PANDEM-2
PANDEMIC PREPAREDNESS AND RESPONSE

Scenarios Analysis and Pandemic Communications Requirements Statement

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Abbreviations and Acronyms

5R	Reflect (on shared social identity), Represent ("us" and our goals), Realize (shared identity in plans and policy). Reinforce (shared identity through ongoing action), Ready (the Group for mobilization)
CARR	Carr Communications Limited
CDC	Centers for Disease Control and Prevention
Clarisoft	Clarisoft Technologies Rom Srl
CLEME	Community Led Ebola Management and Eradication
CMT	Crisis Management Team
COMBI	Communication for behavioural impact
COVID-19	Coronavirus disease, an infectious disease caused by the SARS-CoV-2 virus first identified in 2019
COVINFORM	COronavirus Vulnerabilities and INFOrmation dynamics Research and Modelling (A project that has received funding from the European Union's H2020 research & innovation programme under Grant Agreement No. 101016247)
D	Deliverable
DOI	Digital Object Identifier
EPIC	Epiconcept
ERC	Emergency risk communication
EUWARN	(an app for mobile devices)
FINT	Fraunhofer Gesellschaft zur Förderung der angewandten Forschung e.V.
FOHM	Folkhalsomyndigheten
IATA	International Aviation Transport Association
ICRC	International Committee of the Red Cross
IFRC	International Federation of Red Cross and Red Crescent Societies
INEM	Instituto Nacional de Emergência Médica
INSA	Instituto Nacional de Saude Dr. Ricardo Jorge
ISBN	International Standard Book Number
ISI	Istituto per L'interscambio Scientifico
ITRC	Associazione della Croce Rossa Italiana
KATI	Knowledge Analytics for Technology & Innovation
KATWARN	(an app for mobile devices)
MERS	Middle East Respiratory Syndrome
MS	Microsoft
NHS	National Health Service
NIPH	Institutul National de Sanatate Publica
NPHET	National Public Health Emergency Team
NUIG	National University of Ireland Galway
ORAU	Oak Ridge Associated Universities
ORISE	Oak Ridge Institute for Science and Education
ORK	Österreichisches Rotes Kreuz
PAHO	Pan-American Health Organisation
PANDEM	(A project that has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 652868)

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PANDEM-2	(A Project receiving funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 883285)
PT	Pintail Ltd
Q	Question
RCCE	Risk Communication & Community Engagement
RIVM	Rijksinstituut Voor Volksgezondheid en Milieu
RKI	Robert Koch-Institut
RUNMC	Stichting Katholieke Universiteit
SARS	Severe Acute Respiratory Syndrome
SciComm Collective	Initiative led by graduate students and recent graduates in STEM (Science, Technology, Engineering, and Mathematics), science communication, and science policy
SPRP	Strategic Preparedness and Response Plan
T	Task
THL	Terveyden Ja Hyvinvoinnin Laitos
TRI	Trilateral Research LTD
TWRC	Two-way risk communication
UCL	Universite Catholique de Louvain
URL	Uniform Source Locator
WHO	World Health Organization
WoS	Web of Science
WP	Work Package

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1 Executive Summary

While pandemics have ravaged human populations throughout history, the scale of the recent COVID-19 pandemic has posed an unprecedented challenge and has demonstrated the critical role of communication in pandemic management, particular in modern democracies. Communication between pandemic managers (including public health agencies, first responders, government officials) and the public (particularly communities at risk in a pandemic) is a crucial component of a pandemic response. Though guidance and research on risk communications and crisis communications is available from multiple sources, the lack of a structured overview specifically on pandemics led to a shortage of practical tools and resources that pandemic managers could utilise, and considerable demands to develop new material for the COVID-19 response.

PANDEM-2 Work Package 5 (WP5) is addressing these shortcomings in pandemic communication by setting the scene in a state-of-the-art analysis (Task 5.1, this deliverable), developing new resources and templates (Task 5.2), exploring innovations (Task 5.3) and testing developments in media training (Task 5.4). This deliverable covers a wide range of relevant topics and information sources which impact pandemic communications, to set a foundation for the future work in the Work Package (WP).

In a desk-based literature research, the scientific literature, reports and communication guidelines were screened for essential findings and recommendations, to be made available in a reference literature repository. Furthermore, the analysis expanded to related projects (e.g. in the EU H2020 framework), lessons and materials for crisis communication in different domains (e.g. civil aviation disasters) and experiences with practical support tools (e.g. warning and contact tracing apps) in order to identify the transferability of lessons learnt.

Building on the PANDEM phase 1 project, priority areas from previous pandemics were assessed by investigating historic pandemic scenarios (Influenza, SARS (Severe Acute Respiratory Syndrome) /MERS (Middle East Respiratory Syndrome) and Ebola) to identify requirements for a range of communications approaches, depending on the pandemic type. The analysis revealed there were many commonalities regardless of the specific pathogen and a pathogen-centred categorization (as applied for the construction of the scenarios) was not the main determinant for communication approaches. As information availability (i.e. knowledge of the pathogen and experience in handling it) follows a temporal succession, guidance for communication by pandemic managers also needs to be linked to the typical phases of pandemic management (Preparedness, Response, Recovery). This flexibility of requirements and recommendations changing over time in the course of a pandemic is reflected in the subsequent creation of Knowledge Bases.

The scenarios analysis and previous work in the PANDEM phase 1 project (https://cordis.europa.eu/project/id/652868) highlighted the importance of two-way communication between public health authorities and society. This includes an active engagement with the public, recognising the seriousness of their concerns and staying on top of the key messaging. In this deliverable the umbrella topic of two-way communication was explored further and sub-divided into key topics and established as **Knowledge Bases**: short, and practice-oriented summary tables to be used by pandemic managers or stakeholders.

First, establishing and maintaining **trust** is the foundation of pandemic communication. While hard to earn in 'peacetime', it can be quickly lost during a crisis and thus attention to recommendations regarding trust is essential. Second, the growth of social media allows **misinformation** to spread

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rapidly, which needs to be detected and countered in a timely manner. Third, **commercial lessons** (such as principles from marketing, advertising and public relations) are embedded to determine how public behaviour can be positively influenced.

Findings of the desk research were validated and compared with the **experiences of the PANDEM-2 consortium end-users**, to match theoretical findings to real-life practice and build a Knowledge Base regarding the practical application of pandemic communication. In order to learn about the status quo end-users are currently operating under and focus on potential areas of improvement, a survey was conducted among end-user partners of the PANDEM-2 project. This questionnaire was designed to identify the overall communication strategy within the organization (including training received), awareness of strategies against misinformation, their means of communication with the public, as well as an overall evaluation of how their organization was able to communicate during the current COVID-19 pandemic. Building on these questionnaires, end-users were invited to a pandemic communication requirements workshop. Here, participants worked together to name, cluster and refine potential communication pitfalls as well as best communication practices and lessons identified or learned during the COVID-19 pandemic for the key topics of two-way communication, trust, misinformation and along the temporal pandemic phases of preparedness, response and recovery.

In summary, this deliverable reviewed a variety of resources, informed by pandemic scenarios and ranging from theoretical discourse to practical application, to identify essential topics as Knowledge Bases. Each Knowledge Base summarizes key lessons to adhere to when implementing pandemic communication during the phases of preparedness, response and recovery. The findings of the Knowledge Bases are provided in the form of highly condensed templates in the conclusions section of this deliverable, as a resource for stakeholders including pandemic managers and first responders.

2   Introduction & Background

WP5 addresses the area of pandemic communication, which itself can be seen as belonging to the discipline of risk communication. This deliverable, as part of Task 5.1 serves as a foundation for other work to be conducted in WP5, and also informs work in other WPs. For this reason, several key elements are covered in this deliverable, ranging from a methodological framework for analysis, the theoretical background of pandemic communication, to existing guidelines as well as end-user perceptions and needs related to pandemic communication. All of these inputs will feed into later work of WP5, e.g. for the development of pandemic communication resources (Task 5.2). In addition, this deliverable will feed into platform development and the demonstration scenarios of WPs 2 and 6.

To provide this overview in a clear and concise manner, all key elements of PANDEM-2 WP5 will be structured in Knowledge Bases that can be subsequently used. Informed by the PANDEM phase 1 project (How et al., 2017), research gaps in pandemic communication are used to identify relevant focal topics for the Knowledge Bases. For each Knowledge Base this deliverable will provide key take-away messages which can be picked up by other tasks and WPs in the project as relevant. The four Knowledge Bases are I) The Concept of Trust in Risk Communication, II) Misinformation & Disinformation in Pandemics, III) Commercial Lessons, and IV) Practical Application of Pandemic Communication. These Knowledge Bases directly relate to some of the main concerns of PANDEM-2 by combining theoretical reflections with practical applications and end-user perspectives, in order to generate relevant findings on modern, transparent and dialogue-based pandemic communication for further use throughout the project. These findings are structured as easy-to-read tables found in the Conclusion section 5, which also provides a short explanation.

One of the key aspects of pandemic communication, which is also a guiding principle of PANDEM-2, is two-way communication. Two-way risk communication (TWRC) "is a mutual feedback process that engages the government and citizens for credibility-building. […] In TWRC, citizens are entitled to information and democratic participation, instead of being regarded as passive, "ignorant" information receivers" (Guan et al., 2021). Risk communication in this sense is a dialogue between people to facilitate a more accurate common understanding of risks and the decisions they make to manage them. When looking at the communication happening in the real world, a discrepancy between theory and reality becomes apparent (Árvai, 2014).

Risk communication often takes place as one-way communication used to educate the "general public" on the appropriate perception of risk – according to the government or industry: "Risk communication is often viewed as means of simply educating people about risk assessments so that, on their own, they might make (or contribute to) better risk management decisions" (Árvai, 2014).

PANDEM-2 on the other hand sees risk as

> *"(…) a concept that needs to be understood – by lay people and experts alike – not corrected"*
> *(Árvai, 2014)*

Another key concept discussed in this deliverable is the influence of disinformation and misinformation on pandemic communication, and the challenges faced by professionals in public health agencies responsible for communicating with the public to ensure a functioning pandemic preparedness and response. As will be shown, the interplay of dis-/misinformation can seriously impede public health authorities in their work, often producing dynamics that can hinder efforts in the best case and produce negative outcomes in the worst case.

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Our work in this deliverable is additionally supported by evidence from behavioural sciences pertaining to pandemic communication, and professional communication expertise on communicating with the public. Further, it draws from practical application in other risk communication domains and compares theoretical findings with application in civil aviation crisis communication.

Throughout this deliverable, the complex nature of pandemic communication will also be analysed for practical application, and theoretical reflections will be enriched with end-users' perspectives and feedback. For this reason, we have created a questionnaire and conducted a workshop to contrast theory and practice, and to identify gaps in knowledge and training to serve as an input for further activities in PANDEM-2, namely the communication trainings of WP5 and the demonstration scenarios of WP6. This will be further informed by analysis of current Horizon 2020 research related to PANDEM-2 in general and WP5 in particular. We have also analysed existing guidelines on pandemic communication, verifying our findings through our consortium end-users through the questionnaire and workshop.

The scenarios developed by the PANDEM phase I project were used as primary guidance on how to approach pandemic communication. Moreover, based on pandemic scenarios, different communication approaches are identified to inform our choice of communications tactics in respective situations. Using different settings and pathogens, these scenarios outlined the potential spread of pandemics and the dependency on different variables. And even though in the light of the current COVID-19 pandemic, some predictions appear prophetic, analysis of the scenarios yielded one key insight, which influenced further work on this deliverable: the pathogen itself is not the most important aspect of pandemic communication. Instead, rather than focussing on the pathogen and its properties, it is more important to focus on the pandemic management phase and influencing variables. Regardless of the pathogen in question, crisis communication needs to take place throughout all pandemic scenarios. Naturally, these aspects are intertwined, but the specificities of communicating during COVID-19 or an influenza pandemic differ only marginally when compared to the main issues at hand. Although the scenario on SARS/MERS coronavirus envisaged more moderate spread, factors such as the lack of vaccines and further spread at mass gathering events such as Hajj in Saudi Arabia with mutation of the virus were very relevant to the current COVID-19 pandemic, and the need to constantly adapt public health messages. In addition, information and communication scenarios further examine the dangers of loss in trust in public institutions caused by an intentional spread of misinformation (How et al., 2017). A closer examination of the influence trust and misinformation/disinformation have on effective pandemic communication will be included below.

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3   Approach

3.1   Scenarios

In order to gain a first overview and create an analytical framework allowing the definition of key thematic areas for this deliverable to focus on, the scenarios created by the initial PANDEM project (How et al., 2017) were analysed using a mind map approach (Appendix 7.1). Scenarios included analysis of historical or hypothetical outbreaks of a pandemic influenza, coronavirus (i.e. SARS/MERS), smallpox and Venezuelan Equine Encephalitis. Given the fact we focussed mainly on the European context, Ebola was considered but not the main centre of attention. Some insights regarding community engagement, however, have been included from experiences in dealing with Ebola.

The scenarios were analysed using the approach as set out by Qualitative Content Analysis (QCA), defining categories or thematic clusters through coding the text-based scenarios. In this case, we decided to shorten the process and directly translate the codes into branches on the mind map. In addition, inter-linkages between different topics were identified as part of the process, which were then integrated into the map, thus arriving at a map of topics relevant to pandemic communications. Recurring topics were identified and clustered to highlight main influences on pandemic communication. For some of these main thematic clusters, sub-topics could be identified using a qualitative approach (see Appendix 7.1).

As a result, we identified variables defining pandemic scenarios in general, without delving into specific contexts, e.g. related to specific diseases or geographic contexts, which are otherwise typically used from a public health perspective. To the contrary, the analysis of the existing pandemic scenarios yielded insights into general dynamics and communication requirements common throughout all described pandemic scenarios. In other words, we did not focus on specific pathogens and/or regions, because this first analysis pointed towards other categories being more relevant for pandemic communication. These are, in particular, on a temporal axis and are closely linked to the availability of information: both knowing which phase of pandemic management one is in *and* taking the necessary steps in responding to the pandemic each seems to be of key importance, something that was echoed by consortium end-users (see Sections 4.4.4 and 4.4.5). Other aspects of communication are also "pathogen-agnostic", meaning they apply to any kind of pandemic regardless of pathogen. Two-way communication, which is covered throughout this deliverable in the different Knowledge Bases, is vital in pandemic communications in general.

As such, the mind map based on the PANDEM scenarios defines a "meta-scenario" which can be tailored to a variety of contexts by defining which parameters need to be considered when analysing, planning or executing communication strategies in a pandemic context. These initial findings subsequently further informed the structure of this deliverable and the review of literature on best practice and lessons learnt from previous pandemic events, by highlighting key areas of interest, which are further elaborated in the Knowledge Bases below. The key findings for each Knowledge Base are then in turn grouped by pandemic phase to address the importance of time and the availability of information for effective pandemic communication (see section 5, tables 2-5).

3.2 Literature review

3.2.1 Utilized sources

The literature search was conducted in several online data bases and repositories, namely "Web of Science" (WoS) (Clarivate, 2021), "Scopus" (Elsevier, 2019), and "Dimensions" (Hook et al., 2018). Additionally, EU CORDIS data have been screened for relevant projects, especially for ongoing projects (with existing or expected insights that have not yet been published in publications covered by the aforementioned data bases). Last but not least, the websites of national and international public health organisations have been screened for additional grey literature on best practices, lessons learnt or guidelines related to the topic.

3.2.2 Systematic literature research

The initial search term was rather broad and comprised the keywords *pandemic, epidemic* and *healthcare*; the actual search term and search term optimisation was dependent on the data source, considering the specific query language and filtering options.

In an iterative process (with checks using random subset of search results) the search term was further varied and elaborated. The combination of terms from three topic areas was tested and checked: broadening the search results base by including terms related to pathogens with a known potential for epidemics, narrowing the search results to the general WP5 focus by including terms related to communication and/or narrowing the search results to the perspective of assessment and preparedness. Additional parameters used were the time frame and adjusting the fields of the search in a technical sense, based on the options provided by the sources (i.e. search syntax, search rules and searchable content).

As a complementing approach best practices for key publication identification have been applied, namely bibliometrics. For the WoS core collection this applied the tool KATI (Knowledge Analytics for Technology & Innovation) that has been developed at Fraunhofer INT. For the other sources, the provided search options and analysis tools were applied.

3.2.3 Additional qualitative literature research

The systematic literature review was further expanded by qualitative literature search, in order to capture relevant documents and insights from a wider range of domains. The qualitative literature search focussed on identifying key concepts or conventions by including grey literature, press, overview concepts, guidelines or publications indicated by PANDEM-2 end-users, as well as publications outside the search terms but of great interest or novelty to the overall topic.

The method of the literature search and subsequent review hereby followed selected steps of the PRISMA statement (specifically steps 5, 6 and 8; Page et al., 2021), a framework designed primarily for systematic reviews of studies that evaluate the effects of health interventions. Based on this, reviewers specified databases searched, inclusion and exclusion criteria for the review as well as methods used to decide whether a study met the inclusion criteria of the review. Reviewers searched for publications within the direct scope of the topic and then step-wise expanded search parameters (Table 1). As the previous project PANDEM provided a literature review which screened publications until 2015 (How et al., 2017), this review focused on publications of the past 10 years. However, as the world is just now experiencing the most severe pandemic in over a century, the COVID-19 pandemic initiated

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enormous research activities covering all aspects of pandemics, including

pandemic communication. Consequently, there is a wealth of new information to be considered for pandemic communication.

The qualitative literature search targeted the following questions:

1.	Pandemic/epidemic + EU + [Topic]
2.	Pandemic + Europe + [Topic]
3.	Pandemic + global + [Topic]
4.	Health Care + EU + [Topic]
5.	Health Care + Europe + [Topic]
6.	Health Care + [Topic]

- *What is the focus of the current scientific debate?*
- *What is consensus, which are 'hot' topics?*
- *What are landmark studies?*

The analysis further targeted limitations of the theoretical findings in the literature, either gaps of knowledge or lack

Table 1: Search strings used for qualitative literature review

of application (e.g. potentially no application in the pandemic context). Likewise, novel concepts were included when found, e.g. overall novel approaches in communication or novel to the pandemic context. Lastly, previous application or future applicability in the pandemic (or wider health care) context was explored, to lay the foundation for the upcoming work in WP5.

