agitating, and massing up for a demonstration.

https://www.vaccineconfidence.org/controversial-ebola-vaccine-trials-ghana/
Discussion: Perceptions that the trials were “secret” arose from a combination of premature news reporting and the fact that the trials were prohibited from conducting any publicity before being approved at the time that the story came out, which created an impression of secrecy. Fears about Ebola being spread in Ghana appeared in two forms, the first alleging that scientists would intentionally infect Ghanaians with Ebola in order to test the vaccine, and the second suggesting that the vaccine might give trial participants Ebola as a side-effect.

Conclusion: The rumours captured through this research indicate the variety of strong emotions drawn out by the trials, highlighting the importance of understanding the emotional and social context of such research.
EBODAC Support to Vaccine Trials

**EBO**ola **D**eployment, **A**cceptance and **C**ompliance

**OUR MISSION:**
Building a modular platform scalable for successful deployment of Ebola vaccines

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Community engagement

Identification tools

Mobile technology
A guidebook on Community Engagement, Communications, and Technology for Clinical Trials in Outbreak Settings

London School of Hygiene & Tropical Medicine:
BETH SMOUT, WILL SCHULZ, HEIDI LARSON
Johnson & Johnson Global Public Health:
ANNIK WILLEMS, PAULA MC KENNA

http://www.ebovac.org/ebodac/training-resource/
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A social science team act as the ‘eyes and ears’ for the trial, listening to what individuals are saying about the study through ethnographic observation, clinic exit interviews, in-depth interviews with participants and key stakeholders, and focus group discussions. The social science team provide daily feedback to the community liaison team on any rumours or concerns circulating in the community, to inform prompt dialogue on the issue.
Rumours have public health impacts

A warning from history: how the polio virus escaped the GPEI

Report of the Independent Monitoring Board of the Global Polio Eradication Initiative
November 2012

The 2002-2005 northern Nigeria epicentre: over 1200 polio cases invaded countries far and wide (either directly or indirectly).

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Listening to the rumours: What the northern Nigeria polio vaccine boycott can tell us ten years on

Isaac Ghinai\textsuperscript{a,b,*}, Chris Willott\textsuperscript{a}, Ibrahim Dadari\textsuperscript{c} and Heidi J. Larson\textsuperscript{b}

*Global Public Health, 2013

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure1.png}
\caption{Interactions between global actors working to resume polio eradication in Kano State. Source: Kaufman & Feldbaum, 2009.}
\end{figure}

(Abbreviations: CDC = Centres for Disease Control and Prevention; G8 = Group of Eight; GPEI = Global Polio Eradication Initiative; OIC = Organization of Islamic Cooperation; AU = African Union; NPI = National Programme on Immunisation; JNI = Jama’atu Nasril Islam)
## Diagnostic tool

<table>
<thead>
<tr>
<th>I. Rumor Promoters the “trigger”</th>
<th>II. Sustaining and Amplifying Factors</th>
<th>III. Outcome/Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Media /social media reports</td>
<td>• Geographic spread</td>
<td>• Vaccine refusals</td>
</tr>
<tr>
<td>• New research</td>
<td>• Frequency of rumor reported</td>
<td>(or refusal of other disease control intervention)</td>
</tr>
<tr>
<td>• New recommendation or policy change</td>
<td>• Media reports</td>
<td>• Vaccine is suspended (often fueling more anxiety, rumors)</td>
</tr>
<tr>
<td>• New product</td>
<td>• Historic bad experience that lowers public trust</td>
<td>• Vaccine preventable disease outbreaks</td>
</tr>
<tr>
<td>• Adverse Event Following Immunization (AEFI)</td>
<td>• Socio-economic marginalization</td>
<td></td>
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<tr>
<td>• Political motivations</td>
<td>• Previous existence of self-organized community groups</td>
<td><a href="mailto:Heidi.Larson@LSHTM.ac.uk">Heidi.Larson@LSHTM.ac.uk</a></td>
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Rumours need fertile ground for spread

- An uncertain environment (humanitarian disasters, political changes, experimental trials)
- Distrust
- A trigger of information ("a little information is a dangerous thing")
- Social networks to fuel the spread

Busting the myths about Ebola is crucial to stop the transmission of the disease in Guinea

April 2014

Will eating raw onions once a day for three days protect me from Ebola? Is it safe to eat mangoes? Is it true that a daily intake of condensed milk can prevent infection with Ebola? These are just some of the questions posed to the health workers responding round the clock to calls received through the free Ebola hotline. With so many Ebola deaths to date, fear has allowed the spread of rumours and misinformation.

