The PHERCC matrix. An ethical framework for planning, governing, and evaluating Risk and Crisis Communication in the context of Public Health Emergencies

Giovanni Spitale

0000-0002-6812-0979

Institute of Biomedical Ethics and History of Medicine, University of Zurich, Zurich, Switzerland

giovanni.spitale@ibme.uzh.ch

Federico Germani (co-first)

0000-0002-5604-0437

Institute of Biomedical Ethics and History of Medicine, University of Zurich, Zurich, Switzerland

federico.germani@ibme.uzh.ch

Nikola Biller-Andorno

0000-0001-7661-1324

Institute of Biomedical Ethics and History of Medicine, University of Zurich, Zurich, Switzerland

biller-andorno@ibme.uzh.ch

+41 44 634 40 80

Institute for Biomedical Ethics and History of Medicine (IBME), Winterthurerstrasse 30, 8006 Zürich (CH)

Abstract

In this paper we propose a consistent definition of the risk and crisis communication process in the context of public health emergency (PHERCC), which comprises six key elements: evidence, initiator, channel, public, message, and feedback. Based on these elements and on a detailed analysis of their role in PHERCC, we define an ethical framework to help designing, governing and evaluating PHERCC strategies. The presented framework is based on effectiveness and justice, intended as fairness. It comprises five principles: openness, transparency, inclusivity, understandability, and privacy. The resulting matrix helps understanding the interplay between the PHERCC process and the principles of the framework, simplifying its implementation with real life examples and scenarios. The paper includes suggestions and

recommendations for the implementation of the PHERCC matrix, including the role of censorship and the regulation of free speech; education and empowerment of the public; trust, data access, and contextualization; feedback bias and bias propagation; and reflections revolving around the is-ought issue.

Keywords

ethics, risk and crisis communication, public health emergency

Introduction

Risk and crisis communication

Much has been written on risk and crisis communication; typically, with a 'business-oriented' approach (Quinn 2018), mainly geared toward reputation repair. In this context, communication is aimed at reducing the reputation damage caused by a crisis (Benoit 1997; Coombs 2007; Xu and Li 2013). In 'business-oriented' risk and crisis communication, a crisis is defined as a low-probability event, which occurs unforeseen, and has the potential to generate a vastly negative impact on an organization and on its stakeholders (Burton and Pearson 2016). This definition – and the tradition it stems from – are clearly incomplete and inadequate to understand and define the term 'crisis' as in 'COVID-19 crisis': despite the event was not perceived as such, the pandemic was not a low-probability event (Johnson et al. 2020), there have been similar precedents with other epidemics (Bowen and Heath 2007), its possibility was forecasted (Kreuder Johnson et al. 2015), and its impact did not hit specifically organizations or stakeholders, but the entire world. Some authors developed ethical frameworks for 'business-oriented' risk and crisis communication, suggesting general principles to incorporate in communication strategies. For example, Kim theorizes a model based on transparency (i.e. no information should be kept secret), two-way communication (i.e. listen to how it the message is received), and right time (i.e. such message should be timely) (Kim 2015). Contreras-Pacheco proposes an approach based on care ethics, encompassing five principles geared towards the mitigation of negative outcomes – and reduction of reputational damage – when a business is responsible of a critical event: taking responsibility; apologizing for the pain; acknowledging the victims; honouring the victims' memory; deploying mechanisms to support the victims' families (Contreras-Pacheco 2018). However, despite some similarities, as the differences between 'business-oriented' risk and crisis communication and 'public health emergencies risk and crisis communication' are significant in terms of aims and process, it follows that these two ethical frameworks are not mutually interchangeable. Maintaining reputation and repairing trust (one of the main aims of the 'business-oriented' approach) is indeed only one component of the communication strategies deployed by local institutions, health ministries, national governments, and by the World Health Organization (WHO) in the context of the COVID-19 pandemic.

The main goal was rather providing the public with enough information to elicit protective behaviours and keep people safe: information on the virus' transmission routes; on preventive measures, including the use of hand sanitizers or face masks; and on vaccines as an efficient way to reduce mortality, morbidity and transmission. This type of communication is better described using the CERC model (Reynolds and Seeger 2005), which represents the systematization and the current golden standard for preparing and organizing the content of risk and crisis communication in the context of public health emergencies. It defines the five common stages of crises: a) precrisis; b) initial event; c) maintenance; d) resolution; and e) evaluation; further, it details what the focus of each phase should be, suggesting specific strategies. These include educating the public and develop consensual plans between the information provider (initiator) and the public as a preparedness strategy; establishing an empathetic communication – although structured and formal— providing information and reducing uncertainty; assessing the public's understanding and dispel fake news; informing about post-disaster clean-up and remediation; evaluating, assessing, and planning for

future actions. While the CERC model offers useful guidance in navigating an emergency, it solely focuses on communication strategies, without embedding and analysing the efficacy of this type of communication in an ethical framework – which could ensure justice, intended as fairness, and increase the effectiveness of messages designed through communication strategies as defined by the CERC model.

In this paper, we will refer to the set of communication activities during a public health crisis as 'Public Health Emergency Risk and Crisis Communication'. PHERCC is a crucial process, whose importance is acknowledged and prescribed also by international law, including the International Health Regulations of the World Health Organization, Resolution 46/182 of the United Nations General Assembly, and the Sendai Framework. PHERCC includes the ability to detect, notify and report on public health threats, and disseminate information and recommendations for the population (World Health Organization 2016, 40–41; UN General Assembly 1991). The Sendai framework provides more details on the guiding principles and the aims of PHERCC, specifically in Priority 4, i.e., 'disaster preparedness': to increase communities' resilience to disasters, it is necessary to develop and strengthen people-centred multi-hazard communication mechanisms and social technologies. The aforementioned systems should be developed through a participatory process and tailored to the needs of users, including social and cultural requirements (UN Office for Disaster Risk Reduction 2015, 21).