3.2.4 Literature Repository

Search results from all iterations of literature research were used to fill the literature repository to be made available also on the project webpage by the end of September 2021, providing URLs and/or ISBN (International Standard Book Number) or DOI (Digital Object Identifier) for the references that cannot directly be included as full text. Representing the literature basis for WP5 future tasks - and possibly also with input from other WPs - further additions to the repository will be made as the project progresses.

3.3 End-User requirements

Part of the work done in WP5 is to offer the PANDEM-2 end-user partners workshops and guidelines to improve their existing communications capabilities. While a detailed literature review may reveal a range of recommendations and best practices in pandemic communication, comparing the theory with operational reality remains essential. End-users contributing to this deliverable through questionnaires and the workshop included members of public health agencies, first responders and hospital managers. All desk research done for this deliverable would be useless unless it is enriched with real-life experience by those who have been fighting the COVID-19 pandemic since the beginning. This practical experience will help put the results of our research into perspective, e.g. what practices actually do work and which do not and why. Professionals from different European countries and different organizations within the health sector were asked to share their insights and experiences with us in different formats described below. Given the limited number of professionals in pandemic management, we were able to gather a comprehensive cross section of relevant end-users, both professionally and geographically. With only ten end-user organisations participating in PANDEM-2, however, generalisation of the results poses a methodological challenge (small-n problem). However, given the small overall number of end-users within this specific community, the relative coverage achieved in this research should allow for assumptions to be made regarding the state of European pandemic preparedness and response.

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All end-users participating in the processes described below are part of the PANDEM-2 consortium. Therefore, any processing of data provided through the questionnaire or workshop were covered by the Grant Agreement of the project itself. Further, end-users were notified via email of the rules and regulations regarding the questionnaire and workshop. No end-users were obliged to participate, especially if they did not agree to the terms and could opt-out at any stage of the workshop or refuse to return the questionnaire without blame or punishment. In order to further allow workshop participants to protect their identity and views, end-users were given the option to turn off their camera during the workshop and not to use their full name during the Microsoft Teams (MS Teams) call.

3.3.1 End-user questionnaire

Before any recommendations can be made, it is vital to grasp the current status quo end-users are currently operating under, as well as areas where improvement is needed. For this, a first survey was conducted among end-user partners of the PANDEM-2 project. This questionnaire (see Appendix 7.2) was designed to help find a common ground within the project in terms of communication along the timeline of preparedness, response, and recovery. Central areas of interest were the overall existence of any form of communication strategy within the organization (including any training received in the field of crisis communication), end-user awareness of and strategies against dis-/misinformation, their means to communicate with the public, as well as an overall evaluation of how their organization was able to communicate during the current COVID-19 pandemic (see orange information boxes, giving an insight into how theoretical aspects of communication are realized in practice).

The feedback from these questionnaires was used to gather information on the true end-user reality regarding their experience of crisis communication. Therefore, it was necessary to first determine which kind of guidelines and communication strategies the organizations provide. Similarly, in order to ascertain the status quo future work that WP5 can build upon, questions were asked on the communications training end-users had received previously as well as the kind of training they felt they needed/wanted to receive.

Further questions addressed the channels and means used to communicate with the public, especially their use and experiences with social media. As it is an aim for WP5 to investigate it, end-users were also asked about their experience with fake news, disinformation and misinformation. In order to determine best practices or trainings in this area, it was vital to enquire how end-users counter misinformation. Lastly, as the current pandemic could be regarded as a communications test, end-users were also asked to assess their organization's ability to communicate during the current COVID-19 crisis, as well as areas that could be improved upon in the future.

In order to protect the anonymity of the participating end-users, returned questionnaires were pseudonymised by using a unique identifier number and a reference list separate from the completed questionnaires. Please refer to D8.2, which outlines the safety measures FRAUNHOFER will implement to prevent unauthorised access to participant's personal data, which will include FRAUNHOFER's plan to pseudonymise the data collected from participants. As all participants are part of the PANDEM-2 consortium, it was not necessary to obtain a separate informed consent and thus the lawfulness of processing is covered by the Grant Agreement for the entire project. The answers to the questions in the questionnaire are discussed in Section **Error! Reference source not found.**.

3.3.2 End-User workshop

Based on the information end-users gave in their questionnaires, end-users were invited to a Pandemic Communication Requirements Workshop on 24/06/2021. The first ambition of the workshop was to facilitate an exchange between end-users, as it was to be expected that communication strategies, guidelines, training and funding may differ greatly between organisations. Secondly, the key aim of the workshop was to contrast key findings of the desk research with current practice of end-users, to determine further gaps between theory and practice.

Due to ongoing travel restrictions posed by the COVID-19 pandemic, the workshop was planned in a virtual format, using the conference software MS Teams and the online whiteboard tool Miro in parallel (for the workshop agenda, see Appendix 7.3). The welcome reception and first brainstorming were held in a plenary joint conference call, to address disclaimers (recording of the workshop, Chatham House Rule (Chatham House, 2021), timekeeping) and to invite participants to introduce themselves.

In a first step of active contribution, participants were asked to create and share practices which they deem would constitute a worst-case communication approach. Here, each participant filled out post-it's in the virtual white board and placed them under pre-set categories. These categories mirrored key categories of the literature research: Trust, Two-way communication, Misinformation and added a free Miscellaneous category. Contributions then were clustered by thematic content in a joint discussion round, where larger thematic clusters highlighted core challenges in pandemic communication. Identifying the big communication fails in this step then set the scene to further discuss alternative strategies and best practices experiences by the end-users.

For this, parallel sessions were created using the break-out room function of MS Teams to simulate a so-called Word-Café workshop environment (based on a workshop concept first described by Juanita Brown, together with David Isaacs (World Café Community Foundation, 2021)). In a real-life workshop, participants would move as a group around the room, from table or station to station. In this case, however, due to travel restrictions, participants would receive a link to a virtual whiteboard and virtually move as a group from board to board to discuss the objective of the board and to add to the findings of the previous group, until each group visited all boards. The boards thematically reflected the core findings of the scenario analysis, which identified the high relevance of tailoring communication strategies to the temporal phases of a pandemic (see Section 4.4.5). Boards thus centred around communication during preparedness, response and recovery phases and were each hosted by a moderator. All groups started in parallel. Participants were assigned to group rooms and remained there, only moving virtually across the overall Miro board to the next board. Board moderators entered group rooms, when a new group would focus on the moderators board. As each group added and progressed the findings of each board, the focus questions for the participants also matured from general to specific:

- Focus round #1: Which examples from the clustered communication fails apply in this phase?
- Focus round #2: In your experience, how can these problems be addressed in positive way?
- Focus round #3: How can these lessons be implemented? What would potentially hinder the implementation?

Final findings and discussion spotlights of each board were summarized and brought back to the plenary for participants to comment. Here, participants were asked whether they can name relevant

guidelines or trainings to address these problems. The workshop ended with a final tour de table, where participants could share novel input that they took from the workshop.

The findings of the workshop are discussed in Section 4.4.5.

4 Results

Pandemic communication requires a particular form of risk communication, which can be defined as a dialogue between people to facilitate a more accurate understanding. It thus requires us to see citizens as entitled to information and democratic participation, instead of regarding them as passive, "ignorant information receivers" (Guan et al., 2021). Consequently, active pandemic communication requires a strong underlying approach encompassing two-way communication. Two-way communication is therefore at the core of modern pandemic communication. As such, we expect any activities regarding communication in pandemic situations to be two-way. This is directly linked to current guidance and recommendations issued by the World Health Organisation (WHO). A report commissioned by the WHO reviewing grey literature on communication found that "Communities should be involved in developing and tailoring interventions, not only at the beginning of a response, but throughout the entire response." (Toppenberg-Pejcic et al., 2018). In order to do so, suggested approaches include barrier analysis (to identify communication barriers hindering behavioural change), use of "social mobilizers", and active listening to identify and address concerns (see 4.3 Knowledge Base III: Commercial Lessons). A best practice identified by the report is the Community Led Ebola Management and Eradication (CLEME) approach (Toppenberg-Pejcic et al., 2018).

The key element for successful communication is clearly distinguishing evidence-based messages from uncertain messages, as this can undermine trust if not done properly (see 4.1 Knowledge Base I: The Concept of Trust in Risk Communication). This can be compounded by the lack of an open communication style that allows for the admission of failures or changing information, as communication in pandemic situations always takes place in a situation of uncertainty (also see 4.2 Knowledge Base II: Misinformation & Disinformation in Pandemics). There is also a link between success of communication measures and the implementation of response measures (see 4.4 Knowledge Base IV: Practical Application of Pandemic Communication). If response measures are lacking, e.g. in quality, speed or resources, this can render communication efforts for behavioural change useless (Toppenberg-Pejcic et al., 2018).

The biggest barriers for open, transparent, interactive two-way communication include top-down communication, stereotyping, and paternalism, as some of these types of communication lead to a breakdown of trust, creation of fear and alienation of local communities. Similar effects can result from intransparency and the use of force (Toppenberg-Pejcic et al., 2018). For PANDEM-2, we see two-way communication as a must. All research conducted and explored in the following Knowledge Bases build on this principle, which aims to establish an understanding of critical factors and means to achieve two-way communication by exploring the concepts of trust, misinformation and include lessons from behavioural science and application.

The four Knowledge Bases subsequently set out different aspects that are vital in achieving transparency, building trust, and ensuring community voices and needs are heard, thus creating accessible yet authoritative public health messages for measures to control a pandemic. We analyse both theoretical concepts as well as applications and guidelines with regards to key take-away messages responsible stakeholders can use for their own work. These findings are enriched with end-user perspectives through a questionnaire and workshop to reflect not just an academic viewpoint, but a broad and interdisciplinary understanding of pandemic communication. The following sections discuss each Knowledge Base in detail. A summary of the results (pandemic communications requirement statements for each Knowledge Base) are provided in section 5, tables 2-5.

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4.1 Knowledge Base I: The Concept of Trust in Risk Communication

4.1.1 Trust as a commodity

Trust building

Effective public communication is vital to ensure implementation of and compliance with public health advice. Compliance, however, requires a high degree of public trust in the information being delivered by respective governments. A major challenge for governments during the current pandemic is the difficulty faced in providing clear and consistent advice, arising from the many unknowns and uncertainties which are symptomatic of an evolving crisis. This initial information lag/inconsistent messaging paved the way for something as dangerous as the virus itself – an infodemic (for more on this, see Section 4.2). The resulting confusion due to mis- and disinformation, especially via social media, compounded by real-time evolution of governmental advice has tested the fragility of citizen's institutional trust.

Essentially, trust, built through effective and accurate information sharing between scientists, policy makers, governments and their citizens, is key to managing a pandemic. As Llewellyn (2020) succinctly states "in times of crisis, trust is the most important thing to consider if you want to communicate health advice". The unique nature of the COVID-19 pandemic has emphasised the importance of institutional trust – a measure of support for, or sustainability of, the political systems and implementation of a wide range of policies (Boda & Medve-Balint, 2014; Newton & Zmerli, 2011). As van Bavel et al. (2020) highlight the personal behavioural change measures required for dealing with health emergencies such as pandemics are difficult to enforce directly: this, in turn, makes trust in public authorities all the more relevant. In the absence of trust, any institutional-directed intervention is likely to fail, as the necessary behavioural change measures, such as wearing a face-mask, frequent hand sanitation, and physical distancing, cannot be effectively monitored or implemented, and therefore rely largely on active public compliance. The positive role of trust in promoting adherence and compliance with preventive regulations and guidance has scientific and psychological grounding.

For example, in addition to confirming the positive relationship of trust in health agencies and willingness to adopt recommended behaviours, Siegrist and Zingg (2014) also recommend that health authorities should actively establish trust during peacetime. This is succinctly described by Lewnard and Lo (2020), stating that

> "The effectiveness and societal impact of quarantine and social distancing will depend on the credibility of public health authorities, political leaders, and institutions. It is important that policy makers maintain the public's trust through use of evidence-based interventions and fully transparent, fact-based communication." (p. 632)

Thus, the confidence, based on past-performance of the health authorities, prove invaluable in the rapid engagement in behavioural change measures (Siegrist and Zingg, 2014).

Using fear in pandemic communication

Trust is a valuable commodity in the response to pandemics. However, institutional trust does not 'magically appear', instead it must be earned, nurtured and its fragility treated with deserved respect. Rousseau, Sitkin, Burt, and Camerer describe trust as "a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behaviour of another" (Rousseau et al., 1998). In their meta-analysis, Witte and Allen (2000) report that appealing to peoples' fear leads to behaviour change if they feel capable of dealing with the threat, but leads to defensive

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reactions when they feel helpless to act. This notion of self-efficacy is another key for facilitating trust and increasing cooperation.

Of course, when faced with a pandemic, emotions such as stress and fear are unavoidable. However, there is a significant body of psychological-based evidence that suggests that feeding into people's psychological fragility may actually be counter-productive. Research suggests that the type or amount of stress does not determine its impact, but rather situational appraisal and mind-sets about the stress can alter its impact (Jamieson et al., 2018; Crum et al., 2020). Indeed, adaptive mind-sets about stress can have potentially positive psychological and physiological outcomes (Crum et al., 2013). In essence, the public should be viewed as part of the solution through harnessing their resilience, rather than part of the problem by assuming psychological frailty. Evidence supports this approach (Drury et al., 2019; Haslam, 2020).

As witnessed during the current COVID-19 pandemic, fear has been a central emotional response. A person's perception of threat to oneself can modulate the level of institutional trust experience. For example, compliance of populations in enacting governmental measures hinges on whether citizens believe advice from their government is in their best interest. A study based on a representative survey in Denmark during the COVID-19 pandemic (N = 1782) demonstrated that the willingness to adhere to physical distancing was positively associated with the perception of threat the pandemic may have on the nation. Results suggest lower levels of political trust and lower generalized social trust are negatively associated with willingness to distance. Younger male respondents with the lowest levels of education and least political trust report lower willingness to distance (Olsen and Hjorth, 2020).

Institutional trust

A recent large-scale analysis of European Social Survey data of 25 European countries (N = 47,802) during the COVID-19 pandemic, also suggests that institutional trust acts as a protective factor (Oksanen et al., 2020). Specifically, countries with pre-pandemic low levels of institutional trust experienced significantly higher mortality rates during the crisis. Interestingly, it was reported that governments of countries with low institutional trust introduced restrictions later than those with higher levels of institutional trust, which contributed to the rate of mortality experienced. The importance of trust as a protective factor is not unique to COVID-19. Other studies arising from the Ebola crisis demonstrate that low institutional trust and belief in misinformation were associated with decreased engagement in preventative behaviour, including vaccination (Vinck et al., 2019). Further, during the Ebola outbreak, trust in the Liberian government was positively associated with decisions to comply with directed physical distancing policies (Blair et al., 2017) and use of health services (Morse et al. 2016). Vinck and colleagues (2019) also highlight the relationship of trust in facilitating uptake of preventative measures, such as vaccination, during the Ebola crisis in the Democratic Republic of Congo.

However, the role of trust as a protective factor is not unilateral, as is evidenced by the negative effects reported in situations of low institutional trust, or circumstances where trust is 'broken' (Wardman, 2020). Further, it is worth noting that high institutional trust, or 'too much trust' can be potentially detrimental for public compliance with governmental guidance. In this instance, it was reported while Singaporeans record high institutional trust, this led to a decreased perception of risk by the public, which gave rise to increased risk-taking behaviours, and decreased compliance with government guidance (Wong & Jensen 2020).

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It is worth mentioning that trust in science also plays a role in pandemic response communications, and interacts with institutional trust. Trust in science can significantly increase acceptance of protective measures such as physical distancing and hand sanitation etiquette. In the same study, institutional and scientific trust significantly impacted adoption of protective measures such as facilities closures (Dohle et al., 2020). In support of these observations, Plohl and Musil (2020) investigated whether and how risk perception and norm compliance may be influenced by several constructs (e.g. religious orthodoxy, or trust in science) during the COVID-19 pandemic. Trust in science and COVID-19 risk perception (but not the other variables) significantly and directly contributed to explaining compliance with COVID-19 prevention guidelines (R^2 = 0.265), suggesting that people that perceive COVID-19 as a serious threat, and have greater scientific trust, are more inclined to cooperate with proposed guidelines. This is also supported by the current recommendation for health emergency communication by the Centers for Disease Control and Prevention (CDC) Epidemiology Field Manual where it is suggested that familiarity breeds trust, therefore there should be a lead spokesperson whom the public gets to know (Rasmussen & Goodman, 2019). This is further underlined by recent evidence arising from the current pandemic (Abu-Akel et al., 2021). Importantly, it is suggested that the lead spokesperson should be a scientist/medical professional, which will help avoid issues of political polarisation.

4.1.2 The role of trust in pandemic communications

Communication objectives

One of the major challenges of pandemic communications, to paraphrase The New Yorkers Charles Duhigg (April 26th, 2020), is that epidemiology is essentially a science of probabilities and persuasion. Therefore, the challenge of pandemic communications is to convince people to cooperate with guidelines, in a landscape where information can be initially scant, evolves and requires response in real-time, meaning best-practices change frequently. It is worth noting that importance and difficulty of pandemic communications is nothing new. In fact, in their Field Epidemiology Manual, the CDC contains a dedicated chapter to health emergency related communications. This manual provides excellent practical evidence-based guidance on communication strategies, with harnessing trust as a central tenet behind many of the recommendations.

As outlined in the CDC Field Epidemiology manual, a Single Overriding Health Communication Objective should be identified and clearly and succinctly stated at the beginning and end of any public health statement. In order to enhance shared identity, the spokesperson should empathise with the public's concerns, acknowledging the range of emotions and challenges faced. Transparency is key to maintaining trust. Part of this can be enacted through prototypical behaviour. For instance, if the advice is to wear facemasks, then every member of the trusted institute should be seen to abide. In addition, a definitive effort should be made to explain the information known and importantly, what is not yet known. Excessive assurances and hollow promises will just erode the public's institutional trust, thus making subsequent interventions doomed for failure.

