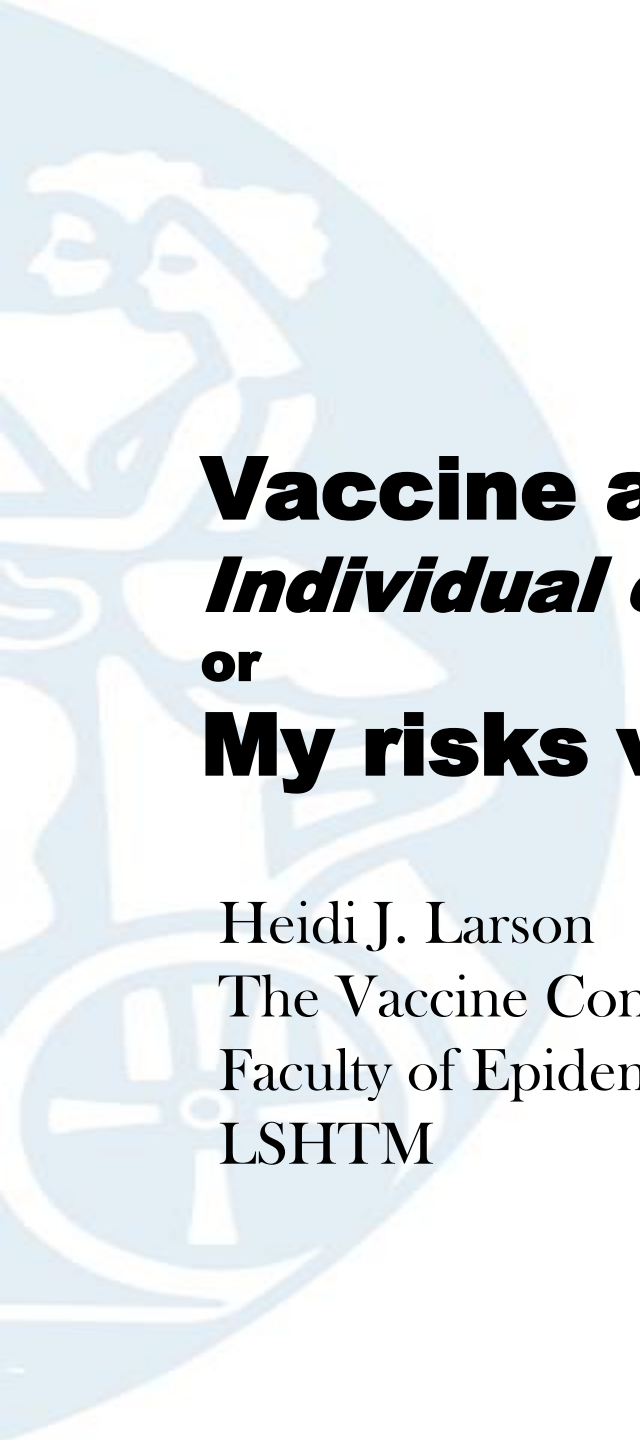




Vaccine acceptance or refusal?: ***Individual choice vs societal needs*** **or** **My risks vs “our” risks**

Heidi J. Larson

The Vaccine Confidence Project

Faculty of Epidemiology and Population Health

LSHTM

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WHAT ARE RISKS TO HEALTH?

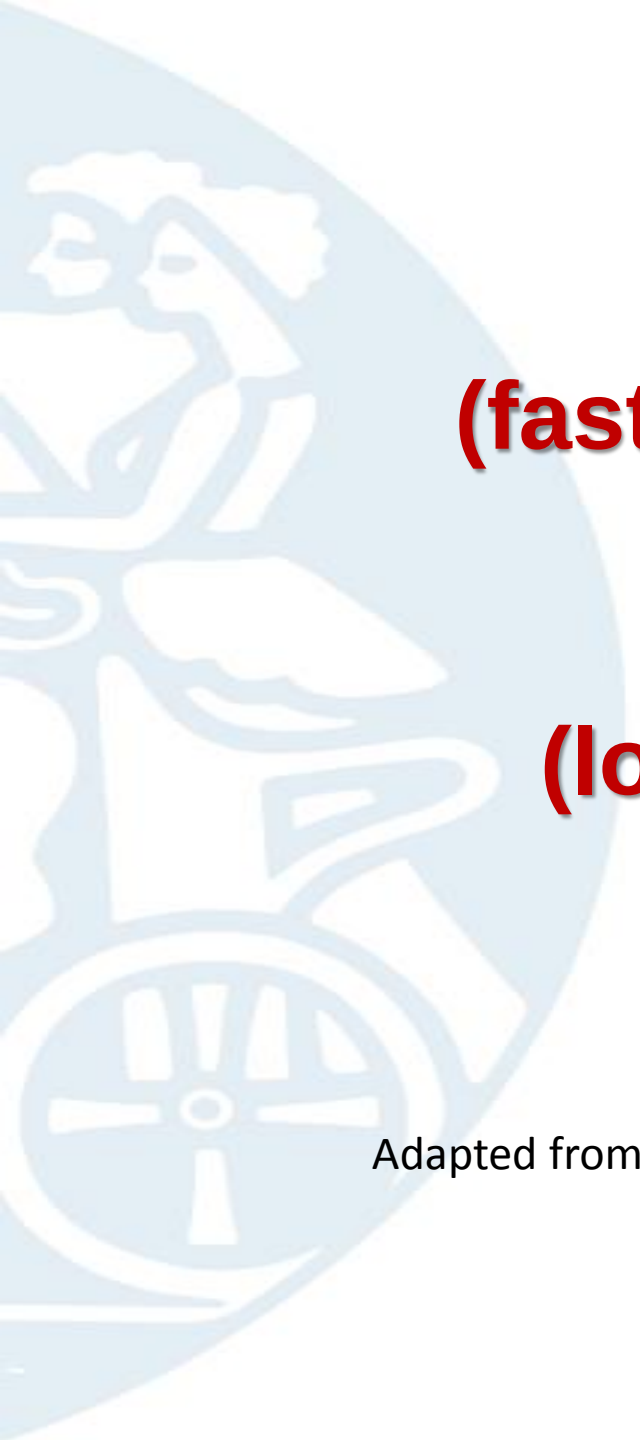
*R*isk can mean different things to different people. The two most common meanings will be used in this report – risk as a probability of an adverse outcome, or a factor that raises this probability.

The
WORLD
HEALTH
REPORT
2002

*Reducing Risks,
Promoting Healthy Life*

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Risk as *feelings*
(fast , instinctive, emotional..)

Risk as $\frac{1}{5} \times 2 \frac{1}{2} \times \frac{1}{10} \times 3 \frac{1}{10}$
(logic, reason, scientific...)

Risk as Politics

Adapted from Slovic et al. *Risk Analysis* 2004; 24 (2): 311-22



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(Internet Explorer Required)

THE VACCINE REACTION

“When it happens to you or your child, the risks are
100%”

Published by the National Vaccine Information Center

*Website reconstruction
funded in part by the Tides
Foundation*

**ACTION ALERT
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SPEAKS OUT

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Reasons for vaccine hesitancy and opposition

In the 19th Century

- Principles were not well understood
- Vaccination is ineffective.
- Vaccination is not safe.
- Religious and philosophical concerns.
- Resistance to compulsory vaccination.

In the 21st Century

- Principles STILL not well understood
- Perception that vaccination is not needed
- Concerns about vaccine safety
- Religious and philosophical concerns
- Resistance to compulsory vaccination



Vaccine hesitancy and risk perception

BMJ

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NEWS

“Vaccine hesitancy” means scientists need to be more honest about risks

BMJ 2011; 342 doi: 10.1136/bmj.d2479 (Published 15 April 2011)

Cite this as: BMJ 2011;342:d2479

Immunology (including allergy) Vaccination programs Child health
 Infectious diseases Neurogastroenterology [More topics](#)

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NRA'S ROLE IN THE REGULATION OF DRUG SAFETY

National regulatory authorities (NRAs) are responsible for ensuring that every pharmaceutical product – including vaccines – used within the country is:

- ▣ Of good quality,
- ▣ Effective,
- ▣ Safe for the purpose or purposes for which it is proposed.

But what about the perception of safety??



Prompters of questions and risk perceptions

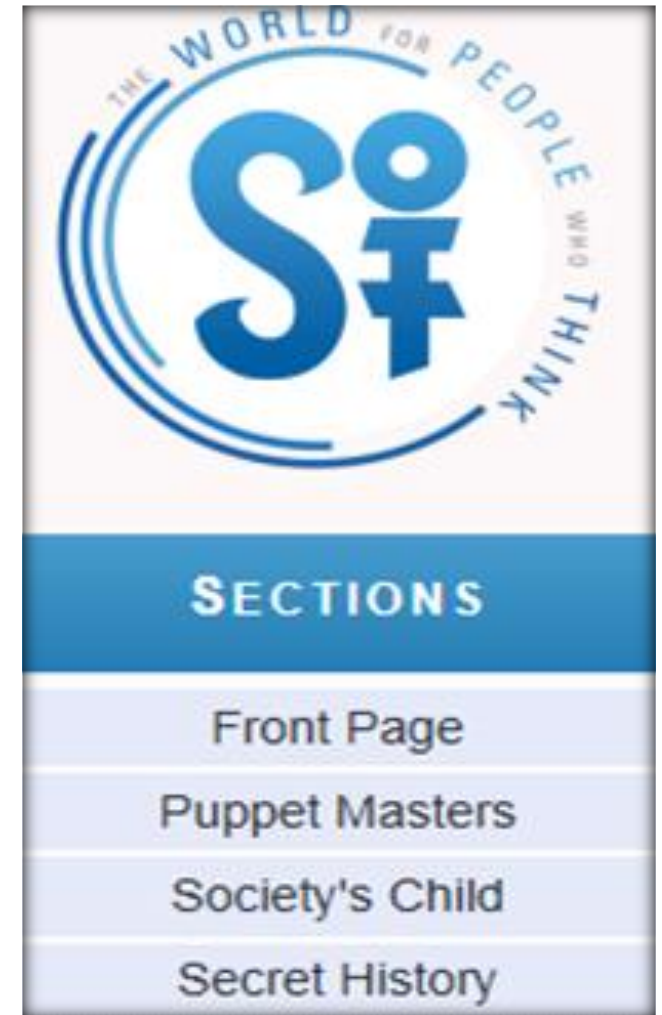
- **Adverse Event (AEFI)** –local AEFI are usually stronger prompters of rumors, but a distant event reported can also spread and provoke questions
- **New research** reported
- **New recommendation or policy change**
- **New product** (introduction of new product or product packaging)



