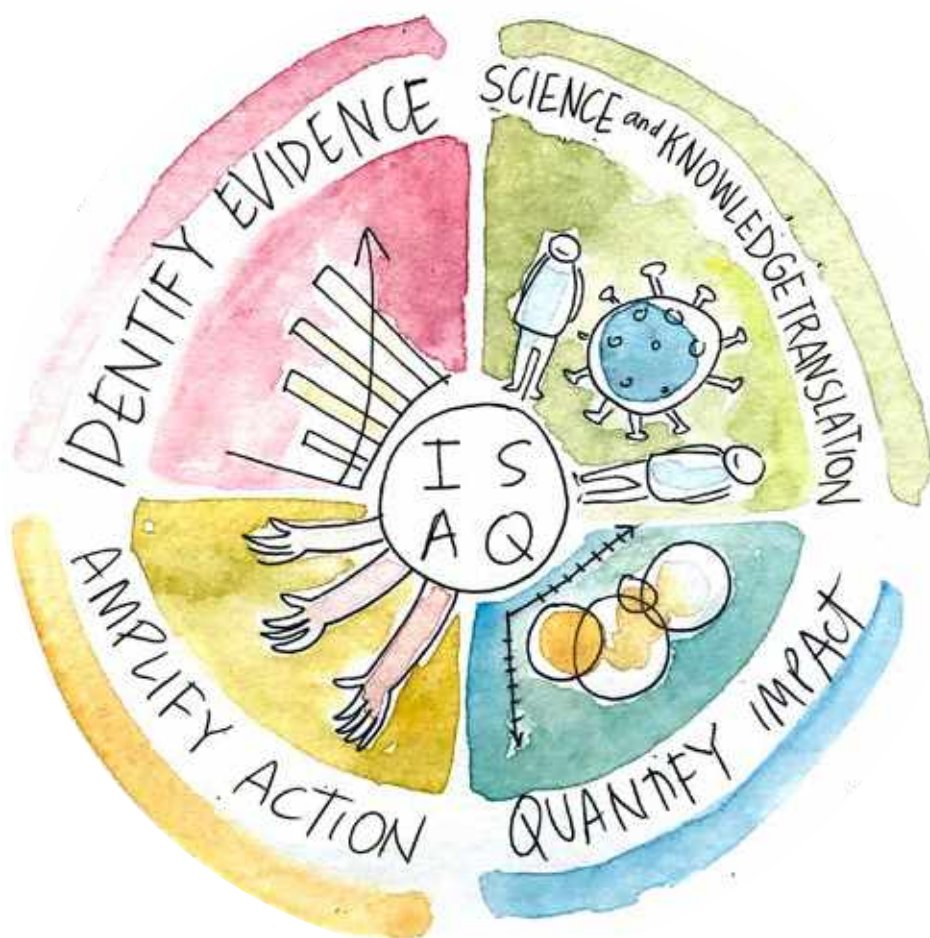


AN AD HOC WHO TECHNICAL CONSULTATION

Managing the COVID-19 infodemic

CALL FOR ACTION



World Health
Organization

infodemic
MANAGEMENT

AN AD HOC WHO TECHNICAL CONSULTATION

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Organization

infodemic
MANAGEMENT

An ad hoc WHO technical consultation managing the COVID-19 infodemic: call for action, 7-8 April 2020

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Note to the reader

This report condenses discussions according to the subjects addressed, rather than attempting to provide a chronological summary. The summaries of the discussions and group work address the themes emerging from wide-ranging discussions among all speakers, and do not necessarily imply consensus.

Summaries of presentations and of points made in discussion are presented as the opinions expressed; no judgement is implied as to their veracity or otherwise.

Acronyms & abbreviations

AFRO	WHO Regional Office for Africa
AG	Advisory Group
AMRO	WHO Regional Office for the Americas
BARDA	Biomedical Advanced Research and Development Authority
EMRO	WHO Regional Office for the Eastern Mediterranean
EQAP	External Quality Assessment Project
EURO	WHO Regional Office for Europe
GAP	Global Action Plan for Influenza Vaccines
GBT	Global Benchmarking Tool
GISRS	Global Influenza Surveillance and Response System
HHS	USA Department of Health and Human Services
HIC	high-income countries
IFPMA	International Federation of Pharmaceutical Manufacturers and Associations
ILI	influenza-like illness
JRF	WHO–UNICEF Joint Reporting Form
LAIV	live attenuated influenza vaccine
LMIC	low- and middle-income countries
NIC	national influenza centre
NRA	national regulatory authority
PIP	Pandemic Influenza Preparedness (Framework)
RT-PCR	reverse transcriptase polymerase chain reaction
SAGE	Strategic Advisory Group of Experts on Immunization
SARI	severe acute respiratory infection
SEARO	WHO Regional Office for South-East Asia
SMTA2s	standard material transfer agreements
UNICEF	United Nations Children's Fund
USA	United States of America
VLP	virus-like particle
WPRO	WHO Regional Office for the Western Pacific

Executive summary

“We’re not just fighting an epidemic; we’re fighting an infodemic.”

WHO Director-General Tedros Adhanom Ghebreyesus at the Munich Security conference, 15 February 2020

An ‘infodemic’ is an overabundance of information—some accurate and some not—that occurs during an epidemic. It spreads between humans in a similar manner to an epidemic, via digital and physical information systems. It makes it hard for people to find trustworthy sources and reliable guidance when they need it. During epidemics, more so than in normal time, people need accurate information to adapt their behaviour to protect themselves and their families and communities against infection.

The infodemic is propagated by the fundamentally interconnected way in information is disseminated and consumed through social media platforms and other channels, and, in the context of the COVID-19 pandemic, it is exacerbated by the global scale of the emergency. Infodemics can impact citizens in every country, and addressing them is a new and centrally important challenge in responding to disease outbreaks.

At the same time, though, the current, COVID-19 infodemic is an opportunity to find and adapt new preparedness and response tools.

On 7 and 8 April, the WHO Information Network for Epidemics (EPI-WIN) held a global online consultation on managing the COVID-19 infodemic. The aim of this consultation was to crowdsource ideas for managing the infodemic from an interdisciplinary group of experts and the 1 300 participants who joined the webinar. Alongside the inputs of the speakers, almost 600 ideas were submitted through an online interactive forum while the consultation was taking place. Together, all these will form the basis for a COVID-19 infodemic framework to guide the actions that governments and public health institutions can take.

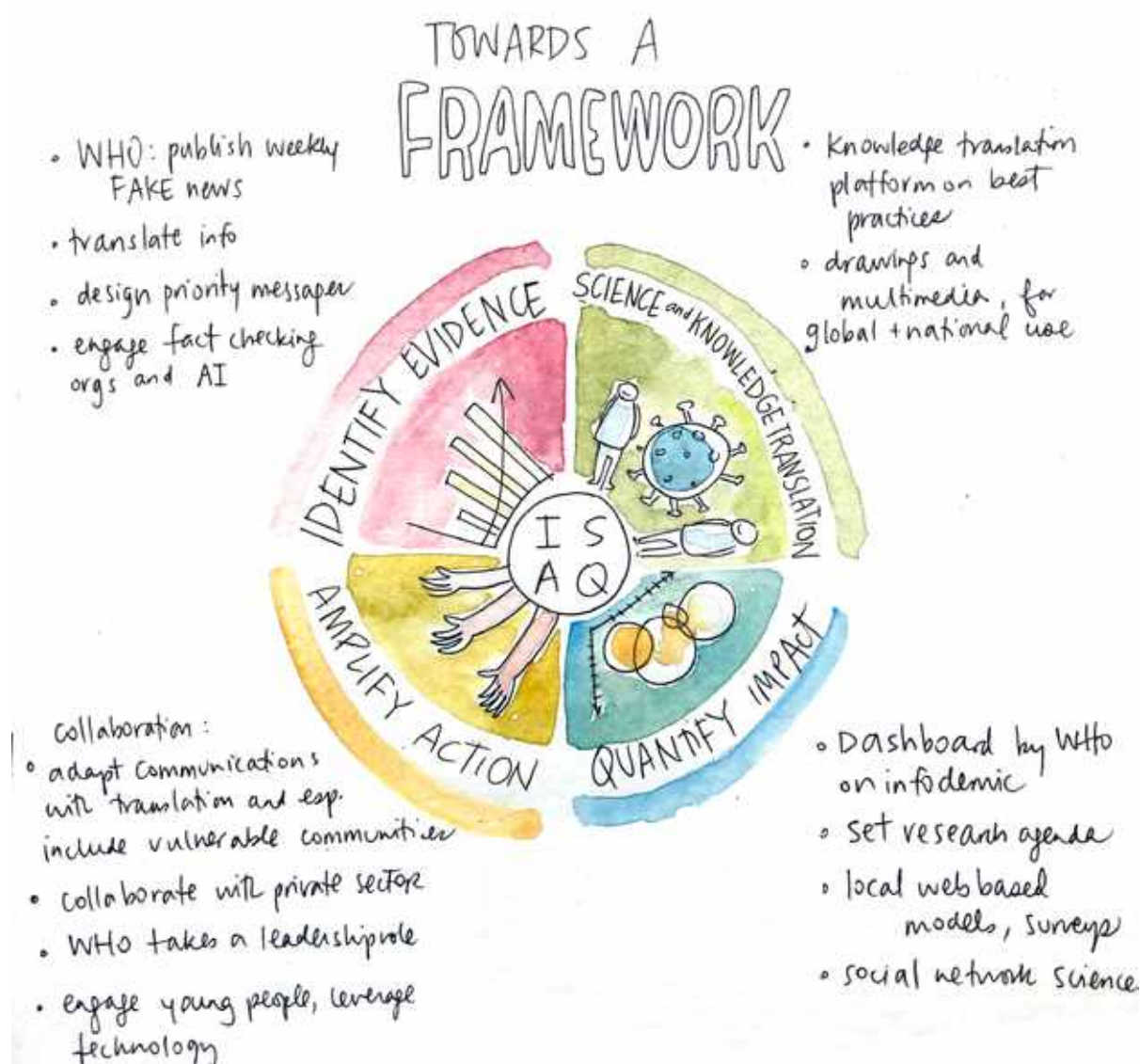
The infodemic can be seen as having four major thematic areas in which people look for trustworthy information, and where misinformation and rumours are placed: the cause and origin of the disease; its symptoms and transmission patterns; available treatments, prophylactics and cures; and the effectiveness and impacts of interventions by health authorities or other institutions. These four areas require the addition of a fifth: the coordination and governance of the generation, verification and dissemination of trustworthy information.

The framework for response will also be built around four principles.

Firstly, interventions and messages must be based in science and evidence. Within this topic there are two main overarching challenges: the need to manage the creation and dissemination of trusted information so that it is not excessive, overwhelming or confusing; and the need to counter misinformation.

Second, this knowledge should be translated into actionable behaviour change messages, presented in ways that are accessible to all parts of all societies. Cultural and contextual sensitivity in the messages used, and translation into local languages, are necessary.

Thirdly, governments should reach out to key communities to understand their concerns and information needs, the better to tailor advice and messages that can help these communities address the audiences they represent. Through this process, communities—of all kinds, whether neighbourhood, religious, professional or other communities—amplify the right public health messages in ways that are user-friendly and which can lead to the right changes in behaviour.



Fourthly, strategic partnerships should be formed with social media and technology platforms and stakeholders, along with other relevant stakeholders such as those in academia and civil society.

WHO's immediate response to managing the COVID-10 infodemic is and has been to provide timely and accurate technical guidance, scientific briefs and situation reports, communicating the evidence-based knowns and unknowns through frequent press conferences, educational videos and trainings, 'Myth Busters,' and the WHO presence on social media platforms. WHO is tailoring guidance to the needs of—among others—governments, faith-based organizations, the food and agricultural sectors, organizers of large events, employers and unions, and health professionals. The organization is also engaging major social media platforms to provide access to accurate health guidance, while at the same time working to understand the sentiment of the discussions taking place on these platforms.

WHO is building on all of this work through this report and the draft Framework for Managing Infodemics in Health

Emergencies (see Annex 1), produced in response to the perspectives that emerged from this consultation, and which will be reviewed and refined as the COVID-19 pandemic continues and when it ends. This framework provides guidance in five key areas of action that emerged from the consultation: (1) strengthening evidence and information; (2) simplifying and explaining what is known, fact-checking, and addressing misinformation; (3) amplifying messages and reaching the communities and individuals who most need the information; (4) quantifying and analysing the infodemic, including information flows, monitoring the acceptance of public health interventions, and assessing factors affecting behaviour at individual and population levels; and (5) strengthening systems for infodemic management in health emergencies.

Managing the COVID-19 pandemic and related infodemic requires swift, regular, coordinated action from multiple sectors of society and government. The timely translation of evidence into knowledge that people can use, adapted to their local cultures, languages and contexts, will continue to be crucial to fighting misinformation and saving lives as the pandemic evolves.

Introduction:

WHO ad-hoc technical consultation on managing the COVID-19 infodemic

For the most effective national responses, private and public actors have to pull together for the greater good.

Background

The 2020 pandemic of Coronavirus disease (COVID-19) has been accompanied by a massive 'infodemic.' An infodemic, simply put, is an overabundance of information, good and bad. Together, it forms a virtual tsunami of data and advice that makes it hard for people in all walks of life to find clear messages, trustworthy sources and reliable guidance when they need them. Some of it is merely confusing, but some of the misinformation can be actively harmful to life. Addressing infodemics like this is a new, but centrally important, challenge in responding to all disease outbreaks.

In the context of the COVID-19 pandemic, the infodemic is exacerbated by the global scale of the emergency, and propagated by the fundamentally interconnected way in which information is disseminated and consumed through social media platforms and other channels. The infodemic impacts citizens in every country.

In response to the pressing demand for timely, trustworthy information about COVID-19 and subsequent epi- and pandemics, the World Health Organization (WHO) established the Information Network for Epidemics (EPI-WIN) to serve as a network uniting technical and social media teams within WHO. EPI-WIN disseminates and amplifies evidence-based information about COVID-19, and tracks and responds to misinformation, myths and rumours.

On 7 and 8 April 2020, EPI-WIN held an online technical consultation on managing the COVID-19 infodemic, with the aim of gathering information, evidence, ideas and comments from a wide range of technical experts and other stakeholders. The objective of this exercise was to gather inputs to feed into a draft infodemic response framework (See Annex 1), with the secondary aim of catalysing a new community of practice on infodemic management, and beginning to define its work.