Encouraging preventive behaviour

Previous work on infectious disease outbreaks such as SARS, H1N1 influenza and MERS have demonstrated a direct association between perceived threat and adherence to mitigating measures. Beyond the theoretical models, however, is the effect of our emotions in situations of perceived threat. Indeed, emotions have a prevalent function in guiding information processing that underlies the

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perception of risk and benefits (Finucane et al., 2000). An understanding and incorporation of the key principles driving preventative behaviours, are therefore, key for the successful delivery of preventative behaviour messaging in crisis communication, especially when mass adherence, such as facemask wearing, social distancing etc. are required to ensure their effectiveness (Eikenberry et al., 2020; Hsiang et al., 2020).

Studies have demonstrated that due to the lack of, and changing information associated with psychologically highly threatening situations, such as pandemics, the role of emotions, particularly negative emotions such as anxiety, becomes even more important (Leppin & Aro, 2009), and have been correlated with uptake of preventative behaviours. Of particular relevance here is that emotional response and threat perception to a situation such as a pandemic can be intensified by how it is communicated. Specifically, media coverage has a significant and vital role to play in the communication of risk. For instance, research has shown that the intense media coverage associated with crisis situations such as COVID-19 can increase risk perception (Rubatelli et al., 2020). Nonetheless, in early stages of the response, the media in a number of countries compared COVID-19 to seasonal influenza virus. This comparison may be effective in terms of symptoms and behavioural interventions required to curb spread such as isolation, hand sanitation, physical distancing, however, from a medical and psychological perspective, these two diseases differ greatly. Psychologically, this initial media coverage comparing seasonal influenza and COVID-19 created a familiarity with the disease that was unfounded and likely generated an undervaluation of risk. This is supported by recent evidence that underlines the importance that effective risk communication during pandemics should not stress comparisons to other, well-known viral diseases, as this can ultimately reduce self-protective behaviours (Vacondio et al., 2021).

Interestingly, the best practice recommendations on crisis communication in areas such as pandemic response have not evolved dramatically over the years. During the SARS outbreak in 2003, evidence-based crisis communication best practices were developed founded on key tenets such as openness, clarity of speech and honesty. These key guidelines still hold true, however application of said guidelines are often significantly influenced by leadership, which will now be explored.

4.1.3 Leadership and shared identity as a means of fostering trust

"Good communication practices will not substitute for poor planning or misconceptions"
(Nicola et al., 2020, p.123)

The Pan-American Health Organisation (PAHO) argues that two of the most productive pandemic **preparedness** measures that an organisation can make is to (a) establish a crisis emergency response team with a communications expert as one of its key leaders and (b) develop a crisis communications response plan. A first step within the plan should be to appoint a communications coordinator and a media spokesperson who will work in a symbiotic relationship. The role of the leader or spokesperson is to communicate with the public and the media "the most important messages at every step of your pandemic response" (Pan-American Health Organisation, 2013).

Leadership in a Crisis

Clear communication in the context of a pandemic can never occur too early or too often (Hooker & Leask, 2020; Beilstein et al., 2020). Australia's initial COVID-19 response plan was timely released in late February 2020 however, it contained a 'risk communications vacuum' of non-credible sources. Unfortunately, the science and health community failed to communicate credibility and transparency

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in the first instance causing public stockpiling and panic. Thus, it was argued that clearer communication in the earliest instance which engaged the diverse group of stakeholders could have mitigated such behaviours (Hooker & Leask, 2020). This is in line with recent research on strategic crisis management when dealing with a high degree of uncertainty, either through unknown unknowns (black swan events, i.e. events which come as a surprise with severe consequences, which was in hindsight bound to happen) or unpredictability as a result of high complexity and dynamic events. In such situations, research points to quick action and sense-making through communication as viable tools (Ansell & Boin, 2019). Because of her swift and decisive action very early on, New Zealand's Prime Minister Jacinda Ardern has often been referenced as an example of effective and trustworthy leadership during the pandemic (Kerrissey & Edmondson 2020). For a further examination New Zealand as a case study of effective leadership and further examples of good communication during the COVID-19 pandemic, see Appendix 7.4.

In summary, a good crisis leader will communicate the essential information their target audiences need to protect themselves. In doing this, they must acknowledge the fact that they are responding to the crisis without over re-assuring the public (Pan-American Health Organisation, 2013). Inaccuracy will be inevitable as circumstances develop but instead of avoiding this, crisis leaders must address any cases where information is not absolute or awaiting further expert confirmation. Effectively, this will reduce the risk of emphasising misinformation. Honesty and transparency will increase public trust particularly when control of a pandemic depends on the public's compliance with health recommendations.

Shared identity leadership

The current COVID-19 response has demonstrated with great clarity that pandemics are as much about psychology as they are about biology. The uncertainty that arises during a pandemic highlights the importance of social identity and cohesion, resilience and mass cooperation of the people. This intricate relationship between a people and their nation is a crucial factor in pandemic management (Baniamin et al., 2020; Frey et al., 2020; Lin et al., 2020; Lofredo, 2020; Rudolph et al., 2020; Silbey et al., 2020). A sense of 'we-ness' is difficult to achieve without a sense of trust in leadership. One could argue therefore that while the message to be delivered is important, how it is delivered, and by whom may be of equal if not greater importance in terms of acceptance and eliciting pro-social behavioural change (Fischhoff et al., 2005).

There have been significant shifts in leadership psychology in recent years, with theory and evidence supporting a 'new psychology of leadership' that emphasises leadership operates effectively through mechanisms such as communication, influence and persuasion (Haslam et al., 2021), rather than traditional transactional leadership approaches which exact compliance via unidirectional, top-down communication and leadership. Social identity leadership advocates for a sense of togetherness and shared purpose (Jetten et al. 2020), such as by making salient how a particular hazard poses a risk to all, and how in turn everyone may need to unite in action in the collective interest to mitigate a shared threat (Drury et al. 2019). A more comprehensive overview of the psychological theory and evidence-based research supporting application social identity leadership can be found elsewhere (Haslam et al., 2021). Figure 1 and Figure 2 illustrate and summarize important aspects of shared identity and leadership. Nonetheless, there are several important considerations in terms of effective pandemic communications that should be highlighted.
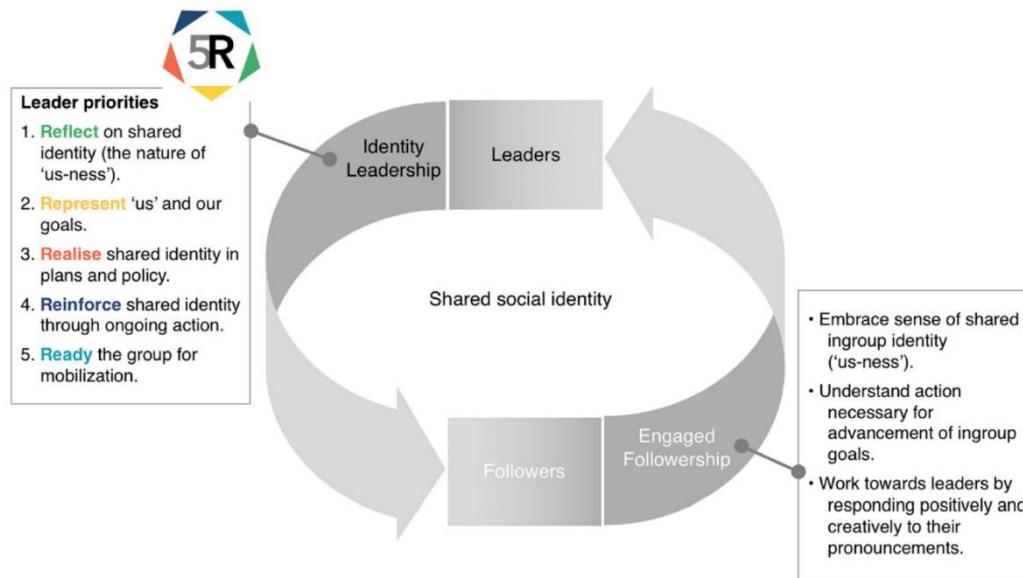
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Figure 1: Lessons of leadership in the context of the 5R approach to shared identity leadership (Haslam et al., 2021)

5R approach to shared identity leadership
Priority 1: Reflect on Shared Social Identity
› Leaders will be in a better position to manage a crisis effectively if they focus on achieving power through followers
› Leaders who treat groups as the solution to a crisis are likely to be more effective in harnessing the power of those groups.
› Leaders will be more likely to encourage adherence with their policies if they recognize that people can be resilient but need to understand what they are being asked to do.
Priority 2: Represent "Us" and Our Goals
› Leaders secure followership by building, and drawing on, a sense of shared social identity (a sense of "us").
› Leaders will be more effective if they treat group members, respectfully, fairly and as equal partners.
› Leaders will be more likely to encourage broad support for their policies if they advance a broad and inclusive definition of their ingroup.
Priority 3: Realize Shared Identity in Plans and Policy
› Leaders will be more effective if they implement policies that are sensitive to the differing circumstances of different group members.
Priority 4: Reinforce Shared Identity through Ongoing Action
› Leaders maintain support through the ongoing distribution of resources to those who most need them
› Leaders will be more effective and seen as more charismatic if they are associated with the achievement of outcomes that are highly valued by those they lead.
Priority 5: Ready the Group for Mobilization
› Leaders will be more effective if they have done the groundwork to prepare their group materially and psychologically for a crisis.
› Leaders will be more effective if they are attuned, through practice, to the needs of the group they lead.

Figure 2: The 'new psychology of leadership' (taken from Haslam et al., 2021)

In terms of pandemic crisis response, the collective experience of being affected by a health emergency such as a global pandemic, gives rise to a sense of shared identity (Drury et al., 2009). This has been particularly evident during the initial emergency response phase of COVID-19 where the realisation of

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the severity of the situation increased, so too did the sense that COVID-19 is about 'we' and not about 'me'. Indeed, using the nuances of psychology to harness public cooperation in health-related matters, has precedent (Carter et al., 2015). Notable examples of leaders enacting a sense of shared identity are for example, the German Chancellor Angela Merkel and Irish Prime Minister Michael Martin, who self-isolated after being informed of being a COVID-19 close contact. Similarly, New Zealand's Prime Minister continuously emphasized the 'team of five million' (see Appendix 7.4) as an image of shared identity and unity in the fight against the COVID-19 pandemic.

Trusted leadership

On the other hand, if leaders are perceived as putting their own interests first, it will undermine the sense of shared identity of the group. This will reduce trust and influence the leader has and consequently, leaders become less effective as they may no longer be perceived as being part of the social in-group (Haslam, 2020). The handling of 'Cummings-gate' by UK Prime Minister Boris Johnson is case in point. Johnson's refusal to terminate Dominic Cumming's position as chief advisor after Mr Cumming's explicitly and inexcusably broke lockdown regulations resulted in a significant decrease of 19% in trust in Johnson's leadership to provide accurate information over 6 weeks (Fletcher et al., 2020). In terms of social identification, members of the public that perceived Cummings (and by association the UK government) to be part of their in-group (the group to which they identify) could construe Boris Johnson's' actions as normative, and may be more inclined to non-comply with restrictions. In contrast, those who identified Cummings and the government as the out-group were more likely to comply with restrictions, as his behaviour was regarded as anti-normative. Leadership and public health messages during pandemics must therefore define the normative content of relevant social identities.

Social norms

Psychologically, our behaviour is moulded by social norms – the social behaviour or 'rules' we consider appropriate (Cialdini & Goldstein, 2004). In this context, people will be inclined to do what is 'right' if it aligns with the in-group to which they identify. In part, this is why the use of respected sports stars or popular TV personalities can be beneficial in reinforcing health-related measures. If a person identifies with a particular sport star, their behaviour (e.g., washing hands, wearing a mask) is deemed as part of the in-group social norms (acceptable behaviour) and is more likely to be enacted by the individual.

However, in the event an environment becomes less stable, such as that experienced during a pandemic, the importance of a person's self-certainty arising from their social identity is likely to become more prominent as well as more vulnerable, and feeds into the threat to oneself as discussed. Often, as observed during COVID-19, in uncertain times citizens, perhaps in an attempt to reduce uncertainty (Hasel, 2013) and regain a sense of limited control (Rothbaum et al., 1982), turn to their leaders for direction. Studies suggest that in crisis situations, people seek out action-orientated leadership (and perhaps even more authoritarian leadership than normal) (Hasel, 2013), in addition to having greater trust in political leaders and their decisions (Kay et al., 2008).

Theoretically, a social identity approach suggests that leadership that provides a meaningful translation between social identity and the normative context for behaviour will be most significant (Haslam, 2020). However, leadership and subsequently communication are impacted by the uncertainty posed by pandemic situations. Embracing uncertainty in leadership and communication,

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focussing on rapid action and sensemaking while processing information as it emerges, rather than waiting for a full information picture that never arrives, is advisable. This can facilitate trust, as sense and meaning emerge in an open and iterative way and are thus always based on available knowledge, rather than generalised and potentially wrong information derived from other situations (Ansell & Boin 2019). We have seen in theory and practice that during the uncertainty of a global pandemic, superordinate self-categorisation (Turner et al., 1987), i.e. a high-level category that subsumes a number of basic-level categories such as categorising one's self as a European citizen instead of Spanish, Polish or Danish, supports the salience of national and global leaders. In terms of crisis response, a leader's ability to frame response efforts enhances how prototypical they are perceived to be of the superordinate group (e.g. their country). This approach thus supports their citizen's perception of their leaders as embodying the in-group's new and/or reinforced social norms (Hogg, 2001; Abrams et al., 2008). Evidence would suggest that these effects may manifest as increases, albeit temporary, in trust in leadership even in countries traditionally defined by low political trust (Ipsos, 2020; Falcone et al., 2020).

Fractured group identity & distrust

Importantly, in terms of crisis response it is vital to recognise that as a crisis persists and life is continually pervaded by uncertainty, there will be an inevitable fluctuation and/or diminishing of superordinate in-group identification. We observed this during COVID-19 where initial adherence and identification with a common fate became challenging in light of varying forms of lockdowns, healthcare guidelines and socioeconomic inequalities that led deviation from the superordinate in-group leading to additional stigmatisation and blame based on their perceived risky behaviour and increase disease vulnerability (Jetten et al., 2020). Similarly, as vulnerable groups become more aware of how they are marginalised by the agenda of the superordinate group, the initial common identity shared is likely to become fractured, and therefore less effective for change. Indeed, prejudice towards particular minority groups increases in conditions of socio-economic decline and increases uncertainty (Abrams & Vasiljevic, 2014). The recent COVID-19 pandemic has all too clearly demonstrated how fragile this relationship is. With public discontentment and increased uncertainty due to persistence of the pandemic, we witnessed shifts in public perception from empathising with groups of high vulnerability (e.g., ethnic minorities, those in lesser secure socio-economic positions) to increased scrutiny and criticism of these group behaviours for not respecting health guidelines (Jetten et al., 2020). In broader terms, we have also observed tensions between newly salient in-groups and out-groups such as for instance, people working from home versus those returning to the workplace, and people wearing face masks versus those who do not (Abrams et al., 2021).

Social inequality has proven to be a critical gap in pandemic response efforts. In particular socio-economic position and racial inequality have significant impact on institutional trust, and by consequence, cooperation. The current COVID-19 pandemic has once again highlighted the longstanding legacy of institutional distrust based on experiences of discrimination that members of racial and ethnic minority communities have experienced (Alesina & Ferrara, 2002; Farrah & Saddler, 2020). For example, traditionally in a health emergency, members of racial and ethnic minorities have higher rates of illness and death (Harding et al., 2015), which is reinforced with findings during the COVID-19 response (Garg et al., 2020; Office for National Statistics, 2020). In addition, for racial minority groups maintaining adequate physical distancing, (despite a willingness to adhere to the measures), may not be practical given that racial minority groups are more likely to live in multi-generational households and/or densely populated areas (Loftquist, 2012, Bravo et al., 2018), and face

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increased risk for being fined for breach of guidelines (Gidda, 2020). Similarly, families of low socio-economic status have been found to be six times less likely to be able to work from home and three times less likely to be able to self-isolate (Atchison et al., 2020). Therefore, it is fundamentally key for effective pandemic communication strategies that leaders create a sense of responsibility towards each other by appealing to shared norms without further marginalising higher risk and vulnerable groups and underlines the recommendation for civic engagement during health emergencies such as pandemic (Templeton et al., 2021), as a mode of developing targeted social norm 'strategies'. Precedent for this type of approach can be found elsewhere (e.g. Eliason et al., 2012).

It is recommended that the spokesperson acts as the human voice of the crisis response and understands the shared purpose in delivering it through confidence, credibility and trust (Pan-American Health Organisation, 2013). Academic and commercial views agree that a unified sense of purpose should be communicated by an empathetic leader on one hand and engage stakeholders early and often on the other. In effect, this will not only help navigate the crisis response but create improved trust and credibility by acknowledging the audience's self-efficacy in the face of the pandemic (Gast et al., 2020; Hooker & Leask, 2020).

Furthermore, the leading spokesperson must be identifiable. Ratzan, Sommariva and Rauh's (2020) state that a *recognised* leader should be selected by following the identification of a clear set of shared goals. Zerfass et al. (2018) state that effective strategic communications can often be determined by how much the organisation's values are embedded in society and linked to cultural values. Therefore, we can argue that it's essential for a crisis spokesperson to have the necessary skills and characteristics, but it is also important that they are 'culturally regulated' (Marsen, 2019).

