

The Fallout of Fake News in Infection Control, and Why Context Matters
Prof. Pierre Parneix, and Prof. Didier Pittet
A Webber Training Teleclass

The Fallout of Fake News in Infection Prevention
... and Why Context Matters

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Hosted by Paul Webber
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Why bother talking about this ?

In the scientific community, we have a tendency to ignore misinformation, thinking that it will go away if we do not give it attention

But in the age of fake news, this just adds fuel to the fire

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Why bother talking about this ?



Bad science impacts public health.

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“Fake news” and misinformation is a major disruptive force in society

Fake News: deliberate misinformation or manipulation of data

Bad Buzz: misrepresentation of the nature or conclusions in otherwise sound information or studies

Is science «protected» from fake news?

NO!!!!

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Examples

- Hospitals disinfecting non-critical areas in the environment
- O'Neill Report projected deaths from antimicrobial resistance
- Anti-superbug pajamas
- Copper everywhere



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How Fake News & Bad Buzz affects IPC

- within the field of IPC we often work with low category of evidence (case reports and expert opinion)
- some products and practices originate from the public sphere
- nexus and sharing of information between IPC and the public

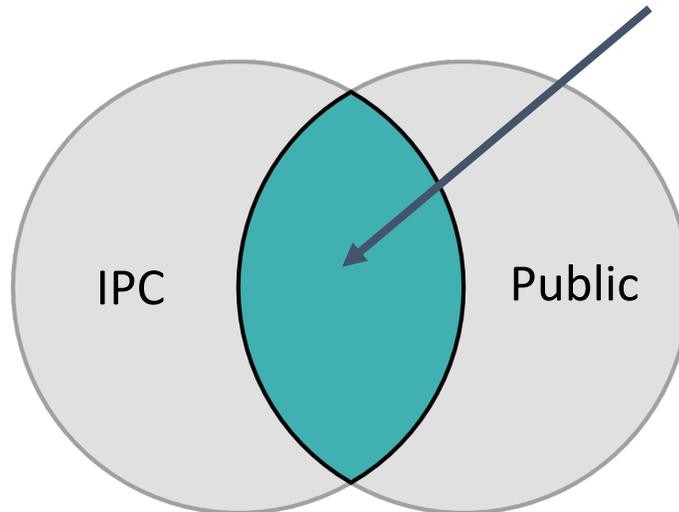


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Publication and dissemination of research



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Missinformation can take place at various levels:

- Misleading statements
- Ecological fallacy
- Inferences without sufficient evidence



A possible way of analyzing if hypotheses are supported is to use the Koch postulates / Bradford Hill criteria (but do not always apply)

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Scientists → Journal/press release → Print/ online Media → Social Media

Information / misinformation spread

- Abstract misleading compared to paper
- Sensationalist / Alarmist titles
- Misleading soundbites from scientist commentary



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Scientists → Journal/press release → Print/ online Media → Social Media

Information / misinformation spread

- Lay press
- Specialized medical news sites
- Often sensationalized



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Why Bad Buzz is a growing concern (1)

- Pseudo-science and misinformation have always been an issue
- But rapid proliferation of publication platforms make it easier for poor designed studies to get public attention
- Normally, in the context of a large number of well-performed studies, one would not expect bad articles to matter or to exert as much influence as they do