Perceptions are also about motives



<http://www.gmofreeglobal.org/en/mission>



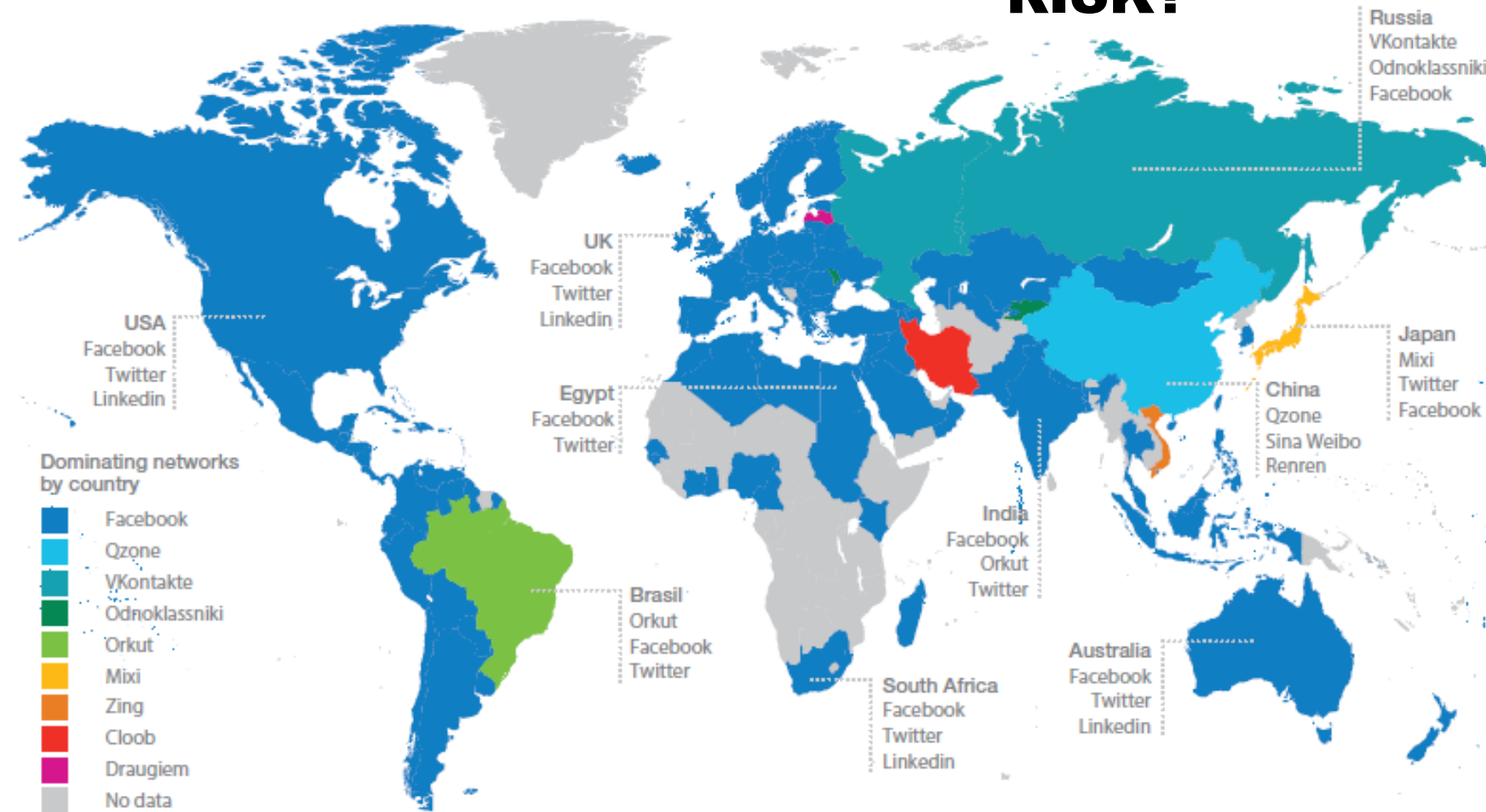
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The role of social media

Figure 12: The World of Social Media
Leading social media networks by country

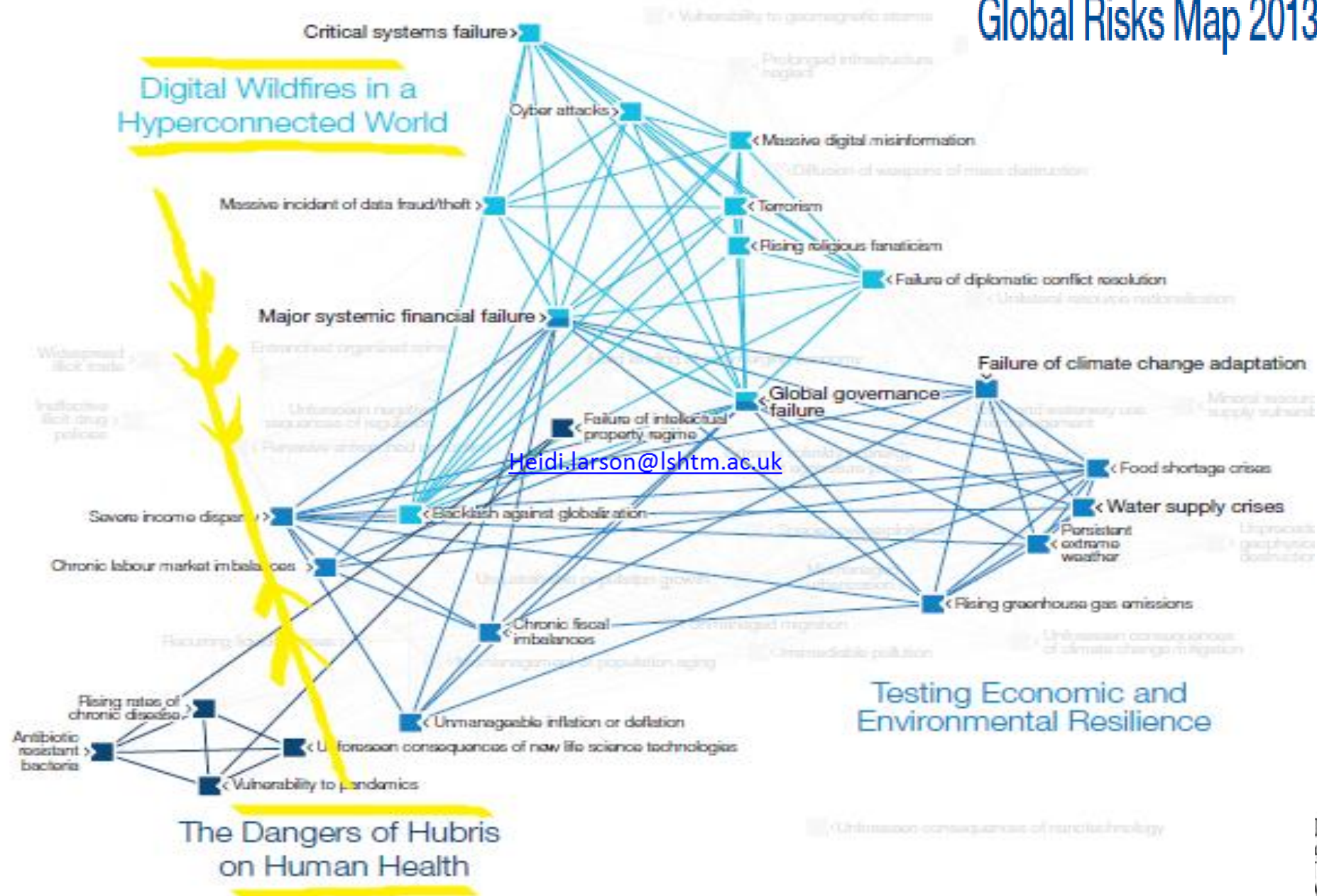
OPPORTUNITY or RISK?



Source: Adapted from "Search Engine Journal", <http://www.searchenginejournal.com/wp-content/uploads/2011/09/social-media-black.jpeg>, 2012.