Fortunately, the guidelines for managing and leading a crisis response have not undergone any drastic changes over time apart from having to adapt to the digital age. Therefore, in reviewing recent guidelines following major pandemics such as Ebola, MERS and COVID-19, a recurrent list of best practices for good leadership in a health crisis has emerged:

·   Engage in clear communication
·   Aim for credibility
·   Communicate openly and honestly
·   Communicate with empathy
·   Address uncertainty
·   Proactively combat misinformation
(Hyland-Wood et al., 2021)

One issue that arises from a legacy of distrust is that citizens may be more susceptible to disinformation, foregoing public health advice and government-based guidelines in place of a more identifiable 'expert'. In addition to being considered an expert authority to advise, source credibility arises from how trustworthy an individual is perceived to be (O'Keefe, 2016). In terms of facilitating behavioural change, the recruitment of trusted voices has been shown to be beneficial and provides an effective means in the delivery and uptake of health-related messaging. Evidence from the Ebola epidemic in West Africa 2014-2015 demonstrates the effectiveness of complimenting public health messaging from national leaders and health officials, with local trusted voices in increasing the success in the adoption of recommended public health measures. In this instance, cross-sectional religious leaders were recruited and advocated for behavioural change tactics such as hand-washing and safe burial practices. Further, dedicated treatment facilities employing community liaisons to engage with

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local communities to help resolve misconceptions and raise awareness of the disease were associated with increased case reporting (Christensen et al., 2020). The impact of enrolling these trusted voices was considered a pivotal strategy in responding to, and managing the crisis (Greyling et al., 2016).

For a health communication strategy to be effective, it is therefore vital that it recognises the concerns and values of diverse populations, in particular vulnerable groups, and that delivery of information is tailored to consider these needs. This is not a novel concept (e.g. https://www.covinform.eu/) and current best practices suggest that specific population cohorts, such as children, older (+70 years, and those living in residential care homes) and younger adults (18-30 years), hearing- and vision-impaired, gender diverse and immunocompromised patients should be explicitly considered for government-orientated community engagement (e.g. Hyland-Wood et al, 2021). Of course, in the midst of a pandemic response, civic engagement falls down the list of priorities while institutions focus on disease-impact and mitigation. We should be mindful however, that institutional trust is suggested to decrease among people that have experienced a disaster (Thoresen et al., 2018). Moreover, a significant association exists between institutional trust and people's quality of life and well-being (e.g., Boda & Medve-Bálint, 2014; Ciziceno & Travaglino, 2019; Piumatti et al., 2018). Therefore, investment during phases of pandemic preparedness should be dedicated to civic engagement, particularly with more vulnerable and at-risk groups. This pre-investment of time and finances is necessary to identify shared values in advance of crisis situations, thereby further legitimising pandemic response strategies beyond generic emergency responses. At this stage of the COVID-19 pandemic, the point of recovery is becoming clear. It is imperative therefore, that leaders build-on public participation and wider-community engagement to ensure that the concerns, values and considerations of these communities are understood and incorporated into pandemic communication and response strategies to avoid further marginalisation in times of crises (Hyland-Wood et al., 2021).

4.2   Knowledge Base II: Misinformation & Disinformation in Pandemics

First and foremost, it is important to outline the differences between misinformation and disinformation. Misinformation refers to information that is false but not created with the intention of causing harm, while disinformation is information that is false or based on reality but deliberately created to harm a particular person, social group, institution, or country (Chou et al., 2018).

The spread of misinformation and disinformation is heightened during an 'infodemic'. An infodemic is an overabundance of information that occurs during an epidemic (World Health Organization, 2020). In the 21st century, an infodemic can occur easily as information can spread at lightning speed to other parts of the world due to the interconnected ways in which information is disseminated across traditional (TV, newspaper, radio, word of mouth) and non-traditional (social media, web, chat apps, etc.) communication channels (Tangcharoensathien et al., 2020). The use of non-traditional communication channels as an information source is naturally increasing with the number of individuals worldwide using the internet increasing 8-fold from 412 million people in 2000 to 3.42 billion in 2016 (Our World in Data, 2017). These figures suggest that living in 2021, we are exposed to an abundance of information, which can be difficult for many to navigate during an anxiety-inducing period that is a pandemic.

The spread of false news, whether intentional or not, can be harmful to life and exacerbate the outbreak. Therefore, it important to establish guidelines to manage and mitigate an infodemic along with ensuring the public have the knowledge and opportunity to access accurate and reliable information from credible sources. For effective pandemic risk communication to occur, public health

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agencies and governments should identify the 'best-practices of listening and two-way communication with the public' by considering the guidelines/concepts (in relation to misinformation/disinformation) that address all the stages of pandemic risk communication. WHO recognises that there is no one-size-fits-all approach for effective Risk Communication & Community Engagement (RCCE). They outline that one of the key challenges in 2021 is to counter and build resilience to misinformation, particularly in relation to vaccines:

> *"Coordinated, adaptive, innovative, and localized approaches to engage and empower communities will be crucial to achieving the strategic objectives of the SPRP [Strategic Preparedness and Response Plan] 2021"* (World Health Organisation, 2020)

The following sections will take a closer look at strategies to combat and deal with mis- and disinformation, especially in the context of pandemic communication.

4.2.1 Sender

Trust

Sources perceived as credible are more persuasive. Therefore, enlisting trusted voices has been shown to make public health messages more effective in changing behaviour during epidemics (Van Bavel et al., 2020). The concept of trust in pandemic communication has been discussed in more detailed in Section 4.1. It may sound obvious, but trusted voices are required to communicate effectively to the public.

Strategic Planning by Governments & Authorities

Overarching such activities is strategic planning by governments and authorities, which is central to enhancing preparedness. In 2018, Europe had a 73% preparedness capacity, which is level 4 (out of 5) on the Preparedness Index (World Health Organisation, 2019). Risk communication has been identified as a persistent bottleneck from the previous report in 2010, but nothing has been implemented (World Health Organisation, 2019).

According to the WHO, the following components should be included in strategic planning for communication: Communication networks in preparation for events; Communication training/updates/assessments; Pre-positioning communication resources/materials; Mechanisms for monitoring & assessing the effectiveness of messages; Engage with local stakeholders for communicating key messages; Early preparation & planning with key stakeholders (World Health Organisation, 2020).

More concretely, it is advisable to establish an infodemic task force to design and implement a decision-making tool to decide if, when and how to counter mis- and disinformation. Such a task force could also be used to identify misinformation early using social listening systems and to address rumours. It could also help disseminate messages/materials in local languages and via relevant trusted communication channel. Such strategies, that are crucial to effective response, recovery times, and financial and political stability during a pandemic should include transparent governance, community vigilance & well-developed communication channels (Fakhruddin et al., 2020). For a more detailed listing of effective and ineffective strategies, see Appendix 7.5.1.

Leadership Communication & Community Engagement

Apart from planning, leadership communication and community engagement are needed to fill strategies with life. The concept of leadership communication is further elaborated on in Sections 4.1.3 and 4.3.2. In short, community leaders need to be involved in the risk communication plan from the outset and in decision-making activities i.e. need to engage in two-way communication.

It is a strong recommendation from the WHO to include community leaders in the decision-making processes around risk communication to ensure a collaborative approach and to build trust with the public (World Health Organisation, 2017). The recommendations are:

- Engage with local leaders (traditional & non-traditional communication channels)
- Tailor interventions and campaigns to specific target audiences
- Community encouraged to create own interventions
- Listening and two-way communication
- Use local media
- Use visual aids, role play and story telling

Lilleker and colleagues outline how the leaders in various European countries approached the first wave of the COVID-19 outbreak, how they engaged with communities, and what were the positive/negative outcomes of their actions (Lilleker et al., 2021). While it may not be directly linked to misinformation, the lessons learned will contribute to the PANDEM-2 guidelines (Summary in Appendix 7.5.1).

4.2.2 Information & Messaging

Misinformation & Disinformation

In his statement, the Director General of the World Health Organisation summed up one of the biggest challenges of the pandemic, which ironically, was not remotely health related. Quoting the newspaper, The Guardian he stated: "Misinformation on the coronavirus might be the most contagious thing about it" (World Health Organization, 2020c). Indeed, the unrivalled prevalence of "fake news" appears to have contributed to increased political polarisation and decreased institutional trust (Persily, 2017; Tucker et al., 2018). Evidence suggests that in the situation of a large life-changing event, such as a pandemic, people tend to try to make sense of the event by explaining with equally dramatic causes, becoming more inclined to give credence to disinformation and conspiracy theories, especially when fundamental psychological needs are frustrated (Douglas et al., 2007; Leman & Cinnirella, 2007).

> **Q11: How relevant are fake news, disinformation and misinformation for your daily work in communicating with the public?**
>
> Across the board, all end-users regard fake news and dis-/misinformation a very relevant topic in communicating with the public. Efforts are being made to delete or refute them as soon as possible, having been confronted with the dangers and effects since the beginning of the pandemic.

Infobox 1: Misinformation and Disinformation

In response to the severity of impact the prevalence of disinformation, there is a concentrated research effort attempting to understand and counter this phenomenon (see Infobox 1). One such intervention strategy involves fact-checking and correction (Lewandowsky et al., 2012). Claire Wardle (2020), a leading specialist in the spread of disinformation and founder of the First Draft News project, suggests that

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"The best way to fight misinformation is to swamp the landscape with accurate information that is easy to digest, engaging, and easy to share on mobile devices. It should also answer people's questions and, ultimately, fears. It's the vacuums that are creating space for rumours to run wild."

Another preventative method with scientific grounding is the process of 'nudging' people to consider the accuracy of the information they receive, which is linked with reducing the belief in disinformation in social media headlines (Bago et al., 2020). Van Baval and colleagues (2020) suggest that this could be done via social media platforms that could ask (nudge) users to assess the accuracy of randomly selected posts, the results of which could be beneficial for identifying sources of disinformation. A precedent for such an approach has been established using crowdsourcing to rate trustworthiness (Dias et al., 2020).

However, given the volume of information that is generated during a crisis situation such as a pandemic, fact-checking all sources of mis- and disinformation is unrealistic. This may lend support to the concept that sources of misinformation that are not fact-checked, may potentially increase their believability. In addition, there is evidence to suggest that fact-checking may potentially fall foul of the 'back-lash' phenomenon, whereby counter-attitudinal arguments reinforce individuals' initial opinions or beliefs, rather than abating them (Guess & Coppock, 2019). However, there are arguments against the extent to which this phenomenon may occur (Wood & Porter, 2019).

One could argue that having the information correct at the start may counter many of these issues. And while that is the ultimate goal, in reality the dynamism of a pandemic scenario, the real-time shifts in information and resulting changes to guidelines communicated, prove challenging to this goal. However, there are several interventions that have proven useful in at least partially addressing this issue. For instance, evidence suggests that it may be possible to pre-emptively protect, or psychologically 'inoculate' public attitudes against misinformation (e.g. van der Linden et al., 2017), thus avoiding 'back-lash'. This approach of 'pre-bunking' has scientific merit. For instance, a meta-analytic study has found that inoculation messaging was superior to supportive messages and no treatment controls at protecting attitudes against persuasion (Banas & Rains, 2010). This strategy also has some 'real-life' evidence in the form of the online game Bad News (https://www.getbadnews.com) which has been used, particularly in schools, to reduce susceptibility to misinformation (Basol et al., 2020).

Fact-checking

Fact-checking is another key practice to prevent infodemics. Its purpose is to educate the population about misinformation and disinformation so that they are able to identify and stop false information spreading (World Health Organisation, 2021). However, findings from a recent study suggest that for the majority of countries (6/8) response to misinformation is loosely organised, with Belgium and Sweden being more strictly organised (Torpan et al., 2021). Formal guidelines/regulations for dealing with the challenges of misinformation, in the context of emergency management, exist in Sweden, Norway, Estonia and Finland. In addition, findings from an exploratory study suggest that fact-checking is not the norm with false claims propagating faster

Q12: How do you deal with fake news, disinformation and misinformation?

Strategies to tackle misinformation are very consistent throughout end-users. All of them regard it as a serious and relevant issue that needs to be solved. Being trusted voices by the public, the end-user organizations are able to credibly dispute and correct false information. Monitoring social media posts, providing shareable content with correct information and in extreme cases, notifying federal authorities like the Ministry of Health are the most common strategies.

Infobox 2: Strategies against Disinformation

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than partially false claims (Shahi et al., 2021). Therefore, in the current information dense society we live in authorities and governments need to address and highlight the importance of fact-checking and this section will outline some of the potential mechanisms to achieve this. Infobox 2 gives a brief glimpse into the methods and strategies PANDEM-2 end-users are employing to counter mis- and disinformation.

Based on a study conducted on the infodemic in times of the COVID-19 pandemic, Tangcharoensathien and colleagues developed several recommendations and guidelines on how WHO member states, as well as societal actors can employ to ensure "that we promote trusted information and fight misinformation, thereby helping save lives" (Tangcharoensathien et al., 2020):

- Foster **dialogue** between public health organizations and local journalists to raise the capacity of local media to use verified information
- Develop tools and guidance to **disseminate trusted information**
- Develop tools and standards for **assessing the integrity/accountability** of fact-checking initiatives
- Build **capacit**y for **promoting** trusted content and fact-checking
- Support **collaborative development** of **integrated resources** on risk communication:
    - Global **resource centre**
    - Infodemic **dashboard** for emergencies & for systemic issues such as vaccine mistrust and misinformation
    - Support the **propagation of updated information** via networks & activities

Other aspects to consider in relation to promoting fact-checking are based on a study by Torpan et al. (2021). It examined various institutional emergency management approaches to dealing with false information in Europe, not specific to biological outbreaks (Torpan et al., 2021). Lessons learned from countries on approaches to false information include:

- **Campaigns with evaluation procedures** would allow for early identification and rapid response to counter misinformation (International Federation of Medical Students' Association, 2020).
- Use **healthcare professionals** and well informed/trained medical students to decrease the impact of misinformation and raise awareness (International Federation of Medical Students' Association, 2020).
- **Educate the population** about mis/disinformation to ensure that they are part of the solution and able to identify and stop mis/disinformation (World Health Organisation, 2021); Provide media literacy training and organise public awareness campaigns (Torpan et al., 2021)
- Detection of problematic issues in media helps to mitigate the spread of possible false information – social media is the primary channel for disseminating false information (Torpan et al., 2021)
- Provide media literacy training and organise public awareness campaigns (Torpan et al., 2021)
- In the preparation stage, decide whether a centralised or decentralised response is adequate for the demographic of country and previous exposure to misinformation (Torpan et al., 2021)

Example of Campaign/Initiatives Ireland:

1) BeSmartMedia campaign. This campaign is run by Media Literacy Ireland and supported by academia, media organisations and big corporations such as Google, Facebook and Twitter. However, no there is indication of how this programme is being monitored.
2) In May 2021, RTÉ News launched a brand-new podcast series *The Truth Matters: A Guide to Misinformation*, which is presented and produced by two journalists.

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In general, a relationship and dialogue need to be fostered between public health agencies and the media. Tools and resources are required to disseminate trusted information and to monitor fact-checking initiatives. The public should be educated to engage in fact-checking when presented with information.

Content

Risk communication should openly address uncertainty, describe the level of risk, and respectfully address public fear and concern (World Health Organisation, 2021). Below the key points from three different sources will be presented.

Consistent messaging should, according to the WHO (World Health Organisation, 2017):

- Come from different information sources as message will be believed and acted upon.
- Promote specific and practical actions that people can take to protect their health

According to the UK's National Health Service (NHS) Pandemic Flu Communication Strategy (Department of Health, England and Health Departments of the Devolved Administrations of Scotland, Wales and Northern Ireland, 2012):

- Social media should be monitored, with content then needed to be adapted/created as required in response to the public's needs. Engagement & effectiveness assessed.
- Until the characteristics of an outbreak are better known, the communication plan needs to remain flexible and pragmatic, while being straightforward to implement.
- Use tracking surveys (national/regional level) to ensure communication message is reaching all members of the population, especially those most vulnerable.

The WHO COVID-19 RCCE guidelines call on authorities to (World Health Organisation, 2020):

- Ensure consistency in information and language from all partners
- Inform the general public how the public health agencies are responding, monitoring, detecting and preventing the spread of the outbreak
- Ensure effective feedback mechanisms are in place and utilised (two-way communication)

Studies have found the way probabilities are communicated significantly influence message uptake within the population (Visschers et al., 2009). Thus, messaging needs to be constantly checked against current scientific evidence on psychological factors influencing message uptake. Amongst the recommendations in this regard is, for example, to include step-by-step descriptions of probability calculation, making the resulting numbers more easily comprehensible and reducing the blackbox effect. Furthermore, conclusions from studies on probabilistic risk communication indicate a strong need to specifically tailor risk communication regarding based on contents and the context/situation to effectively get the intended message across and have an impact on people's actions (Visschers et al., 2009). Risk and probabilities should thus not be explained in technical terms, as this is not helpful for promoting risk mitigation behaviours (World Health Organisation, 2017).

Detailed recommendation/guidelines also exist for communicating when dealing uncertainty (Paek & Hove, 2020; World Health Organisation, 2017):

- Authorities should explicitly communicate uncertainties associated with risk, events, and interventions, but information should be consistent and not contradictory
- Positive interactions among and between stakeholders is paramount - some convergence of opinion before scientific views are communicated to the public.
- When scientific disagreements persist, explain why and in which specific contexts

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- Authorities should carefully consider the long-term messaging goal/output - provide <u>currently</u> known health and risk information repeatedly and regularly.
- Consider how to communicate both desirable and undesirable outcomes
- Co-ordination with mass media, as new information on the event is being frequently published by them and this may be different than the most recent official information.

National public health authorities should consider adopting an "uncertainty-normalizing" communication strategy as opposed to traditional public communication strategies (promoting hope and prosocial values), as findings from this study revealed that "uncertainty-normalizing" is a more effective strategy for mitigating ambiguity aversion (preference for known risks over unknown risk) in crisis communication efforts. (Han et al., 2021).

The last dimension relating to the content of messaging is cultural appropriateness. There is need to ensure that the message is culturally appropriate for the target audience (World Health Organisation, 2021):

- Identify/map marginalized and at-risk populations to engage with messaging
- Pilot messages through participatory processes (targets key stakeholders). Messages need to be tailored for all sub-population groups.
- Disseminate empathetic and contextualized messages and materials in local languages and via relevant trusted communication channels and community networks/influencers.