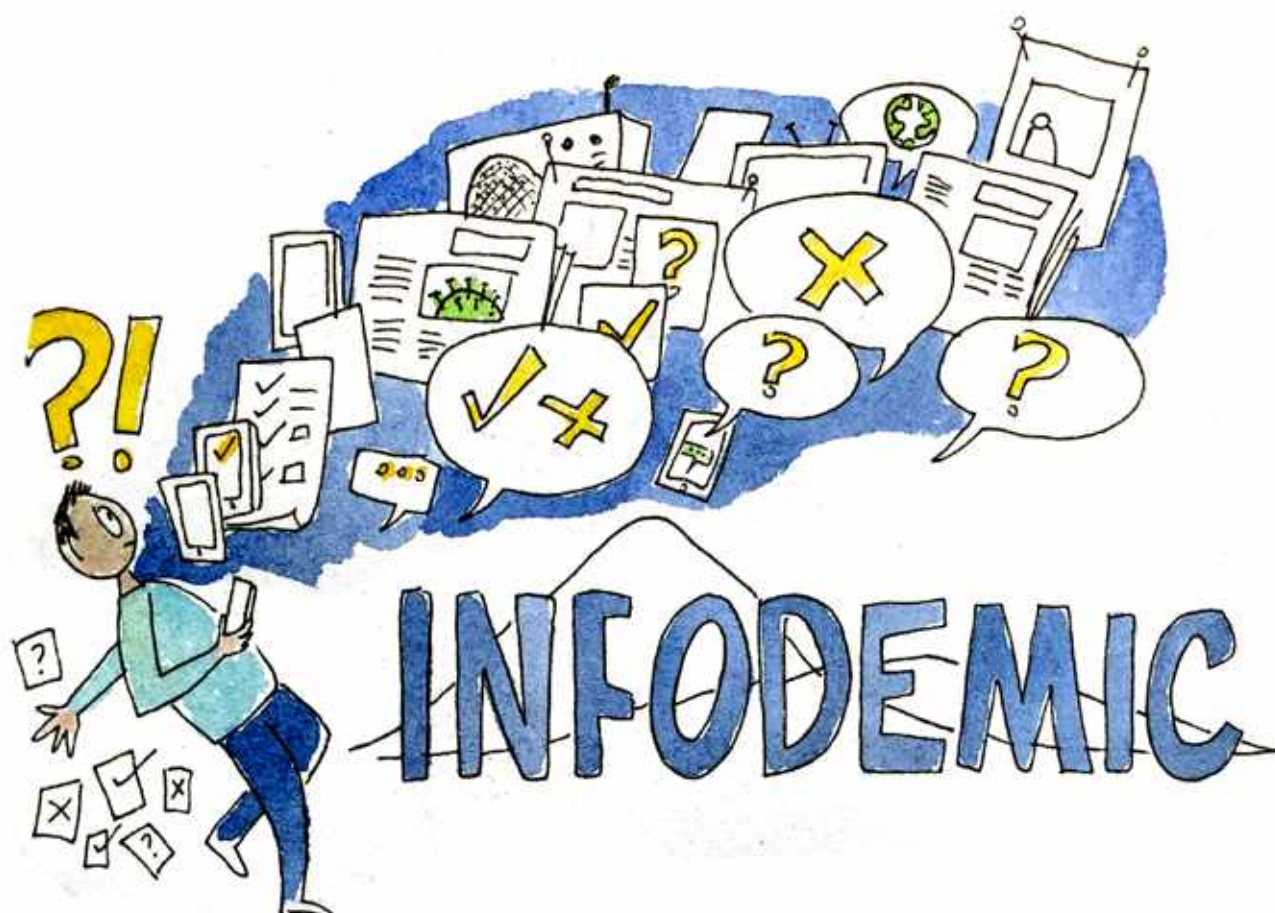
Problem statement

A number of overarching themes and needs emerged from both the presentations and the online engagement.

There is need for (a) international coordination of the response to the infodemic, even—perhaps particularly—around such basic issues as the consistent use of terminology; and (b) coordinated and integrated methods to manage the flow of information for maximum positive impact. To fill these gaps, both an overview and a detailed understanding of the distribution and sharing of information are crucial, clarifying where it comes from; how it propagates; who clicks and shares it; and how we can expect it to evolve in the coming weeks and months.

To earn and keep that essential trust, public health agencies and other authorities need to be open—often—about the fact that this is a new virus, and therefore recommendations and advice will change with more data.

For people act on information as best they can, health education and health literacy are crucial, to help them absorb, analyse, understand and act on the information they receive, question misinformation, and evaluate correctly which sources to trust.



Just as an effective public health response to an epidemic is based on a strong health system, resilience to misinformation depends on strong digital and health literacy. To facilitate this, authorities could run information campaigns on how to practice digital hygiene in the same way that they promote personal hygiene. It is already clear that one lasting lesson from COVID-19 will be the fact that health education before a crisis is hugely valuable.

For the most effective national responses, private and public actors have to pull together for the greater good. The key to an effective response to an infodemic is multidisciplinary cooperation. The range and effectiveness of possible response measures increases in relation to the degree of cooperation between all these actors, across the whole of society—including but not limited to private sector communication and telecoms companies, state communication bodies, search engines, civil society, academia, frontline health workers, and others, all the way down to the grassroots level of neighbourhood mutual support groups.

Widespread cultural change around online comportment may also be necessary. For example, the dynamics of misinformation might be far less dangerous to life if it were more socially acceptable for online actors to retract and delete inaccurate posts they might have shared.

Local context is absolutely crucial. Good information has to be adapted in response to culture, language and literacy, and any other relevant influences on how information is received and used. This adaptation must extend to marginalised and vulnerable communities and languages.

A great deal of the necessary work has already been done. Strong, tested intellectual frameworks already exist for (a) conceptualizing and mapping the nature of infodemics and/or online misinformation, and (b) responding to them. New approaches are constantly being developed and refined. There already exist many resources, tools, hubs, portals, frameworks, networks, initiatives etc. for action and analysis. Many of these were outlined during the meeting, including rebuttal strategies for misinformation, an infodemic risk index that measures exposure to unreliable sources of information, and a glossary of social interventions. Some of these initiatives have already amassed large amounts of data and long track records, and have been monitoring and refining their methods since long before the COVID-19 pandemic.

One problem, if it can be described as such, is an overabundance of options: WHO must now choose the most appropriate tools for the COVID-19 context and bring them to scale. This consultation may have been one of the first opportunities for many of the people attending to hear about the expertise and activities of others, and to frame the entirety of this activity within the problems of pandemic management and public health. The desired outcome is to bring these tools together and reorient existing knowledge and expertise towards countering and managing infectious disease, providing crucially necessary multidisciplinary expertise and coordination, and bringing important, trusted information to local level.

Meeting proceedings

The consultation was held online via the Zoom platform, and was open to all. The event brought together a multidisciplinary group from a range of different backgrounds, including but not limited to academia (including social scientists, epidemiologists, clinicians and communication experts); representatives of technology, web and social media platforms and companies; staff from ministries of health and institutes of public health; attendees from organisations that act as 'amplifiers' of information, including the World Economic Forum (WEF), the International Air Transport Association (IATA), a number of faith-based organizations and the World Council of Nurses; journalists and media professionals, including health and science reporters and representatives of major media outlets; and civil society, including fact-checking organizations. The agenda for the meeting¹ can be found in Annex 2 and a list of speakers in Annex 3. Full proceeding of and outcome of meeting is described in journal article².

Attendance at the consultation dwarfed the numbers for a conventional, physical meeting:

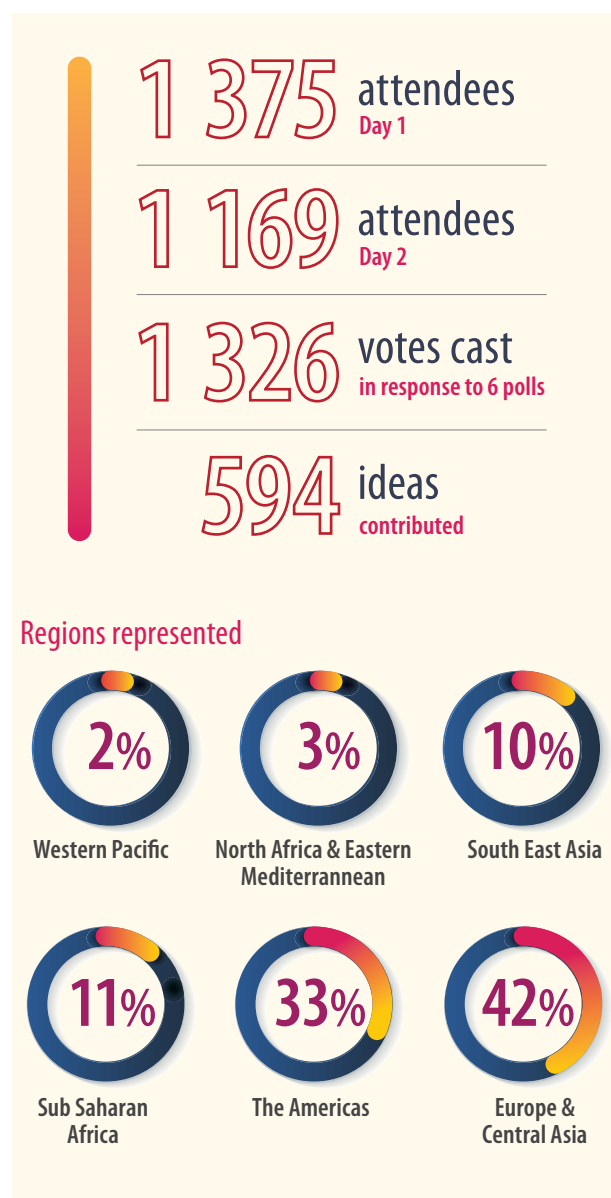
- On day one alone, 1 375 people attended from all around the world; on Day 2, there were 1 169.
- 685 of those people were active on the interactive Slido forum held at www.sli.do (out of a total of 782 logged in).

This forum allowed those listening to the presentations to interact with the discussions, casting votes in polls and contributing ideas and comments. 1 326 votes were cast on Slido in response to six different polls, and 594 ideas and comments were contributed.

- Attendees represented every continent bar Antarctica:
 - Sub Saharan Africa 11%
 - North Africa & Eastern Mediterranean 3%
 - South East Asia 10%
 - Western Pacific 2%
 - Europe & Central Asia 42%
 - The Americas: 33%
- Attendees came from a wide range of professional backgrounds:
 - Academia/research 26%
 - Public health/government 8%
 - Health care sector 7%
 - NGOs 22%
 - Civil society 2%
 - International organizations/UN 14%
 - Private sector 10%
 - Students 8%
 - Other 3%.

In addition to the online interaction, which generated a large quantity of data, responses and comments for later analysis, the meeting was illustrated in real time by Sam Bradd³, who provided unique, engaging perspectives on the discussions.

Attendance at the consultation dwarfed the numbers for a conventional, physical meeting.

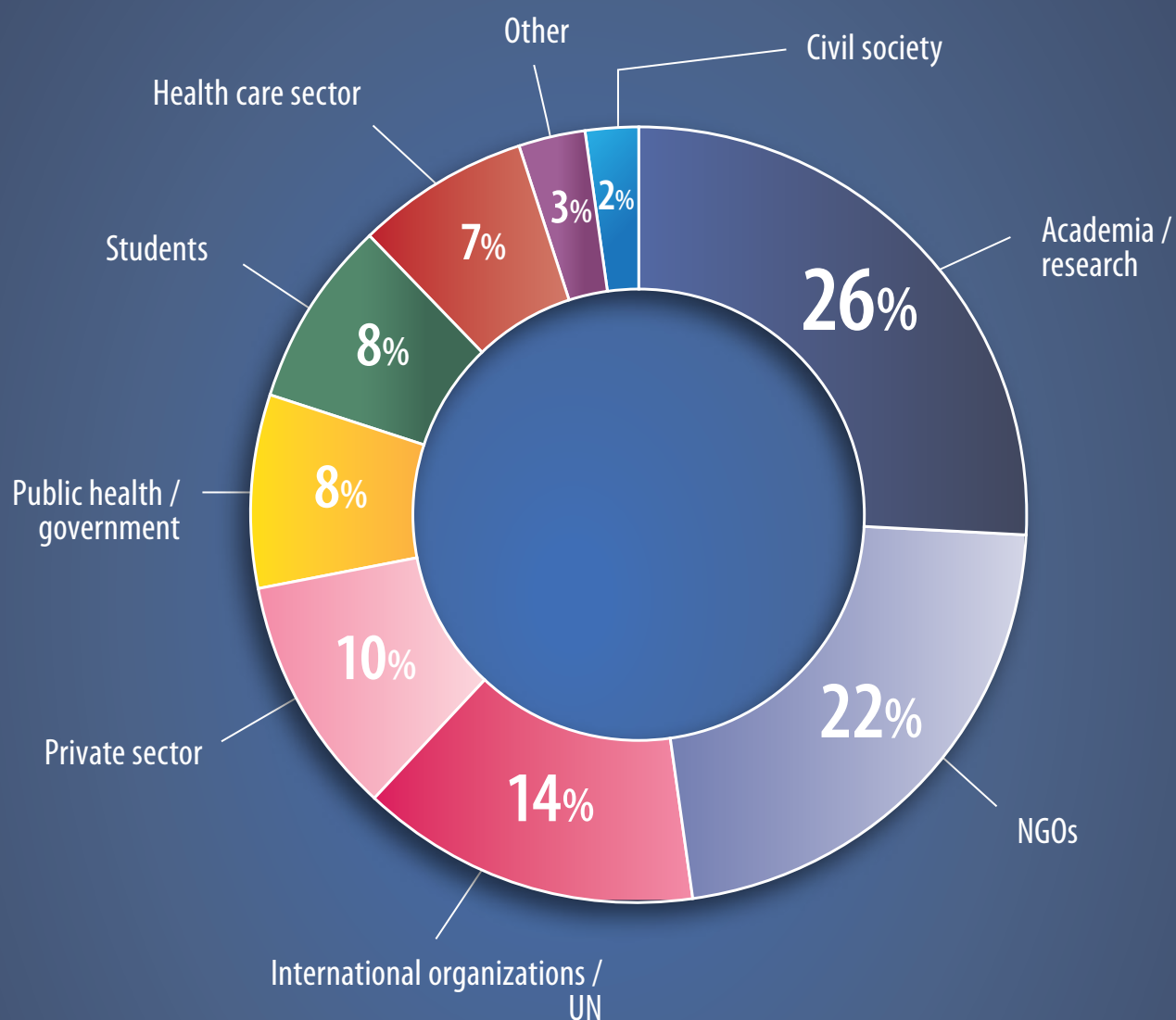


¹ Agenda and other meeting documents are available at <https://www.who.int/teams/risk-communication/who-ad-hoc-online-consultation-on-managing-the-covid-19-infodemic>

² Tangcharoensathien V, Calleja N, Nguyen T, Purnat T, D'Agostino M, Garcia-Saiso S, Landry M, Rashidian A, Hamilton C, AbdAllah A, Ghiga I, Hill A, Hougendobler D, van Andel J, Nunn M, Brooks I, Sacco PL, De Domenico M, Mai P, Grudz A, Alaphilippe A, Briand S. Framework for Managing the COVID-19 Infodemic: Methods and Results of an Online, Crowdsourced WHO Technical Consultation. *J Med Internet Res* 2020;22(6):e19659. DOI: 10.2196/19659

³ See more of Mr Bradd's work at www.drawingchange.com

Professional backgrounds of attendees



Attendees came from a wide range of professional backgrounds...

Summary of presentations

01 WHAT IS THE NEW PHENOMENON? A ROUNDTABLE OF PERSPECTIVES

*Presenters: **Tim Nguyen**, WHO; **Viroj Tangcharoensathien**, Thailand Ministry of Public Health; **Yana Dlugy**, Agence France-Presse (AFP) Digital Verification, France; **Ève Dubé**, Institut National de Santé Publique du Québec, Canada; **Athas Nikolakakos** and **Praveen Raja**, Facebook; **Gunther Eysenbach**, JMIR Publications, Canada; **Pier Luigi Sacco**, IULM University of Languages and Communication, Italy; **Alexandre Alaphilippe**, EU Disinformation Lab, Belgium*

In the meeting's first session, seven speakers presented different perspectives on the infodemic.

WHO's role

The key principle of WHO's response to the infodemic is that individuals and communities can better protect themselves if (a) they have timely access to, and understanding of, the collected knowledge and wisdom of trusted sources; and (b) they are engaged as part of the solution. WHO has a special position that allows—and obliges—it to receive and communicate information directly from countries, from the field, from hospitals and elsewhere; put together the big picture of what is happening on the ground; and bring it to the attention of appropriate scientific networks. It has to present information in ways that are actionable, and, where necessary, in ways that target specific vulnerable groups. It also acts as a convener, gathering other trusted sectors and pillars of society—such as faith based organizations (FBOs), the private sector, governments and others—to share and adapt information. Finally, its position of overview allows WHO to work to understand and quantify the infodemic, identifying issues as early as possible and responding fast, with correct information.

To meet these needs and obligations, EPI-WIN has devised the basis for a five-part framework for an infodemic management strategy, as outlined earlier: (1) identifying evidence and gathering the necessary knowledge and wisdom; (2) simplifying knowledge for different audiences; (3) amplifying action; (4) quantifying the impact of the infodemic; and (4) assisting the coordination and governance of all these activities.