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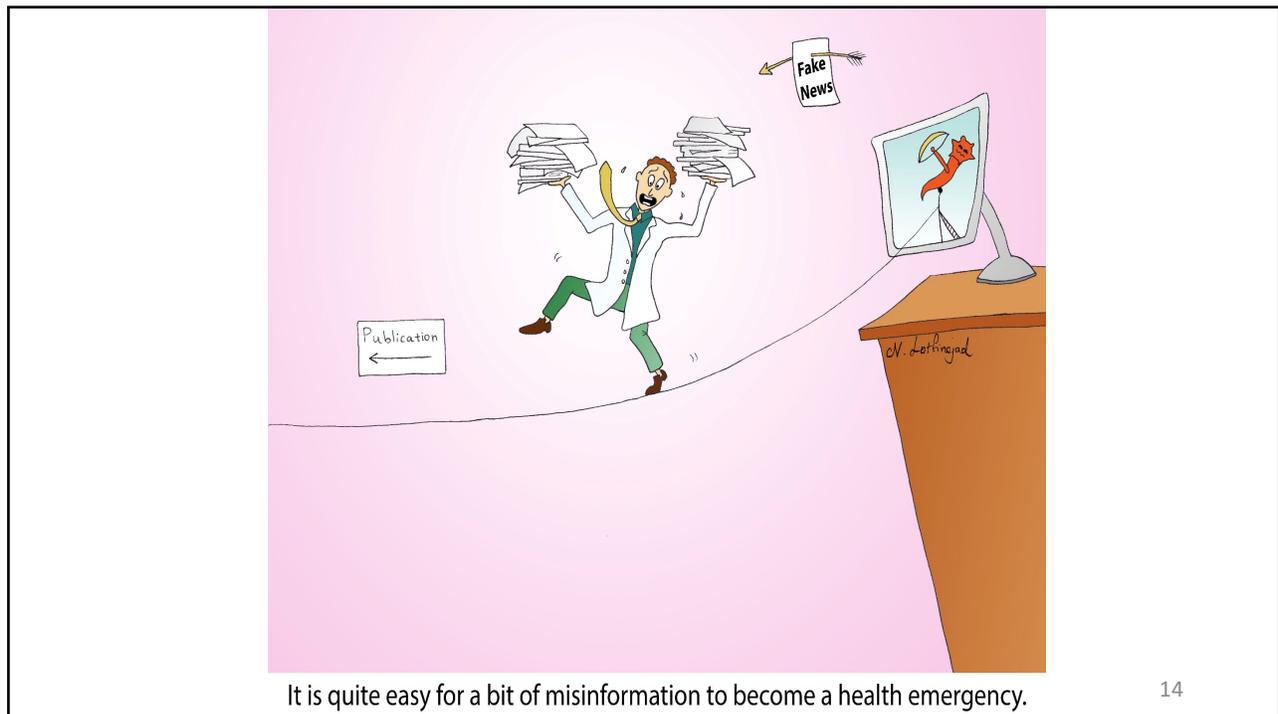
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Why Bad Buzz is a growing concern (2)

- Types of news outlets and platforms
- Open access
- Online media
- Social media
- Viral spreading of sensationalism and fear (clickbait)
- Real-life consequences

Misinterpreting the quality of a study or the real-life relevance of its conclusions can lead to wasted resources, bad policy making decisions, and increased morbidity and mortality

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Case Studies in infection prevention & IPC

- Measles prevention and ecological fallacy
- Misleading science and bad press concerning alcohol-based handrubs
 - Bisphenol A
 - Triclosan/triclocarban
 - *E. faecium* tolerance to alcohol



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Measles

- 1998- Wakefield et al. publish in *The Lancet* about a possible link between measles, mumps, and rubella (MMR) vaccine and autism
 - retracted in 2010



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Measles

- 1998- Wakefield et al. publish in *The Lancet* about a possible link between measles, mumps, and rubella (MMR) vaccine and autism
 - retracted in 2010
- Reasons for retraction:
 - uncontrolled study design
 - small sample size
 - speculation in the conclusions
 - blatant conflicts of interest
 - allegations of misconduct & ethical violations



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Measles

- 1998- Wakefield et al. publish in *The Lancet* about a possible link between measles, mumps, and rubella (MMR) vaccine and autism
 - retracted in 2010
- 20 years later cited over 2800 times including 1090 times since 2012
- The Wakefield article was published and circulated in the media; people around the developed world began to increasingly fear vaccines