To sum up, there is a need for consistent, culturally appropriate messaging that is practical and from various reliable sources. Risk should not be explained in technical terms and uncertainties should be addressed through what is currently known. Experts need to discuss internally before messages are released and mass media need to acknowledge and outline how their current information differentiates from official information.

4.2.3 Communication Channels

To minimise the spread of misinformation and disinformation the first question that needs to be asked is 'who are the target audience' and secondly 'what information do they need to make informed decisions?'. The answers to these questions should determine what communication channel should be used to reach the target audience and what the content should contain. Risk communication with target audiences are addressed in more detail in Section 4.3.3, in addition Infobox 3 offers insight into the different channels used by the PANDEM-2 end-users. The *Rapid Quantitative Assessment Tool* could be used to understand what demographic of the population use certain communication channels and establish what

> **Q7: Please indicate your organization's use of the following public communications channels**
>
> All end-users make use of a variety of channels to engage with the public. Outlets range from the organization's website, over news media, press conferences, Social Media to public events. Other, less popular channels of communication include outdoor advertisement, press briefings and podcasts.

Infobox 3: Channels of Communication

knowledge/attitude they have towards a particular public health crisis and subsequently what information do they require (World Health Organisation, 2020b). In addition, while the misinformation/disinformation content may be similar on both communication channels the impact and audience may differ. For example, social media content can reach a worldwide audience in the

matter of seconds while a newspaper is more localised and is only released daily (online articles are a hybrid of both channels). Therefore, the recommendations for combatting misinformation on these two communication channels will differ immensely.

Traditional (newspapers, flyers, telephone, radio, TV, direct mail)

Journalists play an important role in framing the message being sent to the public as different presentations of the same information can elicit different responses (Glik, 2007). Furthermore, it is important to consider that the message frame changes over time as new information is presented, which may lead to concern or criticism. Therefore, crisis risk communication strategies should anticipate this and refine their messages to address audience concerns (Glik, 2007). In addition, when responding to a pandemic it should be the priority of public health agencies to provide individuals and communities with actionable, timely and credible health information in both an online and offline manner (World Health Organisation, 2021).

Tangcharoensathien et al. (2020) give the following guidelines in relation to infodemic management:

- Establish a multidisciplinary team (public health experts, journalists, fact-checking community, etc.) to disseminate verified information and respond to misinformation
- Foster dialogue between public health organisations and local journalists to 1) strengthen visibility and trust and 2) increase capacity of local media to use verified information
- Media 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 statements into standard reporting practice.

Journalists play an important role in framing the message being sent to the public as different presentations of the same information can elicit different responses (Glik, 2007).

Non-traditional (social media, online forums, etc.)

Social media is one of the main contributing factors to the infodemic as there are so many players and players that lack expertise/knowledge in public health. Social media acts as a public forum for free discussion, which may fuel rumours on anecdotal evidence and misunderstandings regarding pandemics and epidemics (Suarez-Lledo & Alvarez-Galvez, 2021). Social media is the ideal environment, consisting of functional illiteracy, information overload, and confirmation bias, that results in the spread of misinformation (Zollo & Quattrociocchi, 2018). In order to establish or generate 'best practice guidelines' for reducing the spread of misinformation/disinformation on social media there are few factors and concepts that need to be considered. Additionally, while an infodemic occurs during a pandemic there may be components (e.g. education, policy, legislation) that need to be considered before/after a pandemic to limit the spread of misinformation (preparation and recovery phase). The following provide guidelines and recommendations from the recent scientific literature in relation to non-traditional communication channels:

1) Guidelines of how to conduct data analysis of online information

- The *Infodemic Risk Index* (Gallotti et al., 2020) & network reconstruction techniques (Zhang et al., 2021) and its relationship to the outbreak of COVID-19.
- The relationship between misinformation and personal attitudes (Loomba et al., 2021)
- Comparison between countries of distribution of misinformation and the impact/reach it can have (Fung et al., 2016)

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2) Responsibility of social media platforms & collaboration with public health authorities (Torpan et al., 2021)

- Instagram must suspend its algorithm to publish 'suggested posts'.
- Removing verified status, often seen as a symbol of status and recognition, of known anti-vaxxers; introduce warnings on algorithmically published content; promote posts that inoculate users against misinformation.
- Display corrective posts to users who were exposed to misinformation; donate ad revenue from misinformation to health organisation.

3) Recommendations to combat the spread of misinformation (Tangcharoensathien et al., 2020)
- Engage with social media companies and other local online information platform/sources
- Social media platforms need to respond to the propagation of misinformation on their platforms by:
  o Improving the alignment of platforms' terms of use to local information laws in order to address disinformation/misinformation
  o Implementing mechanisms for user reported misinformation alerts, to facilitate faster review of misinformation
- Ensure organisations with established websites do not register new domains for the pandemic. Should dedicate a page/section to it instead.

Social media platforms should introduce a "likelihood of fakeness" component, based on machine learning and integrated repositories of misinformation & trusted content.

- Instagram
  1) Information page on COVID-19 (Discussed to summarise)
  https://about.instagram.com/blog/announcements/continuing-to-keep-people-safe-and-informed-about-covid-19

  2) *COVID-19 information centre* link automatically displayed on users' stories if pandemic content is discussed

- Twitter
  They have introduced a strike system to educate the public on their policies and further reduce the spread of potentially harmful and misleading information on Twitter, particularly for repeated moderate and high-severity violations of their rules.
  (https://blog.twitter.com/en_us/topics/company/2021/updates-to-our-work-on-covid-19-vaccine-misinformation.html). Helping people find reliable information: COVID-19 account verification; #knowthefacts (https://blog.twitter.com/en_us/topics/company/2020/covid-19.html)

Social media has been described as a dichotomy when it comes to its use in a crisis. On one hand, the speed and reach at which crisis managers can disseminate key information to a mass audience is an advantage in a rapidly growing situation. On the other hand, the viral nature of this distribution risks the spread of misleading and often dangerous misinformation. Anyone can contribute to the narrative on social media regardless of their status meaning that crisis communicators often have less control over the absolute truth of their key message being heard without any misleading alterations along the way (Freberg, 2012; Wendling, Radisch & Jacobzone, 2013; Lin, Spence, Sellnow & Lachlan, 2016; WHO, 2021, Waddington, 2018).

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There is an opportunity for researchers to investigate how this growth in traditional media translates into pandemic preparedness. In 2016, study findings on channel preference in the Zika virus stated that participants who evaluated themselves as less prepared were more dependent on TV news and health department websites compared to groups that perceived themselves as highly-prepared who used radio news, medical professionals and Facebook as information channels (Park et al., 2019)

Although users may be tracking savvier than expected, the overarching challenge that remains in social media crisis management is the threat of misinformation. Thus, the challenge for public health officials is to reach their audience with *accurate* information. However, there are some founding best practices that have been outlined from scholarly and commercial viewpoints, these include:

1. Fully **integrate social media** into decision making and policy development
2. Actively **engage** in online discussion
3. Use **media affordances to provide credible sources** of information
4. Remain **cautious about the speed** of message updates
5. Control the **hashtag narrative**
6. **Cooperate with the public** and similar organisations

(Lin et al., 2016)

The social media management platform, Hootsuite (Cooper, 2020) can add to this by recommending to explicitly put a social media policy in place, to ensure employees are aware of your organization's position, to communicate with honesty, openness, and compassion, to use social media listening and monitoring to stay informed, and to avoid "trend-jacking" or profit-driven activities.

Journalists need media training in public health in order to frame messages correctly. The onus should be placed on social media platforms to reduce spread of misinformation & regulate algorithmically published content. Social media platforms should introduce mechanisms for user reported misinformation alerts & a "likelihood of fakeness" component.

4.2.4 Receiver

Health Literacy

Findings from a recent study suggest having a low COVID-19 eHealth literacy was associated with lower and less-protective knowledge, attitudes and practices on protection against the disease (An et al., 2021). The following are approaches/guidelines to promote health literacy in the public (Tangcharoensathien et al., 2020):

- Provide resources for citizens to promote digital health and media literacy
- Implement programmes to boost critical thinking skills and health literacy among all
- Liaise with education sector, health literacy experts and others to develop curricula, guidance, and tools to promote health and media literacy throughout the life course
- Conduct extensive research during pandemic planning phase to explore the baseline of health literacy and identify groups that require extra assistance on a regional or national level (An et al., 2021).

Target Audience/Demographic Approach

This topic is discussed in more detail in Section 4.3.1.

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- When developing public health messages government official and public health agencies must consider that information/approaches will be better suited to certain demographics than others.

As per the guidelines of Tangcharoensathien et al. (2020) messages need to be brought down to an individual level and communities need to be engaged with, this can be done in the following manner:

- Foster networks and communities for localisation, context adaptation, and translation of communication material and ensure this content can be disseminated effectively
- Incentivise local communities to engage with risk communication content: memes; games; quizzes; competitions; podcast participation.
- 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
- Promote collaboration between public health agencies and local media
- Develop and introduce monitoring of key indicators for questions, opinions and attitudes to inform infodemic interventions
- Research to establish how audiences' interactions with information, including their vulnerability to misinformation, misinformation exposure, and self-efficacy as related to their health literacy, beliefs, knowledge, and behaviour

Attitude/Knowledge/Behaviour/Norms

The aim of good crisis and pandemic communication must be to successfully instruct, inform and motivate the public to adopt appropriate self-protective behaviours whilst also building trust and confidence in officials, dispelling myths and rumours and ultimately acting in partnership with the authorities' overall strategy. However, increased information does not automatically lead to behavioural change, and it is important to use multiple channels and means of communication to reach these populations (World Health Organisation, 2017).

Communication for behavioural impact (COMBI) should be used as a 'toolkit for behavioural and social communication in outbreak response' (World Health Organization, 2012). It is a planning framework for using communication strategically to achieve positive behavioural and social results. The WHO's report outlines the various actions that need to occur both before and during an outbreak, along with supplying tools and templates for collecting behavioural data.

Baseline health literacy assessment needs to be conducted in planning phase. Programmes and resources need to be developed and rolled-out to all members of society to improve health literacy. Local incentives need to be adopted to engage locals with risk communication resources. Constant research and monitoring in local communities are necessary to monitor the information circulating. COMBI should be used as a planning framework to ensure people adopt the risk communication messages into practice.

4.3 Knowledge Base III: Commercial Lessons

4.3.1 Target Audiences

"To reach the target audience, communication needs to be proactive, as it is competing with many other sources of information. It should aim to establish trust and contradict false information. This can be achieved by focusing on people and their needs and expectations." (Beilstein et al., 2020)
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The need to understand your target audience is typically the imperative first step to an effective communications plan regardless of its context. According to an applied training platform for the CDC, integrating audience awareness into the communications strategy will ensure that the right message gets to the right people at the right time (Centers for Disease Control and Prevention, 2014). As a result, this will help protect public trust and reduce the harm often caused by time-wasting and convoluted messaging.

Audience analysis is an extremely valuable tool when developed in the pre-crisis phase but ideally, it should be used as an ongoing task. Therefore, the preparedness stage is an opportunity to develop a thorough understanding of the audience network and test early risk and crisis messages for feedback (Reynolds & Seeger, 2014). Findings of Edelman's Trust Barometer (2021) state that the COVID-19 pandemic has reduced people's trust in their domestic government as both a competent and ethical body. Therefore, there is a clear and essential case for health communicators to proactively seek to understand their target audience in future pandemic preparedness and response (for more on the relevance on trust in pandemic and crisis communication, see Section 4.1).

There are several established theories and frameworks that health communicators can adapt for understanding their target audience. In the communications industry, the target audience is never simply 'the general public' as this selection is too broad, particularly in a crisis where members are competing for their voice to be heard. Rather, specific audience segmentation will ensure that bespoke messages are communicated to targeted audiences.

An evidence-based post-crisis theory

Situational Crisis Communication Theory (SCCT) is often linked to reputation repair however, it also provides a structure for understanding audience perception of a crisis, by forecasting how they will react to its threat and the strategies used to manage it. Based on attribution theory, SCCT focuses on changing audience perception (Coombs, 2007). Attribution theory suggests that people will typically search for the cause of the event and more likely respond with a positive behaviour change if the organisation takes accountability and conveys empathy towards its audience (Coombs, 2007).

To enable communicators in scanning the crisis environment, Coombs suggests broadly categorising the crisis into one of the following types: initial crisis responsibility, crisis history, and prior relational reputation (Coombs, 2007). This is further refined into one of the three crisis clusters: victim cluster (weak attributions of responsibility), accidental cluster (minimal attributions of responsibility) and intentional cluster (very high attributions of responsibility). Hence, SCCT is a two-step process in which the crisis manager firstly identifies the audience's perception and secondly, reviews the history of similar crises in the organisation and prior-relationship reputation (Coombs, 2007). Ideally, this process should be conducted at the crisis onset and followed up with the appropriate response strategy (SCCT Response Strategies (Coombs, 2007)Figure 3).

SCCT can be relevant to pandemic preparedness and response as it can inform health communicators in the mid to post-crisis phases for two reasons: (1) it will help them define the crisis and (2) better understand their target audience by analysing their relationship to the event. In turn, they will be more equipped to manage audience perception. Finally, this will inform and prioritise their key message strategy.

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Primary crisis response strategies
    Deny crisis response strategies
        Attack the accuser: Crisis manager confronts the person or group claiming something is wrong
                with the organization.
        Denial: Crisis manager asserts that there is no crisis.
        Scapegoat: Crisis manager blames some person or group outside of the organization for the crisis.
           Diminish crisis response strategies
        Excuse: Crisis manager minimizes organizational responsibility by denying intent to do harm
            and/or claiming inability to control the events that triggered the crisis.
        Justification: Crisis manager minimizes the perceived damage caused by the crisis.
             Rebuild crisis response strategies
        Compensation: Crisis manager offers money or other gifts to victims.
        Apology: Crisis manager indicates the organization takes full responsibility for the crisis and asks
            stakeholders for forgiveness.

Secondary crisis response strategies
    Bolstering crisis response strategies
        Reminder: Tell stakeholders about the past good works of the organization.
        Ingratiation: Crisis manager praises stakeholders and/or reminds them of past good works by the
            organization.
        Victimage: Crisis managers remind stakeholders that the organization is a victim of the crisis too.

Figure 3: SCCT Response Strategies (Coombs, 2007)

4.3.2   Key Messages

Key Messages

Andrews et al. (2020) combine science and risk communications to prepare pandemic responders in supporting their target audience to make informed decisions that reduce the risk of harm. Their guiding principles for communicating key messages are divided into three components: **strategy, form and content.** This structure is discussed in the following on best practices for creating key messages in a crisis.

  (a) Strategy:

Hyland-Wood et al. argue that:

> *"an effective communication strategy is a two-way process that involves clear messages, delivered via appropriate platforms, tailored for diverse audiences, and shared by trusted people"* (Hyland-Wood et al., 2020, p.1)

Research suggests two-way communication as the primary recommended strategy for engaging a diverse cohort of stakeholders. The earlier EU-funded TELL ME project (https://www.tellmeproject.eu/) which focused on transparent communications in epidemics created a new framework model for outbreak communications (School of Public Health at the University of Haifa & Centre for Science, Society and Citizenship, 2014). Building on the idea of the 'rhizome structure' from Deleuze and Guattari (1979) the framework aims to address the complexity, uncertainty and misinformation which often challenges two-way dialogue with the public. Additionally, it explicitly involves the public in decision-making at the state level which is perhaps a potential method for closing the behaviour-intention gap that has been linked to public health guidelines (Deleuze & Guattari, 1979). It contains seven key components highlighted in Figure 4 with the public sphere at the
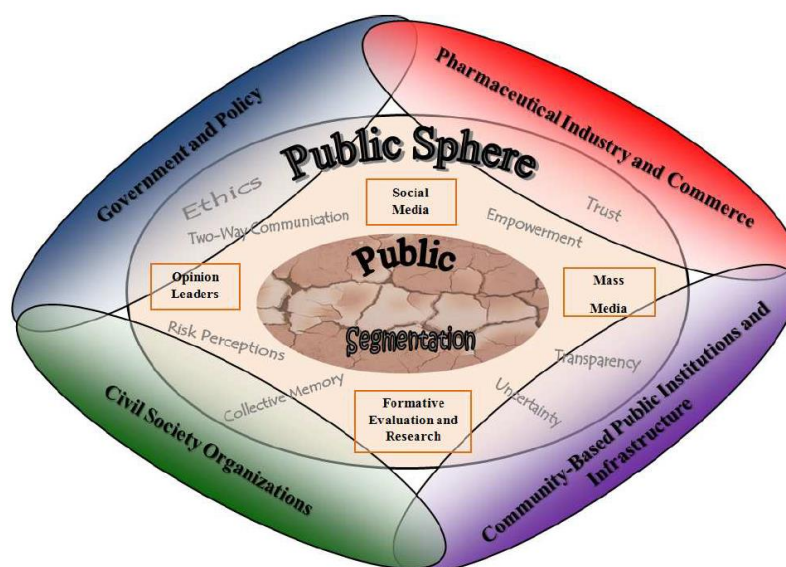

Figure 4: New Framework Model for Outbreak Communications (School of Public Health at the University of Haifa & Centre for Science, Society and Citizenship, 2014)

centre. The idea of two-way symmetrical communication was catalysed by theorist James Grunig's Excellence Theory (Grunig & Grunig, 2008) which set the benchmark for strategic public relations at the time but perhaps what we are seeing in the TELL ME model is a multi-way model of communication. Communications expert Stephen Waddington argues the relevancy of the Excellence Model today. He states that the interconnected nature of the digital network means that "if a message resonates with an audience it will be shared and passed from network-to-network" rather than an exclusive exchange between sender and receiver (Waddington, 2018).

The outbreak model suggests a change in how we can engage and communicate with the public in a pandemic. It contests the use of linear models of communication. Instead, it proposes that the complex reality of a health crisis which is reflected in its rhizomatic structure is better responded to by integrating the public sphere as a partner with supportive engagement from its more formal stakeholders. Hierarchy is not advised (School of Public Health at the University of Haifa & Centre for Science, Society and Citizenship, 2014).