TOWARDS A WHO INFODEMIC MANAGEMENT FRAMEWORK

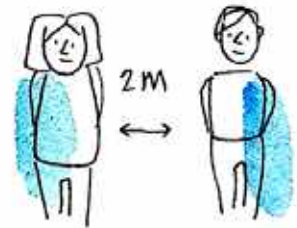
I

IDENTIFY
EVIDENCE



S

SCIENCE AND
KNOWLEDGE
TRANSLATION



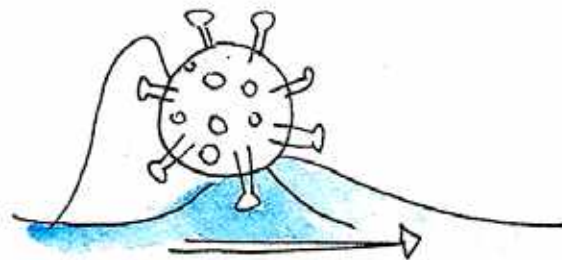
A

AMPLIFY
ACTION



Q

QUANTIFY
IMPACT



The policy perspective

The policy implications of the infodemic were explored by Viroj Tangcharoensathien of the Thailand Ministry of Public Health, and by Ève Dubé of the Institut National de Santé Publique du Québec (Quebec National Institute of Public Health).

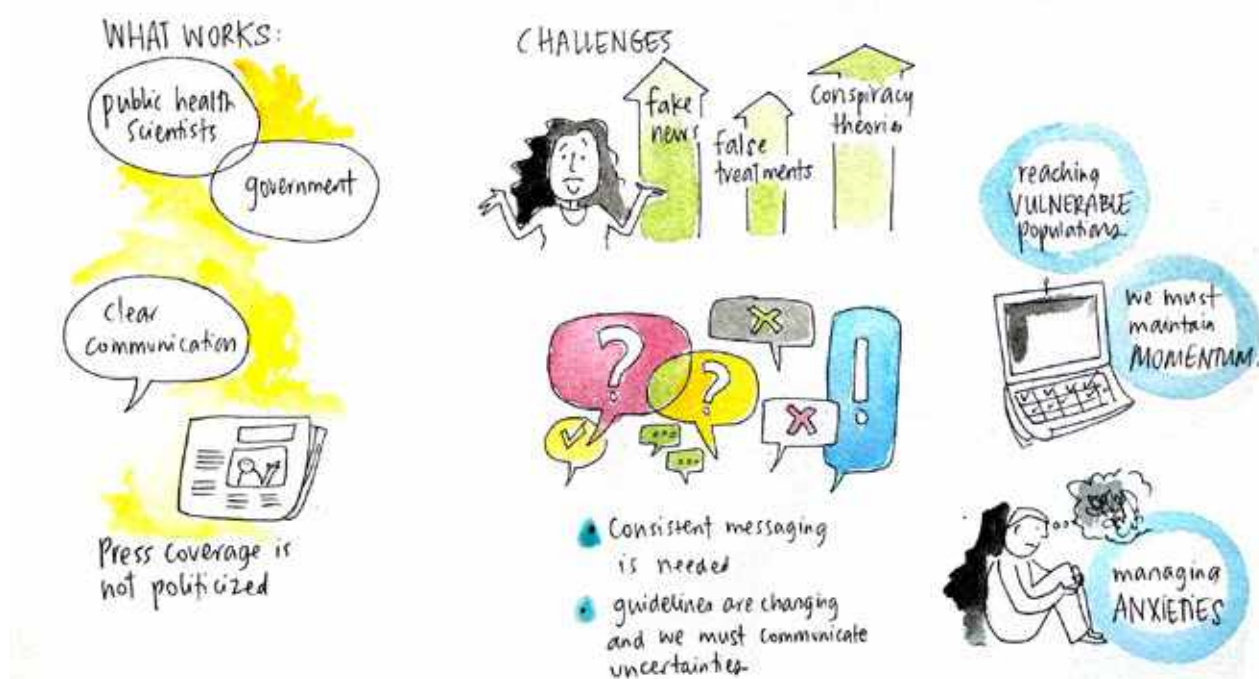
Dr Tangcharoensathien outlined Thailand's evidence and information demands after 2.5 months of intensive work on COVID. The Ministry of Public Health serves a wide range of audiences and by necessity operates a demand-driven strategy to providing information about COVID-19. Three main groups need information: the public, policy makers at various levels, and frontline health care workers.

The general public needs information on the nature of the virus and how it works, and the correct social interventions, some of which needs to be made specific to local contexts. The WHO Myth Busters⁴ information has been particularly useful in this regard, and should be expanded. Policy makers require daily epidemiological updates—for regions and cities, nationally, and for other countries—and evidence on the effectiveness of different interventions, as well as information on the balance between the pandemic's economic impacts and morbidity and mortality. They also need advice and evidence on the management of disinformation and—of course—the allocation of health systems resources (including personal protective equipment/PPE, beds and surge capacity, workforce and lab capacity, medicines, etc.) for different epidemiological scenarios. Meanwhile, frontline workers require evidence-based guidelines on effective public health interventions and clinical management of patients.

In Quebec, which at the time of the meeting had more COVID-19 cases than any Canadian province, a number of responses to the infodemic are working well. Collaboration between public health scientists and government are informing action, and authorities are prioritising clear, transparent communication, which in turn has resulted in positive press coverage without politicization. Phone lines have been set up to deal with issues like medical health; and there are email channels through which members of the public can pose questions to government. Statistics on social distancing behaviours to date show good adherence to advice.

Of course, there are challenges. There has been “an unprecedented increase in fake news,” and the people in fact-checking and debunking roles are overwhelmed. It is impossible to address pieces of disinformation one by one, and is now necessary to triage the fake news that could have the most negative impact on health. Mis- and disinformation can have non-health effects (such as changes in fuel prices and key shortages), but there is also dangerous wrong information around treatments, diagnostics and prevention approaches. The emergence of a number of conspiracy theories does not help. Managing these challenges is difficult: in the era of 24/7 news, even well intended communications can generate ambiguity and confusion regarding recommended approaches. Canada is a federal country, so measures differ by province, and there is confusion round specific questions such as whether or not to wear masks. An increase in anxiety and psychological distress has been noticed across the population after only three weeks of social distancing, and the distancing is likely to last much longer. Mental health issues will be a challenge, raising questions around how to quarantine, and how to communicate to people not using traditional or known sources of information and/or people who consume media from other countries. Another common issue is the difficulty of communicating uncertainties and changing guidelines—for example, when the time comes, managing the transition out of full social distancing.

⁴ See <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/myth-busters>





POLICY PERSPECTIVES

FROM VIKOJ TANGCHAROENSATHIEN




identify evidence

- require effective international collaboration, AFP fact check

} key function of WHO



simplify knowledge

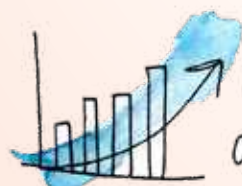
- is the remit of COUNTRIES, in line with socio-cultural, religious contexts



amplify positive actions

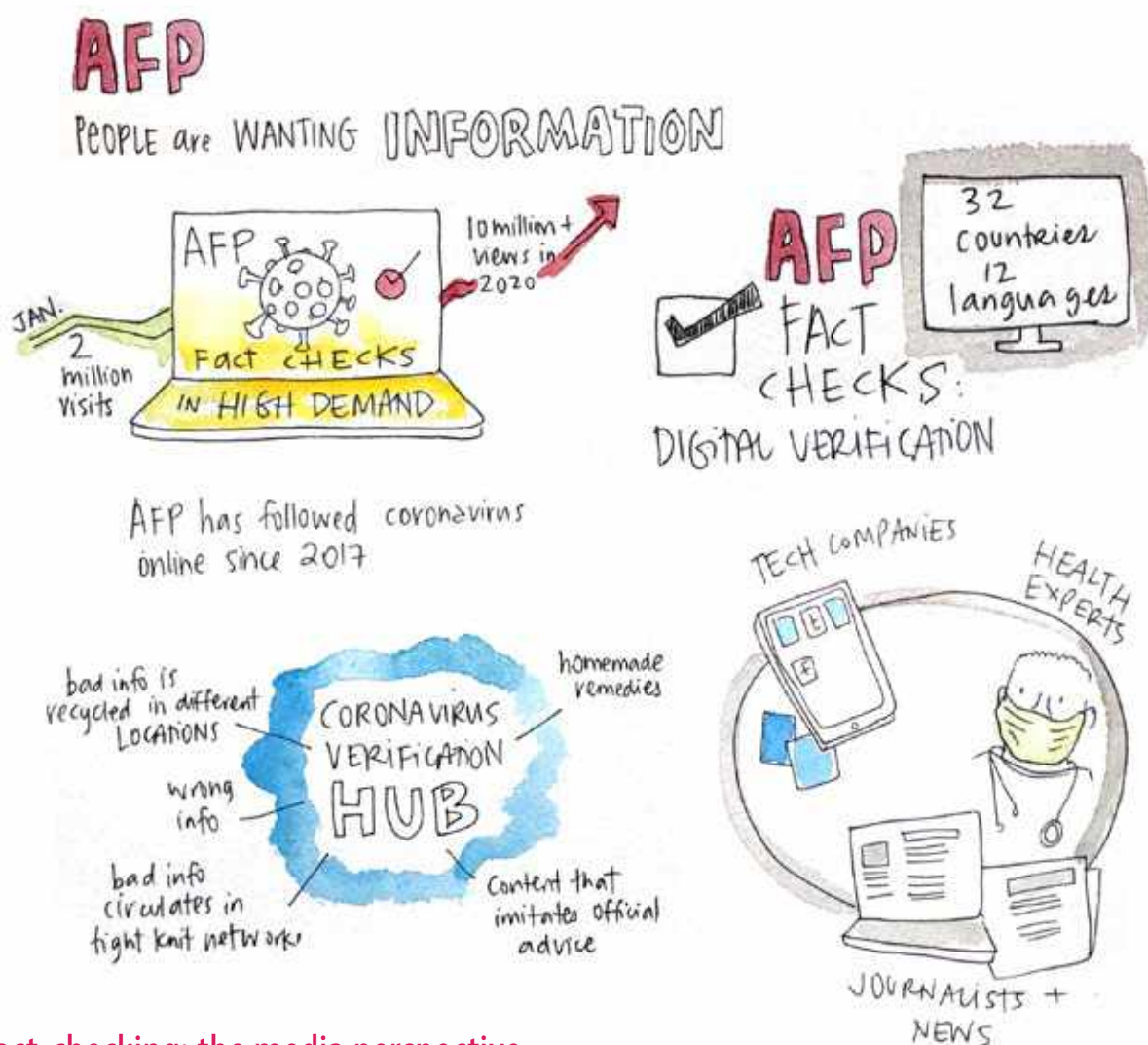
- countries can:

- build trust
- share rebuttal techniques
- use social media well
- share culturally friendly messages
- counter myths
- replace myths with science



impact assessment

- have global + national dashboards
- potentials for more collaborations



Fact-checking: the media perspective

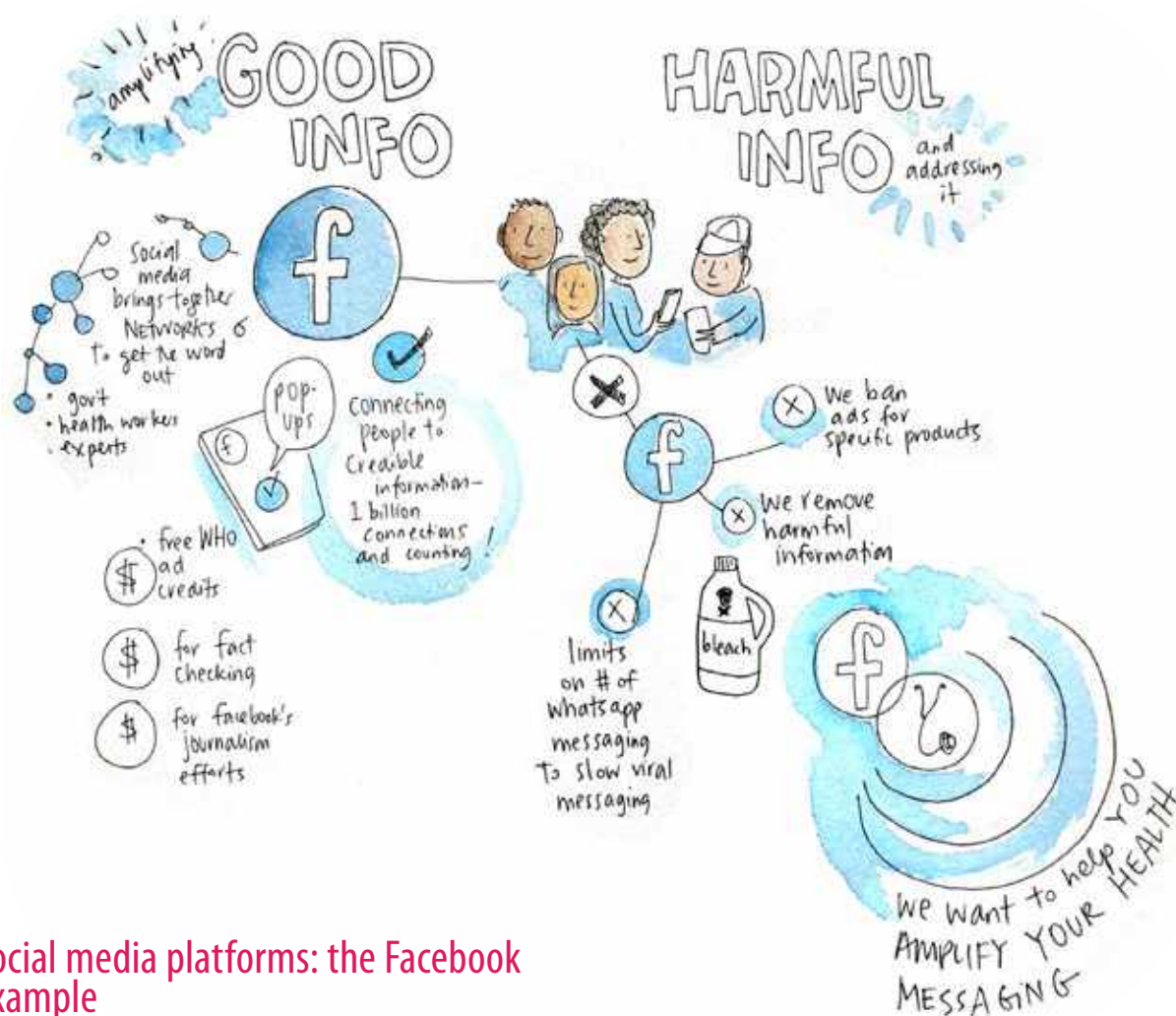
Some insight into the media perspective was provided by Yana Dlugy of the AFP Digital Verification Service, which has had a team looking at misinformation since 2017. AFP's worldwide network includes 76 journalists in 32 countries, performing fact-checks in 12 languages on a dedicated verification hub. This work reveals a number of things about the infodemic. There is a huge public thirst for verified information, and traffic to AFP fact-checking has exploded. To the date of the consultation in early April, 2020 had already seen more traffic to AFP fact-checking than all of 2019.

Trends particular to COVID-19 include the fact that much wrong advice is not shared maliciously, but can still be threatening to life and health (for example, the idea that the virus can be cured with herbal eyedrops, or that disposable masks can safely be steamed and reused; dangerous recipes for home made hand sanitizer recipes; numbers for unreliable information hotlines, and so on). Alongside this, 'imposter content' generated by those pretending to be authorities and trusted sources has been effective in propagating rumours and misinformation, much of which has been contrary to official advice. The same disinformation is being recycled in different regions, as are many of the same photographs (for example, a photograph that originated with an art project in Germany commemorating the Holocaust was originally shared with the claim that it showed victims of COVID-19 in China; some time later, it reappeared purporting to show victims in Italy).

Many rumours propagate in local or closed spaces such as Telegram, Nextdoor and WhatsApp, such as one widely-shared recommendation of dangerously high doses of chloroquine for those infected. While some of these memes and ideas are wrong but harmless, some are potentially deadly and lead to dangerous incidents such people in the United Kingdom destroying 5G towers, Americans drinking bleach, and Iranians dying after drinking bootleg alcohol.