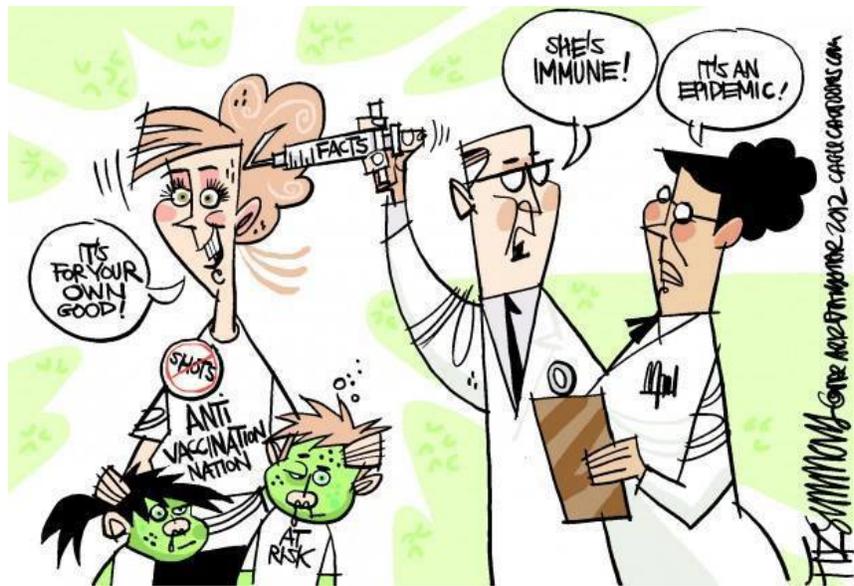
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Effects:

- Lack of “buy-in”
- Anti vaxx movement
 - Dr. Wakefield is a vocal supporter
- Social Media (SoMe) as a source of public health misinformation



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In the UK...

- MMR vaccine coverage dropped from 91% in 1998 to 80% in 2003

Coverage too low for herd immunity

- measles cases increased
 - from 56 cases per population of 58.5 million in 1998
 - to 1370 in a population of 61 million in 2008

Flaherty, D. K. The Vaccine-Autism Connection: A Public Health Crisis Caused by Unethical Medical Practices and Fraudulent Science, OECD Data Available at: <http://data.oecd.org/pop/population.htm>.

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...and around the world

- Extremely low vaccination rates in certain areas
 - affluent California schools up to 70% of students exempt from vaccination for non-medical reasons
 - Worse vaccination rate than South Sudan
- 2014: measles in the US spiked with 23 outbreaks and 667 cases
- 2016: 25% of French parents surveyed had an unfavorable perception of the measles vaccine risk–benefit balance
- 2017: a study showed that healthcare professionals in Italy had even become the vector of transmission in the recent measles resurgence

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Measles

- 1998 : Wakefield et al. publish in *The Lancet* about a possible link between measles, mumps, and rubella (MMR) vaccine and autism
 - Retracted in 2010



- 2018 : It would be interesting to see a study assessing the negative economic impact of the Wakefield paper

*Ultimately, it did not matter that the paper was retracted, its shortcomings analyzed in the literature, its experiments replicated with different results, and its authors discredited: **the damage was done***

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Misleading science and bad press concerning alcohol-based handrubs



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Case Studies in infection prevention & IPC

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 - *E. faecium* tolerance to alcohol



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1. Handrub and Bisphenol A: a prime example of a misleading study



- HCW applies a large amount of ABHR containing skin penetration enhancers (such as propylene glycol)
- HCW touches paper containing BPA for an artificially prolonged time (4 min)
- HCW then eats ten French fries after holding each fry for 10 seconds
- Absorption of BPA in blood is measured



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Effect of the study



- Drastic reduction in ABHR use by HCW (30% in France)
- Luckily did not spread internationally
- Possible impact on transmission of healthcare-associated infections



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2. Triclosan & Triclocarban

- Media falsely linking triclosan and triclocarban to all ABHRs
 - Some recommending to stop using ABHR
- The very large majority of ABHRs does not contain these chemicals
- Florence Statement might have raised awareness and concern
 - Subsequently misplaced in ABHR

To note : Although triclosan was banned from soaps in the USA, it is still present in some toothpaste. No articles published on this topic using this information to advocate stopping the use of toothpaste in general.