Global Risks Map 2013



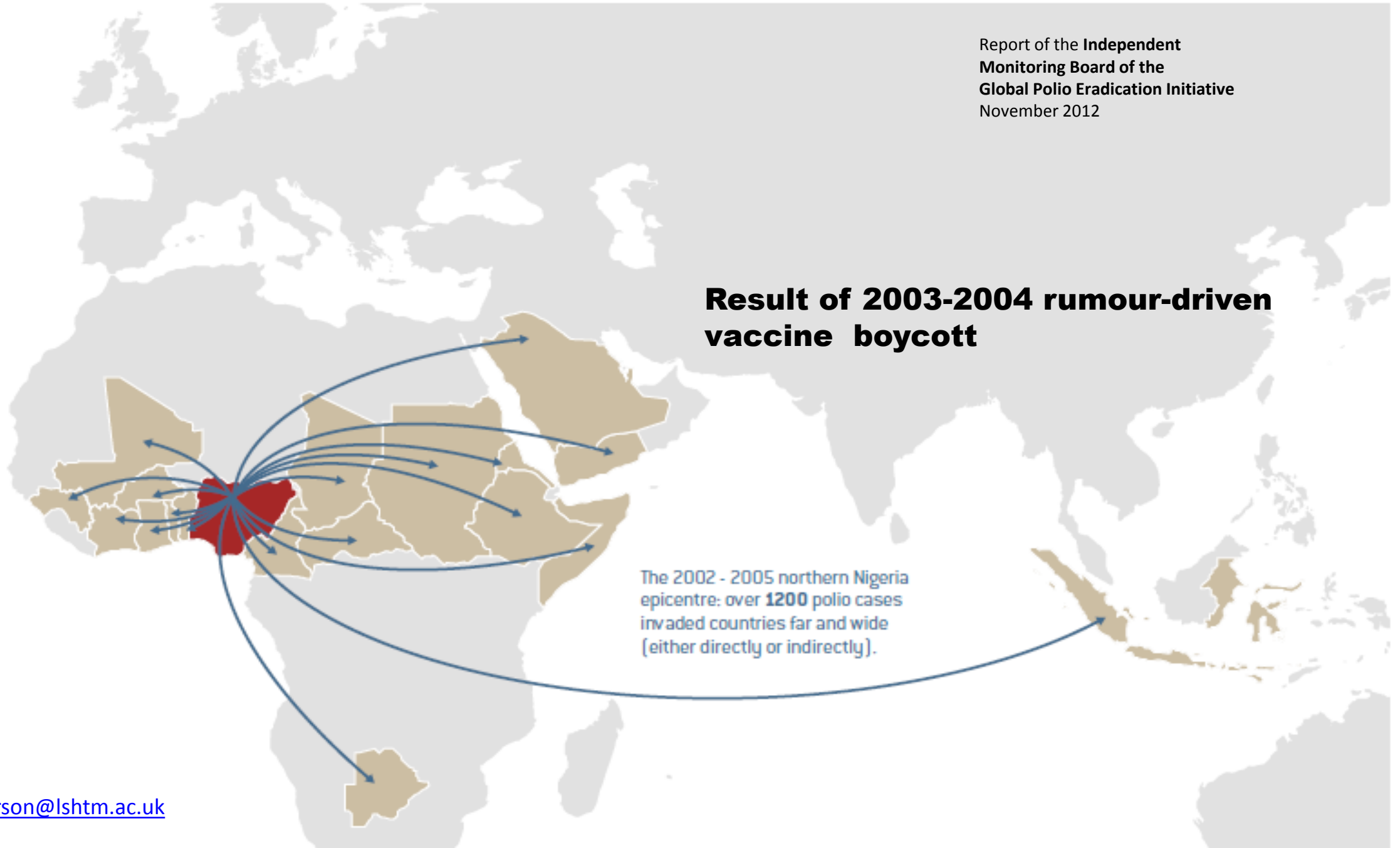
Heidi.larson@lshtm.ac.uk

Source: World Economic Forum



Result of 2003-2004 rumour-driven vaccine boycott

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



European Health Forum Gastein

Creating a better future for health in Europe

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EVENTS

ases 2011 > 6.10. L1 Adult Vaccination

Bad Hofgastein, October 6, 2011 –

EHFG 2011: EXPERTS ADDRESS “VACCINE CONFIDENCE GAP”

The Internet and social media are proving a serious nuisance by spreading unfounded scare-stories about vaccines, the European Health Forum Gastein was told by vaccine expert Dr Heidi Larson. The consequences could be alarming. One was the return of measles, with the WHO posting 25,000 new cases in September 2011. Public trust in vaccines is highly variable, experts said, this needed to be addressed by decision makers.

France hit by Gardasil cancer vaccine scare

AFF | NOVEMBER 26, 2013 9:22AM

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ONE of France's top medical experts has appealed for calm as a scare over Australian-pioneered cervical cancer vaccine Gardasil gathers momentum.

News

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Japan withdraws support of controversial HPV vaccine over safety concerns

BY THADDEUS BAKLINSKI

Wed Oct 16, 2013 14:01 EST

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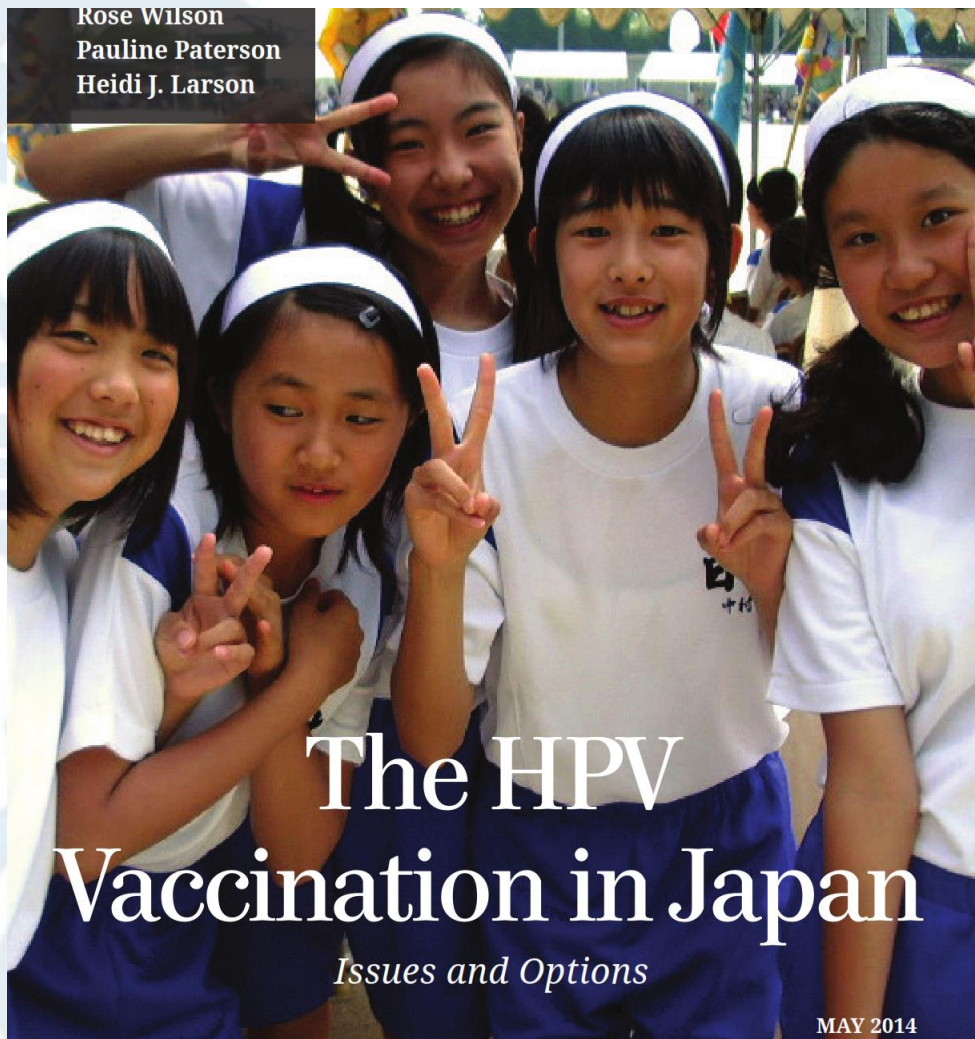
Tweet

37

TOKYO, October 16, 2013 (LifeSiteNews.com) – While jurisdictions throughout the Western world continue to promote the HPV vaccine, the Japanese government has pulled its support of the controversial drug and sent formal notifications to local health officials saying that it should not be administered until safety concerns are investigated.

The vaccines in question, Gardasil and Cervarix, are meant to combat Human Papilloma Virus (HPV).

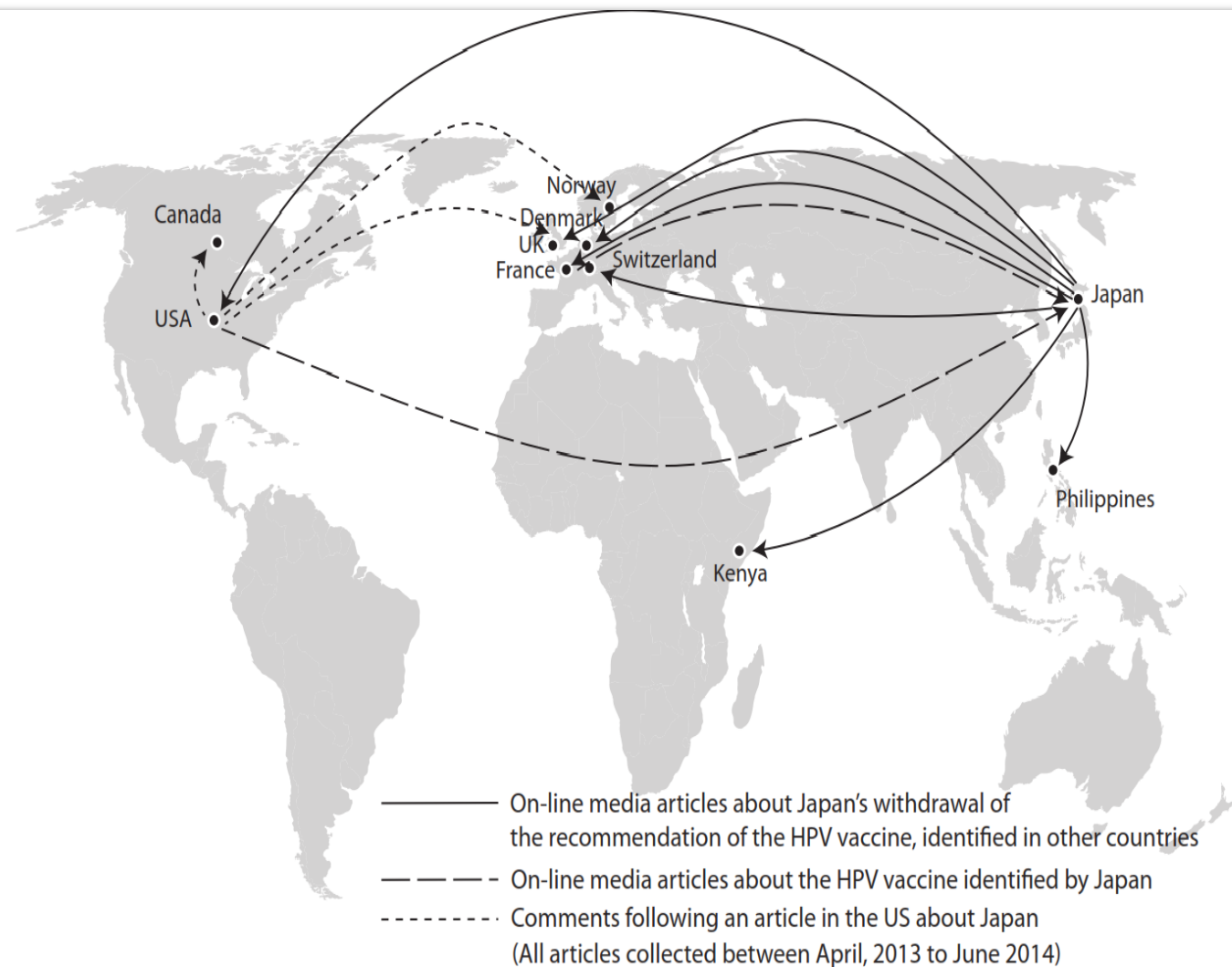
Rose Wilson
Pauline Paterson
Heidi J. Larson