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(b) Form:

"Clear communications goals form the foundation of an effective communications response during a pandemic" (Pan-American Health Organisation, 2013)

Coombs (2019, cited in Andrews et al., 2020) describes the form of a key message as the method taken to meet the communications objective. Setting clear communications goals and objectives will not only act as a north star in formatting key messages, but it will also facilitate measurement and evaluation in the crisis recovery phase.

The COVID-19 pandemic has shown us instances of 'split messaging' which lead to unnecessarily harmful effects. However, a common set of principles for how key messages should be formatted in a crisis remains, these include (Andrews et al., 2020; Pan-American Health Organisation, 2013; Joubert & Metcalfe, 2020; WHO, 2017):

- Timeliness

- Transparency (including evidence-based information)

- Consistency

- Expertise (Credibility)

- Accuracy

- Relevancy

- Empathy

A Leader's Guide to Crisis Communication: Lessons from Ebola for COVID-19

The *3 W's* of Crisis Communication convey *WHAT* to communicate

The 3 W's of Crisis Communication	WHAT leaders should communicate
What happened?	To increase knowledge and understanding
What are you doing about it?	To enhance trust and credibility
What does it mean to me?	To minimize negative impacts of fear

The *4 C's* of Crisis Communication convey *HOW* to communicate

The 4 C's of Crisis Communication	HOW leaders should communicate
Credibility	Build relationships through trust
Context	Provide appropriate context
Compassion	Demonstrate genuine compassion for those in need
Commitment	Focus on problem solving and resolution

Figure 5: A Leader's Guide to Crisis Communication (Tetteh, 2020, p.1373)

A recent framework from Tetteh (2020) may help facilitate the implementation of the above principles. Based on lessons learned from the Ebola virus, he argues that the six-question guide outlined in Figure 5 can help guide a health communicator in what and how to communicate when responding to a pandemic. The simple framework ensures that the communicator is implementing purposeful

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messages that are underlined with trust, credibility, and compassion while synonymously working to provide a resolution.

(c) Content:

Within the literature, Covello's message map (Covello, 2006) has been highlighted as an effective model for developing sound key messages that will dilute misinformation and inform practical decision-making, through a well-constructed message delivery. According to Covello, message framing and delivery is crucial in crisis and risk communication. He defines the purpose of the message map as:

"an organized means for displaying layers of information; it is a lens through which principles for effective risk and crisis message development can be focused into effective and powerful communication" (Covello, 2006, p.25)

In sum, Covello's framework maps out the important key messages in a constructive visual aid for the health communicator. It organises based on the level of importance in each message's central response. It contains four key headlines (Figure 6) including the target audience and related question or concern (Tier 1), three related key messages (Tier 2) and the supporting information (Tier 3) (Covello, 2006). Effectively, this ensures that only the essential information is communicated, and no question or concern is left unturned in working with a diverse audience. Within this, the

Stakeholder: Question or Concern:		
Key Message 1	Key Message 2	Key Message 3
Supporting Information 1-1	Supporting Information 2-1	Supporting Information 3-1
Supporting Information 1-2	Supporting Information 2-2	Supporting Information 3-2
Supporting Information 1-3	Supporting Information 2-3	Supporting Information 3-3

Figure 6: Covello's Message Map (2006)

complex nature of science communication must be translated into accessible messages and concepts so that the chance of positive behavioural action is more likely (Glik, 2007). In Ireland, the government has collaborated with members from the science and health community to debunk the information surrounding the COVID-19 pandemic (see Appendix 7.6).

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Communicating with the Media

Journalists and members of the science and health community must work together as allies when responding to a pandemic crisis. What are the needs of the media in a crisis and how can health communicators meet them within a mutually beneficial relationship? Glik (2007) proposes that there are two components to engaging with the media industry in crisis and risk communication: working with and understanding them.

The media has two important functions. Firstly, the agenda-setting function whereby the media share news based on the content's newsworthiness which in turn plays a role in shaping the public's perception. Secondly is their method of framing key messages which suggests that different presentations of the same message can elicit different responses. However, Avery et al. (2010, cited in Park et al., 2019) note that "health concerns are particularly well-suited" for media and its social media counterpart because they are both personal and political topics. Therefore, health communicators must be aware of the juxtaposing effects of working with the media; there is the risk of creating speculation but it's also an effective method of reaching a mass audience.

Media relationships and your organisation's reputation with amongst local and national journalists plays a key role when a crisis breaks. Accordingly, there are some important guidelines for engaging with the media in the crisis context that can benefit from creating a proactive relationship that is nurtured not only during the heat of the crisis but in the crisis preparedness and response phases too. Press Page suggests that running a simulation involving the appointed crisis communications team is an effective method that will nurture the media relationship and better prepare its communicators (PressPage, 2020).

In addition, the CDC highlights the shared goal between crisis communicators and the media: to deliver the most accurate information in a timely manner, to a widespread audience. In doing this, it's important to remain aware of the deadline driven environment of journalists (Centers for Disease Control and Prevention, 2017). The CDC outlines some widely agreed guidelines for effectively engaging with the media and meeting their needs in a crisis including:

- Establish relationships with your local as well as your national media agencies before a disaster.
- Provide all media outlets with the same information at the same time.
- Try and provide journalists a reasonable timeframe to expect new information updates.
- Understand journalism deadlines and work to accommodate them. During a crisis, it is important to remain available and have a prepared spokesperson for any interview requests —this will help reporters get the facts right before their deadline.
  (Centers for Disease Control and Prevention, 2017)

4.3.3   Channels of Communication

An effective communications plan will select its appropriate channel of communication-based on its target audience but generally, it will take more than one medium. Reuters annual digital news report (Newman et al., 2020) found that the COVID-19 pandemic has reminded people of the value of traditional media as a news source. Local newspapers were highlighted as a top source for news about a specific region reaching 44% in most countries. Television as a preferred channel for news increased across six countries polled from January to April 2020. As a result, trust in public service broadcasters for COVID-19 information averaged at 59%, directly behind health experts and organisations.

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On average regarding all age groups, 28% looked to new media including websites and apps for their news while the group of those aged between 18 and 24 years was "more than twice as likely to prefer to access news via social media". Interestingly, celebrities and influencers have also become a popular source of COVID-19 information on newer platforms such as Instagram. If engaged on a collaborative level, the creation of influencer-health communicator relationships could have many advantages for pandemic response. Enke & Borchers define the term 'social media influencers' (SMIs) as:

"third-party actors who have established a significant number of relevant relationships with a specific quality to and influence on organizational stakeholders through content production, content distribution, interaction, and personal appearance on the social web." (Enke & Borchers, 2019)

Additionally, social media has become an increasingly important source of information. Updates on an unfolding crisis can be spread to a large audience in very little time. It does, however, come with its own and very unique challenges and issues (for more on social media as a conveyor of misinformation, see Section 4.2.3).

In conclusion, in a crisis response situation, health communicators must utilise all media channels with the appropriate messaging and for the right audience. For the most effective results, planning for communication channels should be incorporated in the pandemic preparedness phase. While traditional formats remain an extremely valuable medium, communicators must not shy away from the use of social media. Within a phased pandemic preparedness and response plan, Wendling et al. (2013) suggest focusing on social media monitoring and situational awareness in the preparedness phase, providing factual information and mitigating misinformation in the crisis phase, and finally, communicating recovery and reconstruction in the response phase.

4.3.4   Monitoring and Evaluation changes in behaviour

Kitterman argues that failing to thoroughly measure and evaluate a communications campaign defeats its core purpose as this means the value in whether it changed the audience has not been identified (Kitterman, 2020). This principle remains true in crisis communications and therefore requires a clear description of the outputs and outcomes of the plan. However, public relations literature debates that there is often too much focus on output-level metrics such that the more insightful value in the outcomes can be misplaced (Bajalia, 2020). Outputs refer to quantifiable results such as the number of people reached while outcomes refer to the actual behavioural change on the individual audience members. In other words, did the communications campaign inspire the audience to act?

A recent report from the WHO on community engagement in contact tracing recommends that planning for measurement and evaluation should ideally be implemented in the initial stages of the response phase (World Health Organization, 2021). Taking the case in point, Seeger et al. (2018) states that emergency risk communication should be monitored and evaluated for the refinement of key messages in the onset of the crisis response, for audience feedback throughout the crisis and to demonstrate their impact and identify successful methods in the post crisis response (for the proposed evaluation model see Figure 7). However, they further illustrate that measuring impact is challenged by the noise and contextual variables surrounding potential outcomes and the restricting effect of the crisis on target audience data collection. Based on relevant literature and data from the CDC which provide a benchmark for impactful communications, goal setting is fundamental for practical measurement and evaluation results, measurement of outcomes should be prioritised, and the entire process should be transparent, consistent and credible (Wilkinson, 2021).
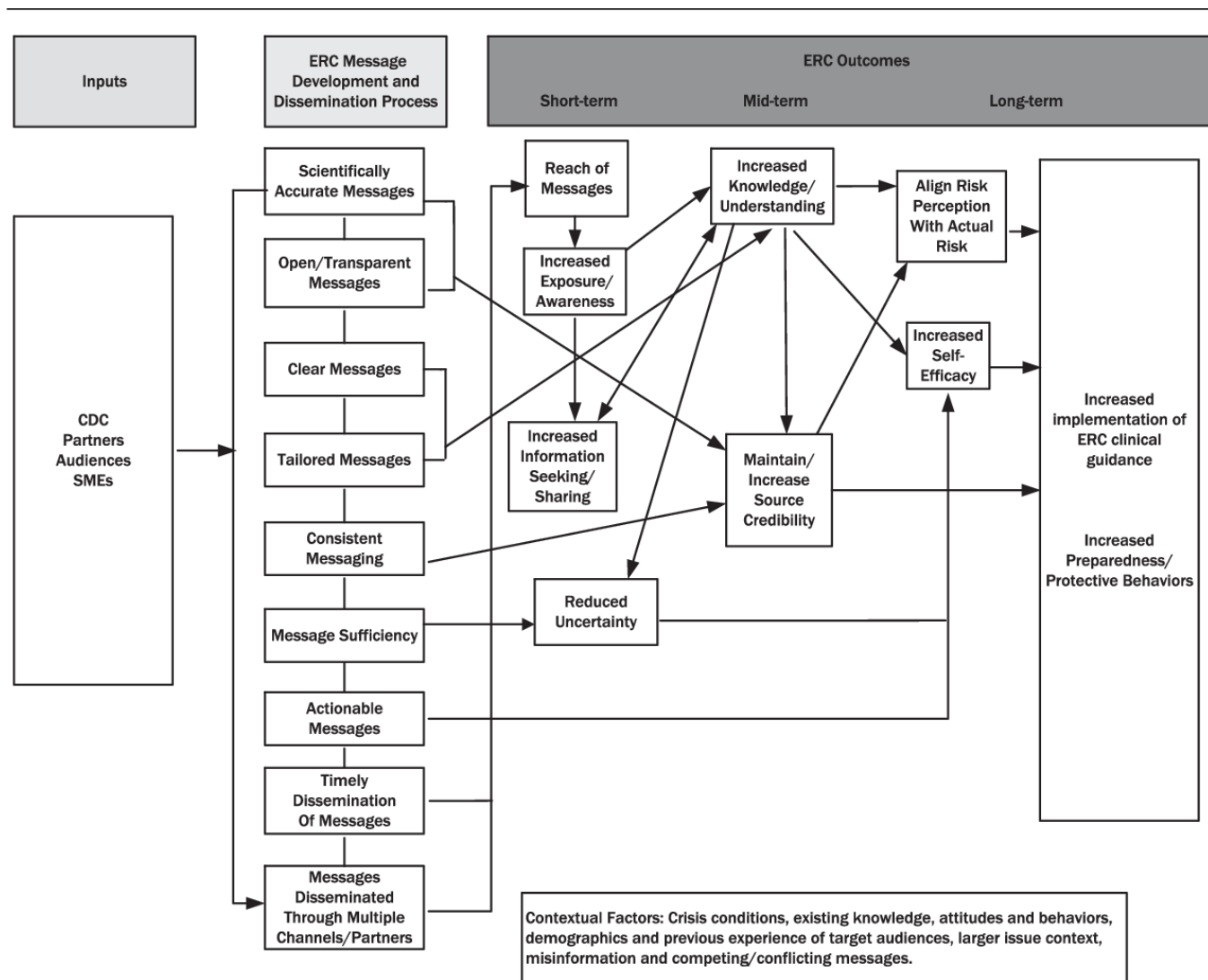
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Figure 7: Emergency Risk Communication Evaluation Model (Seeger et al., 2018)

4.4 Knowledge Base IV: Practical Application of Pandemic Communication

The following section will take a closer look at some real-life applications of crisis communication. This does not only include a brief look into the guidelines published by different organizations but also a deep-dive into crisis communication within civil aviation, a field that has dramatically influenced the development of the science of crisis communication as it is today. Lastly, this section includes the results of our end-user participation, both the questionnaire and workshop. Some aspects mentioned within this section will repeat what has been outlined in the previous sections. This only goes to show how the mainly theoretical ideas have already found practical application within crisis and pandemic communication.

4.4.1 Communication Guidelines

The previous sections have taken a close look at different elements of risk communication. Several international organizations, no doubt aware of the relevant criteria, have developed their own guidelines and strategies for risk and pandemic communication. In order to facilitate better communication throughout, a number of guidelines are available to the public, giving every organization or company, even government, the possibility to enrich their own guidelines with trusted and valuable information – or even build their strategies on them. The spreadsheet in Appendix 7.7 provides an initial collection of international guidelines on crisis communication, readily available on the internet. What it shows is the abundance of guidelines and recommendations that are being offered by international and well-respected organizations. The spreadsheet is in no way meant to be an exhaustive list and new and updated guidelines are published regularly. Additionally, end-users were able to provide previously unknown guidelines, may they be national or international, that had previously gone unnoticed (see Infobox 4).

> **Q3: Which relevant guidelines are you aware of and/or are used by your organization?**
>
> Overall, no "gold standard" could be discerned among the end-users. While guidelines by the WHO have been mentioned by two end-users, the rest employed a vast number of different international guidelines, ranging from national ethical guidelines to full out strategies provided by international organizations (like the CDC, the WHO or the IFRC/ICRC).

Infobox 4: International Communication Guidelines

What the spreadsheet and the end-user feedback have in common are guidelines provided by big and international organizations, the WHO and IFRC/ICRC (International Federation of Red Cross and Red Crescent Societies/International Committee of the Red Cross) in particular.

4.4.2 Revolutionizing Crisis Communication: Lessons Learned from Civil Aviation

Crisis communication is not a field exclusive to public health. The aviation industry through the International Aviation Transport Association (IATA) has taken a close look at past incidents and developed a comprehensive guide on how to best approach the field of crisis communication in the field of civil aviation. But even though pandemic and civil aviation crisis management might differ drastically, the IATA's guideline can function as a basis on which the PANDEM-2 project might develop adapted communication guidelines. In line with incidents involving civil aviation, pandemics are likely to become more and more frequent in the future (Gill, 2020). Although both cannot be avoided completely, the fallout and harm done can be contained by proper preparation and a detailed crisis management plan. Civil aviation has developed comprehensive guidelines for crisis communication that can help inform the development of pandemic crisis communication.

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First and foremost, the IATA emphasizes the importance of effective preparation: existing strategies and plans need to be updated and revised on a regular basis, ensuring the information is accurate and up to date. Further, the IATA stresses the need for regular training exercises that test and rehearse the measures spelled out in the crisis manuals. Comprehensive and well tested crisis manuals not only make sure that every party involved knows their responsibilities and role in mitigating the crisis, but also that they are aware of who else is involved and what the other parties are doing.

Due to the rarity with which accidents occur in civil aviation, previous incidents have been employed as case studies for developing guidelines and manuals how best to prepare for and deal with a crisis. Despite the great differences between incidents in civil aviation and public health management, the guidelines developed by the IATA should be considered as a well-founded starting point to developing a pandemic related crisis communication plan for public health agencies and first responders. Key elements a communications plan needs to cover and include, according to the IATA, are:

- ''Statement of company communication policy, including names (or positions) of authorized spokespeople
- Outline of the communication organization, and its interface with the corporate Crisis Management Team (the head of communications should sit on the [Crisis Management Team])
- Protocols for ensuring all available communication channels are properly coordinated and that information and messaging is consistent to all audiences
- Description of functional roles and responsibilities, and candidates
- Checklists for each functional role, outlining the main tasks
- Templates for initial statements and employee communications, including the first online posts, which can be issued immediately after key information is confirmed. Templates should be developed for various possible scenarios, including accident; serious incident; diversion; hijacking/security incident; service disruption
- Database with phone and email addresses of important internal and external contacts (including primary media outlets, online influencers and service providers)
- Standard forms and documentation (for example, media call logging form, press conference registration form'' (IATA, 2019).

Civil aviation communication guidelines also advise on what the actual communication in case of an incident should cover. Apart from the aviation-specific social media templates, the IATA gives guidance on the initial communication after the incident. In the first message published by the organization, awareness of the situation needs to be mentioned, as well as any verified factual information (flight number, type of aircraft etc.). The message should convey the commitment of the organization to provide further information as soon as possible and – if applicable – contain an appropriate hashtag, making it easier to filter the information on social media. The IATA also suggests publishing a summary of the events and information on a regular basis, additionally to communicating any new information as soon as it is available and verified. Such summaries should always contain, apart from the factual information, expressions of concern and regret for the people affected, as well as the actions taken by the organization since the incident. Summaries should also contain a mentioning of the organization's next steps and immediate priorities. Ongoing communication should remain consistent and open, giving as much factual information as possible, expressing regret and concern for the wellbeing of those affected as well as support for the ongoing investigation (IATA, 2019).