The combination of recent epi/pandemics and new technologies that allow rapid and 'horizontal' spread of information (e.g.: social media) generated further insight on the strengths and limits of previous and current PHERCC strategies and approaches. In fact, 'public reaction could be considered another outbreak to be controlled during an epidemic' (Hsu et al. 2017). Horizontal means of communication can be both an asset and a barrier – an asset, in that they allow rapid and capillary communication; a barrier, in that they can generate echo chambers, which in turn can foster the spread of rumours and fake news (Malecki, Keating, and Safdar 2020). Moreover, the 'lasting emergency' of COVID-19 has been showing that there is a critical need for theoretical and practical tools to deal with uncertainty and changing evidence, advice, and content of PHERCC: information providers need to be able to dynamically adapt their messages over time, to different audiences with specific needs and characteristics (Malecki, Keating, and Safdar 2020).

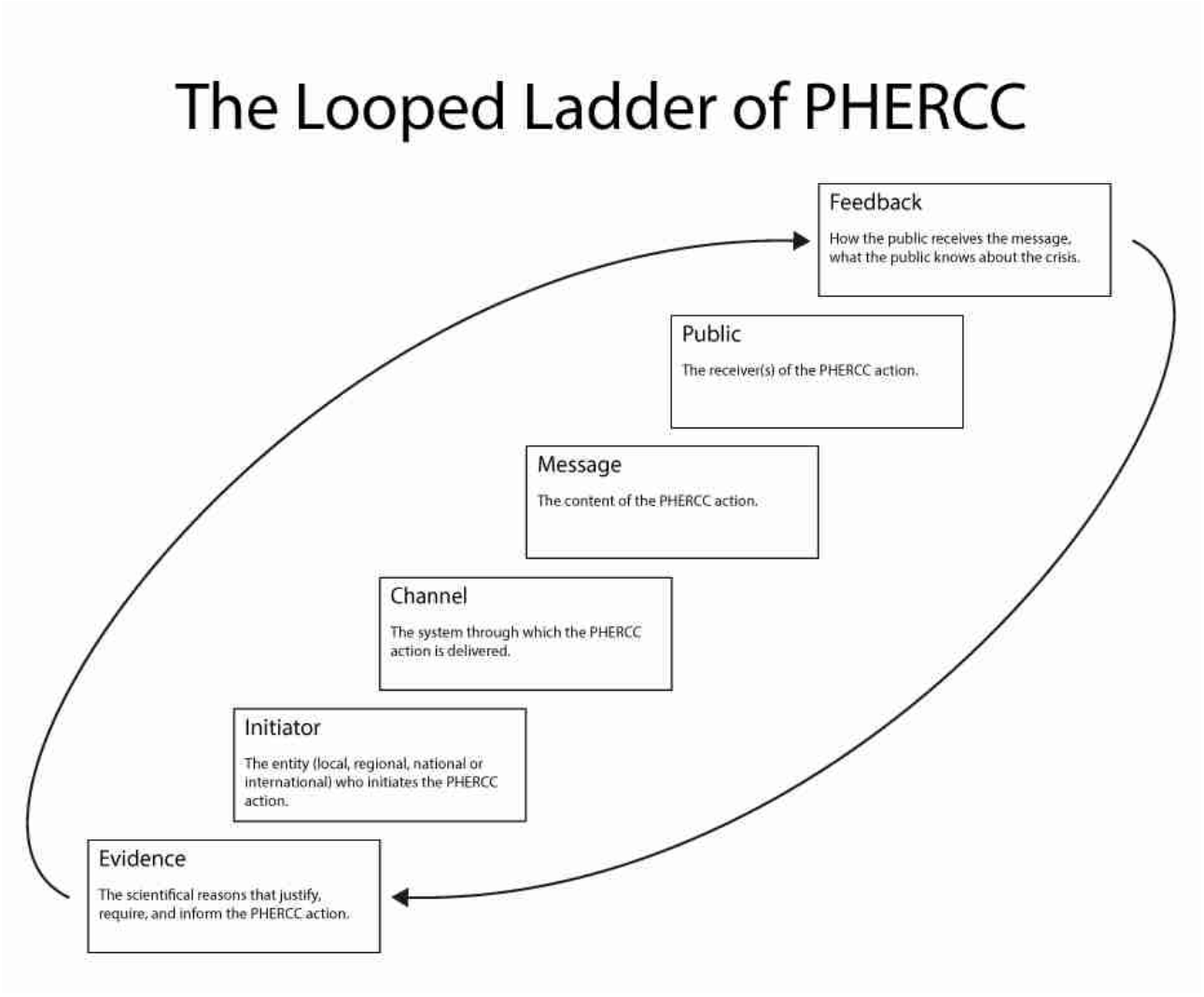
PHERCC is extremely dense of ethical implications and potential pitfalls (Kim 2015; Attademo 2022). Although some work on the ethics of PHERCC exists (Sellnow and Seeger 2013, chap. 9), a framework that systematizes the issues, the stakeholders, and the approaches, providing both theoretical reflection and practical guidance for planning, governing, and evaluating PHERCC strategies is still missing. As the world wishes to transition, slowly and limping, to a post-pandemic phase, this appears to be the right time to develop a detailed and comprehensive framework for PHERCC, and to incorporate it in the design and development of future response strategies to public health crises.