The Ministry of Health of Guinea set up Hotline 115 when it announced the country's Ebola outbreak on 21 March. Its main goal is to respond to people's concerns and to be able to quickly refer suspect cases to the isolation ward at Donka hospital in Conakry for further investigation. It currently receives between 200 and 300 calls per day.

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Rumors have deep and complex roots
Kenya Catholic Church tetanus vaccine fears 'unfounded'

13 October 2014 Last updated at 19:58 BST

Kenya’s government has dismissed allegations made by the country’s Catholic Church that a tetanus vaccine can cause sterility in women.

“It’s a safe certified vaccine,” Health Minister James Macharia told the BBC.

Catholic priests have been telling their congregations to boycott a campaign that begins on Monday to vaccinate women against tetanus.

Dennis Okari reports from Nairobi

Read more
Kenya Catholic Church tetanus vaccine fears ‘unfounded’
In pictures: Pneumonia vaccination in Nairobi
The biggest pandemic risk? Viral misinformation

A century after the world’s worst flu epidemic, rapid spread of misinformation is undermining trust in vaccines crucial to public health, warns Heidi Larson.

This month, the death rate from the 1918 flu pandemic was estimated at 50 million people worldwide, with 3% of the global population at the time. Vaccines have made massive outbreaks of pneumonia and polio — rare. But people still feel that flu and its complications were not dealt with adequately. Of the 183 children whose deaths were attributed to the virus, none had been vaccinated that enters for Disease Control and Prevention. For all — whether of a highly fatal disease or a highly volatile one — will not be due to a lack of a highly fatal disease or a highly volatile one — will not be due to a lack of evidence, emotional considerations, and social media and social contagion of misinformation and social media.

Emotions around vaccines are volatile, making vigilance crucial for public outreach.

Disciplined and his article was retracted 12 months after publication rather than 12 years, we might not be remarking that this year marks the twentieth anniversary of its publication.

The second-most-dangerous category includes those who see anti-vaccine debates as a financial opportunity for selling books, services, or other products. (Wakfield, who maintains that financial concerns have not affected his research and that he has been unfairly vilified, gave paid testimony against the vaccine and filed a patent that allegedly stood to become more valuable were the vaccine to be discredited.)

The next tier of damaging misinformation comes from those who see anti-vaccine debates as a political opportunity, a wedge with which to polarize society. Multiple reports this year found that Russian trolls and bots used emotional, angry language to spread misinformation and exacerbate the divisions between those for and against vaccines. (See D. A. Broniatowski et al. J. Pub. Health 108, 1378–1384; 2018.)

Next are ‘super-spreaders’, who propagate misinformation through social media to like-minded vaccine-questioners. A common claim is that suspected adverse reactions to vaccines (typically coincidences) are confirmed reactions. Finally, there is misunderstood or inadequate information that might be circulating generally.

Targeted social media can combat misinformation. Both Denmark and Ireland faced groups spreading false stories on social media and television news of young girls alleged to have been harmed by human papillomavirus (HPV) vaccination. In Denmark, national immunization rates fell from over 90% in 2000 to under 20% in 2005.
Measuring vaccine confidence: analysis of data obtained by a media surveillance system used to analyse public concerns about vaccines

Heidi J Larson, David M D Smith, Pauline Paterson, Melissa Cumming, Elisabeth Eckersberger, Clark C Freifeld, Isaac Ghinai, Caitlin Jarrett, Louisa Paushter, John S Brownstein, Lawrence C Madoff

Published Online
May 13, 2013
http://dx.doi.org/10.1016/S1473-3099(13)70108-7

Figure 2: Proportion of vaccine-related reports categorised as positive or neutral, by country
Based on analysis of all 10,380 reports. Of the 9,655 reports (93%) that mentioned a country or countries, 11,535 countries were mentioned. Countries about which there were fewer than ten vaccine-related reports are shaded grey. The world proportion (69%) is shown by the arrow on scale bar. Country border data are from the Global Administrative Areas database.14
Do you believe vaccines are safe?