In different scenarios and exercises, participants need to familiarize themselves with the details of the plan as well as internalise their position and responsibility within the management structure. IATA therefore suggests several different formats that could easily be adapted for training exercises in the area of pandemic communication and management:

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- "Notification exercise: Check contact numbers are valid and key players can be reached quickly
- Slow walk-through: Take a potential scenario and ask a series of questions of your team. Check whether your current plan provides the answers
- Table top: Run through a simple scenario and test one aspect of the plan – for example, developing updated press statements
- Input-response exercise: Test the entire communication plan by using an exercise control team to provide 'inputs' via phone calls, emails, social media posts and 'news reports'." (IATA 2019)

What further unites crisis communicators of civil aviation and pandemic management is their fight against disinformation and false reporting. The availability of social media platforms and the rapid spread of information can make the task of truthful communication ever more challenging. To remain a trustworthy actor for the press and on social media, the IATA suggests that the most effective strategy is to remain true to the organization's stated identity and values. Information given to the public should always be truthful and as complete as possible though as not to appear to be hiding anything from those affected (for more in-depth analysis on dis- and misinformation see Section 4.2).

4.4.3   Contact tracing Apps

In any impending crisis or disaster, quick and swift action is key to preventing material damage or life-threatening harm. In order to provide citizens with as much warning time and information for preparation as possible, disaster warning apps alert users of relevant emergencies such as forest fires or flooding (Fischer-Pressler et al., 2020). In its 2013 World Disaster Report, the IFRC warned "information is just as important as access to food, water or shelter, for without information, who would know where the nearest shelter is, or whether the water is safe to drink?" (International Federation of Red Cross and Red Crescent Societies, 2013). Warning apps not only alert users of potential dangers but also give ample information and recommendations for actions, like measures to protect material possessions or for evacuation. If all users adhered to the warnings, natural and man-made disasters would not be prevented in their entirety, but the human and material costs could be reduced significantly.

Warning apps are based on software running on mobile devices to disseminate warnings to a relevant public. Receiving a warning enables users to take countermeasures to protect themselves, which constitutes effective use of emergency warning systems (EWS) (Fischer-Pressler et al., 2020). One prime example is the German app KATWARN, developed by the Fraunhofer Institute for Open Communication Systems (FOKUS) in 2011. The app sends alert notification to its end-users in the event of large fires, severe weather events (such as floods) or unexpected hazards (KATWARN 2021). The alerts are based on information provided by government agencies and other relevant safety and security organizations. Users can personalize the alerts they receive based on their location and thus reduce the number of notifications they receive to a necessary minimum. For end-users without a smartphone it is possible to sign up for e-mail or SMS notifications instead, thus broadening the number of possible end-users and minimizing the threshold of accessibility (Fraunhofer FOKUS, 2009). Since its launch, KATWARN is constantly expanding and improving its functionality and range, but application outside of Germany is still limited, so far only Austria as launched a compatible Austrian version of KATWARN in 2017 (Fraunhofer FOKUS, 2019a). Since the terror attacks in Brussels in 2016, the KATWARN developers have been cooperating closely with the EU Commission to develop a specific app called EUWARN for members and employees of the Commission to notify them in case of any dangers or hazards occurring on Commission grounds (Fraunhofer FOKUS, 2019b).

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Other EU states like Romania or the Netherlands have developed their own warning apps. But unlike the German KATWARN, they do not require a specific app or, sometimes, even registration. The Dutch NL-Alert for example is already set up on most new mobile phones that are being sold in the Netherlands (expect for Apple's iPhone which requires the user to to sign up after they have purchased the phone) (Ministerie van Justitie en Veiligheid, 2020). In case of emergencies, "the government sends a text message to mobile phones and digital departure sign for bus, tram and metro in the immediate vicinity of an emergency. NL-Alert on your mobile phone is based on cell broadcasting technology" (Nationaal Coördinator Terrorismebestrijding en Veiligheid, 2021). In order to test its functionality and reachability, NL-Alert will send out semi-annual national test alerts, also asking users to alert citizens around them to inform them of the impending danger, thus expanding their radius.

So far, the EU did not develop an EU-wide emergency alert service. In 2018, however, it passed a directive, obliging "all EU member states to ensure such public warning be transmitted by providers of mobile number-based interpersonal communications services to concerned end-users" (Directive (EU) 2018/1972) by June 2022 (European Parliament and the Council, 2018). The directive signals willingness but also need for improvement.

In times of the on-going COVID-19 pandemic, apps like KATWARN do offer information on current measures and regulations depending on the location of the end-users. They do not, however, provide users with active containment measures. This is most often done with so-called contact tracing apps, varying significantly from emergency alert apps both in their functionality and purpose:

> "As one of the oldest public health disease methods, contact tracing works by public health experts identifying infected individuals, isolating them and then finding out with whom they came in contact. Digital contact tracing expands on this by harnessing mobile technologies such as GPS, Bluetooth or QR codes, to digitally track and notify users about their interactions with potentially infected individuals. This automated and digital approach thus offers governments a more cost-effective and easily scalable method than traditional contact tracing." (Amann et al., 2021)

Even in analogue form, contact tracing has been an integral part of any effort containing an epidemic or pandemic. By identifying and notifying those people who have come in close contact with an infected person, authorities aim to disrupt the chain of infection and thus contain the further spread of the disease (Amann et al., 2021). Contact tracing apps register relevant contacts, most often via Bluetooth and automatically alert the relevant end-users should they have come in contact with an infected person, requesting them to isolate immediately and to watch for any occurrence of the usual symptoms (Jacob and Lawarée, 2020).

In response to the COVID-19 pandemic, many EU Member States have started developing contact tracing apps to support the analogue tracing done by health agencies across the continent. By May 2021, 22 Member States had developed and launched their own national apps, most of them functioning interoperably with other EU apps, thus ensuring that contact tracing does not stop at the border – only the French and Hungarian apps were not designed for interoperability. Bulgaria, Luxembourg and Sweden are the only countries where development of contact tracing app is not foreseen in the future (European Commission, 2021).

Unfortunately, after rushing to development, critics became increasingly vocal and hindered an effective and swift launch. With Germany being one of the first EU Member States to introduce their "Corona Warn App", data protection experts in particular concentrated their efforts on taking apart every bit of code and examining it for weaknesses.

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As a result, the reception of the different contact tracing apps was more than muted. Predictions had estimated around 85% downloads, in practice, however, rarely any app achieved more than 20% (Jonker, 2021). In examining the roll out of three European contact tracing apps, Jacobs and Lawarée (2020) summarized eight common issues that had a negative effect on the apps' successes:

1. the operability (i.e. how the application works),
2. the interoperability (i.e. the exchanges and synergies between the different digital contact tracing applications),
3. the relevance (i.e. the coherence between the problem to be solved and the instrument used),
4. the acceptability (i.e. a favourable opinion of the target population with regards to the use of a digital contact tracing application),
5. the security and data protection (i.e. protection of the user, the application and the smartphone),
6. the effectiveness (i.e. the direct effects produced by the application on the management of the epidemic),
7. the temporality (i.e. the time constraints for the development of the application)
8. the political competition in multiple governance contexts (i.e. difficulties in reaching cooperation agreement between Federal State and the federated entities in Belgium)

> **Q16: What do you consider areas within the field of crisis communication in general that could be improved upon in your organization?**
>
> In general, end-users rate their efforts during the COVID-19 pandemic as successful. They do, however, recognize that any organization has always areas that could be improved upon. These areas include adapting to novel challenges like fake news, broadening their target audiences to include a younger demographic or groups with special needs, as well as extending competences in the area of real time communication (Questionnaires 2, 6).

Infobox 5: Improvements in Communication

Several of these issues have not been exclusive to the three case studies in question. Concerns over privacy and data protection have been common in most cases in Europe and beyond (Morley et al., 2020). But although criticism and scepticism have curbed the enthusiasm and possibly also the success of national contact tracing apps, Jacob and Lawarée (2020) stress the importance digital contact tracing can have for any future pandemic: if done successfully, it can support pandemic management especially in areas with a high number of cases or multiple channels of transmission. When done successfully, contact tracing apps might not be a tactic to entirely avoid lockdowns and harsh restrictions all together, but to rather mitigate certain negative restrictions and help manage an outbreak.

Due to the very limited time frame within which the warn apps were developed during the COVID-19 pandemic, certain decisions were rushed and problems were predestined to occur along the way. Just like with emergency warning apps, some degree of trial and error needs to be expected in order to successfully enter the age of effective digital contact tracing. Thus, before labelling these apps as a failed attempt and trying again anew when the next pandemic comes around, it is vital that development and improvement continue, all the while keeping a close eye on the current criticism and issues (for a list of guidelines for ethical considerations, see Morley et al., 2020).

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4.4.4 End-user reality (Questionnaire results)

After having examined in great detail what end-users should and should not do, it is necessary to compare the theory with reality. While it may be logical to handle a pandemic crisis a certain way, prepare with an abundance of time and resources, reality often looks very different.

In order to test, to what degree theory and practice diverged – and to prepare for the upcoming work of WP5, first a questionnaire was sent out to PANDEM-2 end-user partners. This questionnaire (see Appendix 7.2) aimed to find a common ground in terms of crisis preparedness, response, and recovery. Based on this information, as well as on the research done within WP5, end-users were invited to participate in a workshop to determine further gaps between theory and practice.

Among the end-users that received the questionnaire, 7 (out of ten) organizations returned their completed versions. The majority of respondents reported that their organizations do provide relatively up to date communication guidelines and strategy. However, in relation to the training respondents received varied, some were offered training while others were reliant on work experience from previous employment or university degrees. Overall, they expressed the wish to receive more training in the field of communication, especially focussing on a general "what's new" update, as well as more specific trainings in terms of pandemic communication and how to deal with fake news and disinformation.

Direct communication with the public happens on various channels and through different means. Apart from social media and online webinars, end-users also make use of more traditional means like hotlines, website FAQ sections, and public E-Mail addresses where the public can direct their questions and concerns. With an increased use of social media also comes the concern and problem of fake news and disinformation for end-users. Across the board, respondents regard them as very relevant for their daily work to tackle, confront and refute fake news as soon and as thoroughly as possible.

End-users were also relatively unified in regards to the conveying of information to the public about current events or developments, as well as the disputing of false information, these were seen as very important goals for communication. The exchange of ideas and concerns with members of the public was not considered quite as important by a number of respondents. This marks an interesting contrast between theory and practice that should be explored further in the work of WP5 . It is necessary to comprehend why theory and practice seem to diverge on the concept of two-way communication. As was pointed out repeatedly throughout this deliverable, functioning and effective two-way communication between professionals (health care workers, the government etc.) and the general public is vital for effectively fighting a global pandemic. Further inquiry and debate with the PANDEM-2 end-users is therefore needed to determine how the real-life interpretation of the concept of two-way communication can be improved.

Overall, participants were content with the work their organizations have done during the COVID-19 pandemic, regarding it as a very steep but successful learning opportunity. Lessons have been learned, especially during the initial wave in early 2020, which have served as a basis for the phases and waves that came during the rest of 2020 and 2021.

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4.4.5 End-user Workshop Results

During the End-user Pandemic Communication Requirements Workshop, 10 participants from 7 public health agencies and responder organisations shared and discussed their experiences in pandemic communication with the academic staff and communication experts of WP5. Participants addressed potential communication pitfalls, current communication strategies, challenges experienced and best practices identified when engaging the general population before, during and after a pandemic.

After establishing the agenda and the workshop aim, the participants were invited to share what – in their experience – constitutes a failure in pandemic communication with the public (see Section 3.3.2). In order to avoid naming and shaming of actors or countries regarding their communication practices in the recent COVID-19 pandemic, the communication fails were attributed to a hypothetical country (Figure 8). Though several topics may touch multiple realms (e.g. trust and misinformation), the thematic clustering by participants revealed common problems:

Trust
- Lacking trust and negative relationship between public health or authorities and the public prior to a pandemic
- Failing to identify your audience and failure to involve them
- Not responding in time or not at all
- Contradictory information by experts

Two-way communication
- Unidirectional communication (only press releases)
- Using complex or scientific language
- Dismissing fears and alternate viewpoints
- Not addressing vulnerable groups or assess impacts on them

Misinformation
- Lack of transparency
- Failure to address rumours (e.g. on social media)
- Being late with own message or to identify misinformation

Miscellaneous
- Being very slow with providing official communication or guidelines
- Technical issues: not being able to handle traffic on communication channels
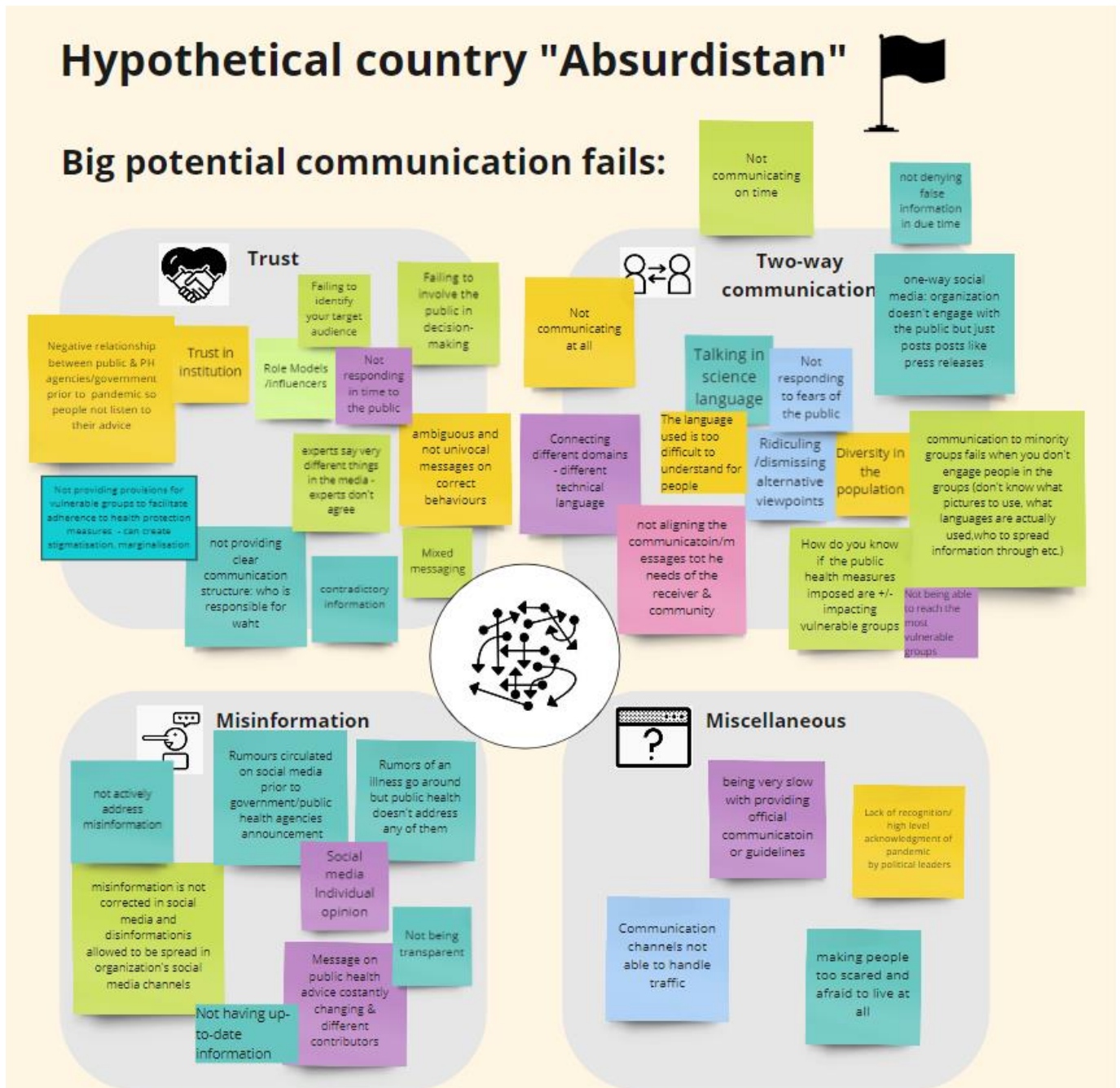- Lack of high-level recognition of a pandemic by political leaders
- Spreading Fear

Figure 8: Results of the PANDEM-2 End-User Pandemic Communication Requirements Workshop. Participants' collection of communication pitfalls

In the next step, the communication pitfalls which were identified for a hypothetical country were translated into actionable pandemic best practices. In parallel discussion rounds participant groups focussed on respective pandemic phases (preparedness, response, recovery) in the iterative process of a World-Café (see Section 3.3.2). Thus, one group started by identifying problems of relevance for this pandemic phase and later groups added input on how to overcome them and how to practically implement findings. By this strategy, participant groups stepwise matured key findings which were

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then later discussed in the main plenary. Since images of the original boards would be illegible to displayed in this deliverable, board moderators transcribed the main workshop outcomes below.

Outcome Board 1: Preparedness

The discussions around how best to prepare an organization's communication strategy were very homogenous across all groups. Reflecting on the current COVID-19 pandemic, participants were able to reflect on what would have been useful for them to have beforehand. The three groups were not only able to build on the fictional case constructed in the plenary beforehand but also on contributions made by previous groups.

What was most important to participants could be summarized very well by one contribution stating "Have a plan – but be flexible about it". Under this motto, contributions can be roughly clustered as organizational and content preparation:

- Organizational:
    - Have a core communications team that can be extended as needed in times of crisis
    - Team members should have clear roles and responsibilities
    - Establish a working relationship with the media ("media list" of relevant contacts and availabilities)
    - Training for the core team (esp. media training, everyone on the team should be comfortable in front of the camera)

- Content:
    - "Be aware of what channels that are going to be used for communication" and reassess on a regular basis
    - "Have a plan on how to reach 'hard-to-reach' groups and people who are illiterate", establish a network with vulnerable groups
    - Maybe even have representatives of such 'hard-to-reach' groups be part of the communications team
    - Use 'peacetime' to establish and test communication strategy, i.e. build a team and train it, establish rules on platforms like social media, establish organization as a trusted source and use 'smaller' outbreaks and crises to test strategies
    - Test how messages are being received by different societal groups (e.g. by conducting surveys)

Outcome Board 2: Response

The discussions about essential communication principles during the response to a pandemic were strongly informed by the recent experiences in the COVID-19 pandemic. Nevertheless, participants quickly abstracted to general communication requirements in the response phase. Based on the negative version of communication discussed in the previous stage, several topics were highlighted as very important by participants and formed the nucleus for further discussions by all later groups. The topics can be clustered into three main topics: communication strategies and materials, collaboration and communication to vulnerable or minority groups.