Discussion

Conceptualizing the PHERCC process

PHERCC is a multi-actor and multifaceted process. While its core revolves around delivering information to the public, defining the aim of PHERCC is not a simple endeavour. Looking at recent examples emerged during the COVID pandemic, PHERCC aim is to reduce infection rates, to guarantee access to information, to curb economical damage, to keep people informed and aware of what is happening, among many others. These different aims have been achieved by crafting messages concerning hygiene measures, supporting lockdowns, endorsing vaccination uptake, etc. On the one hand, PHERCC aims at eliciting protective behaviours that allow risk reduction; on the other hand, it aims at guaranteeing and fostering freedom of information – as recognized and defined in international law (UN General Assembly 1946; 1948, pt. 19), enabling informed decisions and maintaining public trust in institutions (Loss et al. 2021).

Since the purpose of PHERCC is to deliver information and elicit behaviours, it needs to create a space for an 'asynchronous conversation' between the initiator and the recipients of the action. This entails that a) the initiator needs to understand the identity and characteristics of the public, and the public needs to understand the identity and characteristics of the initiator; b) the initiator gathers all the evidence that can contribute to building an effective and precise message, tailored to the public based on its specific needs; c) the initiator ensures the existence and maintenance of a solid infrastructure through which the conversation with the public can take place; d) defining a set of messages, e) finally, the initiator needs to consider and accept the public's voice and incorporate it as fundamental feedback for the next iterations of communication (Malecki, Keating, and Safdar 2020). In fact, as disasters tend to follow a 'drop loop model' (Clarinval and Ahmad 2015), feedback and iterations are core components of the process. PHERCC processes can therefore be described as a looped ladder consisting of six steps: evidence, initiator, channel, public, message, and feedback (Figure 1).



[Figure 1. The looped ladder of PHERCC: evidence is used by an initiator to deliver a message to the public through a specific channel that allows feedback to be incorporated as new evidence to craft the next for iteration of communication between the initiator and the public.]

Evidence

PHERCC needs to be primarily and structurally grounded on scientific evidence (e.g.: how COVID-19 spreads). An important caveat here is that the absence of evidence does not mean that a theory should be refuted at such by the initiator, especially as this emerging theories or potentially fallacious information can be used within the process of building evidence based on the public's feedback. The role of the initiator is

to provide reasoning for why or why not certain theories are more or less likely to be correct. For example, conspiracy theories should be debunked whenever evidence is available to do so, and this should play a relevant part in the PHERCC process, as disinformation is dangerous for people's lives and endangers proper public health responses. Especially in early communication, when not much evidence on the underlying phenomenon causing a crisis is available, the initiator should ensure no information based on lack of evidence is transformed into public health advice to the public, whether this is an institution or a citizen. For instance, early pandemic advises from WHO suggested international flights should not be halted as there was no evidence that SARS-CoV-2 could start circulating worldwide (World Health Organization (WHO) [@WHO] 2020). Later evidence suggesting the airborne nature of COVID-19 demonstrated this advice to be incompatible with a proper pandemic response (Lewis 2022; Zhang et al. 2020). As mentioned above, feedback is an integral component to build evidence necessary to develop a message, and therefore evidence should also include how the message will possibly be received by the public, and ultimately how the message is perceived by the public. This includes understanding and analysing communication strategies, the instruments adopted to convey a specific message (e.g., social media vs traditional media, which social media channel, textual vs graphical communication, etc.), the timeframe in which the information is provided and the cultural, geographical, and socio-economic context of the public.

Initiator

PHERCC actions are usually initiated by local, regional, national or international authorities, and often in combination, providing a mix of information of local and global relevance. PHERCC initiation requires an internationally recognized authority and is backed up by national states, and by the scientific community at large. In this category fall non-governmental Institutions such as WHO. The initiator needs to be acknowledged by the public as a leading institution, else the effectiveness of its communication, even when backed up by evidence, would be negatively impacted. This is one reason why the initiator should also ensure its public is responsive and receptive and does not lack trust in the institution providing the information. The establishment of authority occurs when there is no ongoing public health crisis, whereas the reinforcement of institutional trust takes place in a time of crisis.

Channel

Channels are the operative system, or platforms, through which PHERCC actions are delivered – these include official websites, press releases, TV, and social media. The adequacy of the channel is crucial: PHERCC actors tend to be present on established channels as they need to have a sufficiently basin of followers (i.e. receivers of the message), in order to guarantee effective outreach and circulation of messages; however, some communication channels are structurally inadequate for PHERCC actions due to how contents are selected and displayed in the users' feeds (Hindman, Lubin, and Davis 2021), or due to a mismatch between the intentionality of the action and the public's expectation. Indeed, each channel has tailored communication mechanisms and a different public. Specific rules apply to each channel, thus content selection, censorship, and social polarization (i.e., how information is displayed to users based on their own interests) are issues to be considered. Regulations on content selection and transparency of social media are currently being discussed in the EU (Satariano 2022), but the road to effective enforcement will be long and complex.

Message

The message is the actual content of the PHERCC action, which is based on evidence, prepared and transmitted by initiators through adequate channels to the public. In line with what discussed above, the same message should be declined in different forms, based on the recipient and the communication channel, maintaining the same meaning and aim, but tailoring it to the needs of the public (SteelFisher et al. 2012; Spitale et al. 2021). The message is based on evidence produced by scientific literature and the public's feedback. In fact this evidence should not be limited to the content of the message itself, but also how the message is conveyed. The initiator should ensure the communication strategy is in line with

scientific evidence in terms of effectiveness and design, but it should also consider experimenting with different forms to evaluate the efficacy of specific designs and strategies. Indeed, public health emergencies differ from each other, and the public changes its attitude, understanding and predisposition to listen over time, based on unfolding events, as well as changing social, cultural, and economic context.