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Emotions are volatile,
Rumors are contagious,
Images are powerful
A protest against 11 mandatory vaccines in front of the Health Ministry in Paris

FRANCE


INDONESIA

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Why fear of vaccination is spelling disaster in the developing world

Anti-vaccination scares are as old as vaccination itself - but now they lives at risk in the developing world

Social media voices warn parents ahead of vaccination drive in Tamil Nadu

COIMBATORE: Ahead of the measles-rubella (MR) vaccination drive in Tamil Nadu, messages doing the rounds in social media like WhatsApp and Facebook are warning parents from vaccinating children.

Image for representational purpose only.

According to these messages, the vaccination will harm children and will not raise their immunity. Indeed, it would weaken children, as most children are already receiving the same vaccines as part of their vaccination schedule, they say.
“Vaccines are NOT safe!...Know the risks!”


Emotions are strong

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New Zealand
Australia
As a nurse, I was never taught VACCINES can KILL until my son was a victim.

Nicholas Catone
Sept. 8, 2015 - May 12, 2017

www.LearnTheRisk.org
Paid for by Learn The Risk. Santa Barbara, CA

#FlyHighNicholas

USA

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HPV vaccine anxieties: The power of images, social media and adolescence
A global challenge, rapidly evolving and connecting

Now for the first time, several doctors express their concerns -

The Vaccinated Girls - 2015 Documentary

Broadcast on TV2Danmark. In Danish with English subtitles.
HI I’M REBECCA AND I JUST, I AM ONE OF THE GIRLS WHO REACTED TO THE VACCINE, I HAVE 4 DOCTORS TREATING ME FOR
Don't let them vaccinate you, because it can kill you...

Gardasil did it/Fue el Gardasil
Denmark: Decreasing HPV vaccination coverage

Share vaccinated with Human papillomavirus vaccine (HPV) finished vaccinated birth: 1993-2004, Gender: Women

Controversy over human papillomavirus (HPV) vaccination in Japan has led to much confusion among healthcare professionals and parents, with the result that vaccination rates have plummeted, from around 70% to only 1%.

The situation in Japan is summarized by Ryo Kono, MD, of Jichi Medical University, Saitama Medical Center, Japan, speaking in a Lancet Oncology podcast that accompanied an article reviewing breast and cervical cancer screening.
Ireland

Figure: HPV vaccine uptake by academic year in Ireland, from 2010-11 to 2017-18
Data are the proportion of girls aged 12–13 years who were given the first, second, and third doses of vaccine (the dosing schedule for the vaccination was changed in 2014–15 from three doses to two doses). Data are from the Irish Health Protection Surveillance Centre.1 HPV=human papillomavirus. *Data estimated from the Irish National Immunisation Office.

www.thelancet.com Vol 391 May 26, 2018
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Outbreaks of mass psychosomatic illness following HPV vaccination
Colombia and the mass psychogenic events

August 2012

Colombia introduced a school-based HPV immunization programme which successfully reached over 90%.

May 2014

15 girls in one school present adverse reactions, viral media & viral spread of symptoms to 600 girls fainting and hospitalized across Colombia.

2018

HPV vaccine acceptance drops to 3.8%

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Brazil and adverse reactions to HPV vaccination

• Brazil implemented HPV immunization in 2014, with reports of adverse events registered spread geographically, and 91.0% of those were not considered as severe (Dominguez et al. 2015);

• In June 2018, 43 cases of adverse events following HPV vaccination in the state of Acre. Symptoms include: convulsive crises, headache, paralysis in the legs, difficulty of walking, fainting. Girls symptoms are covered widely by local media and videos posted online

• Families refuse evaluation by Psychologists or Psychiatrists and are insist that ‘vaccines are to blame’.
The Philippines
Dengue vaccine scare
Medical experts: Stop Dengvaxia autopsies

By Sheila Crisostomo, Christina Mendez (The Philippine Star) | Updated February 4, 2018 - 12:00am


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Philippines’ ‘highly politicized’ response to Dengvaxia mess erodes public trust in vaccines – study

(philstar.com) - October 13, 2018 - 6:35pm

MANILA, Philippines – The Philippines’ “highly politicized response” to the reported risks posed by controversial dengue vaccine Dengvaxia has eroded overall public trust in immunization, a new study found.