The HPV Vaccination in Japan

Issues and Options

MAY 2014



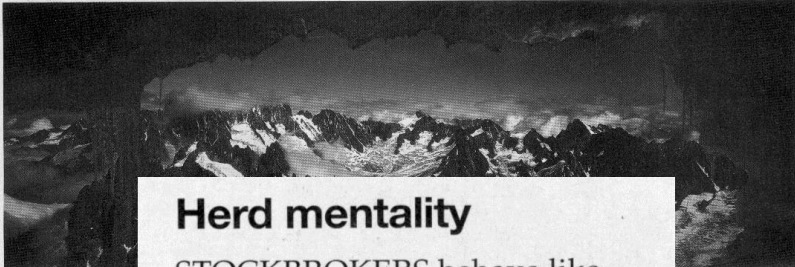
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Herd immunity or Herd mentality?

IN BRIEF

New Scientist • www.newscientist.com 13 January 2001



Melting mo

GLOBAL warming could melt completely in a few decades the ice masses that hold water in holding slopes and villages in Europe, says Victor Eguiluz and Martin Zimmermann of the Mediterranean Institute for Advanced Study in Mallorca. The researchers showed that in a model in which stockbrokers behave like flocking animals—sharing information and following the same rumours—the market returns vary in line with the power law (*Physical Review Letters*, vol 85, p 5659).

Some like it hot

THE common ancestor of living things was able to survive in almost boiling water, claims Akihiko Yamagishi of the Tokyo College of Pharmacy. His team worked out that the enzyme with temperatures as high as 99 °C—three degrees higher than the version normally found in *Sulfolobus*, Ye told a recent meeting of the Molecular Biology Society of Japan. Many researchers believe life on Earth began in a low-temperature environment. "The fact that we have a high-temperature ancestor suggests there was an evolutionary bottleneck," says

60 per cent of cases. This may be because people whose nerve ends are damaged produce no nitric oxide.

candidates for storing "qubits" of data—the quantum equivalent of normal computers' 0s and 1s. But

the same rumours—the market returns vary in line with the power law (*Physical Review Letters*, vol 85, p 5659).

Herd mentality

STOCKBROKERS behave like sheep, say Victor Eguiluz and Martin Zimmermann of the Mediterranean Institute for Advanced Study in Mallorca. Market watchers have long known that stock market returns are not random, but follow a "power law" distribution. The researchers showed that in a model in which stockbrokers behave like flocking animals—sharing information and following the same rumours—the market returns vary in line with the power law (*Physical Review Letters*, vol 85, p 5659).

Herd mentality

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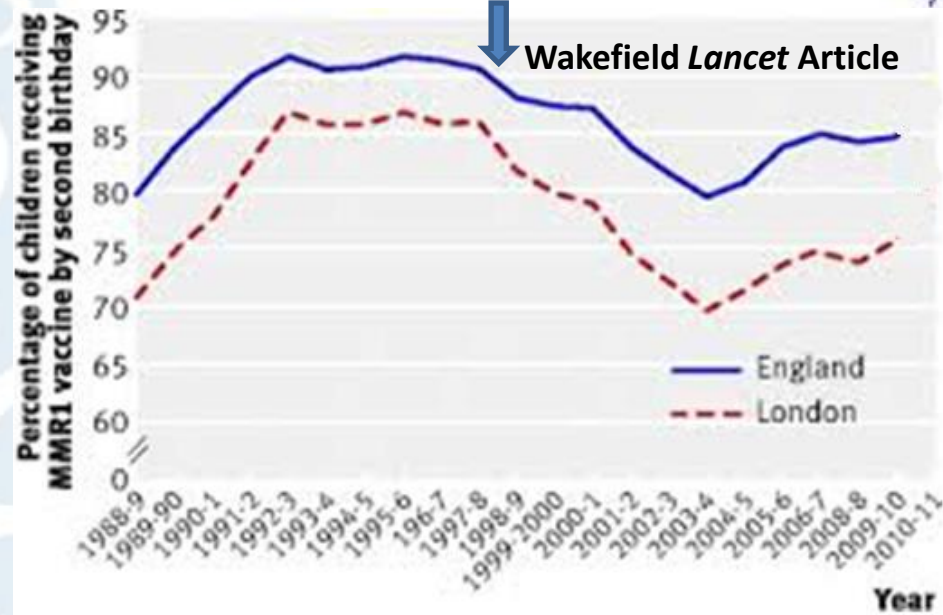
its are destroyed by a fraction of a second. Now Kielipinski's managed to make a quantum last 3.6 times longer using a pair of ions. Any noise in particles equally, the qubit. "Most likely this is the way to team member David. The paper will be in *Science*.

Herd mentality

STOCKBROKERS behave like sheep, say Victor Eguiluz and Martin Zimmermann of the Mediterranean Institute for Advanced Study in Mallorca. Market watchers have long known that stock market returns are not random, but follow a "power law" distribution. The researchers showed that in a model in which stockbrokers behave like flocking animals—sharing information and following the same rumours—the market returns vary in line with the power law (*Physical Review Letters*, vol 85, p 5659).

New Scientist • www.newscientist.com 13 January 2001 23





Guangzhou pharmaceutical shares drop on vaccine doubts

Global Times | 2013-12-16 23:38:02

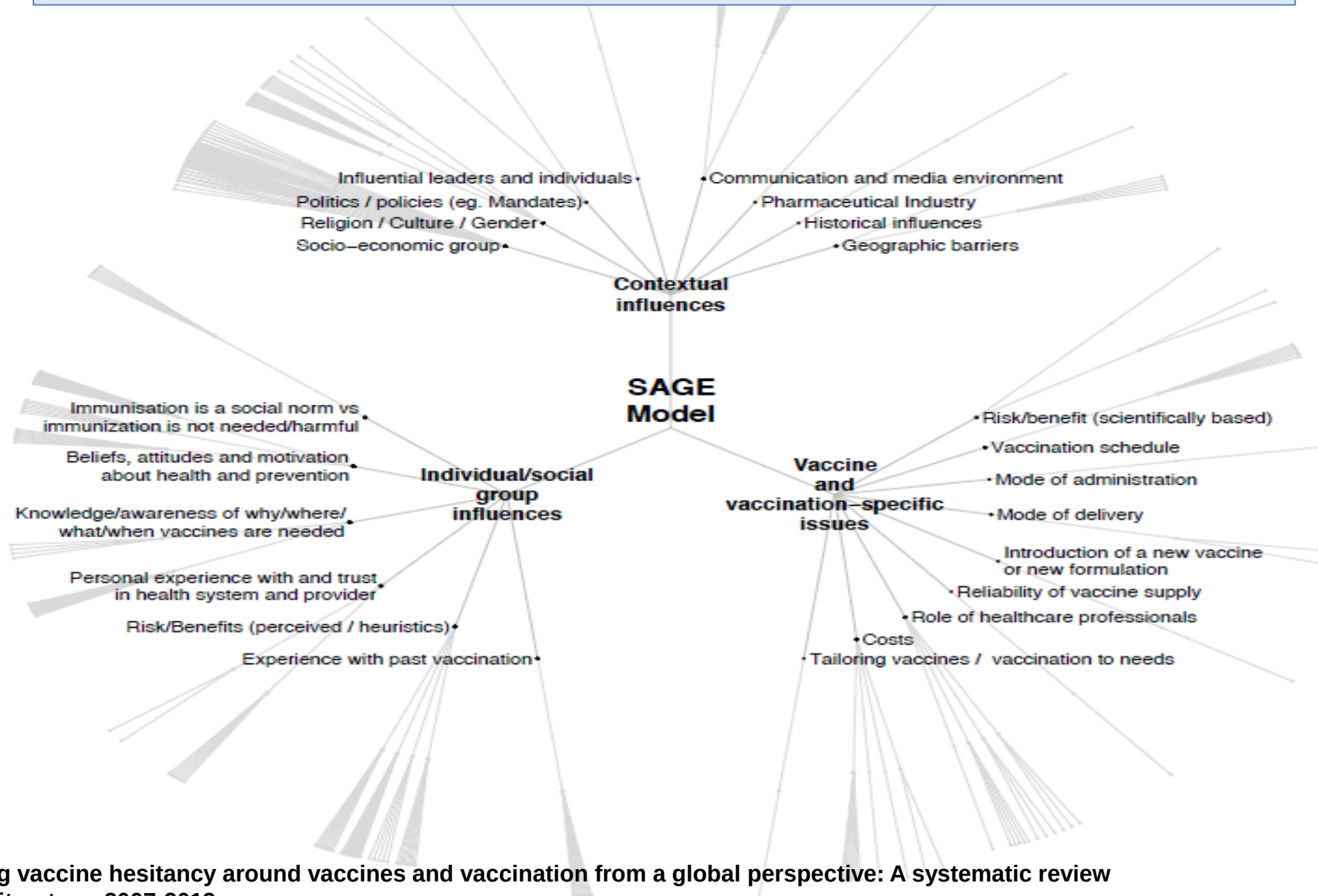
By Global Times

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The share price of Guangzhou Baiyunshan Pharmaceutical Holdings dropped by more than 9 percent on both Shanghai and Hong Kong exchanges Monday, after its latest clinical report made experts doubt the effectiveness of the Hepatitis B vaccine that the company has been working on.