Public

The public comprises people or institutions for whom a specific PHERCC action is intended, i.e., the receiving end of the messages. Different people understand or misunderstand the same messages in different ways: there is growing evidence that 'social and cultural factors, immediacy, uncertainty, familiarity, personal control, scientific uncertainty, and trust in institutions and media all shape perception and response to risk messaging' (Malecki, Keating, and Safdar 2020). Therefore, a better understanding of the public and its specific needs is paramount.

Feedback

Feedback is a set of information on how different segments of the public receive and understand the message provided by the initiator. Feedback data are crucial for the following iterations of the PHERCC process, especially when facing long lasting emergencies, during which evidence might change as well as the public perception of the underlying issue. A recent and poignant example of this is the so called pandemic fatigue – 'an expected and natural response to a prolonged public health crisis – not least because the severity and scale of the COVID-19 pandemic have called for the implementation of invasive measures with unprecedented impacts on the daily lives of everyone' (WHO Regional Office for Europe 2020). Thus, listening to the public and understanding what they think, and incorporating their feedback in future PHERCC actions plays a pivotal role. Its importance has been previously considered: the Sendai framework explicitly recommends developing people-centred multi-hazard, multisectoral emergency communication mechanisms through participatory processes, tailoring them 'to the needs of users, including social and cultural requirements, in particular gender' (UN Office for Disaster Risk Reduction 2015). Two approaches have emerged: active social listening and passive social listening. Passive approaches entail gathering and studying data, which are shared by people for their own purposes, on social media or messaging platforms. It is an observational approach, based on 'collecting information from digital communities without engaging with them' (Spitale, Biller-Andorno, and Germani 2022). Active approaches, on the other hand, entail engaging with the public, asking them explicitly their opinions and personal views, e.g., on the implementation of safety measures as well as their acceptability considering their impact on people's lives, businesses, and personal versus societal risk evaluation. Passive social listening systems, although very effective in the short run, can be problematic: their systematic use can undermine the proper functioning of the public health system due to the erosion of public trust in public health institutions (Sekalala et al. 2020). Moreover, passive social listening systems can be used – and have been used – to legitimize discriminatory public health policies against minority groups (Sekalala et al. 2020). Active approaches, on the other hand, although slower and depending on effective bidirectional interfaces between the public and authorities, can help building trust rather than undermining it further (Spitale, Biller-Andorno, and Germani 2022). A limitation of active social listening approaches, however, is that the collected sample, and thus the opinions, of participants engaged in active discussion is limited and could potentially bias conclusions and determine misunderstanding, creating improper evidence, which could lead to a new iteration of ineffective, or even dangerous, PHERCC actions.

A unifying framework: how it works

Status quo

While studying the Chinese response to the 2002 – 2003 SARS outbreak, Bowden and Heath identified 5 key areas: a) a moral obligation to society – 'the level of moral responsibility for an issue is determined by the amount of control the person or organization exercises over the decision'; b) a need for enabling relationships – 'providing candid and accurate information'; c) do no harm and consider harm potential –

ground decisions on the moral imperative of respect, not on self-interest; d) maintain legitimacy through ethical actions – being dishonest and not forthcoming information undermines trust and legitimacy; e) the obligation of veracity – 'concealment might indicate a moral problem' (Bowen and Heath 2007). When analysing the impact on human rights of public health surveillance measures in the context of the COVID-19 pandemic, Sekalala and colleagues concluded that 'they should be evidence based, contribute to a comprehensive public health surveillance system, include sunset clauses, be non-discriminatory, and ensure mechanisms for greater transparency and accountability' (Sekalala et al. 2020). Finally, although their work is mostly geared towards developing practical recommendations for communication strategies, also the work of Malecki and colleagues provides some insight that is relevant from an ethical point of view. This entails 'data driven transparent decision making'; accepting the public as a partner; transparency, honesty, and acknowledging of uncertainty; compassion and empathy; evaluation and reassessment of the strategy (Malecki, Keating, and Safdar 2020).

Fair or effective?

PHERCC processes, and more generally risk response strategies, are usually considered as requiring trade-offs based on the subtle balance between effectiveness and justice – intended as fairness (Rawls 1985). This could be true – to some degree – for enforceable risk response strategies like quarantine and isolation (Dong et al. 2022; Spitale 2020). However, the case of PHERCC is different, as communication and understanding cannot be enforced. To achieve its aims (i.e., eliciting specific protective behaviours across different segments of the public and increasing risk awareness), PHERCC needs the public to be fully on board. Therefore, in this specific context there is no trade-off between justice (fairness) and effectiveness: PHERCC actions will likely fail, when they are not perceived as fair by the public.

The PHERCC matrix

Based on the mentioned considerations on justice intended as fairness – as a *conditio sine qua non* to effectiveness – we propose our framework in the shape of a matrix. We defined the PHERCC process, we identified relevant ethical principles, geared toward guaranteeing fairness across the whole process, and we propose the application of said principles in each step. There are two assumptions with meta-ethical relevance in this reasoning. First, supported by some evidence, that there are no trade-offs between effectiveness and justice – intended as fairness; on the contrary, that aiming for fairness can increase the effectiveness of PHERCC actions. Second, in line with Rawls, that fairness is a desideratum in a modern constitutional democracy. In this sense our principles can play both an ethical role – they have intrinsic ethical value – and a pro-ethical role – they are instrumental to the pursuing of aims which have ethical value. Such principles, adopting a principlistic view, have intrinsic ethical value; adopting a deontological perspective, they form a stack that contributes to the realization of fairness as a moral duty. Finally, it is important to stress the consistency of the model also from a utilitarian perspective: literature shows that fairness increases the effectiveness of the PHERCC action, producing desirable consequences (Malecki, Keating, and Safdar 2020), therefore the proposed framework has ethical value also from a utilitarian perspective. Thus, a systematic application of this framework in the planning, governing, and evaluation of PHERCC actions can be understood as an enabling factor for a fair and effective intervention, and – importantly – for a fair and effective public discourse. Our matrix is summarized in Figure 2.