According to a research of 1,500 participants by the London School of Hygiene & Tropical Medicine, respondents who expressed confidence in vaccines declined to 32 percent this year from 93 percent in 2015.

The researchers said the findings highlight the importance of identifying gaps or breaches in public confidence in vaccines to “rebuild before a pandemic strikes.”

Vaccine confidence plummets in the Philippines following dengue vaccine scare: why it matters to pandemic preparedness

Heidi J Larson¹, Kenneth Hartigan-Go⁰, and Alexandre de Figueiredo¹,⁰

¹Department of Infectious Disease Epidemiology, London School of Hygiene & Tropical Medicine, London, UK; ⁰Department of Health Metrics & Evaluation, Human Vaccines & Immunotherapeutics

https://doi.org/10.1080/21645515.2018.1522468
Vaccine confidence plummets in the Philippines following dengue vaccine scare: why it matters to pandemic preparedness

Larson et al. 2018

Percentage of vaccinated children age 12 to 23 months

These include all basic vaccinations, namely BCG, 3 doses of DPT, 3 doses of OPV or IPV, and one dose of MMR.

- BCG (tuberculosis)
- DPT 3 (diphtheria, pertussis, and tetanus)
- OPV/IPV 3 (polio)
- MMR (measles)

All basic vaccinations

Source: National Demographic and Health Survey (NDHS) • Get the data

Compared to the previous year, this would be a 10% drop, as the DOH saw 70% of children receive their basic vaccination, according to the 2017 National Demographic Health Survey. Data for 2018 is not yet available as of posting.

REPORTED MEASLES CASES IN THE PHILIPPINES

Jan - Nov 2018: 17,298
Jan - Nov 2017: 3,706

2018, Turok: A Seminar Geared towards Understanding the National Controversy, the Dengvaxia Vaccine Program.

Here’s a challenge to all of us: we shouldn’t only treat the disease of our patient, but also we should treat and fill the gaps of information in the social media to improve health outcomes.
Measuring Vaccine Confidence: No single metric tells the story

Bringing together fast and slow data to understand the vaccine confidence phenomenon

This figure illustrates the various measurement approaches available to researchers investigating vaccine confidence, and the ways different data sources can be used to understand the phenomenon of vaccine confidence. Surveys and media tracking can provide "fast data," near-real-time estimates of public perceptions of vaccines, which can be analysed to best understand how to engage the public.

Qualitative and epidemiological research, meanwhile, offer "slow data," which takes longer to collect, but can provide deeper insights into the predictors of vaccine hesitancy, the social phenomena that can help or hinder vaccination campaigns, and, in particular, long-term contextual factors that create "fertile ground" for a crisis of confidence. Both fast and slow data can also help identify "prompters," or the factors that can prompt a crisis of confidence, especially when "fertile ground" conditions are present.

Finally, systematic reviews can help synthesise findings from multiple studies across different disciplines, providing researchers and policy-makers with practical wisdom and further issues to study in vaccine confidence.

Figure 1: Fast and slow data monitoring cycle
Source: Vaccine Confidence Project. 2015. The State of Vaccine Confidence 2015
Confidence Commentary:
Ebola outbreak: Importance of gaining community trust during vaccine roll-out – expert comment

Heidi Larson  |  24 May, 2018

The experimental Ebola vaccine rVSV-ZEBOV is being deployed in the Democratic Republic of Congo to help stop the spread of the disease.

At this crucial time Dr Heidi Larson, Director of The Vaccine Confidence Project at the London School of Hygiene & Tropical Medicine, comments on the importance of gaining the trust of the local population.