According to the report, published Friday, the occurrences of adverse events in experiment and placebo groups were both over 12 percent, meaning that no serious adverse event occurred.

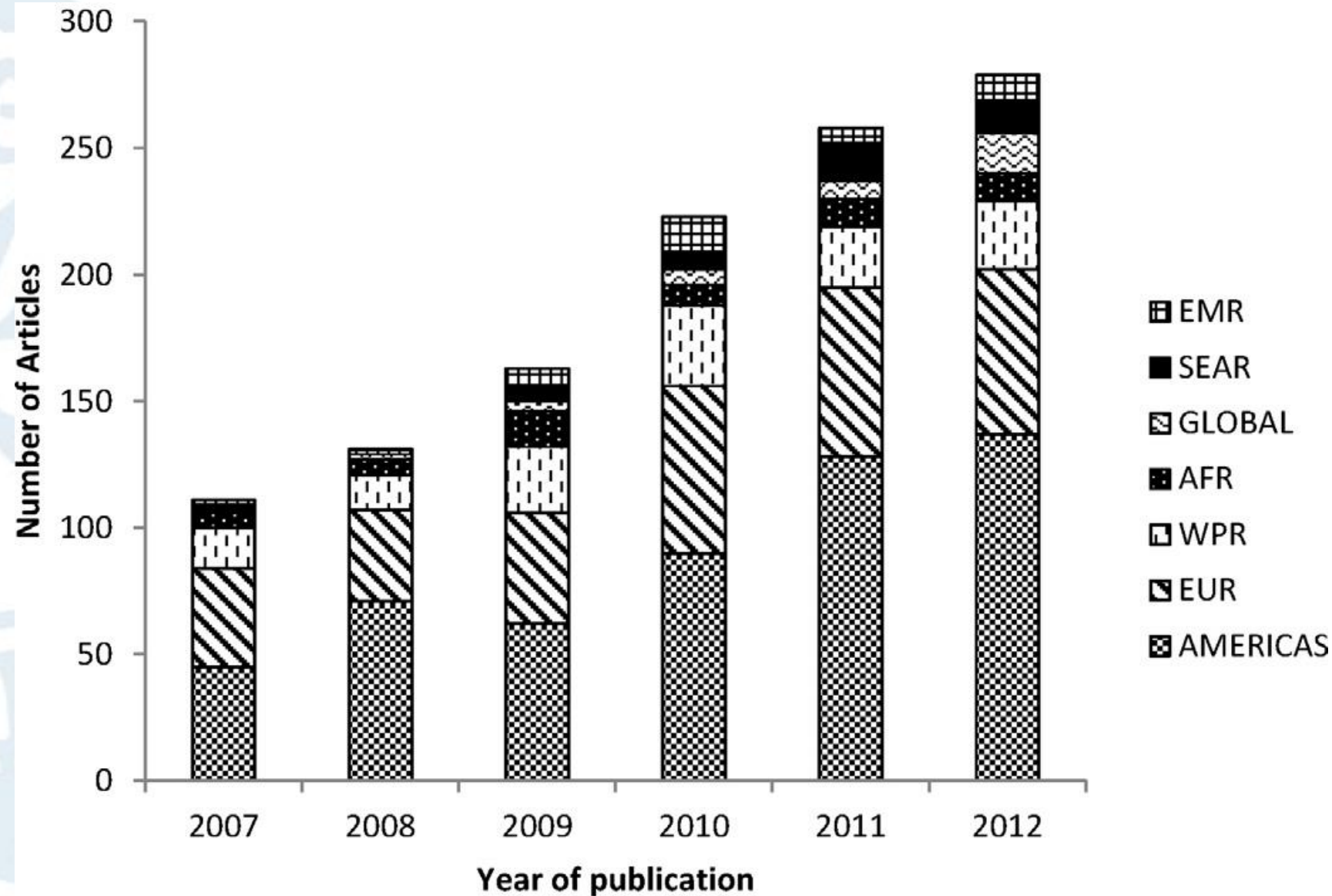
Determinants of vaccine hesitancy



Understanding vaccine hesitancy around vaccines and vaccination from a global perspective: A systematic review of published literature, 2007-2012.

[Larson HJ](#), [Jarrett C](#), [Eckersberger E](#), [Smith DM](#), [Paterson P](#). [Vaccine](#). 2014 Apr 17;32(19):2150-2159.

Articles about vaccine hesitancy by year and WHO region [n = 1164]



Understanding vaccine hesitancy around vaccines and vaccination from a global perspective: A systematic review of published literature, 2007-2012.

[Larson HJ, Jarrett C, Eckersberger E, Smith DM, Paterson P. Vaccine. 2014 Apr 17;32\(19\):2150-2159.](#)





Can we monitor public confidence in vaccines?



Rumor Surveillance and Avian Influenza H5N1

Gina Samaan,*† Mahomed Patel,†
Babatunde Olowokure,* Maria C. Roces,*
Hitoshi Oshitani,* and the World Health
Organization Outbreak Response Team¹

OPEN ACCESS Freely available online

PLoS COMPUTATIONAL BIOLOGY

Assessing Vaccination Sentiments with Online Social Media: Implications for Infectious Disease Dynamics and Control

Marcel Salathé*, Shashank Khandelwal

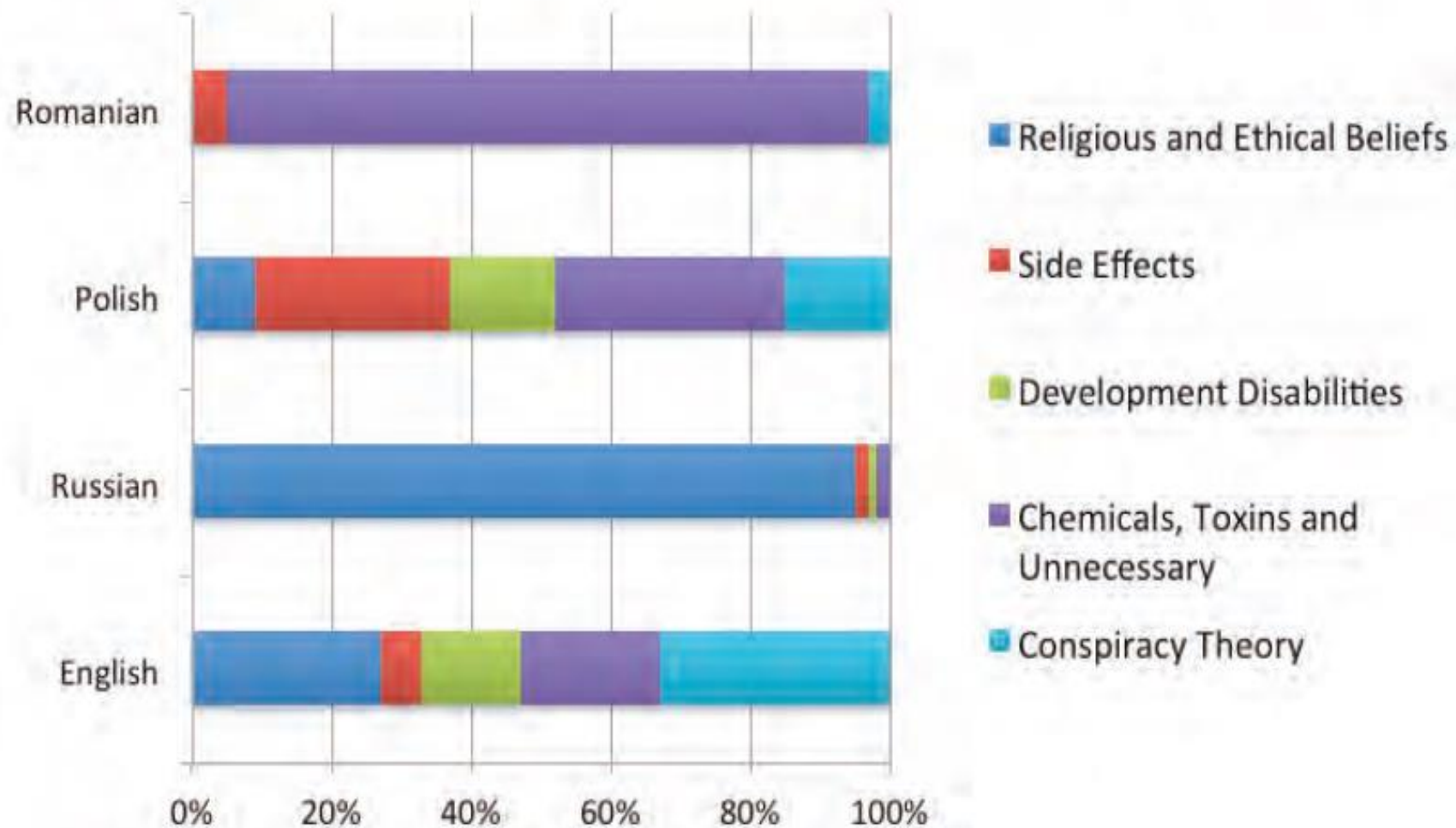
TRACKING
ANTI
VACCINATION
SENTIMENT
IN EASTERN
EUROPEAN
SOCIAL MEDIA
NETWORKS

April 2013

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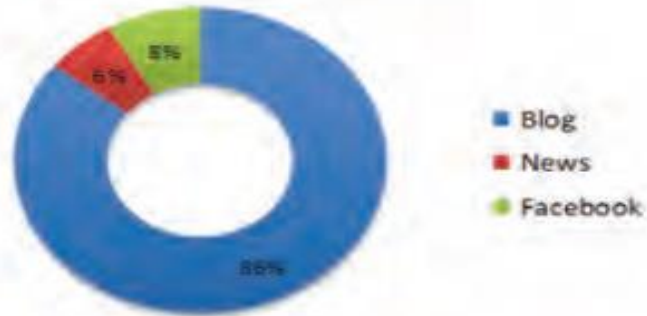