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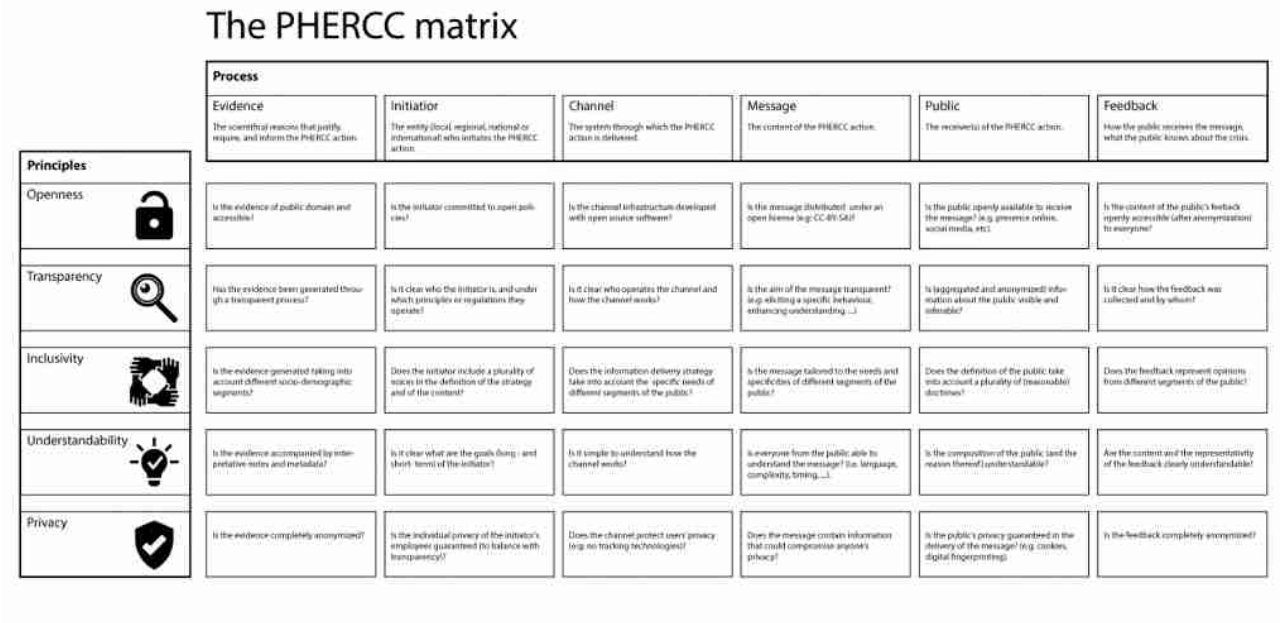

[Figure 2. The PHERCC ethics matrix: the first row describes the PHERCC process, the first column describes the principles, the intersections describe the application of the principle in the different steps of the process. As PHERCC processes are context-specific, the questions are intended to be representative and not exhaustive of the interplay between the process and the principles.]

Openness

Openness in PHERCC is conceptualized similarly to the concept of openness in 'open science'. The Draft Recommendation on Open Science produced by the UNESCO General Conference defines it as 'an inclusive construct […] aiming to make multilingual scientific knowledge openly available, accessible and reusable for everyone, to increase scientific collaborations and sharing of information for the benefits of science and society, and to open the processes of scientific knowledge creation, evaluation and communication to societal actors beyond the traditional scientific community' (UNESCO General Conference 2021). From a theoretical point of view, 'openness' can be understood in two ways: first, as the sheer availability of information, be it datasets resulting from primary research, or code; second, as the attitude and ability to create new knowledge, the will to share it and the ability to receive it.

Transparency

According to Turilli and Floridi, information transparency is not an ethical principle per se, but rather a 'pro-ethical condition', in that it enables an ethical evaluation of the information, which per se could be considered ethically neutral (Turilli and Floridi 2009). In the context of PHERCC, information cannot be considered ethically neutral, as it allows participation and informed decision making, fostering autonomy. Therefore, transparency can be considered as a full-fledged ethical principle. Transparency is intertwined with openness, as they are mutually enhancing (Ball 2009). Michener and Bersch developed a solid framework for transparency, identifying two hallmarks: 'visibility of information, and its inferability – the ability to draw accurate conclusions from it' (Michener and Bersch 2013). Transparency and openness play, together, a relevant role in determining the accuracy, and thus fairness, of information. Disinformation is produced with a willing act to deceive, and therefore disinformation per se can involve openness but not transparency, as the aim of the message is hidden and not conveyed together with the message itself. Misinformation, instead, is false information which has not been necessarily shared or produced with the intent of deceiving, and thus meets the principle of transparency but not that of openness, since openness requires the ability to understand and elaborate on a piece of information.