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3. Increasing tolerance of VRE to alcohol

- 2018 Australian study Pidot et al. *in Science and Translational Medicine*
- Authors compared older and newer *Enterococcus faecium* isolates from 1997-2015, and the tolerance of these strains to 23% alcohol
- When using a 70% solution, no difference between resistant and sensitive isolates was observed (ABHRs contain 60-90% alcohol)
 - Tolerant *E. faecium* were killed by 70% alcohol
- Wiped mouse cage with a 70% isopropanol wipe
- *CCL: Because ABHRs have been used increasingly over time and while proportion of E. faecium tolerance to 23% alcohol increased from 1997-2015, ABHRs were pointed as causal factor*

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In Summary: Research is important and well-conducted

BUT

- Title of paper referring to “handwash alcohols”
- Press release: “alcohol loses its luster”
- Conflating of hypotheses concerning the role of exposure to alcohol in the environment vs. handrubbing



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Effects

- Major negative media coverage-
 - Guardian, Times, etc.
- Global concern in hospitals
 - even in remote areas of the world
- Possible loss of faith in over 25 years of research
- Lower compliance?



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Correspondence

***Enterococcus faecium* tolerance to isopropanol: from good science to misinformation**

Following the publication by Sacha Pidot and colleagues,¹ alarmist articles appeared in the lay press, including *The Guardian*, *Reuters*, *NBC*, and *The Times*.^{2,3} These stories have (probably inadvertently) mischaracterised the study analysis and implied that alcohol-based handrub is becoming ineffective. In reality, alcohol-based handrub is the most effective agent available for

handrub), regardless of those strains' tolerance to alcohol.¹ Hospitals must select high quality, validated alcohol-based handrub formulations and encourage high rates of hand hygiene compliance among health-care workers to lower rates of health-care-associated infections and the spread of antimicrobial resistance.⁴

The study also showed that some alcohol-tolerant vancomycin-resistant enterococci strains spread more quickly to mice than non-tolerant strains after mouse cages were wiped down with an alcohol-impregnated wipe. Hospital environmental disinfection for VRE is a comprehensive protocol, not a

medicines list and saves millions of lives worldwide every year.⁶

Misinterpreting the relevance of laboratory study results can lead to major negative consequences. The road between a bit of sensationalism and full distortion is as dangerous as it is short.

We declare no competing interests.

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Lancet Infect Dis 2018

Published Online
September 4, 2018
[http://dx.doi.org/10.1016/S1473-3099\(18\)30542-5](http://dx.doi.org/10.1016/S1473-3099(18)30542-5)

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Open platforms and non-peer reviewed literature

- Scientific articles and science are presented to the outside world
- Many of the increasing number of open-access platforms allow for the publication of “academic” articles without any peer review
- Part of a normal process of democratization of information in the internet age



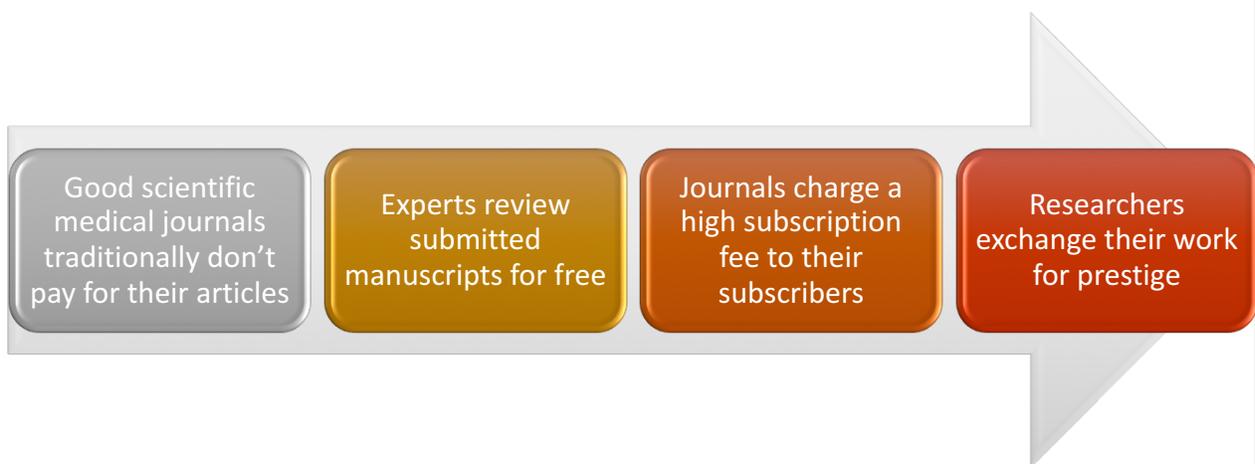
PEER REVIEW
(BBC RADIO 4 “SCIENCE BETRAYED”) 32