Influences on risk perceptions are highly varied

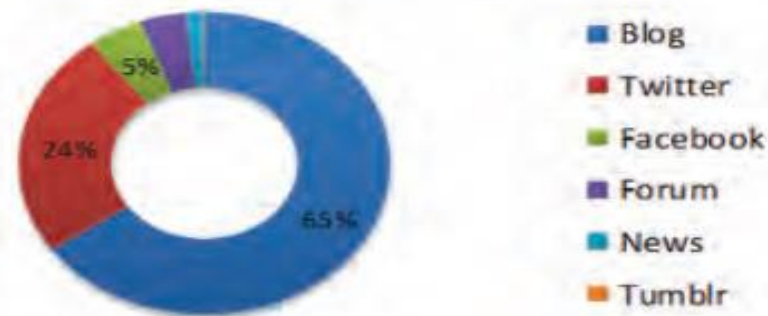


Modes of communication differ by location

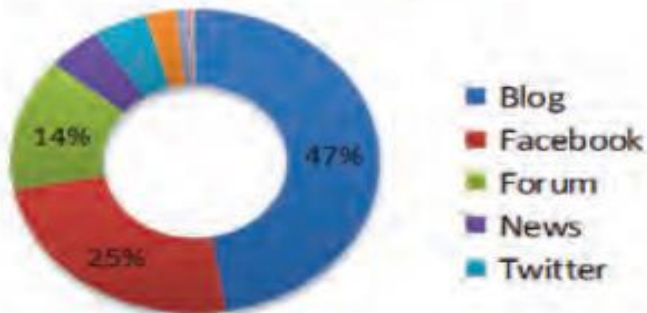
Rumanian Networks



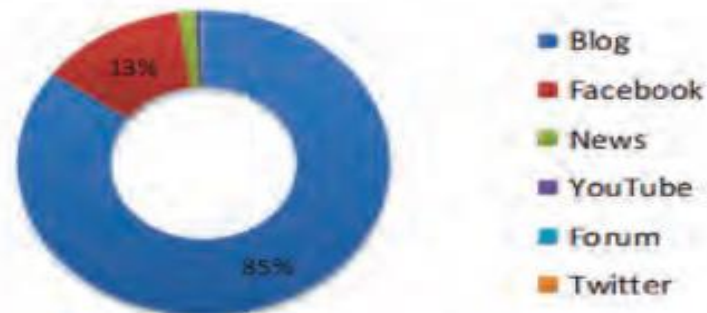
Russian Networks



English Networks



Polish Networks



Tracking Anti-vaccination Sentiment in Eastern European Social Media Networks. UNICEF.2013



Perceptions of risk can have serious impacts

- In the **Philippines**, risk perceptions that **tetanus vaccines** caused sterilization led to a **45% drop in coverage between 1994 and 1995**

Damage to Immunisation Programmes from Misinformation on Contraceptive Vaccines

Julie Milstien, P David Griffin, and J-W Lee

Tetanus is responsible for 550,000 neonatal deaths globally each year. Tetanus toxoid vaccines are provided through the World Health Organization and the United Nations Children's Fund for national immunisation programmes to prevent infant deaths from tetanus. The vaccines are manufactured and controlled under strict standards. Rumours have circulated recently in Mexico, Tanzania, Nicaragua and the Philippines that WHO and UNICEF are using women as guinea-pigs to test a contraceptive vaccine given to them under the guise of tetanus toxoid vaccine.

- In **1998**, **Andrew Wakefield's** publication linking MMR vaccine to bowel disease and autism caused public confidence to plummet. **MMR coverage rates in England dropped from nearly 93% in 1997 to 79.9% in 2003-04 due to risk perceptions**
- In **Japan**, adverse events following HPV vaccination, amplified by negative media and a highly vocal victim support group **led the government to withdraw their HPV recommendation** (despite no evidence of vaccine-link) and HPV vaccine uptake **plummeted from over 70% to under 10% between 2013-2014.**



Although perceptions may seem to not have an immediate impact, they can have longer term impacts

WIRED GEAR SCIENCE ENTERTAINMENT BUSINESS SECURITY DES

An Epidemic of Fear: How Panicked Parents Skipping Shots Endangers Us All

By Amy Wallace | October 19, 2009 | 3:00 pm | Categories: Wired Nov 2009

Oct. 2009

CBSNEWS Video US World Politics Entertainment Health

Vaccination Rates Decline: How Many Children at Risk?

By CAROLINE BLACK / CBS NEWS / September 17, 2010, 12:20 PM

Sept. 2010

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Childhood diseases return as parents refuse vaccines

By Liz Szabo, USA TODAY

Updated 6/15

June 2011

CDC Home



Centers for Disease Control and Prevention
CDC 24/7: Saving Lives. Protecting People.™

Press Release

Immunization Rates Remain Stable at High Levels Among the Nation's 19- Through 35-Month-Old Children

Aug. 2009

CDC Home



Centers for Disease Control and Prevention
CDC 24/7: Saving Lives. Protecting People.™

Press Release

CDC Survey Finds Childhood Immunization Rates Remain High

Sept. 2010

CDC Home



Centers for Disease Control and Prevention
CDC 24/7: Saving Lives. Protecting People.™

Press Release

CDC national survey finds early childhood immunization rates increasing

Sept. 2011

Figure 2. Ad hoc risk communication vs. CDC assessments of NIS data. Despite annual statements from the CDC reiterating that childhood vaccination rates are high and not declining, news reports, usually quoting individual public health professionals, routinely assert that immunization coverage is falling due to increasing parental opposition.

**Vaccine Risk Perceptions and Ad Hoc Risk Communication:
An Empirical Assessment***Dan M. Kahan*

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MEDICINE



NAIROBI. MAY 2013 (25 years post-MMR Wakefield scare—risk perceptions travel)



Nature Immunology **9**, 1317 (2008)
doi:10.1038/ni1208-1317

A case of junk science, conflict and hype

Despite accumulating evidence that vaccines are safe, vaccination uptake is falling, driving a resurgence in old scourges of society.



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Press Briefing Transcript

CDC Telebriefing on the National Immunization Survey, Vaccine for Children

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This year, the U.S. is experiencing a higher than usual number of measles cases... it's so different than what we were seeing in back in 1989 to 1991. Seventy-nine percent of the U.S. residents cases that were unvaccinated had philosophical objections to the vaccine. ..

...outbreak in Texas, 20-actually 21 cases, more since we've made the report in the MMWR... Seventeen of those cases in Texas were unvaccinated. As these outbreaks are showing, **clusters of people with like-minded beliefs leading them to forego vaccines** can be susceptible to outbreaks when measles outbreaks are imported from elsewhere.

The nature of vaccine concerns also vary Globally, by vaccine and over time

Articles

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

Summary

Background The intensity, spread, and effects of public opinion about vaccines are growing as new modes of communication speed up information sharing, contributing to vaccine hesitancy, refusals, and disease outbreaks. We aimed to develop a new application of existing surveillance systems to detect and characterise early signs of vaccine issues. We also aimed to develop a typology of concerns and a way to assess the priority of each concern.