In response, AFP has stepped up collaborative projects to share information and increase the impact of its work. These include a Trusted News Initiative in collaboration with tech companies like Facebook, Google, Twitter—a crucial workstream, given that these platforms are key to how the misinformation is spread. AFP is also working with fact checkers worldwide on a COVID facts alliance, led by the International Fact-Checking Network (IFCN)⁵. Given the massive public demand for trustworthy information, there is a pressing need to increase cross-sectoral partnerships and include health in this work, so that correct expert advice is incorporated into these initiatives as quickly and thoroughly as possible.

⁵ See <https://ifcncodeofprinciples.poynter.org/know-more>



Social media platforms: the Facebook example

Praveen Raja and Athas Nikolakakos, respectively Head of Health and Partnerships and Head of Integrity at Facebook and leads of Facebook's response to health misinformation, outlined how Facebook is attempting to responding to the infodemic. Facebook is a tool for people to share information, and in crisis situations it offers a number of ways to help them receive critical messages. Governments and other authorities can use it to get the word out through their own channels and accounts, interact with the public, host Q&A sessions, and so on; and individual doctors, researchers and other authoritative sources can share first-hand accounts. The company's goal in the COVID-19 context is to support global public health work and keep people safe through a twofold strategy of (1) connecting people to accurate information from credible sources; and (2) stopping the spread of misinformation and other harmful content.

For the first part of this strategy, Facebook has launched its coronavirus information centre, which can be found at the top of each user's news feed. This contains real time updates, verified information and tips, and links to useful articles and videos. There are further measures to ensure that people receive this information through other pathways as well—for example, every search on the Facebook platform for coronavirus or every joining of a coronavirus-related group results in a pop-up linking to WHO information; and on Instagram, tapping on a COVID hashtag produces a pop-up link to WHO or other verified information. Over one billion people have received these links, and 100 million of them have

clicked through. Outside these pop-ups, Facebook has linked WHO and others with celebrities and influencers to connect with people; has given WHO and others (including global fact-checking partners) free advertisement credits to help their information campaigns; and has helped launch a service on WhatsApp allowing users to sign up for daily alerts, tips for disease prevention, and other public health information that they can pass on to others. In the USA, local governments and emergency response organizations are being helped to link more easily with communities, and to produce localized alerts.

For the second part of the strategy, Facebook has been removing false claims, as flagged by leading global health organizations, that could lead to physical harm—e.g. by making false claims about cures, treatments, the availability of essential services, or the location or severity of the outbreak. Guidance is regularly updated in consultation with WHO and other trusted authorities. For a second category of false claim that does not threaten physical harm, such as conspiracy theories around how the outbreak, Facebook works with a global network of over 60 fact-checking partners in 50 languages to debunk misinformation. In addition, the organization is blocking advertisements that try to exploit the pandemic—e.g. by selling false cures—and any commerce listings for medical masks, sanitisers, disinfectant wipes and COVID-19 test kits.

On WhatsApp, limits have been imposed on the capacity to send chain messages or perform mass forwarding of messages, and accounts doing mass messaging have been banned. Support has been provided to independent newsrooms and fact checkers promoting correct information and fighting fake news: USD 25 million in funding has been given to local news organizations, and USD 75 million worth of marketing has been donated to help publishers around world as advertising revenue declines. A further USD 2 million in grants has gone to increase the capacity of fact checkers.

More can be done, perhaps particularly through bringing tech companies together with health organizations and ministries. Possibilities for further work include generating content “that resonates with diverse populations and [which] meets them where they are,” enabling those people to “be their own best advocates on social media,” and reach the organizations they care about with the best information—impactful, locally relevant, in native languages. Another possibility was to encourage and/or develop better ways of sharing information about potentially false information trends, building an evidence base to enable quicker learning about new trends in misinformation around the world in order to improve processes to find and act on it. Finally, it might be possible to support WHO and others with existing initiatives, such as Myth Busters.

Infodemic preparedness requires new infodemiology tools. Some ideas for these that could be done quickly include WHO-backed infodemiology hackathons and the establishment of new WHO Collaborating Centres for infodemiology and related work.

The antidote to misinformation is openness: transparency leads to trust. To gain that trust, open science is key: “open data, open peer review, open source and open access.”



Infodemiology and publishers

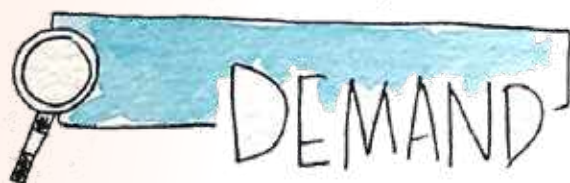
Gunther Eysenbach of JMIR Publications provided an overview of infodemiology from the joint perspectives of both scientist and publisher. The concept of infodemiology started with the study of the determinants and distribution of health information. How digital information affects people’s behaviour is a problem as old as the internet—which generates huge amounts of data with which to study it. Evidence and metrics for information and communication patterns online, and how they relate to health attitudes and status, can be fed to public health professionals and policy makers, helping them refine messaging, thereby influencing attitudes and health status, which can be measured again to create a virtuous cycle. An e-collection of recent infodemiology papers on this topic is available online from JMIR⁶.

For the publisher, the challenge under fast-evolving pandemic circumstances is to review and publish as fast as possible, and to meet the challenge of balancing speed against rigour, new peer review models are needed. A great deal has happened in the last few years in terms of acceptance of pre-prints, which is one route to faster publication: rather than waiting for peer review, this can now be done routinely, with the opt-in of authors. Papers can be indexed in PubMed on the day of acceptance, even before editing and typesetting. New peer review models can also be trialled to accelerate this process, such as virtual pre-print journal clubs that replace and/or supplement the formal peer review process.

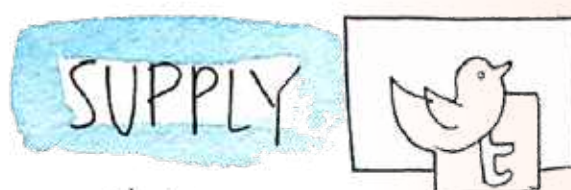
⁶ Link: <https://www.jmir.org/themes/69>

INFODEMIOLOGY

health information + communication patterns
for PUBLIC HEALTH PURPOSES



- metrics –
Search data



- metrics –
what's published,
eg twitter



provide information to
health researchers + policy
makers

Innovation in the
PUBLICATION JOURNAL SPACE:

- preprint journal club



The socio-behavioural dimension of infodemiology

Pier Luigi Sacco of the IULM University of Milan, Italy, pointed out that in the absence of reliable therapeutic strategies, the behavioural dimension is the key variable to mitigate the effects of a pandemic. Information is centrally important: misleading public perceptions or the legitimization of wrong ideas about the pandemic and its effects can have serious negative consequences. This requires an integrated perspective that integrates medical and socio-behavioural dimensions much more tightly than at present—and which includes evaluation of the behavioural effects of public communication. Computational social science approaches offer a way to define and quantify the socio-behavioural dimensions of the infodemic, monitoring both the emotional and the cognitive domains.

The IULM team addresses the emotional dimension mainly through the VAD spectrum (valence, arousal and dominance), which describes emotional components such as how much we like/dislike situations, how much they affect us, and how much we feel in control; and the OCEAN⁷ spectrum, which describes societal 'personality' as defined by openness to new ideas and possibilities, consideration of others, sense of responsibility and organization, sociability and enthusiasm, anxiety, stress, and shifts in mood. Digital content is monitored as a bridging 'mass psychology' dimension where cognitive and emotional elements mix—a complex social phenomenon, in which interaction of individual perceptions, feelings and thoughts causes the emergence of collective cognitions and emotions that in turn feed back onto the individual level. Finally, the cognitive dimension is tracked by defining and measuring infodemic risk associated to fake news with the highest potential of dysfunctional cognitive restructuring.

On the basis of these metrics the team has devised an **index of infodemic risk** that measures exposure to unreliable sources of information, with more unreliable sources conferring

higher infodemic risk. The level of infodemic risk increases with the level of cognitive manipulation that is implied, where 'cognitive manipulation' implies not only exposure to unreliable information, but also a misleading cognitive frame with which to interpret it. Conspiracy theories and junk science are considered the most manipulative forms of content; intentionally designed fake news and hoaxes are the next most serious form.

Based on results to date, different countries present different levels of infodemic risk, without any clear relationship to level of socioeconomic development. Public health interventions are therefore strongly sensitive to socioeconomic factors, which should be taken into account when designing any interventions. For example, lockdown and social distancing clearly affect people differently depending on economic safety (sources of income, available savings, etc.), quality of residential space, and family relations and level of social capital. A number of related potential issues around public health interventions have been identified. For example, widespread perceptions of socioeconomic inequality within a society could induce less advantaged populations not to comply with public health measures if they are perceived as an additional toll; or prescription of mandatory masks might provide a false sense of security, inducing people to go out more often.

There are a number of wider policy implications. Evidence-based approaches on the effectiveness of the behavioural dimension of public health measures are needed, along with protocols similar to those for standard public health interventions. Designing public health interventions and related communications requires a data-driven approach that clearly characterizes audiences' emotional and cognitive contexts, and which takes into account the relevant major socioeconomic parameters and cultural factors. Computational social sciences offer us new tools that are complementary to laboratory experiments to develop new protocols and test their effectiveness.

⁷ OCEAN stands for openness to experience, conscientiousness, extroversion, agreeableness and neuroticism, or the 'Big 5'.

Tackling misinformation

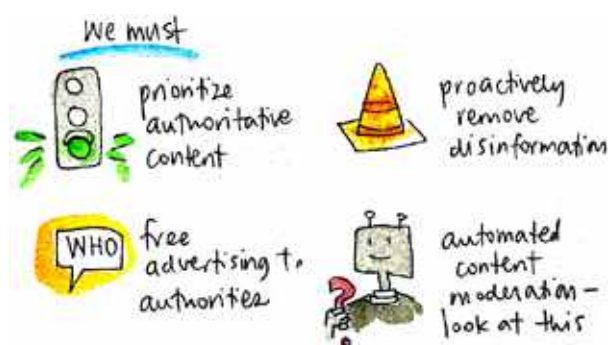
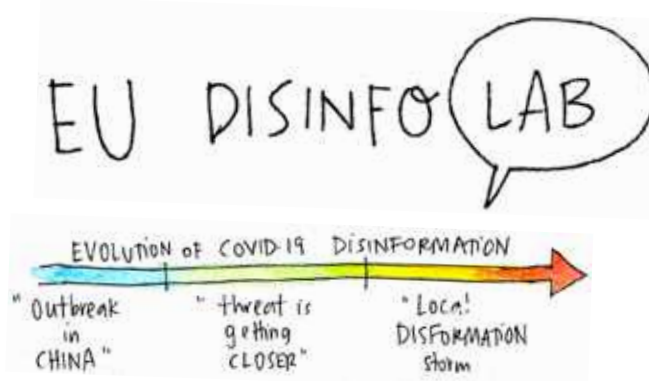
Alexandre Alaphilippe provided an overview of the EU Disinformation Lab's work to understand and address COVID-related misinformation in EU member states. The Lab analyses the spread of information using work of fact checkers like AFP to understand how false narratives repeat themselves and why (for example, because some networks are monetizing fake news). Comparisons are made with global trends observed by partners and the main actors in the disinformation field, and other platforms' responses to the crisis are monitored. A COVID-19 resource hub has been created at <https://www.disinfo.eu/coronavirus>.

The lab has created an overview of how disinformation has evolved throughout the crisis, along with examples of the different manifestations of misinformation, and the main tactics for spreading disinformation. The types of mis- and disinformation campaigns that have been seen "are new to Western Europe, and Europe hasn't been prepared for it." There are many information channels active in spreading bad information, and while foreign influences are driving some of this deliberate misinformation, it is not known who is behind them all. The 'globalization of the fake' nonetheless continues apace, with fake news continuously being adapted to local languages and contexts. Novel digital economies allow opportunities to gather large numbers of viewers very quickly—for example, one French channel spreading conspiracy theories around COVID-19 has gathered a million

viewers in three weeks. There is also huge concern about impersonation of health authorities—for example, fake Twitter accounts purporting to be official sources advocating the use of chloroquine, or people impersonating doctors to create an audience and talk to huge audiences.

Because the disease is fast while science is relatively slow, there is an information asymmetry that needs addressing. It is hard to satisfy understandable demands for information in a crisis with the answer that "we don't know right now:" strategies are needed for this, and to get people to understand the dangers of wrong information so that they are cautious about what they see and share online. Social media platforms are responding in their own ways with a range of actions, including surfacing and prioritizing good content, close cooperation with fact-checkers and authorities to remove disinformation, and provision of free advertising to authorities. They are also using automated content moderation, though this can sometimes lead to moderation mistakes and/or false positives.

After this crisis, the big question will be how we can limit the spread of this infodemic and those that come in the future. Science moves as fast as it can, but it has limits to how fast it can be accelerated—testing vaccines cannot be rushed, for example. Complementary methods will be needed to slow the spread of disinformation, which requires information and oversight on how it is distributed and shared, the main clusters, how many are reached, and how much fake information is online.

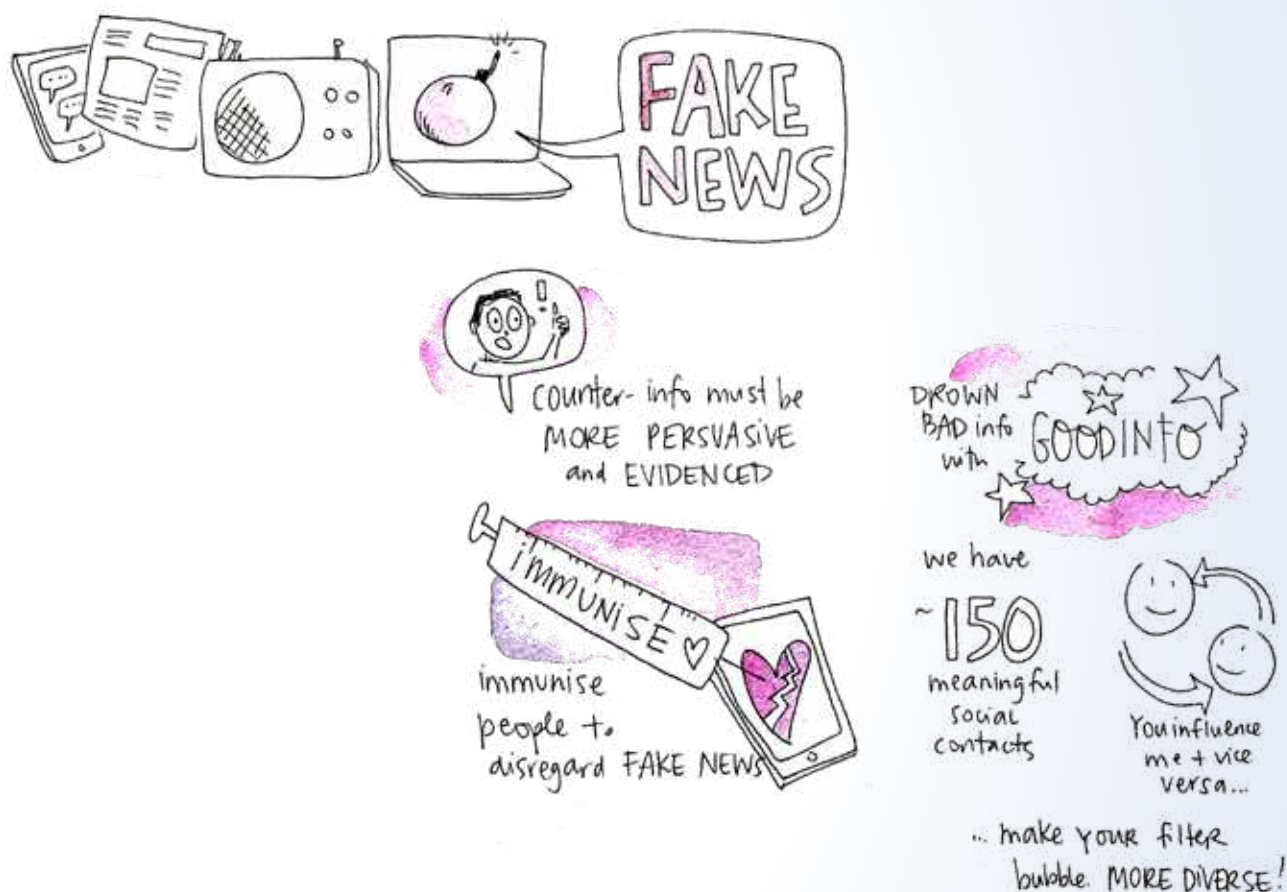


02 HOW CAN THE INFODEMIC BE MANAGED, DESCRIBED AND MEASURED?

*Presenters: **Kisoo Park**, Korea University College of Medicine, South Korea; **Julii Brainard**, Norwich Medical School, University of East Anglia, UK; **Leticia Bode**, Georgetown University, USA; **Rebecca Petras**, H2H Network, USA/France; **Philip Mai** and **Anatoliy Gruz**, Ryerson University, Canada; **Philipp Schmid**, University of Erfurt, Germany; **Jay J. Van Bavel**, New York University, USA; **Tim Zecchin**, Media Measurement, UK; **Manlio De Domenico**, Complex Multilayer Networks Lab, Fondazione Bruno Kessler (FBK), Italy; **Marcelo D'Agostino**, Pan American Health Organization (PAHO), and **Ian Brooks**, University of Illinois, USA; **Tavprites Sethi**, Indraprastha Institute of Information Technology Delhi, India*

In the next parts of the consultation, speakers discussed different possibilities for quantifying the infodemic.