Inclusivity

In line with Rawls, reasonable pluralism is a basic feature of liberal democracies. It entails the societal co-existence of 'a plurality of conflicting reasonable comprehensive doctrines, religious, philosophical, and moral'. Liberal democracies must avoid 'friend or foe' approaches to conflicting doctrines – as long as they are not incompatible with the very idea of a constitutional democratic regime (Rawls 2005, 441). Intended in this sense, inclusivity plays a central role in the PHERCC framework. For these reasons, information should be as effective as possible for as many people as possible, including minorities. PHERCC, for example, should include strategies to deal with people lacking access to Internet, or people with no understanding of the initiator's preferred language of communication. Also, inclusive approaches should attempt to ensure information won't be polarized, and ideally use communication strategies that attempt to bypass biases produced by polarized channels of communication. For example, communication about the effectiveness of masks to prevent the spread of SARS-CoV-2, without promoting their use or accusing those opposing their use to endanger the population at large, could have mitigated political categorization on social media of the masked versus unmasked debate during the COVID-19 pandemic.

Understandability

The principle of understandability further broadens the scope of inclusivity. PHERCC actions should consider that the recipients of information are coming from different socio-cultural backgrounds, hence they not only have different world views, but also different levels of education and different predisposition to understand specific concepts with a specific communication strategy and in a specific timeframe. Understandability is a matter of 'fair opportunity' – which guarantees everyone the possibility to be part of the PHERCC conversation, and the application of this principle helps delivering a more capillary message, enhancing its penetration. The role of the public in shaping the initiator's ability to produce an effective message has been discussed before – as such, understandability should be a guiding principle to shape actions, and in particular the type of communication adopted for a specific goal. Implicitly the public, with its diversity, provides a variety of voices that should be used to generate more messages, reaching out to more people. The initiator is generally a trusted institution with experts in public health, and thus should provide guidance and leadership in PHERCC. This requires the involvement of the public, its plurality and understanding of communication not only as the receivers of the message, but also as those shaping the message: a) through the feedback mechanisms described in the PHERCC matrix, and b) by deploying influencers as initiators themselves – with their own ability to reach out to specific niches and with a specific, already existing, and perfectly tailored communication system.

Privacy

Privacy is a fundamental human right, based on the assumption that everybody should enjoy a free space for 'development, interaction and liberty, a "private sphere" with or without interaction with others, free from State intervention and from excessive unsolicited intervention by other uninvited individuals' (UN High Commissioner for Human Rights 2018). Our understanding of 'privacy' must be broadened by the enlargement of digital horizons, and the growth of digital footprints: 'the right to privacy is not only impacted by the examination or use of information about a person by a human or an algorithm. Even the mere generation and collection of data relating to a person's identity, family or life already affects the right to privacy, as through those steps an individual loses some control over information that could put his or her privacy at risk' (UN High Commissioner for Human Rights 2018). Interference with people's privacy is possibly justified only if two conditions are met: the interference is not arbitrary, and it is defined by the law (scope, extent, duration).

Suggestions for implementation

PHERCC is a multi-actor process. It involves research institutions generating evidence; local, regional, national or international initiators; software engineers and media experts developing or improving communication channels; copy strategist, copywriters, graphic designers and translators transforming

evidence-based recommendations into segmented messages; the public itself, as a co-actor providing feedback in the form of evidence, and supporting the role of the initiator in shaping PHERCC; and again, research institutions processing the feedback and developing further contributions to the evidence-based process. The implementation of the framework is simple, but not straightforward. It requires everyone involved in the process to be aware of the general aim of PHERCC, of the specificities of the step they oversee, and of the ethical values that should help shaping it. This stands true for the planning of an action, for its governing, and for its evaluation. In this sense, the initiator can assume a pro-active role, as a 'primus inter pares', ensuring that the various co-actors are aware of and apply the principles to the step they are involved in. This entails education and training actions – i.e. empowerment, to be conceived as a structural part of disaster preparedness – as recommended by the Sendai framework (UN Office for Disaster Risk Reduction 2015).

Strengths and opportunities

Openness and transparency through the process foster trust and allow independent third-party verifications or audits. Adopting inclusive approaches, which consider understandability, allows the design of better tools, strategies, and messages. This in turn allows people to effectively perceive themselves as co-actors, rather than as the recipients only – once more, fostering trust and adherence to evidence-based policies to address a public health emergency. Privacy, clear data processes, and data management by reputable, open, transparent, and trustworthy institutions put people in the condition to freely express their opinions, even when they are very critical – and thus important to consider when aiming for fairness and effectiveness.

Adopting this framework offers several opportunities. People can be provided with information, which is not only relevant, precise, and timely, but also personalized, based on their individual needs, understanding of the ongoing crisis, and their reactions to current or future measures to address the emergency. Such information should be simple to understand, and geared towards eliciting specific protective behaviours, in a way which is perceived as non-judgemental – especially on morally loaded topics. We propose a paradigm shift – from policy-makers 'teaching the public' with a (limited and failing) paternalistic approach, towards fully acknowledging the public as a co-actor of the process.

During the COVID-19 pandemic we could witness the explosion of an arms race in info wars: misinformation rampaged, both on mainstream and on new emerging channels (Cuan-Baltazar et al. 2020); consequently, efforts to track, debunk and contain such misinformation rampaged as well. Adopting the PHERCC framework and incorporating its principles in the definition of the actions can help avoiding or at least curbing this issue.

Which issues can this framework address?