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

See Online for comment



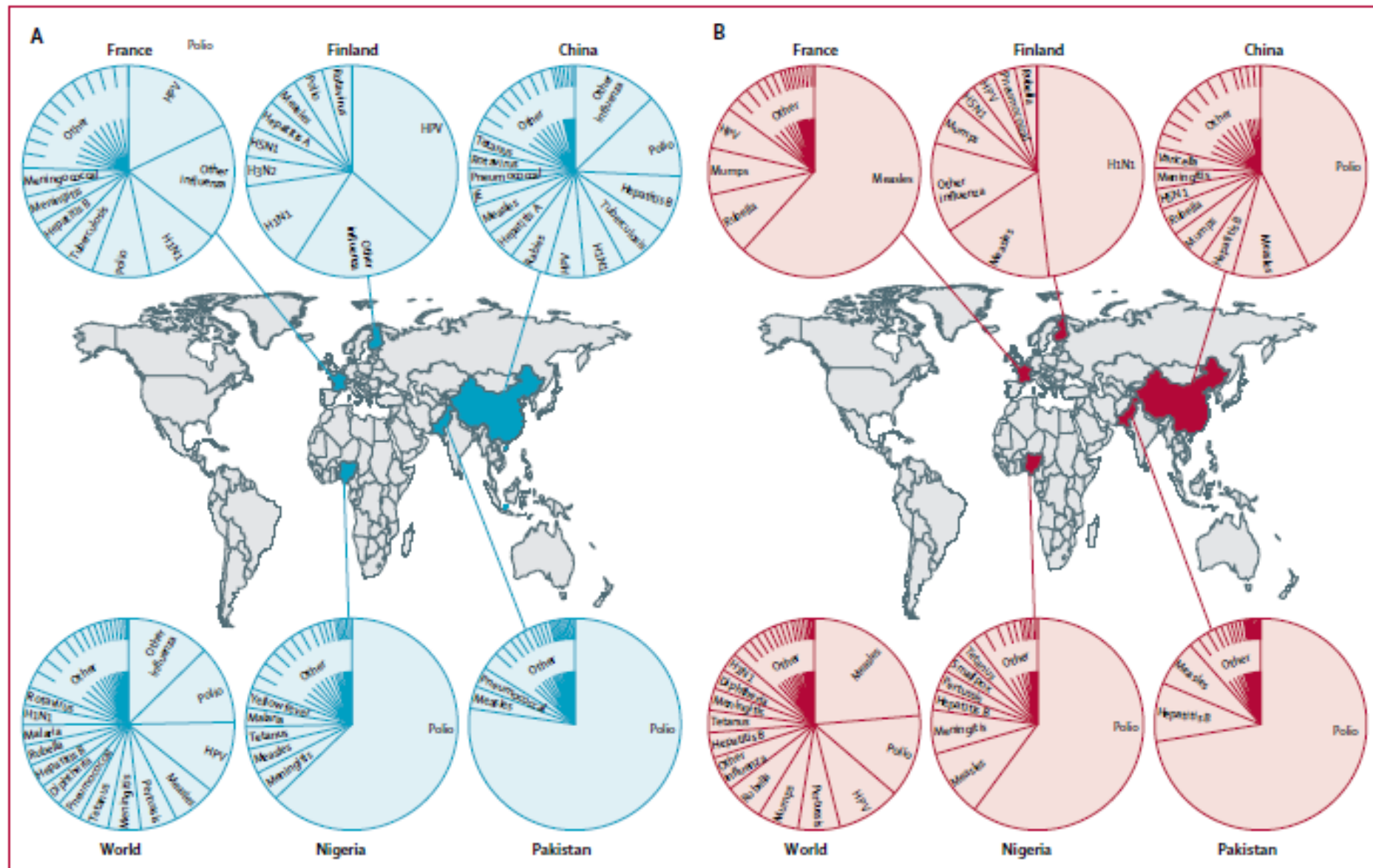
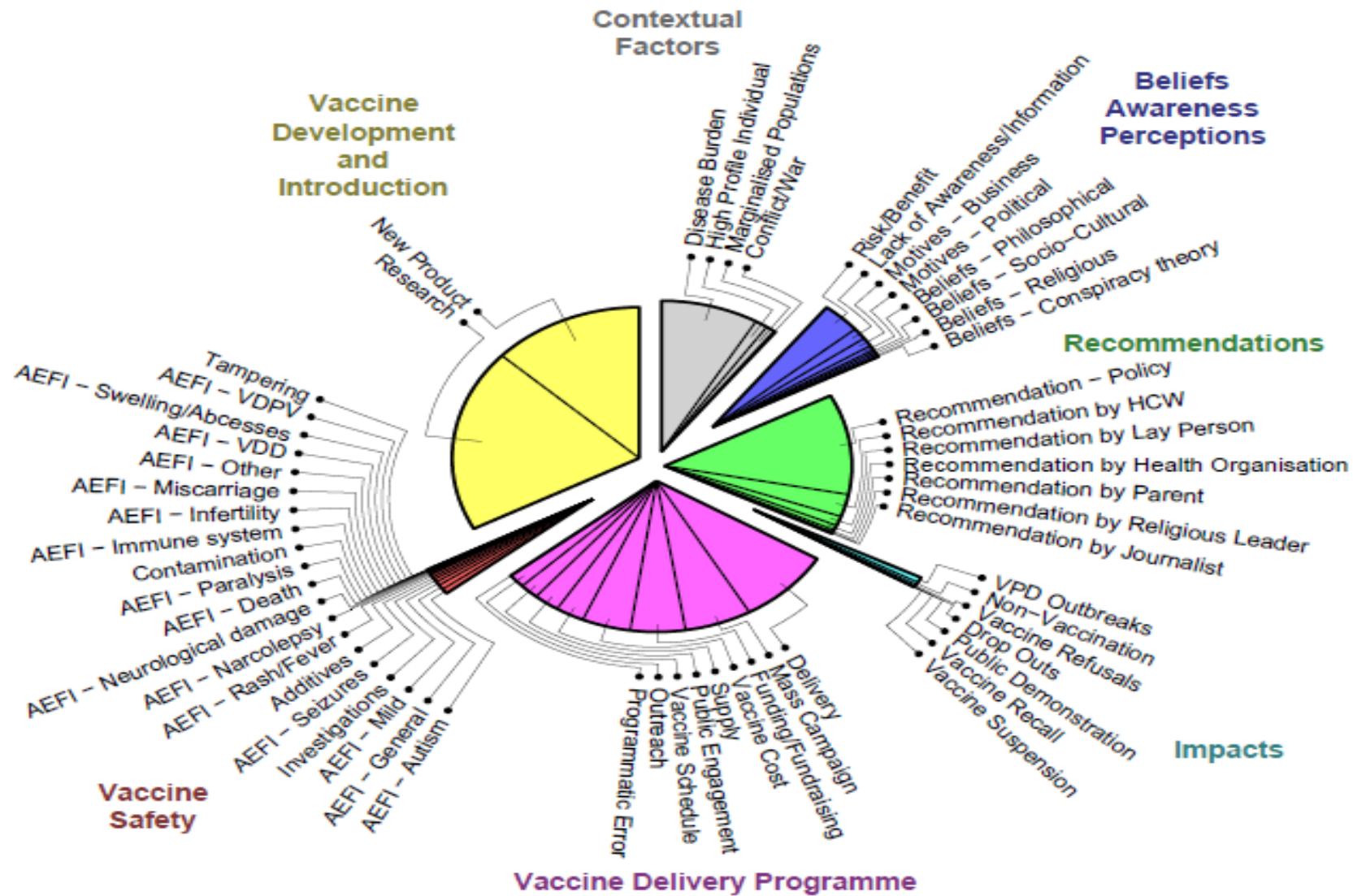


Figure 4: Proportionate number of times specific vaccine types were covered positively and negatively in the media, worldwide and in five selected countries

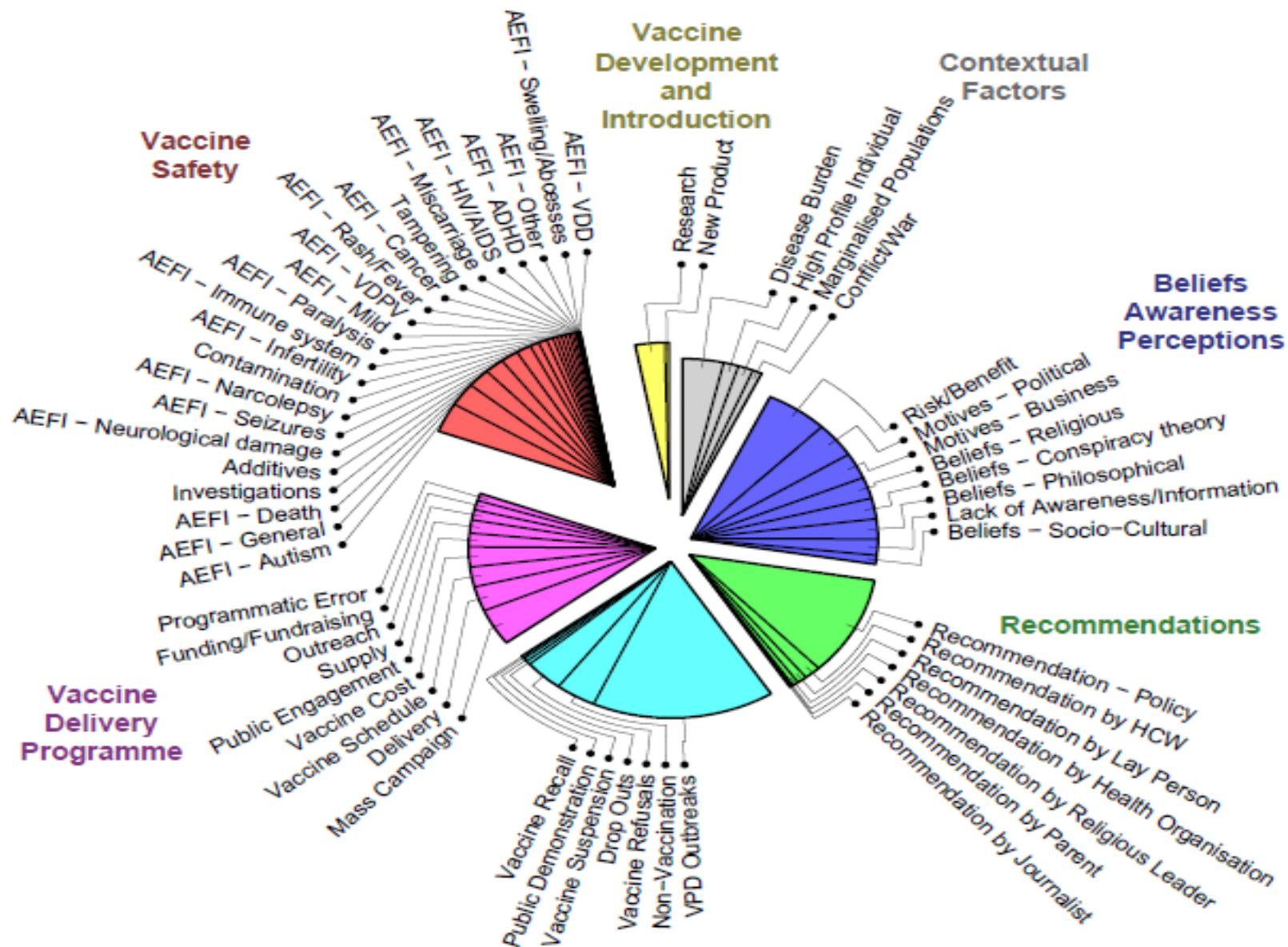
Vaccine types were reported positively (A) 9157 times worldwide, 45 times in France, 22 times in Finland, 171 times in China, 236 times in Nigeria, and 261 times in Pakistan. Vaccine types were reported negatively (B) 4900 times worldwide, 154 times in France, 29 times in Finland, 94 times in China, 193 times in Nigeria, and 311 times in Pakistan. Country border data are from the Global Administrative Areas database.²⁴ HPV=human papillomavirus. JE=japanese encephalitis.