The infodemic spreads easily, and can be conceived as an emerging infectious disease, because there are currently no specific treatments or vaccines—and, as such, it can be conceived from the perspective of the R_0 (basic reproduction rate), which is determined mostly by (1) the probability of transmission per contact; (2) the average number of contacts per time unit; and (3) the duration of infectiousness. In parallel, then, the R_0 of the infodemic could be affected by (1) audiences' vulnerabilities, related to their levels of health literacy and/or socioeconomic and other vulnerability; (2) disseminators' traffic volumes (e.g. through websites and social media); (3) the plausibility of the misinformation; and (4) the speed and effectiveness of health authorities' responses with scientific evidence. Viruses travel along networks—transport networks, social networks—and require epidemiology to follow them; information does the same, and requires infodemiology: but it is crucial to understand that these two processes are entangled, and cannot be studied in isolation from one another. Infodemics are intertwined with other phenomena, and a systemic perspective is needed deal with them.



The infodemic thrives on information that sounds plausible and easy to understand, and which usually contains a little portion of fact that makes it easier to believe. In this hyperconnected world, it spreads and amplifies much faster than the real virus, and moves faster than responders: disinformation can pop up any time, anywhere, but it takes a while for defenders to gather and respond with scientific evidence, especially in more vulnerable and less well-served populations. As ever, society's least advantaged suffer the most risk: the danger is far more acute to those with a lack of health and/or digital literacy, those in places with reduced access to good, locally comprehensible information, and/or those who are psychologically vulnerable in crisis situations.

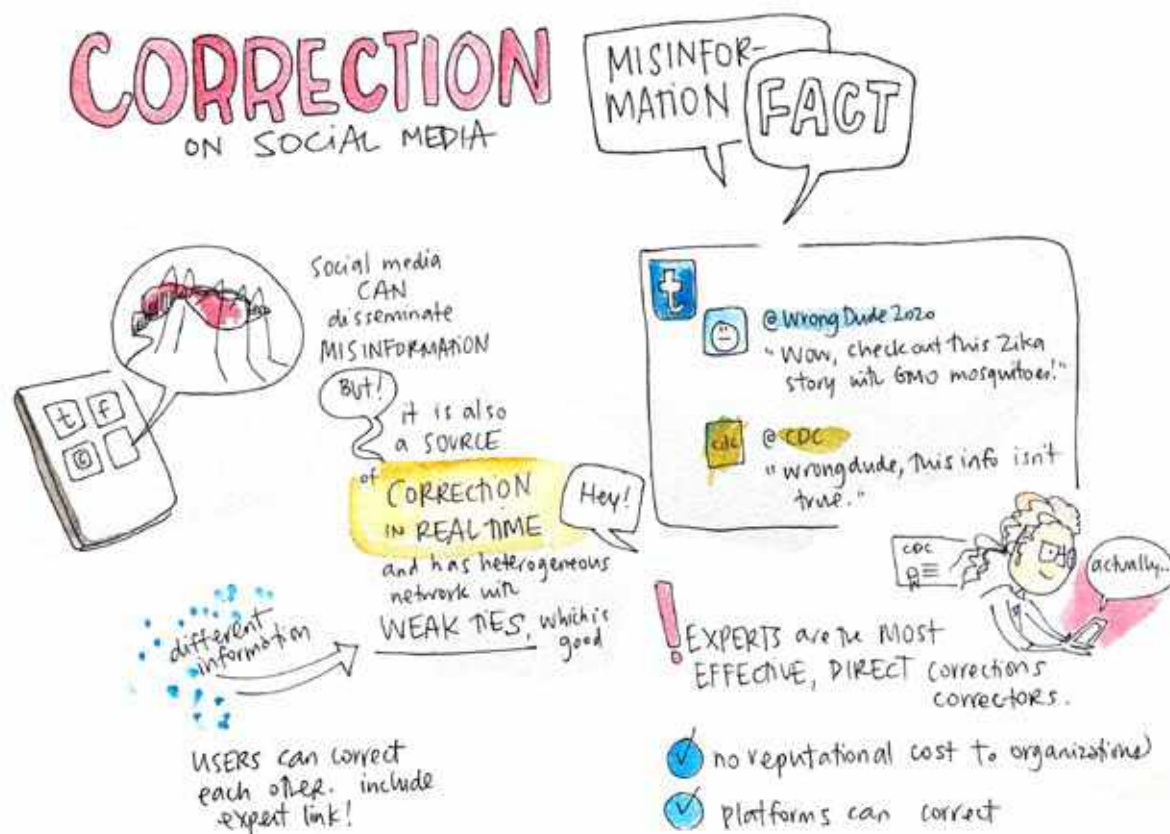
It is possible to model a number of key factors in the infodemic, such as how misinformation might influence disease outbreaks. For example, one such effort—presented by Julii Brainard of Norwich Medical School in the University of East Anglia, UK—produced outcomes that included not only more conventional results (resulting R_0 , peak prevalence, case fatality rate, duration of outbreak, etc.) but also other harms directly related to the effect of information, such as misuse of medication and other harmful health behaviours, hoarding of drugs ineffective in the outbreak but needed for other purposes, undermining important institutions, and gains in social capital for unaccountable and/or disreputable groups.

It is necessary also to look at the mechanisms and motives that make spreading—or not spreading—misinformation productive and attractive. Many if these are financial—for example, as already mentioned, monetising the spread of fake news. This can work in unexpected ways: one striking example, cited in a Financial Times article, described how drug gangs

The infodemic thrives on information that sounds plausible and easy to understand, and which usually contains a little portion of fact that makes it easier to believe.

in Brazilian favelas were enforcing lockdown in contradiction of the President's advice, on the basis that safeguarding the health and stability of their networks and markets was a more favourable outcome for the illegal drugs business. COVID-19 is bad for profits.

A team at Georgetown University has conducted six years of research in how to correct health misinformation on social media in relation to Zika, which provides some insight into managing the COVID-19 infodemic. Correction of bad messages on social media platforms can be effective. Expert organizations were shown to be the most effective correctors, and could perform this function with little or no reputational cost. Social media platforms themselves can also correct, as can other users, but in the latter case interventions from



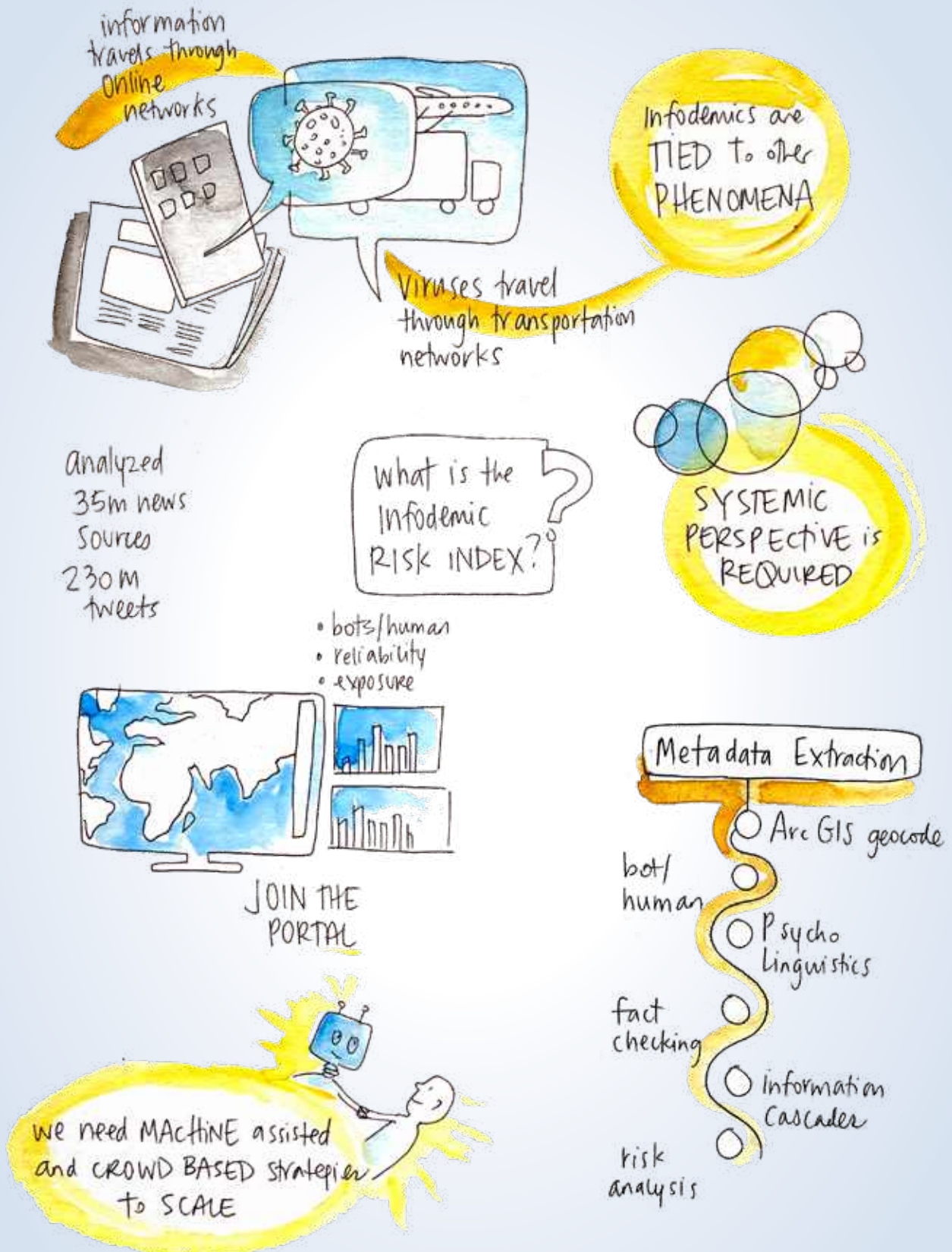


multiple users are needed to achieve the same effects, and corrections should include links to expert organizations. Social media can therefore be an effective conduit for correction of bad information if expert health organizations do the work directly; provide the public with clear, easily digestible, easily shareable information; and partner effectively with the social media.

Member organizations of the H2H network—a collection of agencies supporting humanitarians working during crises—have been supporting the fight against COVID-19 in South East Asia with a number of infodemic-related interventions. These include providing key actors with a library of up-to-date scientific evidence; providing multilingual media content to address misinformation; and data-driven translation support to combat misinformation. An overview of all this work provides a number of key lessons. There is already an 'Infodemic on top of the infodemic': the explosion of information and effort in the humanitarian sector has added to an already formidable tsunami of information, and while new efforts to counter the situation are laudable they multiply quickly, making duplication and 'noise' severely problematic. This issue is

exacerbated by the fact that COVID-19 is a moving target, with the needs for intervention moving and proliferating quickly around the world. Messaging must change as needs and the science shift, and knowing local contexts is crucial. Not all guidelines (for example, on social distancing) work in all places; the degree of different governments' commitments to factual information varies greatly; many people speak local rather than national languages; literacy is low in many areas; and adaptation is necessary. To counter these problems, local media need more resources: fake news is hard to avoid, and journalists need help. Toolkits with validated information need to be readily available, with content in multiple languages. To meet these needs, integration and collaboration are crucial: risk communication efforts must support each other, with new and more effective ways of sharing. In the short term, all of this work must adapt to new realities, developing guidelines on remote risk communications, reducing face-to-face contact while trying to ensure safeguarding, and providing remote support in information management.

Another helpful resource is the COVID-19 misinformation dashboard set up by the Canadian Institutes of Health



COVID19MISINFO.ORG

"Come for the misinformation,
Stay for the FACTS"

Info visualization
dashboards

- misinformation dashboard
- twitter bot-checker
- facebook + instagram trends checker



Fact checking
AGENCY



★ Is it from a
HUMAN or BOT?

★ Are people sharing
CREDIBLE SOURCES?

We need
COORDINATION
of MESSAGES—
or it becomes
WEAPONIZED

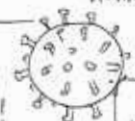
don't add to the
INFODEMIC
Health Agencies must
say again + again
"This is a NEW
VIRUS and our
Recommendations
WILL CHANGE."

No! Stop bad
apples!
we're being
lied to!

enlist social
media influencers



Stop automated
domain registrations
of COVID-19 domain
names



OLD ARTICLE

we need
this feature
everywhere

make it ok to
retract or delete posts

delete

WHOOOPS!

Research⁸, which tracks and visualizes coronavirus claims debunked by trusted, professional fact checkers around the world. Establishing and running this resource has provided a number of important lessons. To instill confidence in an increasingly uncertain information landscape, people's expectations need to be set by reiterating—constantly—that this is a new virus, and that recommendations should be expected to change with more data. To do this effectively, better coordination is needed between different national agencies, down to the basic level of agreeing common terms of reference. To account for regional differences, information must clearly state its intended audience. For dissemination purposes, social media influencers should be recruited and given accurate content that they can 'remix' in accordance with their own creativity and personal branding.

Health authorities should work with domain registrars to act against fraudulent COVID-19 websites, which are important vectors for misinformation. All automated registration of domains containing words related to the pandemic should be halted. Further work with mainstream media organizations is required to implement 'old article' features to reduce the number of old stories re-circulated as new. Metadata can be used to limit the spread of outdated information that could be weaponized by misinformed/bad actors.

This can be supplemented by public service announcements about the infodemic, educating on 'digital hygiene'—in a similar fashion to how they are taught to develop routines and practices for personal hygiene. Finally, cultural shifts are required, and should be encouraged by any means possible, to make it socially acceptable for people to retract and delete inaccurate posts that they might have shared.

While inaccurate messages of science denialism cause damage, they can be mitigated. One technique for doing this is the use of rebuttal approaches, which have been shown to be effective even in vulnerable groups. WHO's response guidelines for vaccine deniers proposes such an approach: while there is potentially an infinite number of messages a science denier can share, making it hard to prepare for any potential debate, the task is made easier if a framework is applied that reduces this to a manageable number. Science deniers tend to take positions along the same five lines: playing down the disease threat; questioning the safety of the vaccine; suggesting alternatives to the vaccine; questioning trust in health institutes; and questioning the effectiveness of the vaccine. A content rebuttal framework allows preparation for those five topics with five key messages of response. Another, complementary approach is that of technique rebuttal, a more generic approach because techniques are shared across domains—whether the science and evidence being denied is that of vaccines, climate heating, the Holocaust, COVID-19 or something else. The techniques used are selectivity; impossible expectation; conspiracy theories; false logic; misrepresentation; and referral to fake experts. Applying the rebuttal approach to denialism messages along these lines also allows the use of a rebuttal matrix. Technique and topic

⁸ www.covid19misinfo.org

rebuttal have been shown to be effective, even in vulnerable groups, with no need for further complex strategies and no evidence of backfire. This evidence suggests that techniques developed in responding to science and vaccine deniers may be key to dealing with COVID-19 misinformation.