Censorship

In a crisis such as the ongoing COVID-19 pandemic, initial assessment of scientific evidence shaping messages and public health policies is typically performed in an environment that was unprepared and in a context with lack of information. In this information void, disinformation and conspiracy theories can emerge at a quick pace, especially if guidance is not promptly provided to the public and to policy-makers. In a short timeframe and in an unprepared environment, curbing misinformation is difficult and likely relies on stronger measures – in the case of the COVID-19 pandemic we have seen limitations of personal freedoms in the form of lockdowns, and for misinformation we have seen attempt to censor potentially harmful information. Censorship is a double-edged sword which can save lives in the short term, but can impact trust in those institutions (i.e., the initiator) providing information (Niemiec 2020). Thus, over time and when a crisis is not resolved in a short period of time, censorship can allow a spiral formation and

reinforcement of conspiratorial behaviours, which can damage the societal fabric and have a negative impact on the expected effects of policies aimed at addressing the emergency (Chang et al. 2022). Censorship of information can be compared to lockdown measures to reduce the spread of a virus – they are effective but short lived. Our framework considers an active role of the public in shaping evidence, thus acting as co-actors in a process of information production. The involvement of the public in the PHERCC process can have positive consequences in the medium and long-term, thus creating an environment which discourages the spread of misinformation. This approach can be compared to mass vaccinations that equip the public with resilience against disinformation and conspiracy theories. Besides, the effectiveness of our PHERCC framework is enhanced when the public is resilient to misinformation ahead of a crisis. Preparedness requires educational measures and research to understand and identify the best tools and teaching strategies to build resilience. This would allow, with the emergence of a new public health crisis, a reduced necessity to impose measures and a higher involvement of the public as a co-actor from an early stage of the crisis.

Public health crises can further exacerbate political and societal tensions within democratic societies. Therefore, PHERCC and the potential use of censorship to deal with misinformation can have larger effects on society than those such messages and censorship are designed for. For example, the use and abuse of censorship can lead to public surveillance, attempts to identify citizens with “deviant” opinions, as well as the generation of predictive modelling as a first step towards controlling the population. In fact, most conspiracy theories emerged during the COVID-19 pandemic have something to do with the idea that a political elite is controlling or attempting to control people’s behaviours (Germani and Biller-Andorno 2021). Examples include: that vaccines are implanted chips controlled by 5G technology, or that vaccines are tools to control the increasing population size, etc. (Spitale, Biller-Andorno, and Germani 2022). These “Brave new world” scenarios emerge as potential derangements of actual risks stemming from the use of censorship, especially when used for a prolonged period.

Convincing versus building: top-down vs bottom-up approaches to information

Providing information can follow two distinct paths, one coming from an initiator and directed to the public, and another, as proposed in our framework, directed from the initiator with an active feedback role provided by the public, and directed to both the public and the initiator. The second approach, which is a bottom-up approach, is preferrable according to our PHERCC framework. If the process of evidence creation and knowledge formation is shared between initiator and the public, and if the latter perceives it is playing a role in such process, then knowledge will be perceived as shared and not imposed, and we could classify this as a top-down approach. This is relevant, as it may help reducing misinformation and debunking conspiracy theories. Therefore, the information provided should build knowledge and evidence, rather than just convincing the public to adopt a certain behaviour. Drawing an example from the COVID-19 pandemic, masks can effectively reduce the spread of SARS-CoV-2 (Howard et al. 2021); there are two approaches to inform the public: a) convincing them that evidence exists to claim masks are effective – this is a convincing effort shaped as a top-down approach to information; b) explaining how viral transmission occurs, and listening to what the public would want to do, once they have such understanding, to curb down viral transmission – this is a bottom-up approach to information.

Trust

As discussed in the introduction, risk and crisis communication has been typically studied and understood with a ‘business-oriented approach’, i.e., the company or organization uses a set of strategies to deal with the negative impact caused by an unforeseen event. As we discussed, the role of PHERCC goes beyond that, but nonetheless we can consider some relevant aspects based on a ‘business-oriented approach’ and our PHERCC framework. The initiator of a PHERCC process (e.g., WHO) has the role, according to our framework, to integrate the public’s feedback in the evidence-building process necessary to shape messages directed to policy-makers and to the general public. As discussed, failing to integrate the public

would mean adopting top-down approaches to inform the public, which can create a distance between initiator and public, and break the loop of information creation and sharing in the PHERCC process. Such distance reflects on public trust in the institution providing the information, thus creating a negative environment in which the initiator is compared to an elite controlling information and shadowing opposing worldviews, understandings (and misunderstandings) of the crisis. The initiator, to maintain high public trust, should therefore a) involve the public as a co-actor, as previously explained; b) consider that its role as information provider should involve branding and advertising itself, as a business-oriented institution would attempt to do, depicting itself as a service providing value to the public, and not just to themselves: the public needs to 'buy the product' (i.e.: the message) and provide feedback on how to make such product more effective, understandable and inclusive.

Open issues, limitations, and ways forward

Regulating information and free speech

The debate over free speech on social media is relevant in this discussion and is particularly timely. The rise of misinformation on social media has posed great risks to people's lives during the COVID-19 pandemic. Thus, measures including censorship were taken by social media including Facebook and Twitter, in line with guidelines provided by WHO (Mosseri 2017; Twitter 2021). Recent debate on Twitter's policies and free speech initiated by Elon Musk is embedded in the debate about how PHERCC should be handled – and about how information should be handled in general. Two opposing worldviews address the issue from different perspectives: a) a regulatory (censoring) approach, sees information (i.e., misinformation) as a potential weapon, whereas purists' free speech views, including Musk's, see regulating misinformation as an assault on free speech, with the consequences of fostering mistrust and further conspiracies (Musk 2022b; 2022a). Our framework addresses how resilience-building methods should be preferred, as reliance to misinformation bypass the problem of regulating information and the implication for free speech. However, our framework relies on educational and training measures, which haven't been identified yet, as tools to build resilience and thus increase preparedness in the event of a new public health crisis requiring PHERCC.