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The Traditional Model of Publishing



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Issues concerning traditional journals

- Access to information is difficult and expensive

- Especially in the developing world
- For anyone without institutional affiliation

World Bank has also been working on this:

<https://www.theguardian.com/global-development/2012/sep/03/developing-world-open-access-research-hurdles>

- Scientists review for free, and paying for their time falls on other institutions
- Leads to conflicts of interest in journals themselves

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Scientific Publishing is Big Business



- Recently, three publishers account for more than 47% of all papers published
- 2010: Elsevier's scientific publishing arm made a profit of £724 million on £2bn worth of revenue, with higher margins than Google or Apple
 - £19bn in yearly revenue



Reed-Elsevier 24.1%, Springer 11.9%, and Wiley-Blackwell 11.3% (2013)

For comparison, the whole US music industry in 2016 was calculated at \$17.2bn (£12bn)

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- The number of open access journals is increasing daily
 - Directory of Open Access Journals: over 1,440 open access medical journals
 - 89 added to the database in the last three months (June 2018)
- Authors generally pay for their articles' publication

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Open access - A fast growing « market »

- From 53'000 articles published in 2010 to 420'000 in 2014
with articles from Asia and Africa accounting for a disproportionate percentage published
- Market of “predatory” publishers at around \$74 million per year
- Although this problem is far from being dealt with, there are websites dedicated to identifying the growing list of over 1175 “predatory” journals

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Issues concerning open access journals

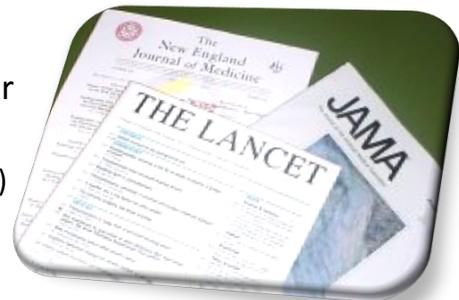
- Still expensive for some
- Motivation of journals to publish as many authors as possible
- Rise of predatory journals (over 1100 counted)
- Issues with lack of peer review and bad quality



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What to do?

- Need to discuss new models and ideas
- Some journals (such as Lancet ID) make some important content open access
- Hard to distinguish facts from fiction
- The burden of discernment is left to the reader
 - Elsevier has a list of professional level journals
 - OMICS International (but fraudulent organization!)



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European Initiative for Publishing



«Plan S»

Jointly developed by Science Europe and the European Political Strategy Centre at the European Commission

Aim: that from 1 January 2020, all scholarly publications resulting from public research funding must be published in Open Access journals or on Open Access platforms

https://www.scienceurope.org/making-open-access-a-reality-by-2020/?fbclid=IwAR38Z-i8EEF-E94njW0UgiCA0TIp05nOllwPXpRGwaiPFADLP6O4_GTEF8k

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Open access can be vital The example of Iran

- Access to published material is complex
 - limited access to academic journals
 - slow internet connections/barriers to access
 - results in complications to conduct research
- International sanctions
 - no access to international payment networks
 - prevents scientists from being able to pay for publications online
 - difficult to enroll in international conferences
- Thus: open access is vital



Peters, et al. Fighting the Good Fight: the fallout of fake news in infection prevention and why context matters. *Journal of Hospital Infection*, 2018. 42