Using social and behavioural science to support COVID-19 pandemic response is a recent paper, co-authored by 41 experts, that examines the last century of insight into COVID-relevant topics⁹ to reveal a number of core lessons. People tend not to appreciate the risks they run, and often unconsciously act as continuing dangers to themselves and others. Broadly speaking, it goes against human nature for us to keep ourselves in rigid isolation as a means of protecting others when our images of pro-sociality often involve the opposite: reaching out to people. But the COVID-19 pandemic is fundamentally framed around a collective response, and only if everybody plays their role—washing hands, cancelling events, distancing, not travelling, sharing resources—does it work. To avoid disincentivizing people as it gets harder, alternative ways are required to maintain social connection while enabling that effort. This paper has a number of pragmatic recommendations to this end, including the need for authorities to build a shared sense of identity by addressing the public in collective terms and urging people to act for the common good; the need to identify sources (such as community leaders) who are credible to different audiences and share public health messages through them; using ‘ingroup models’ (such as community members) who are well connected and well-liked to role model norms; and the need to prepare people for misinformation and ensure they have accurate information and counterarguments. To help slow infections, it may be helpful to make people aware that they benefit from others’ access to preventative measures; and instead of the phrase ‘social distancing,’ it would be preferable to use ‘physical distancing,’ signalling that connection is possible even when people are physically apart.

A number of key issues need to be taken into account when analysing web and social media for COVID-19 communication. Identifying those who originate and share misinformation is in fact of limited value: it is often done retrospectively, and is only truly useful when seeking to share information with specific communities of interest, or when identifying networks. It is also often difficult and resource intensive. It is arguably more important to educate citizens so that they can identify misinformation—but as misinformation becomes more nuanced, this becomes more difficult, and it is a risk to be seen to be stifling debate. In this situation, focusing on sharing correct information via trusted sources becomes more important. It is crucial to identify the citizens who are asking questions. Doing so also identifies a valuable set of data, because the questions they most want answered are a significant information demand opportunity, and meeting that demand helps win the long-term battle. If trusted sources do not fill information voids, misinformation often will.

Machine-assisted, crowd-based solutions are required for the task, because the scale of an infodemic is such that humans alone can no longer do it. For example, analysis by a team at IULM University of infodemic data on over 230 million messages in public discussions on Twitter, collected since

late January 2020, shows that 42% of the messages were generated by non-humans—i.e. bots or software-controlled activities. Fact-checking showed that of over 35 million linked sources outside Twitter that these messages contained, 29% were unreliable or biased. Such data and the accompanying metadata allows geolocation, bot detection, psycholinguistic analysis to quantify emotional content, fact-checking, analysis of the information cascades generated by sharing content, and overall risk analysis—all of which can be used to create an infodemic risk index that allows for spatiotemporal analysis, showing at which rate users are exposed to unreliable facts, and therefore maps of infodemic risk distribution. This can be explored at <https://covid19obs.fbk.eu/>

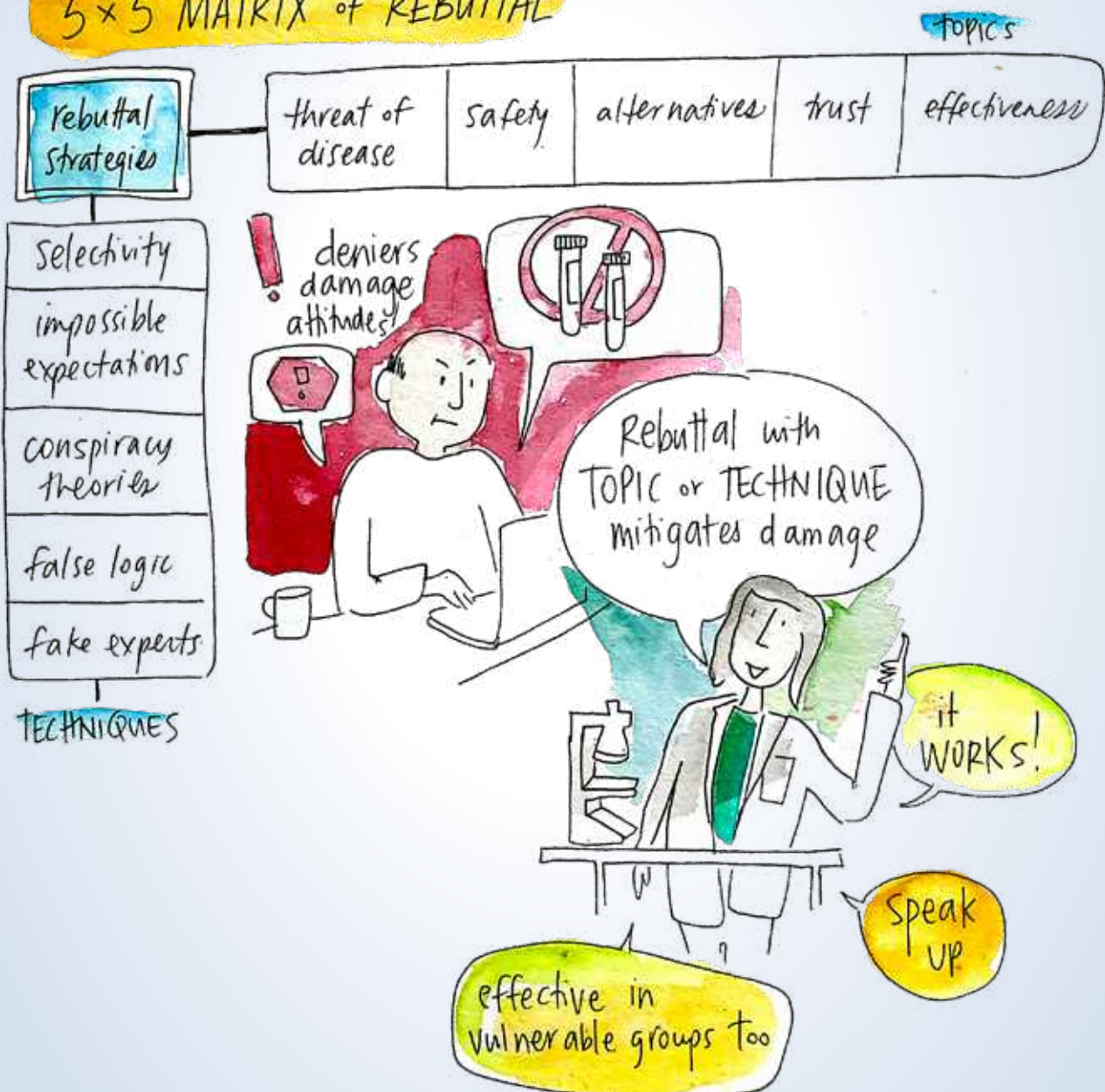
Another example of how artificial intelligence (AI) and machine learning can be applied to the struggle to get the right information to the right people in the right format at the right time come from India. WASHKaro, initially a water, sanitation and hygiene (WASH) intervention, was designed to address this problem by matching WHO guidelines to users’ interests, and was repositioned to include COVID-19 information when the pandemic struck. The app uses provides users with bite-sized pieces of information authenticated using machine learning and natural language processing to match sources of verified and authentic information, such as WHO reports, against daily news. It delivers narrated content in Hindi and English using state-of-the-art text-to-speech engines. Finally, the information is validated and improved by ongoing learning, as users feed back on its relevance to them. With the pivot to COVID-19, the development team decided to provide a full information suite to users, including capacity for contact tracing; a symptom tracker and access to WHO chatbots; access to WHO Myth Busters; and the ability to communicate with other phones running the app and tell users to maintain physical distancing.

Analysis of COVID-19 information on social media in the Americas suggests that the top influencers all heads of state, not technical organizations. Another insight was to do with the hashtags used by ministries of health: roughly half of ministries of health in the Americas are using Twitter, and the hashtags most identifiable as coming from them are not the same as those hashtags most used elsewhere. This raises questions about whether ministries should pivot to use the hashtags most commonly used by others, and/or also come up with a series of hashtags identifiable with the ministries. It would be beneficial to coordinate the regional and international use of hashtags and ensure constant reference to portals containing real evidence. When communicating, ministries need to understand that not all information is suitable for every comment, and to know what information to use, from what source, and for what purpose. Active two-way participation with audiences is essential for this purpose—and not only for social media more broadly, but also for interaction and communication in specific conversations. WHO is currently developing a factsheet to help countries through these processes.

⁹ The paper can be read at psyarxiv.com/y38m9

COUNTER SCIENCE DENIALISM

WE CAN USE A
5x5 MATRIX of REBUTTAL



SOCIAL and BEHAVIOURAL SCIENCE

Communicating
PRO-SOCIAL
behaviour in a
PANDEMIC is
CHALLENGING...

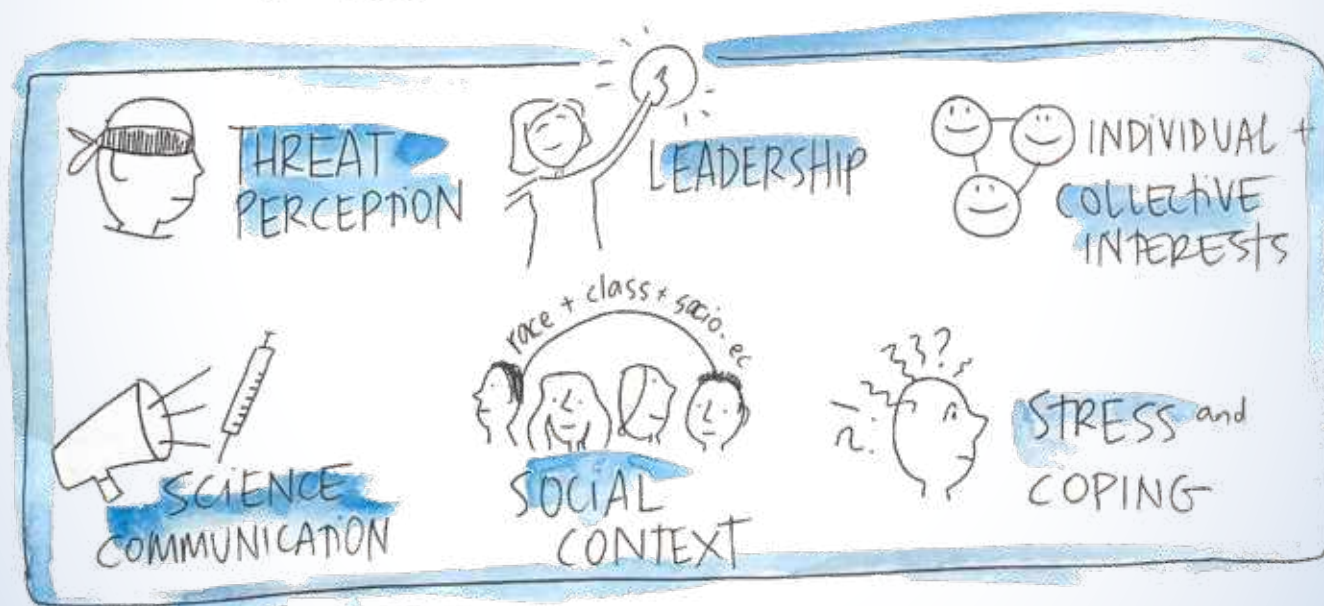
it goes against
our nature to
stay... inside?



We need a
STRONG
COLLECTIVE
RESPONSE



We must
include a
lens of
social
inequality

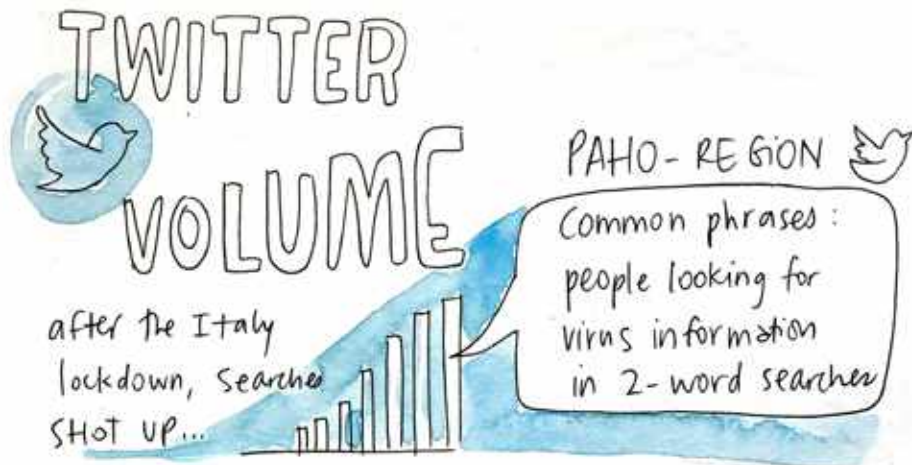


• address the
public in
collective terms
"We", "Us"

• identify key
community
leaders to
spread the
message

• prepare
people for
misinformation

eg
• we all benefit
when OTHERS
have access to
PREVENTATIVE
MEASURES



SOCIAL MEDIA LISTENING



instead of sentiment...

Look at EMOTION



instead of information (good / bad)...

Look at NARRATIVE

it's more NUANCED



instead of volume...

Look at VELOCITY



this looks at reach and Relative Speed

instead of wrong or right...

Share CORRECT INFO + TRUSTED SOURCES



instead of shavers...

Look at SEEKERS



identifying CITIZENS' QUESTIONS is valuable!

Prevention is BETTER than CURE!



03 POLICY IMPLICATIONS

A panel discussion between **Neville Calleja**, Ministry for Health, Malta; **Viroj Tangcharoensathien**, Ministry of Public Health, Thailand; and **Sylvie Briand**, WHO

The consultation revealed five implications for policymakers to consider.

Firstly, interventions and messages must be based on science and evidence. Within this topic there are two main overarching challenges: the need to manage the creation and dissemination of trusted information so that it is not excessive, overwhelming or confusing; and the need to counter misinformation.

Scientific findings must be collated, reviewed, appraised and assessed for relevance to help form recommendations and policies that have an impact on the health of individuals and populations. Scientific and public health institutions are central in this process. COVID-19 has resulted in an explosion of evidence generation and synthesis activities (an 'infodemic on top of the infodemic'), which should be internationally coordinated to avoid duplication. In parallel, work is required to slow down and streamline the flow of information of all kinds, guided by a constantly updated set of guidelines to counter misinformation, a unified strategy for producing and disseminating trusted information, and a measured approach to correcting misinformation. Medical journal editors could also help manage the infodemic problem by—for example—producing plain language summaries for each COVID-19 related article for journalists and the public.