POSITIVE SENTIMENT REPORTS



NEGATIVE SENTIMENT REPORTS



IVI

New research shows that trying to change negative perceptions can make things worse



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AAP study finds pro vaccine messages backfire

Published on [March 7, 2014](#) by [Marjorie Clark](#)



The American Academy of Pediatrics published study results on Monday that found messages about the measles, mumps and rubella vaccine do not produce the desired effect of encouraging parents to vaccinate their children.



Mother Jones

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Study: You Can't Change an Anti-Vaxxer's Mind

A new study examined multiple strategies for communicating about the safety and importance of vaccines. None of them worked.

—By [Chris Mooney](#) | Mon Mar. 3, 2014 11:50 AM GMT

1784 Tweet 638 Like 14k



Everett Collection/Shutterstock





“Telling people they are wrong doesn’t work, no matter who they are or what the situation is.”

Risk = Hazard + Outrage

Source: Peter Sandman. <http://www.psandman.com/articles/zurich.pdf>

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Box 6.2 Important lessons for governments on developing better risk communications

- To establish credibility it is necessary to generate trust
- Trust can only be generated by openness
- Openness requires recognition of uncertainty, where it exists
- The public should be trusted to respond rationally to openness
- The importance of precautionary measures should not be played down on the grounds that the risk is unproven
- Scientific investigation of risk should be open and transparent
- The advice and reasoning of advisory committees should be made public
- The trust that the public has in scientists, experts and professionals, such as chief medical officers, is precious and should not be put at risk
- Any advice to the public from such experts and advisory committees should be, and should be seen to be, objective and independent of government and political influence.

The
WORLD
HEALTH
REPORT
2002

*Reducing Risks,
Promoting Healthy Life*

Risk Perceptions

Personal Beliefs

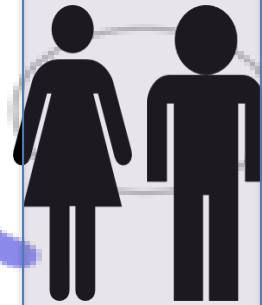
Society

Culture

Media

Scientific Evidence

Politics

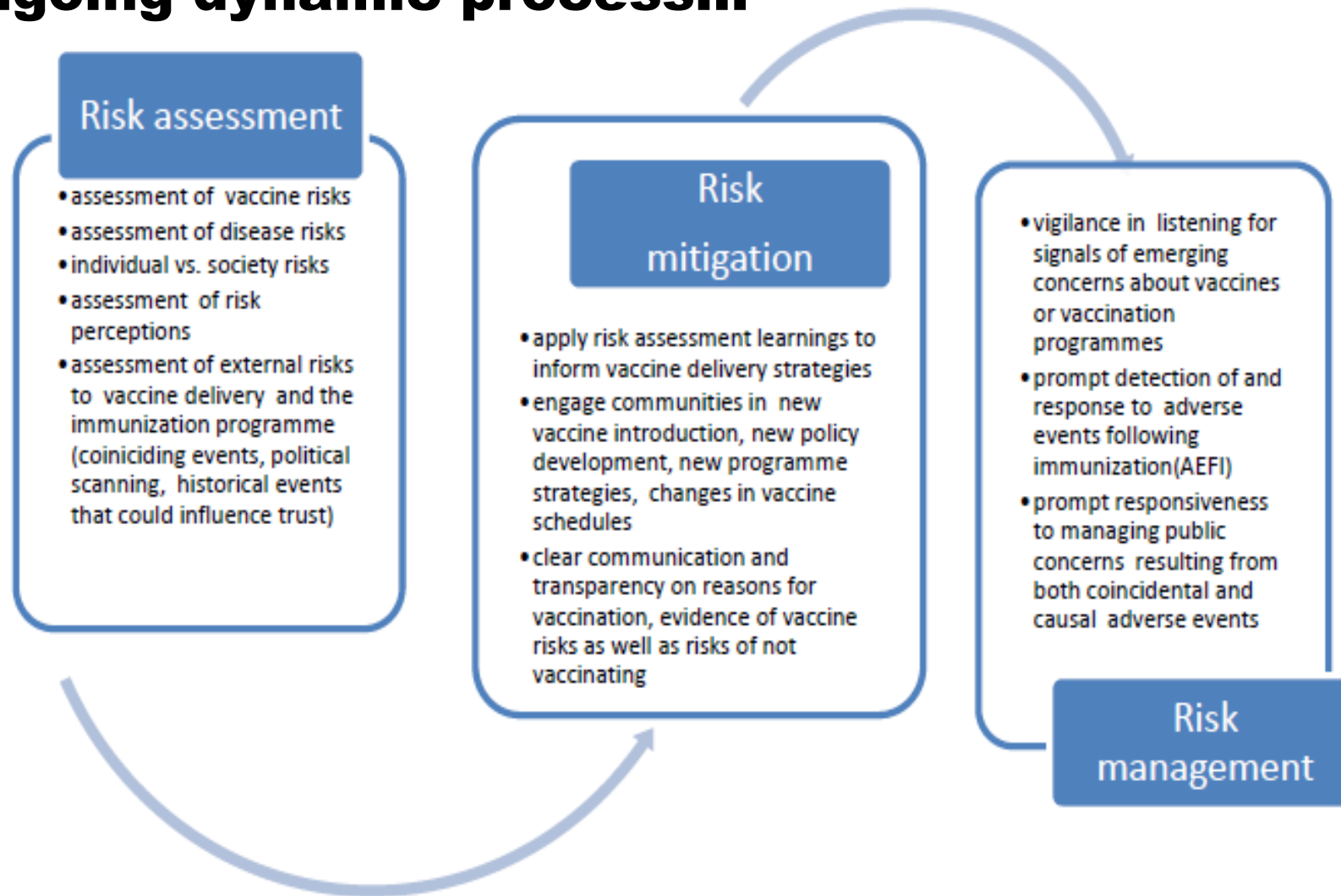


TRUST and RESPECT
can be the tipping point..

Decision Making



Risk/benefit communication is only part of an ongoing dynamic process...

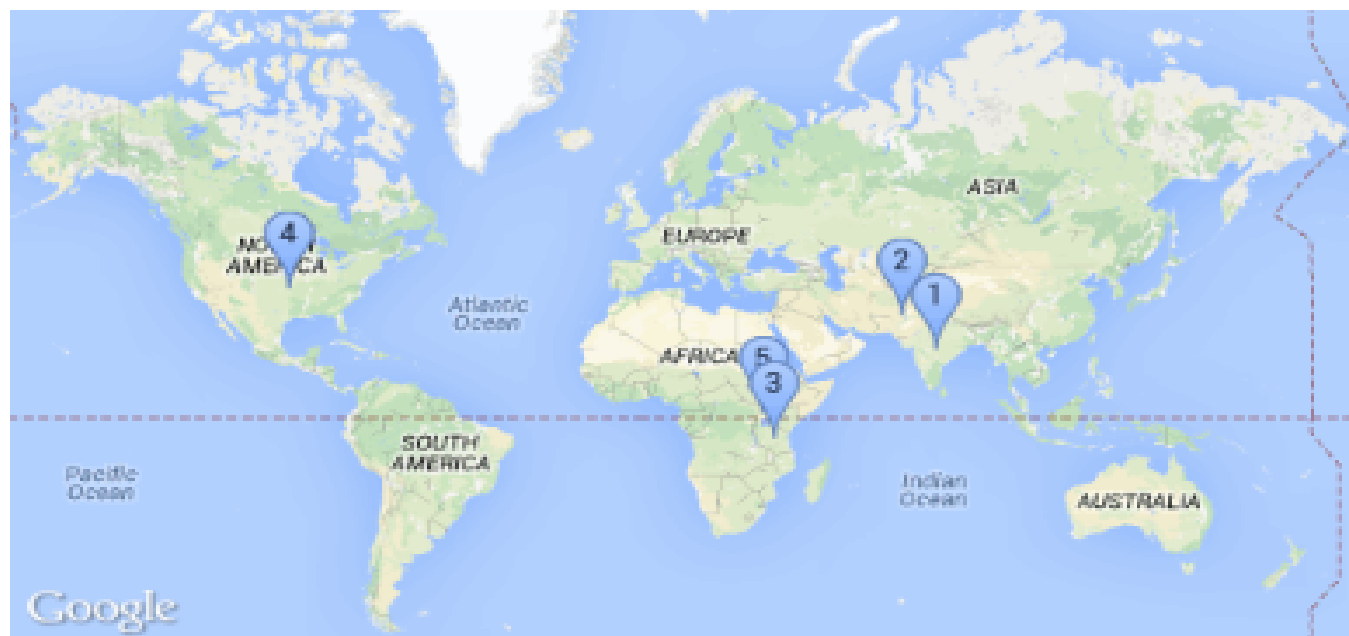


Larson et al. *Drug Safety* 2012; 35(11)

The Vaccine Confidence Project

monitoring public confidence in immunisation programmes

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Confidence Commentary: A blog from Dr Larson

Why we need “science understanding the public” more than just “public understanding of science”: The case of vaccines

There has been a lot of media coverage around a recent study published in the journal *PEDIATRICS* where researcher Brendan Nyhan and his colleagues at Dartmouth College (US) tested different types of vaccine messages with parents to see which were the most effective.

Take part in our survey

Click [here](#) to take part in our survey on public concerns about vaccines.

In the news

1. India: Polio vaccine must for travelers to seven affected countries (09/03/2014)

People traveling from India to seven polio-endemic countries or coming from these places are required to have polio vaccination and produce a certificate for it, according to a new directive of the (India) Union government effective from this month. The notification of the health and family welfare ministry states that Indians going to Afghanistan, Ethiopia, Kenya, Nigeria, Pakistan, Somalia and Syria would have to take the oral polio vaccine at least four weeks prior to their departure...
([external link](#))

2. Pakistan: Anti-polio drive in Karachi's 24 UCs; motorcycles banned (09/03/2014)

The Sindh government has announced eight-hour ban on the use of motorcycles in 24 'sensitive' union councils of the metropolis today (Sunday) for the anti-polio campaign...At least three health workers, including two women, were assassinated

www.vaccineconfidence.org