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The European Battle Against Fake News In General



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Public Consultation



Two questionnaires (Nov 2017 - Feb 2018)

- one for the citizens
- one for legal persons and journalists reflecting their professional experience of fake news and online disinformation

The public consultation : 2986 replies

- 2784 from individuals
- 202 from legal organisations

<https://ec.europa.eu/digital-single-market/en/news/summary-report-public-consultation-fake-news-and-online-disinformation>

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High Level Expert Group

Set up by European Commission (Jan 2018)



Aim: to advise on policy initiatives to counter fake news and disinformation spread online

Deliverable: report *A multi-dimensional approach to disinformation*

Defines misinformation as: “all forms of false, inaccurate, or misleading information designed, presented and promoted to intentionally cause public harm or for profit.”

<https://ec.europa.eu/digital-single-market/en/news/summary-report-public-consultation-fake-news-and-online-disinformation>

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Eurobarometer Survey

Via telephone interviews (February 2018)
included all EU Member States
over 26'000 citizens participated



The findings show a clear concern for the spread of disinformation online in Europe

<https://ec.europa.eu/digital-single-market/en/news/summary-report-public-consultation-fake-news-and-online-disinformation>

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Multi-stakeholders Conference



Purpose:

to “define the boundaries of the fake news phenomenon, assess the effectiveness of the solutions already put in place by social media platforms and to agree on key principles for further action”

Initial meeting Nov 2018, other meetings after

Published a *Code of Practice on Disinformation*

<https://ec.europa.eu/digital-single-market/en/news/summary-report-public-consultation-fake-news-and-online-disinformation>

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Action Plan: 4 Pillars



- **Improving** the capabilities of union institutions to detect, analyse and expose disinformation
- **Strengthening** coordinated and joint responses to disinformation
- **Mobilising** the private sector to tackle disinformation
- **Raising** awareness and improving societal resilience

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Implications for Science How do we proceed?



BAD BUZZ: Let's develop a protocole

Aims:

- **Understand the inaccuracies**
 - Materials to collect and review
 - Review of each unsupported assertion or inaccurate statement in each publication/media (grouped by relative impact/importance)
- **Understand the threats**
 - To institutions and good research
 - To Public Health
- **Understand the consequences**



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In summary:

- Information becoming available to consumers, even the most widely proven and long-standing practices are vulnerable to misinformation
- The more alarmist an article is, the more attention and traction it is likely to get
- Paywalls limit access to published peer-reviewed work for the majority of the audience that reads scientific articles
- General public reads scientific information almost exclusively through open access sources
- The average individual does not know how to critically read a scientific study

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Looking Forward

Options to eliminate the problem entirely are limited:

- one either has to educate a whole population
- or prevent these types of articles from being published and disseminated

We could argue that if a journal that looks reputable to a layperson accepts scientific papers, they should be peer-reviewed

- Seal of approval?
- Standards for websites?
- Make more academic research open access?

There are no easy answers, but we need to be having the conversation

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www.webbertraining.com/schedulep1.php	
February 21, 2019	<u>COLLABORATIVE CLINICAL RESEARCH TO REDUCE INFECTIONS</u> Speaker: Prof. Elaine Larson , Columbia University, Mailman School of Public Health
March 7, 2019	<u>GOING BEYOND THE 5 MOMENTS</u> Speaker: Prof. Colin D. Furness , University of Toronto
March 21, 2019	<u>INFLUENZA AND VIRAL PNEUMONIA</u> Speaker: Prof. Rodrigo Cavallazzi , University of Louisville
March 26, 2019	<i>(European Teleclass)</i> <u>TAMING THE BUGS: CONTAMINATION AND INNOVATIVE APPROACHES TO STETHOSCOPE DISINFECTION</u> Speaker: Dr. Aamer Ikram , National Institute of Health, Islamabad, Pakistan
April 3, 2019	<i>(South Pacific Teleclass)</i> <u>HEALTHCARE ASSOCIATED INFECTION SURVEILLANCE IN THE ERA OF ELECTRONIC HEALTH DATA</u>

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