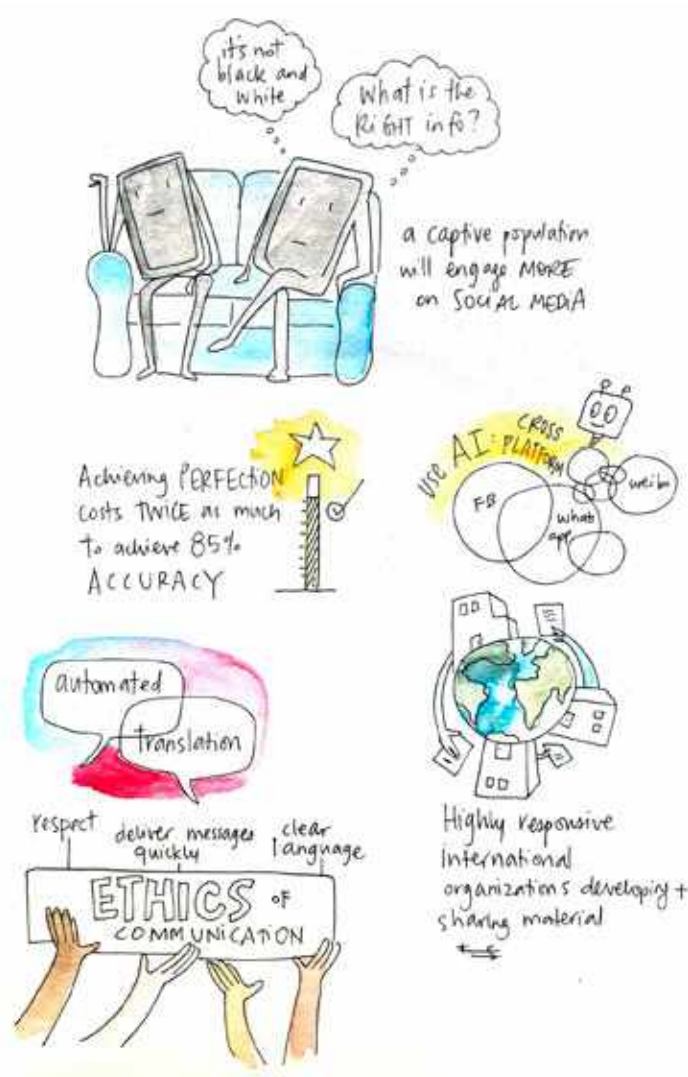
Second, knowledge should be translated into actionable behaviour change messages, presented in ways that are accessible to all parts of all societies. Cultural and contextual sensitivity in the platforms and messages used, and translation into local languages, are necessary. Coordinated work and partnering with a variety of stakeholders, including civil society, is required to ensure the availability of information targeted at vulnerable and/or hard-to-reach communities via non-digital routes. An on-the-ground network of global field workers could help reach out to highly vulnerable people to ensure they can access available relief materials and information: many citizens around the world still do not have access to pandemic information on the internet.

Thirdly, governments should reach out to key communities to understand their concerns and information needs, the better to tailor advice and messages that can help these communities address the audiences they represent. Through this process, communities—of all kinds, whether neighbourhood, religious, professional or other communities—amplify the right public health messages in ways that are user-friendly and which can lead to the right changes in behaviour. Active engagement calls and dialogue could be established for private sector employers, telecoms companies, the food and agriculture sector, faith-based organizations, health care and medical professional associations, and the media. Community Health Workers—the first line of health care in many low-resource settings—could be mobilized with the correct information, graphics and narratives to share within communities.

Fourthly, strategic partnerships should be formed across all sectors, including the social media and technology sectors, academia, and civil society. These are amplifiers and observatories of information. Through strategic partnerships with health authorities, these platforms can place and prioritize relevant information and advice, ensuring citizens see it, as well as help measure and describe the infodemic, and track trends and the impact of messages and interventions. There is a wealth of information on these platforms that can improve understanding of the sentiments of populations and guide the effectiveness of public health measures.

Fifthly, health authorities should ensure that the actions described above are informed by sound information that helps them understand the circulating narratives and changes in trends of information, questions and misinformation in communities. Analysis of online narratives and TV, radio and news media, paired with appropriate fact-checking resources, can be systematically applied. Mixed-methods research approaches can also be put in place to monitor and understand public knowledge, risk perceptions, behaviours and trust in specific pockets of communities to generate rapid snapshots to inform policy-makers. Examples of such research methods include socio-behavioural research and sentiment and media analysis through big data analysis of digital information from online conversations, TV, radio and news media, and community dipstick surveys.

Sixth, following experiences to date in responding to the COVID-19 infodemic and the lessons from other disease outbreaks, infodemic management approaches should be further developed to support preparedness and response and inform risk mitigation, and enhanced through data science and socio-behavioural and other research.



A framework for managing infodemics

The online brainstorming process of this consultation, along with the input from the speakers and the plenary Q&A sessions summarised above, resulted in the online collection and categorisation of 596 ideas. From this, five action areas emerged: identifying evidence; simplifying knowledge; amplifying action; quantifying impact; and coordination and governance.

01 IDENTIFYING EVIDENCE

Infodemic management is not just an operational practice, but also one that should be based on science and evidence. Within this challenge there are two main overarching challenges: the need to manage the creation and dissemination of trusted information so that it is not excessive, overwhelming or confusing; and the need to counter misinformation.

Scientific findings must be collated, reviewed, appraised and assessed for relevance to help form recommendations and policies that have an impact on the health of individuals and populations.

Meanwhile, mis- and disinformation needs to be identified and authenticated, an exercise that requires international collaboration. While this type of work is the normative function of WHO, countries can and should contribute, analysing social media content and submitting their results. Fake news has drivers, and they need to be understood in order for us to be able to counteract them.

Governments and public health institutions are trusted correctors of misinformation, and need to keep doing it.

02 TRANSLATING KNOWLEDGE & SCIENCE

If health authorities can communicate respectfully, delivering decisive messages rapidly in clear layman's language and ensuring that what they are saying cannot be twisted or misrepresented, they can establish and maintain themselves as trusted authorities. To do this, good information has to be translated into actionable behaviour change messages, presented in ways that are accessible to all parts of all societies. Cultural and contextual sensitivity in the messages used, and translation into local languages, are necessary. Coordinated work is required to ensure the availability of information targeted at vulnerable and/or hard-to-reach communities. This adaptation must extend to marginalised and vulnerable communities and languages.

03 AMPLIFYING ACTION

Amplification takes place mainly—though not exclusively—at country level, and is carried out with the goal of building trust and spreading the right information to the right people at the right time. Countries should optimise the use of social platforms through trusted and authentic agencies, using all necessary media, including but not limited to text, video and infographics. There is a need for repeated, correct messaging delivered in culturally friendly formats, along with the timely correction of misinformation and the application where necessary of rebuttals and ‘Myth Busters.’ Governments and other relevant actors should reach out to key communities to understand their concerns and information needs, the better to tailor advice and messages that can help these communities address the audiences they represent. Through this process, communities—of all kinds, whether neighbourhood, religious, professional or other communities—can amplify the right public health messages in way that is user-friendly and which can lead to the right changes in behaviour. Active engagement calls and dialogue should be established for private sector employers, telecoms companies, the food and agriculture sector, faith-based organizations, health care and medical professional associations, and the media. Community Health Workers—the first line of health care in many low-resource settings—should be mobilized with the correct information, graphics and narratives to share within communities. Strategic partnerships are also required with social media and technology platforms and stakeholders, as well as academia and civil society—all of which are amplifiers and observatories of information. Through strategic partnerships with health authorities, these platforms can place and prioritise relevant information and advice, ensuring it is seen by citizens.

04 QUANTIFYING IMPACT

The partnerships described above are key to gathering, organizing and analysing data that can help measure and describe the infodemic, and track trends and the impact of messages and interventions. There is a wealth of information on digital platforms that can improve understanding of the sentiments of the population and guide the effectiveness of public health measures. The infodemic needs to be understood to be managed, and this challenge presents great potential for cross-sectoral and international scientific collaboration.

05 COORDINATION & GOVERNANCE

COVID-19 has resulted in an explosion of evidence generation and synthesis activities, which should be internationally coordinated to avoid duplication. In parallel, work is required to slow down and streamline the flow of information of all kinds, guided by a constantly updated set of guidelines on fake news and a unified strategy for producing and disseminating trusted information, and a measured approach to correcting misinformation.

Managing epidemics—and infodemics—in an emergency requires a whole-of-society approach. For the most effective responses, private and public actors have to pull together, prioritizing multidisciplinary cooperation. The range and effectiveness of possible response measures increases in

relation to the degree of cooperation between all these actors, across the whole of society. For this to be achieved improved coordination is required between stakeholders including but not limited to WHO, its Member States, scientific and public health institutions, private sector communication and telecoms companies, state communication bodies, search engines, civil society, academia, frontline health workers, and others, all the way down to the grassroots level of neighbourhood mutual support groups.

CONCLUSION

WHO is grateful to those who contributed at very short notice and under great pressure to this consultation, and is already learning from the results. The draft framework for managing infodemics in health emergencies (see Annex 1) was prepared in the week following the consultation, and will be reviewed and adjusted as the pandemic and infodemic continue, and once they are over.

Managing infodemics is a complex and cross-disciplinary area of action that requires the participation of a range of different actors and sectors. WHO, through headquarters and in collaboration with regional and country office teams, will work with different stakeholders to advance the ideas discussed in the meeting, with a particular focus on those that are rapidly implementable at country level. Support will be given to social science research and other behavioural interventions to increase understanding; the integrated analysis of the results; and the consequent development—where necessary—of further tools to understand and measure digital information flows and their effects. This will be done in collaboration with partners, different expert teams within WHO, and other important actors such as UNICEF, the International Federation of Red Cross and Red Crescent Societies (IFRC), and the relevant country stakeholders.

When working on a pandemic such as this, many rules go out the window. Time is at a premium; locked-down, captive populations are engaging more digitally, and more often, with the world; certain rules and standards are tightened compared to normal, while others are relaxed. A range of new challenges emerges, and the resultant infodemic makes choosing what guidance to follow difficult. Meanwhile, paradoxically, governments that need advice are getting less than they might expect—or want—from many of the organizations that usually provide it, because those organizations are under such great pressure and the situation is evolving at high speed. Quality assurance takes time, and even when it is done, it is not always possible to identify the ‘right’ information with certainty. Many situations are not black and white. Without sufficient evidence, science does not always show one clear path forward.

Taking these and other uncertainties and difficulties into account, a framework is required to minimise the effect of obstacles and maximise the collective strengths of stakeholders the world over in order to quantify and minimise the negative effects of the infodemic. With thanks to all who contributed to this consultation, Annex 1 of this document presents a first draft of just such a framework.



thank you to
NURSES -
especially on
world health day

infodemics have always
existed, but...
SOCIAL MEDIA amplifies



individuals + communities
can PROTECT themselves
with TIMELY ACCESS to
INFORMATION

Annexes

ANNEX 1:

Framework for managing infodemics in health emergencies

Interim draft for use during the COVID-19 response

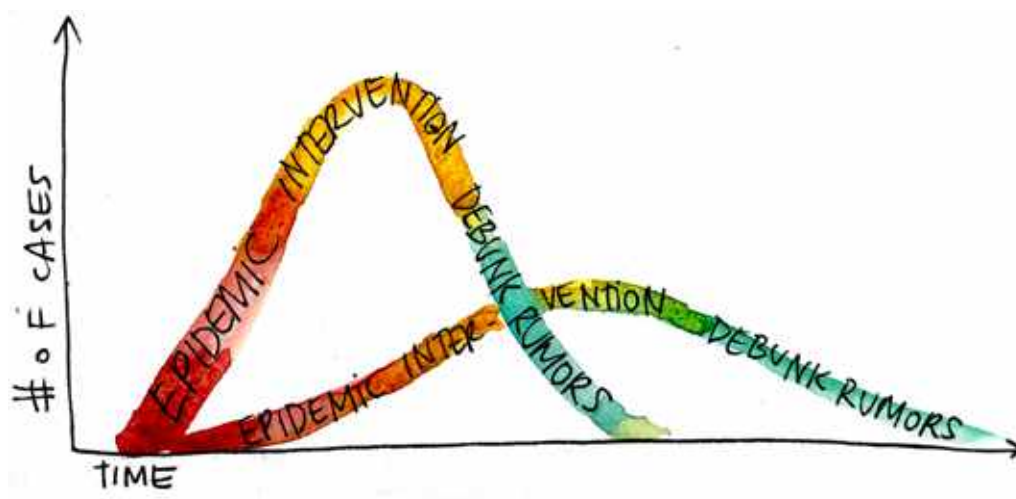
This infodemic framework is proposed in the context of the COVID-19 response, and will be reviewed, and adjusted if necessary, after the pandemic. It is hoped that each WHO Member State and relevant actor of society will, within their mandate, apply localized infodemic management approaches adapted to national and other contexts and ongoing practices.

ACTION AREA 1

STRENGTHENING THE SCANNING, REVIEW AND VERIFICATION OF EVIDENCE AND INFORMATION

Evidence generation & synthesis

- 01 Develop and support international efforts to coordinate production and dissemination of evidence syntheses, and reduce duplication of effort
- 02 Develop tools for rapid appraisal of evidence and synthesis of knowledge, and to disseminate the information they produce
- 03 Develop critical appraisal tools and criteria for reporting and assessing 'grey'/non-academic evidence and community grassroots responses to overcoming COVID-19.



Evidence synthesis and knowledge translation

- 04** Establish national rapid evidence synthesis teams containing knowledge translation specialists tasked with integrating knowledge translation into emergency health responses
- 05** Consider establishing mechanisms within WHO to build sustainable capacity for rapid evidence synthesis and knowledge translation, through mechanisms such as the WHO EPI-WIN network and platforms such as the WHO Academy and Open WHO
- 06** Promote and support systematic reviews of evidence about public health and infodemic management interventions in health emergencies, to identify gaps and opportunities in research. Develop this draft framework further with a set of recommended infodemic management interventions
- 07** Strengthen and support community platforms that make available rapid knowledge synthesis and evidence maps; references for localization of guidelines in Member States; analysis of uptake of WHO guidelines; and guidelines for communicating and disseminating evidence from systematic reviews.

Publication and dissemination of scientific evidence

- 08** Collaborate with scientific journals to define a set of principles for managing, reporting and critically appraising new evidence in order to promote public clarity of scientific findings (such as plain language summaries for journal articles and/or virtual journal clubs)
- 09** Support and reinforce the Open Science values and practices of open data, open peer review, open source and open access, as well as standards for reporting evidence that enable rapid synthesis and evaluation of the evidence in systematic reviews
- 10** Clearly communicate the stages of the scientific peer review process, and the advantages and limitations of using pre-published articles that are rapidly shared
- 11** Develop tools for ranking the provenance, timeliness and credibility of scientific sources to aid citizens, media, health authorities and other scientists, so that the overview of these sources provides a kind of 'evidence barometer.'





ACTION AREA 2

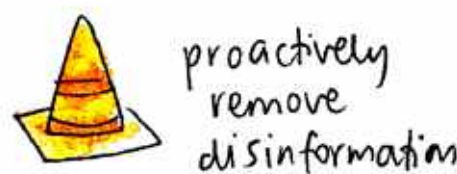
STRENGTHENING THE INTERPRETATION AND EXPLANATION OF WHAT IS KNOWN, FACT-CHECKING STATEMENTS, AND ADDRESSING MISINFORMATION

Risk communication and infodemic management

- 12 Consider establishing or strengthening national mechanisms in Member States for risk communication that involve multidisciplinary teams of experts from national institutes of public health, journalists, the fact-checking and misinformation-fighting community, monitoring and analytical experts and other relevant actors in a coordinated effort to disseminate verified information and respond to misinformation
- 13 Tailor messages to targeted audiences based on available evidence, and debunk the most harmful myths (e.g. through the WHO EPI-WIN network); and develop approaches, standards and tools that address the changing of messages and guidance as knowledge about the pathogen and the disease increases
- 14 Coordinate efforts to produce reliable, multilingual content in response to claims and questions about preventive measures and treatments, and base the work on research about what questions are circulating in communities
- 15 Foster dialogue and communication between public health organizations and local journalists to strengthen visibility and trust across professional sectors and raise the capacity of local media to use verified information
- 16 Consider strengthening journalists' training on health and scientific topics; using Q&As with respected media trainers and health experts for training of journalists; and incorporating retractions of unconfirmed or unfounded statements into standard reporting practice
- 17 Define and promote a research agenda on risk communication in the digital age to develop scalable interventions that can address the receptivity of individuals and the sharing of misinformation online.

Development of trusted sources, fact-checking, and response to misinformation

- 18** Develop tools and guidance to promote risk communication, disseminate trusted information and respond to misinformation during the COVID-19 pandemic and other health emergencies. These could include (but should not be limited to):
 - Guidelines and tools on use of digital tools and analytics for risk communication and community engagement in health emergencies
 - Checklists and guidance on how to promote trusted content and respond to misinformation
 - Protocols to decide which stories need to be debunked because they are gaining traction and approaching a strategic tipping point
 - Resources for citizens to promote digital health and media literacy
- 19** Support the development of networks of trusted information sources and networks for standards-based, multilingual fact-checking activities and misinformation response
- 20** Develop tools and standards for assessing the integrity/accountability of fact-checking initiatives, including a common glossary and terminology for describing the infodemic and its elements that will help facilitate communication, exchange of information and management of the infodemic across all levels of society
- 21** Build capacity for promoting trusted content and fact-checking, monitoring, verifying, reporting and responding to misinformation, by developing a dedicated network of WHO Collaborating Centres and providing courses on training platforms such as Open WHO
- 22** Support collaborative development of integrated resources on communication in public health emergencies, including but not limited to:
 - A global resource centre and dashboards for fact-checking and misinformation that provide an integrated overview of information and related activities
 - Infodemic dashboards for emergencies, but also for more slow-burning systematic issues such as vaccine mistrust and misinformation, incorporating behavioural and other multidisciplinary analyses of past experiences
- 23** Support the propagation of updated information through innovation in information networks and the facilitation of collaborative, distributed fact-checking activities.