Education

Education/teaching measures to build the public's resilience to misinformation is fundamental in the emerging phases of a public health crisis, especially when evidence-based information is not readily available as the underlying cause of the crisis is not yet fully understood. In this context, information voids are usually filled by ill-founded conspiracy theories and misinformation, unless the public is already 'vaccinated', i.e., resilient, to these dynamics. Our framework theorizes that such voids could be filled by designing simple and effective education strategies, which are ideally inclusive and not costly, understandable, and not time consuming. So far, we identify two major limitations to this approach: 1) there is no substantial evidence on what skills should be taught to build information literacy (Albitz 2007), and 2) there is no understanding of which education plan, strategy and design would be effective in building such skills ('Ask the Cognitive Scientist: How Can Educators Teach Critical Thinking?' 2020). Such limitations will need to be addressed by research institutions as quickly as possible, as the understanding of these aspects may have a relevant impact on the PHERCC process and the functioning of the proposed framework once the next public health emergency arises.

Data access and contextualization

Openness is a core principle in the proposed PHERCC matrix. As explained, this implies that data should be available to initiator and public alike. One issue is that, without public resilience to misinformation and with limited instruments to understand and read publicly available data, such undigested pieces of information can be freely misinterpreted or can be manipulated to fill information voids, thus having a negative effect

on the PHERCC process. Educational approaches will also need to provide tools to make publicly available data understandable without restricting access to them.

Feedback bias and propagation

As proposed, the public should participate in the PHERCC process not only as recipient of a message, but also as co-actor in building evidence to generate new messages. The role of the initiator, as specified, is to provide guidance and leadership in the process, but integrating public feedback into an effective action has the risk of propagating the initiator's bias towards evidence and the evidence received through public feedback. For example, the public may report to the initiator the need to discuss the role and differences played by traditional vaccines versus mRNA vaccines, as the public seem to be concerned that mRNA vaccines could alter DNA. The initiator could then attempt to explain how mRNA vaccines work and why they do not alter DNA – however this message can be read and understood by some as an attempt to defend the roll-out of vaccines despite lacking evidence to protect the interest of pharmaceutical companies. To prevent these misunderstandings, we propose that the initiator investigates the potential effects of a given action on a public sample, who reports their feedback actively – thus, again, allowing the public to use active social listening systems to participate in the PHERCC process as co-actor. Such feedback would provide immense value and understanding of how a certain message, its wording, design, and adopted communication channel could lead to a desired or undesired effect.

The 'Boaty Mc Boatface' problem and the is-ought issue

In March 2016 the United Kingdom's Natural Environment Research Council (NERC) launched an online poll to find a name for a new, big, and expensive polar research ship. Everyone from the public could participate, suggesting a name or voting for one of the suggestions. The results were clear: NERC's new jewel, 15,000 tonnes and 129 metres of might, would have been called… 'Boaty Mc Boatface'. NERC was clearly hoping for something different, more highbrow and less prankish – in fact, they overruled the public's decision and chose a more sober solution, opting for 'RSS Sir David Attenbrough' (NERC 2016). The winning crowdsourced name, 'Boaty Mc Boatface', lives on in two ways: as the name of one of the ship's autonomous submersibles, and as a memento: when you let people decide about something, you might have disappointing results. This same phenomenon, which makes Boaty Mc Boatface's story such a good joke, might have tragic outcomes in the PHERCC context. What if through the feedback loop of a PHERCC action we see that the public is strongly in favour of actions that are unethical, such as killing all the infected people, or denying treatment to minorities on the base of racial arguments, the elderly, or people with pre-existing conditions? And what if, despite all evidence provided, there is a strong preference for mitigation measures that do not have any scientific backing, such as stocking hydroxychloroquine rather than vaccines for COVID-19? This is just a special case of Hume's is-ought problem – i.e.: we cannot derive prescriptive conclusions from descriptive premises. MacIntyre proposed a solution based on the notion of telos: 'human beings […] have a specific nature; and that nature is such that they have certain aims and goals, such that they move by nature towards a specific telos'. Good is therefore whatever allows to pursue that aim, hence it is possible to ground moral judgement on facts (MacIntyre 2007, 148–50). It is not our intention to delve into metaethics with this work, which in that respect aims to be as agnostic as possible. But this issue, one of the fundamental struggles of empirical ethics, cannot be ignored. In this sense, it is important to keep in mind that we propose to incorporate the public in a multi-actor discourse, which is not the same as 'letting people decide what to do'. Long-term empowerment strategies, as detailed before, will mitigate the risk of incurring in Boaty McBoatface scenarios. But reality and contingency will call for flexibility in the implementation.

Conclusion

PHERCC is a complex, multifaceted, and multi-actor process, and a crucial component of risk preparedness strategies. As the COVID-19 pandemic demonstrated, PHERCC is dense of ethical implications and potential

pitfalls. A common misconception is to perceive that PHERCC actions require a trade-off between justice – intended as fairness – and effectiveness: while this can be true for other risk control measures, those which can be enforced, this is not true for communication and understanding – which cannot be enforced by any means. We therefore identify fairness as the main driving moral value of PHERCC actions, and propose a framework encompassing five principles: openness, transparency, inclusivity, understandability, and privacy. The matrix we propose can help planning, governing, and evaluating PHERCC actions, incorporating these principles across the board. A consistent implementation of the PHERCC matrix – keeping into account its strengths and limitations, can help to develop and strengthen people-centred multi-hazard communication mechanisms and social technologies that are both fair and effective, in accordance with the recommendations of the Sendai Framework for Disaster Risk Reduction.

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Declaration of interest statement

None to declare.

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