Social media, web and other communication channels

- 24 Engage social media companies and other locally dominant channels of information dissemination in promoting access to trusted health information and reducing the impact of misinformation
- 25 Ensure that social media platforms act to support and innovate in disseminating trusted health information, and respond to the propagation of misinformation on their platforms. Actions to this effect could include:
 - Improving the alignment of platforms' terms of use to local information laws in order to address disinformation/misinformation
 - Implementing mechanisms for user-reported misinformation alerts, to facilitate faster review of misinformation
- 26 Work with domain registration companies to review any new domain registrations related to COVID-19
- 27 Ensure that organizations with established and functioning websites do not register new domains for the pandemic, because this makes it difficult to gain traction in search algorithms. Instead, organizations should dedicate pages or sections on their already existing websites to COVID-19
- 28 Innovate to provide web readers with a 'likelihood of fakeness' assessment of information based on machine learning and integrated repositories of misinformation and trusted content.

ACTION AREA 3

STRENGTHENING THE AMPLIFICATION OF MESSAGES AND ACTIONS FROM TRUSTED ACTORS TO INDIVIDUALS AND COMMUNITIES THAT NEED THE INFORMATION

Coordination of information dissemination

- 29 Coordinate the dissemination of information to reduce the proliferation of sources
- 30 Build intersecting platforms to share concrete communications practices and resources by sector (e.g. for governments, journalists, health care professionals, the technology sector, community leaders, law enforcement, students, and others), fostering self-learning and the exchange of information.

Localization of messages and community engagement

- 31 Foster networks and communities for localization, context adaptation, and translation of communication material, and link up with content production and dissemination networks
 - Involve, and share leadership with, knowledge producers, journalists, librarians, policymakers, civil society and local leaders
 - Where these networks do not exist, engage, and share leadership with, local health care centres, community health workers and/or civil society, with the aim of cascading information down to individual level
- 32 Devise and implement approaches that incentivize society to engage with WHO-recommended content. Methods for doing this might include memes, games, cartoons, quizzes, surveys, polls, competitions, participation in podcasts, scientific entertainment programmes and other events. These should be executed using a coordinated approach across social media, mobile, web, email, radio, TV, and other channels down to word of mouth, and should include the use of influencers or other trusted mediums.

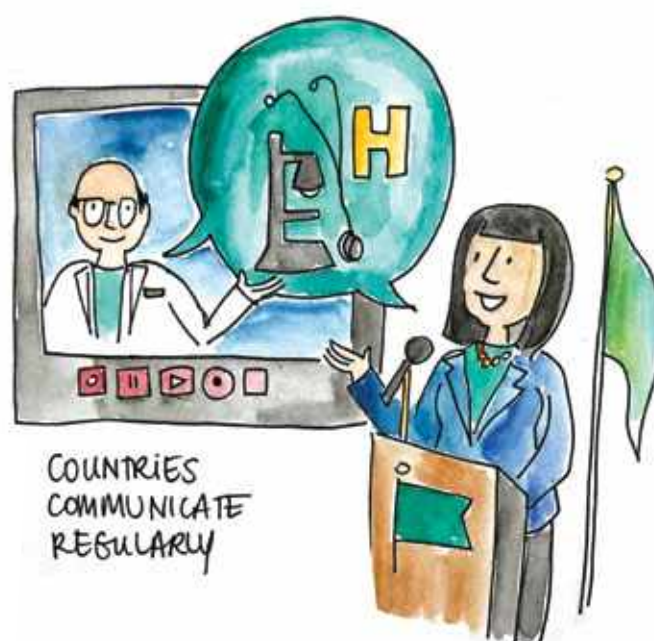


Use of communication channels

- 33** Ensure the strategic use of all relevant communication channels to disseminate information, including social media, news, radio and/or community and other leaders. Include community mechanisms for health provision, psychosocial support, education, provision of water, sanitation and hygiene (WASH), and vaccine safety communication/promotion of immunization demand
- 34** Produce tools and guidance on how to engage social media platforms, and use hashtags and other practices to disseminate health information as effectively as possible
- 35** Collaborate with private sector communications platforms (social media, communication boards/online forums, messaging apps, etc.) to disseminate health information and engage audiences through methods including Q&As, interactive sessions and the use of bots for content dissemination
- 36** Ensure that social media platforms develop policies that institutionalize their support for efforts to share information from WHO, UN agencies, national authorities and other trusted sources
- 37** In low-resource settings with low internet penetration, consider using text messaging and Interactive Voice Response (IVR) to disseminate messages and collect feedback from the population.

Health, digital health and media literacy

- 38** Implement programmes to boost critical thinking skills and health, media and digital health literacy among the population, building capacity to discern what information is reliable
- 39** Work in partnership with the education sector, health literacy experts and others to develop curricula, guidance, tools and evidence to promote digital health and health and media literacy across the population throughout the life course, as well as specifically among health care workers and vulnerable populations.



ACTION AREA 4

STRENGTHENING THE ANALYSIS OF INFODEMICS, INCLUDING ANALYSIS OF INFORMATION FLOWS, MONITORING THE ACCEPTANCE OF PUBLIC HEALTH INTERVENTIONS, AND ANALYSIS OF FACTORS AFFECTING INFODEMICS AND BEHAVIOURS AT INDIVIDUAL AND POPULATION LEVELS

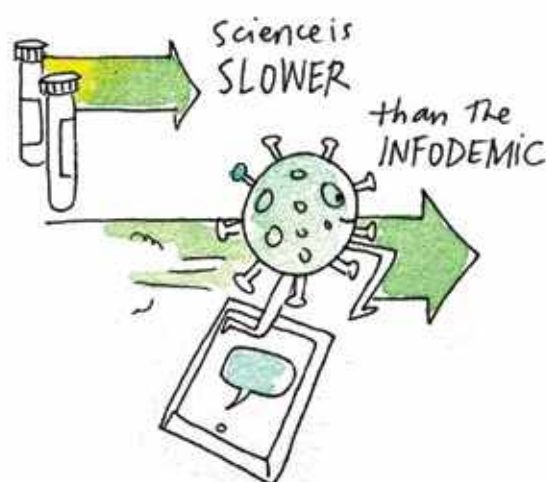
Develop monitoring of the infodemic

- 40** Monitor, analyse and evaluate the implementation of infodemic management interventions
- 41** Promote and develop new data sources, methods and approaches for analysis of infodemic management interventions
- 42** Develop a running research agenda for monitoring, analysis and evaluation of infodemic components and interactions, and infodemic management interventions
- 43** Develop and introduce monitoring of key indicators for questions, opinions and attitudes to inform infodemic interventions, including information from vulnerable and at-risk groups; and develop new indicators for monitoring infodemic management from the points of view of policymakers, the general public, health care workers, individuals, and particular communities
- 44** Develop a multidisciplinary research agenda and develop methods, data sources and mixed-methods analysis protocols for measuring different aspects of the infodemic, including in the areas of:
 - Information flows in digital and traditional media, including analysis of narratives, questions being asked, sentiment, web search activity and information dissemination networks
 - Analysis of information flows focusing on the reliability of information versus types of misinformation, and exchanges of trusted information and misinformation
 - Trust and credibility measurement, including people's attitudes towards information, its sources, and what system it comes from; how these lead to trust or mistrust; and prediction of the likelihood of action
 - Audiences' interactions with information, including their vulnerability to misinformation, misinformation exposure, and self efficacy (a person's belief in having ability to change own behavior, beliefs, motivation, to counter misinformation, and take up knowledge that leads to healthy behaviour and recognize misinformation/low quality info) as related to their health literacy, beliefs, knowledge, and behaviour
 - Analysis to inform the implementation and revision of infodemic management interventions
 - Analysis of circulating information and beliefs, and trust dynamics at community level
 - Modelling of infodemic risk at societal level.

Develop research on health information dissemination and uptake

- 45** Develop infodemic research priorities to identify enablers of, and barriers to, the availability of trustworthy health information, including how to improve production and dissemination of evidence-based information for the public, patients, and health professionals, and measures to increase health literacy and the ability to find and interpret such information.

Rumor management is
CRUCIAL to managing a
CRISIS



ACTION AREA 5

STRENGTHENING SYSTEMS FOR INFODEMIC MANAGEMENT IN HEALTH EMERGENCIES

- 46** Consider establishing national coordination mechanisms or task forces in Member States to coordinate all aspects of infodemic management in support of risk communications, response to misinformation, community engagement and measuring the impact of infodemic interventions.
- 47** Following the experience of the response to the COVID-19 infodemic, and the lessons of other disease outbreaks, refine this draft infodemic management framework to support preparedness and response in the future and inform risk mitigation, enhancing it through data science, socio-behavioural and other research. This could include, but need not be limited to:
 - Building capacity, shared open tools, and collaborations across sectors in global, national, and community responses
 - Production of a value statement declaring access to correct health information as a basic human right and promoting dissemination of accurate health information (including up-to-date information that has been localized for specific communities), and fact-checking and monitoring of misinformation
 - Developing guidelines on ethical considerations for analysis and design of infodemic interventions
- 48** Build a network of WHO Collaborating Centres for all aspects of infodemic management, and pursue collaborations with other UN agencies that are doing infodemic monitoring and management work in the field, to conceive and deliver capacity building programmes online and in Member States
- 49** Promote open source tools and standards that ensure reusable analysis and interoperable exchange of infodemic data, AI training datasets and models
- 50** Use innovative methods, such as hackathons, innovation challenges and online brainstorming, to collect further ideas and innovations and crowdsource problem-solving in infodemic management.

ANNEX 2:

Programme

Day 1

Tuesday, 7 April 2020, 14:00–17:00 Geneva time. Plenary (3 hours)

Time	Session
14:00 – 14:10	Introduction Welcome by <i>Dr Sylvie Briand</i> , Director, Infectious Hazard Preparedness, WHO; Lead of infodemic management pillar for COVID-19 response
14:10 – 15:30	Session 1: Managing infodemics – what is the new phenomenon? Moderator: <i>Tim Nguyen</i> , Rapporteur: <i>Mark Nunn</i> <ul style="list-style-type: none"> • Multi-faceted discussion of the COVID-19 infodemic • Challenges, impact, and approaches to infodemic management <ol style="list-style-type: none"> 1. Towards a WHO framework for infodemic management – <i>Tim Nguyen</i>, WHO 2. AFP fact-checking service (media perspective) – <i>Yana Dlugy</i>, AFP Digital Verification, France 3. Challenges and current experience in informing infodemic management (country/state government perspective) – <i>Ève Dubé</i>, Institut national de santé publique du Québec, Canada 4. Private sector perspective – (TBC) 5. Title TBC (publisher perspective) – <i>Gunther Eysenbach</i>, JMIR Publications, Canada 6. Infodemiology: the socio-behavioral dimension (science perspective) – <i>Pier Luigi Sacco</i>, IULM University, Italy 7. European Disinfo Lab resources for tackling misinformation about COVID-19 (civil society perspective) – Alexandre Alaphilippe, EU disinformation lab, Belgium
15:30 – 15:40	Break
15:40 – 16:50	Session 2: Infodemiology – how can the infodemic be managed, described and measured? Moderator: <i>Marcelo D'Agostino</i> , Rapporteur: <i>Mark Nunn</i> <p>METHODS, TOOLS AND EVIDENCE FROM THE PAST EXPERIENCE AND FROM COVID-19 PANDEMIC</p> <ul style="list-style-type: none"> • fact-checking and relevance analysis, misinformation dynamics • characterizing social and societal dynamics of infodemic during outbreak • science of digital and social information flows and analysis in outbreaks • study of interaction and engagement with COVID-19-related media, web and social media items; analysis of advertising online <p>RISK COMMUNICATION, MISINFORMATION AND FACT-CHECKING</p> <ol style="list-style-type: none"> 1. Lessons from 2015 MERS-Cov and COVID-19 for infodemic management – Kisoo Park, Korea University College of Medicine, South Korea 2. Misinformation making a disease outbreak worse: outcomes compared for influenza, monkeypox, and norovirus – Julii Brainard, Norwich Medical School UEA, UK 3. Correction of Global Health Misinformation on Social Media (Zika experience) – Leticia Bode, Georgetown University, USA 4. Supporting the fight against COVID-19 infodemic in SE Asia – Rebecca Petras, H2H Network, USA/France 5. Canadian misinformation and fact-checking portal – Philip Mai and Anatoliy Gruz, Ryerson University, Canada

continued on next page

Day 1, continued

Tuesday, 7 April 2020, 14:00–17:00 Geneva time. Plenary (3 hours)

Time	Session
16:50 – 17:50	<p>Invitation for collective contribution of ideas towards a framework for infodemic management at global, national and local levels</p> <ul style="list-style-type: none"> • Focus brainstorm ideas on the four areas of infodemic management (Identify evidence; Simplify knowledge; Amplify action; Quantify impact). • Use Sli.do #infodemic to submit ideas into each of four 'rooms' • Suggestions will be summarized and recapped for session 4 next day <p>FOUR AREAS OF BRAINSTORM (SEE SLI.DO ROOMS):</p> <ul style="list-style-type: none"> • Identify evidence: Scan, review and verify evidence and information • Simplify knowledge: Interpret and explain what is known • Amplify action: Reach out and listen to the concerns of sectors and provide advice for action • Quantify impact: Describe the infodemic, measure change and impact of infodemic management interventions

Day 2

Tuesday, Wednesday, 8 April 2020, 14:00 – 17:00 Geneva time. Plenary (3 hours)

Time	Session
14:00 – 14:10	<p>Recap from Day 1 <i>Tina Purnat</i></p>
14:10 – 15:20	<p>Session 3: How can the infodemic be managed, described and measured? (continued from previous day) Moderator: <i>Tina Purnat</i>, Rapporteur: <i>Mark Nunn</i></p> <p>SOCIAL AND BEHAVIORAL SCIENCE</p> <ol style="list-style-type: none"> 1. How behavioral science data helps mitigate the COVID-19 crisis – <i>Philipp Schmid</i>, University of Erfurt, Germany 2. Using social and behavioural science to support COVID-19 pandemic response – <i>Jay J. Van Bavel</i>, New York University, USA <p>WEB/SOCIAL ANALYTICS AND AI TO PRODUCE ACTIONABLE INSIGHTS AND ANALYSIS</p> <ol style="list-style-type: none"> 3. Web/Social media listening and analytics for COVID-19 communication – <i>Tim Zecchin</i>, Media Measurement, UK 4. Infodemiology: tools for detecting and assessing infodemics – <i>Manlio De Domenico</i>, Complex Multilayer Networks Lab, FBK – Fondazione Bruno Kessler, Italy 5. Title TBC – <i>Marcelo D'Agostino</i>, PAHO, and Ian Brooks, University of Illinois, USA 6. Assessing the similarity between daily news headlines and WHO recommendations – <i>Tavpritesh Sethi</i>, Indraprastha Institute of Information Technology Delhi, India
15:20 – 15:30	Break
15:30 – 16:50	<p>Session 4: A framework for managing infodemics (working across whole of society for evidence-informed policy) Moderator: <i>Tim Nguyen</i>, Rapporteur: <i>Mark Nunn</i></p> <ul style="list-style-type: none"> • Report back on four areas of brainstorm: Identify evidence; Simplify knowledge; Amplify action; Quantify impact <p>Brainstorm of suggestions for an infodemic response framework at global, regional and country level</p>
6:50 – 17:00	<p>Conclusions and next steps <i>Dr Sylvie Briand</i></p>

ANNEX 2:

List of speakers & organizing team

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