Communication strategies and materials

- Be quick & flexible in your communication/ responses
- Keep it simple and action oriented:

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- o Main point
- o State what do you want people to do and why
- o Repeat.
- Expectation management. (e.g. that you can get infected while vaccinated; that the virus will remain among us, thus vaccination remains valuable)
- To tackle online rumours: Respond via the same media in time in two-way communication
- Provide visually attractive materials, i.e. infographics with the main message
- Have communication materials available on national level that regional/local institutions can use (both for public health and healthcare providers)
  - Meet the needs of the media including local media
  - Establish an information hub for the media (who needs to be part of it? Experts, National Public Health)?

Collaboration

- Listen to the worries of the community and match communication to this
  - When working in hospital, listen to what is on the minds of health care workers
  - Good relationships to the medical professionals are crucial
- Local hospital districts and close relationships are important to us here. More co-operation might be needed with organizations working with the elderly, children etc.
  - Create mutually beneficial relationships with first-responders
  - Create maintain contacts with non-profit organization
  - Engage with non-profit organisations for distributing translated material to minority groups
- Actively debunk rumours and misinformation by a respected member of community, alongside with e.g. a public health doctor

Communication to vulnerable or minority groups

- Adjust your communication materials to people with lower literacy levels, or who speak different nationality/language
  - Analyse target audience
  - Make sure you know where people get their information from: e.g. certain groups can be reached by Facebook and not the website of the national public health authorities
  - Make sure collaboration with organisations that translate materials for 'marginalised groups' are already in place before pandemic hits.
    During response: collaborate with them because they know what language to use.
    - *Problem*: providing a translation once is possible, but it is problematic to keep minority groups in the loop with updated information
    - *Problem:* How do you motivate people to follow updates?
- Traditional influencers (celebrities etc.) aren't that trusted, but people trust medical experts and also people they know (minority influencers)

Outcome Board 3: Recovery

A common question at the start of conversations was how to define (the start of) recovery. On the one hand, there are definitions (e.g. less than x cases in a region/country during the last y days). On the other hand - especially as recently experienced in the case of COVID-19 - a recovery phase might

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directly switch over to the next response phase without additional time for preparedness and/or some precautionary measures from the response phase are still advisable.

These features related to the transition from response to recovery also led to noting the following aspects:

- Fear of getting back into active phase (response phase)
- Pandemic fatigue
- (Need to) repeat the message
- (Draw and stick to a) route map to recovery referring to data
- Be clear and always explain why measures/restrictions are lifted; why some things are still needed (maybe this is "transition" in the response phase and not recovery)
  - especially regarding vaccination; a clear communication is necessary in order not to decrease the vaccination rate when the restrictive measures are lifted.

Additional aspects are more directly linked to recovery with respect to a short period of time having elapsed since the response phase ended:

- Admit mistakes made; admitting to issues that were not handled properly and addressing them
- (Caveat:) assessment of the pandemic handling will lead to blaming game
- Supporting groups who were disproportionally affected
- Improving communication channels where they are insufficient

Further issues already overlapped with preparedness...

- Prepare for obstacles such as backlash/engagement/technical
- Set up a system for collecting public feedback

...or were in fact relevant at any time:

- Transparency; transparency on why decisions were made
- Expectation management. Always.
- Measurement and evaluation should be consistent throughout a crisis and not just a practice post-crisis
- Measurement and evaluation role should be delegated to someone on the crisis comms team
- Focus on the outcomes as well as the outputs

Best practices or positive example that have been mentioned included the following:
- Vaccination initiatives on local level, "vaccination days"
- Local trust networks; communication via locally trusted persons

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5   Impact & Conclusion

A defining challenge of pandemic management in general also impacted on the work in this deliverable on pandemic communications: pandemic events equal a high degree of uncertainty. This posed several challenges for this work, from a conceptual and analytical perspective. While analysing communication guidelines, for example, we found that no guideline holds all answers of relevance. While analysing literature to look for clues on how to best facilitate two-way communication, it became apparent that there is not just one single way of doing things. However, some key principles are universally identified by various sources and used to recommend our choice of communications tactics. While analysing the role of planning for pandemic communication, we further found that despite the need for having a plan, it remains hugely important to be flexible and adaptable, as well as having the room and vision to improvise. In short, there is no gold standard for communicating in a pandemic. And even though we firmly see two-way communication as state of the art in terms of communication there remain blind spots and knowledge gaps.

However, this deliverable covers a wide range of topics and sources which impact pandemic communications: scientific evidence, findings in grey literature, advice from communication guidelines, lessons from behavioural science, application of risk communication in other domains, support by IT solutions, progress by other public projects and best practice by public health and responder end-users. The D5.1 deliverable provides a state-of-the-art analysis as reference and foundation for the future work in PANDEM-2 WP5. The findings will set the base for the development of pandemic communication resources in Task 5.2. Secondly, indicators for pandemic communication will build on results in this deliverable. In a next step of PANDEM-2, this deliverable will further inform the development of novel communication approaches and the media training in Tasks 5.3 and 5.4.

5.1   Conclusion

In this deliverable, we selected a systematic approach to pandemic communication which aims to provide key take-away messages that can be used by the project, end-users, policy makers, and researchers. After analysing the pandemic scenarios provided by the PANDEM phase 1 project, we arrived at the conclusion, verified in several constructive exchanges with other consortium members, that focussing on the pathogen is not the most straightforward way when devising communication strategies and communicating with the public. Instead, communication approaches depend more on the information available at a given time and on the different phases of pandemic management (preparedness, response, recovery). While arguably these phases could still be divided in sub-phases (especially in the response phase) this categorisation proved to be most sensible for identifying key messages on pandemic communication. The end-user workshop conducted in June 2021 proved this assessment to be right, as following the different phases of pandemic management was familiar to all participants from across Europe and allowed them to quickly work together in identifying challenges and best practices in pandemic communication.

The same holds true for other key elements and characteristics which influence, shape and define adequate pandemic communication. Trust between the public and health agencies needs to be built and maintained before, during and after a pandemic, regardless whether the causative pathogen is COVID-19 or influenza, with different actions required depending on the pandemic phase. Health agencies need to invest into building a trusted relationship with the public *before* a pandemic by actively engaging with the citizens. Identifying shared values can later on be the basis to build good

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pandemic communication strategy and pre-emptively work against misinformation. During the response phase, trust needs to be upheld by communicating open and honestly, even if messages change with emerging new information. It is further vital to acknowledge that it will be unavoidable that institutions and the public will have to deal with uncertainties during the pandemic. Creating an in-group mentality by appealing to social norms and values (identified during the preparedness phase) can help to maintain and strengthen trust. In the aftermath of a pandemic, it is then vital to recognize that some things may have not gone as planned. In order to learn from the mistakes made, communicators need to reconnect with the public, agencies need to demonstrate that they are willing to identify and learn from the mistakes that were made.

With an increase in available information via social media, the danger of having messages corrupted by mis- or disinformation dramatically increased. It is thus imperative to already lay the groundwork during the preparedness phase, before any pandemic outbreak, to educate and sensitise the public on how to spot and deal with false information. This includes, analogous to establishing trust, active work to establish the organization as a reliable and trusted source for information, but also training for journalists, a repository for fact checking tools and resources, as well as developing alerts on social media that flag misinformation and disinformation. In the response phase, the organization needs to build on their previous work, actively engage the public in communicating the risks and measures and constantly monitor and adjust strategies to counter misinformation/disinformation. This last step is also vital for the recovery phase, during which previous performances need to be re-evaluated and adjusted.

Lessons from marketing and PR teach that there is never just one "public". Accordingly, messages need to be targeted to individual groups and audiences. Regardless of the pathogen, key audiences, vulnerable groups and ways to reach them need to be identified before any pandemic starts. Similarly, ground rules with the media need to be set discussed well before a pandemic outbreak and a crisis response team must be established which includes at least one communications expert. The media landscape needs to be surveyed to determine platforms that are either not being used by target audiences or have not been added to the communication plan because they are new. During the response phase, the communications team then needs to stick to the previous plan, following the guidelines to communicate most effectively and communicate the most essential information needed to reassure the public. Facts must be provided without overloading the intended audience. Constant monitoring and evaluation of the communication performance and outcome are necessary to ensure successful communication. In the aftermath, re-evaluation of mistakes and successes is necessary, as well as communicating to the public that they are now in a period of recovery and reconstruction.

Lastly, different practical insights into a crisis and, more specifically, pandemic communication can also contribute to an improvement of communication tactics. By examining lessons learned from civil aviation, the need for a comprehensive communications plan and training thereof becomes apparent. In order to be ready during a pandemic, the developing and training needs to happen during the preparedness phase, mirroring the insights from marketing and the fight against misinformation. End-user partners also stressed the importance of being prepared before a pandemic outbreak. The preparedness phase should be used to train team members in various types of communication, like TV interviews, press conferences and writing press statements. Smaller, non-pandemic outbreaks could function as a sort of test of communication strategies. During the response phase then, communicators should stick to the plan that is in place, but always be flexible enough to adapt to the current circumstances. Collaboration with the media and the public is vital, even during the response phase, D5.1 Scenarios analysis and pandemic communications requirements statement

to stay connected to the needs and concerns of the target audience. As in any other phase and area, transparency and honesty regarding the information communicated is of highest importance. During the recovery phase, crisis managers and crisis communicators need to re-evaluate past performances, without blaming and shaming others for mistakes and wrong-doings. Crisis communication in civil aviation emphasises that only through investigating and evaluating past performances and mistakes, true learning and improvement for future crises is possible.

In order to provide a systematic and more detailed way of presenting our findings and make them useful to further two-way communication in the future, this deliverable build on the initial findings of the analysis of pandemic scenarios devised by the original PANDEM project. As described in chapters 2 and 3.2, we used these scenarios to create a meta-overview of pandemic communications, key aspects of which are represented in the different Knowledge Bases encountered in Section 4 (see mind map, Appendix 7.1). Based on these key aspects and the initial work plan, we defined the Knowledge Bases covered in Section 4. In addition, as the time-axis emerged as crucial component of pandemic communication, findings of each Knowledge Base were further grouped by the temporal pandemic management phases.

All the main findings and key messages pertaining to pandemic communication are thus grouped along these thematic clusters (Knowledge Bases I to IV) and the temporal axis of pandemic management (Preparadness, Response, Recovery) in the 4 requirements statements (tables) on the following pages (see tables 2-5) . This system of grouping results allows quick access to the research results and activities undertaken in Task 5.1 as a reference for future use and as a base for the work in PANDEM-2 WP5.

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Knowledge Base I Requirements Statement: The Concept of Trust in Risk Communication						
Preparedness		Response			Recovery	
Actively engage	Confidence in an institute's past performance will provide a solid foundation for public trust and hence positive public engagement with health-promoting recommendations during pandemic response. It is imperative therefore, that authorities are active in civic engagement during pandemic preparedness in order to identify shared values in advance of crisis situations, thereby further legitimising pandemic response strategies beyond generic emergency responses.	Engage in clear communication	To minimise anxiety and reduce fear and threat perception it is essential to provide specific information on what to do and what to avoid. Messages should clearly define who the target group is (i.e. their social identity), which is inclusive enough to be relevant to large numbers of people (e.g. the Nation) To define in-group normative messages should come from people who are seen as 'one of us' rather than a figure from the out-group.	Go back to the people	Demonstrate a genuine willingness to identify, learn from and improve upon mistakes as well as triumphs. Provide support to those that need it Seek to initiate activities outlined in preparedness
		Message development should be evidence-informed and transparent and based on engagement with relevant stakeholders	To harness institutional trust and increase cooperation, health measures and health-related pandemic information should be delivered primarily by health-care professionals and not politicians to avoid issues such as political polarisation. The complimentary use of national leadership & health officials with local trusted voices can help address critical information delivery gaps, such as social inequality, thereby increasing engagement with healthcare-related behavioural change recommendations		
Prepare for the infodemic	Pre-emptively protect, or psychologically 'inoculate' public attitudes against misinformation.	Recognise that uncertainty is inevitable	Health emergencies contain uncertainty. However, leaders should avoid subscribing to the notion that the nation is psychologically frail and therefore it is imperative not to foster illusions of certainty, which could lead to the erosion of trust.		
		Empower people to act	Power through rather than power over the people. Avoid assuming population are psychologically frail. Reduce uncertainty and fear.		
		Appeal to social norms	Behavioural change should be framed as identity-affirming through invoking higher-order group values (e.g., as a community we look out for and support each other) which then relate to specifically requested behaviours (e.g., physical distancing)		
			Applying both descriptive norms (everyone is doing it) and injunctive norms (it is the right thing to do) to promote desirable social norm behaviours Leaders should demonstrate prototypical behaviour		

| | | Consider diverse community needs | Group members must be capable of performing the requested changes in social norms. Authorities must therefore provide scaffolded support systems to enable the public to perform the required behaviours. The needs of minority and other vulnerable groups should be considered and accounted for to

1. Maximise participation, minimise marginalisation

2. Minimise impact of fluctuations of super-ordinate ingroup identification | | |
| | | Be proactive in combating misinformation | Maintain concise messaging via multiple platforms. Acknowledge and explain changing recommendation's in simple and open terms and in the context of shared identity.
Compliment public health messaging from national leaders and health officials, with local trusted voices
Be mindful of how media coverage can impact the public's perception of risk and adapted communication strategies to account for this e.g. avoid comparing to other diseases, consider emotional toll of perceived risk. | | |

Table 2: Knowledge Base I Requirements Statement: The Concept of Trust in Risk Communication

Knowledge Base II Requirements Statement : Misinformation & Disinformation		
Preparedness	Response	Recovery
Establish network of trusted voices to communicate to the public	Community leaders need to be involved in the risk communication plan and in decision-making activities i.e. need to engage in two-way communication.	Findings from evaluation & monitoring reports need to be actioned upon
Need to establish communication networks & an infodemic task force	Engage with local leaders & encourage them to develop local tailored interventions	Research to establish how audiences' interactions with information in terms of health literacy
Strategic planning by multi-disciplinary team is important	Monitor fact-checking initiatives	
A relationship & dialogue needs to be fostered between public health agencies & the media	Consistent, culturally appropriate messaging that is practical & from various reliable sources	
A repository of fact-checking tools & resources should be developed for the public & specific target audiences.	Risk should not be explained in technical terms & uncertainties should be addressed through what is currently known	
Educate public to engage in fact-checking activities when presented with information. Awareness of naming/shaming/blaming, especially combined with half-truth.	Experts need to discuss internally before scientific views are communicated to the public – disagreements between experts needs to be explained by third-party	
Journalists should be provided with training in the communication of public health message in order to frame messages correctly.	Mass media need to acknowledge and outline how their current information differentiates from official information = ↓ distrust in official authorities	
Baseline health literacy assessment needs to be conducted in planning phase.	Programmes & resources need to be developed & rolled-out to all members of society to improve health literacy.	
COMBI should be used as a planning framework	Local incentives to engage locals with risk communication resources	
The onus on social media platforms to reduce spread of misinformation & regulate algorithmically published content.	Research & monitoring in local communities to monitor information spread	
Social media platforms should introduce misinformation alerts & a "likelihood of fakeness" component.		

Table 3: Knowledge Base II Requirements Statement: Misinformation & Disinformation

Knowledge Base III Requirements Statement: Commercial Lessons		
Preparedness	Response	Recovery
Target audience never just the "general public", nuanced consideration of different cultural and social backgrounds needed	Core principles for message format: · Timeliness · Transparency (including evidence-based information) · Consistency · Expertise (Credibility) · Accuracy · Relevancy · Empathy	Communicate recovery and reconstruction
Ground rules for working with the media need to be acknowledged by public information officers and intended to be met (e.g. media's deadline driven environment, need for fair access to news and exclusives, importance of engaging with local as well as national news outlets)	Specific audience segmentation to ensure that bespoke messages are communicated to targeted audiences and make concerned voices heard	
Planning for communication channels, while traditional formats remain an extremely valuable medium, crisis communicators must not shy away from the use of social media, incl. focussing on monitoring and situational awareness	Communicate the essential information their target audiences need to protect themselves by acknowledging the fact that they are responding to the crisis without over re-assuring the public	
Establish a crisis emergency response team with a communications expert as one of its key leaders and develop a crisis communications response plan	Commonly used guidelines for helping the media get your message out in the middle of a crisis include: · Provide the journalist with verified information · Advocate for the media journalist and engage with them on a personal level (promote the creation of a mutually beneficial relationship) · Respect the media's deadlines · Set up an information centre or hub where journalists can retrieve "official" statements · Provide sufficient expertise on the topic · Respect and understand the media's needs	
	Providing factual information and mitigating misinformation	
	Goal setting is fundamental for practical measurement and evaluation results, measurement of outcomes should be prioritised, and the entire process should be transparent, consistent and credible	

Table 4: Knowledge Base III Requirements Statement: Commercial Lessons

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Knowledge Base IV Requirements Statement: Practical Application of Pandemic Communication		
Preparedness	Response	Recovery
Constant revision and training of procedures outlined in the comm strategies is necessary · Names/roles/availability need to be up to date · Practice unexpected situations at inconvenient times (try to prepare for the unpreparable)	Establish and uphold trust the public has in the organization by remaining truthful to organization's values and identity in messages to the public · Only publish information that is as truthful and complete as possible	Re-evaluation of communication strategy after the event without assigning blame, do not let lessons learned be lost

Develop a communication plan, that should include certain organizational aspects
· Have a core communications team that can be extended as needed in times of crisis
· Team members should have clear roles and responsibilities
· Establish a working relationship with the media ("media list" of relevant contacts and availabilities)
· Training for the core team (esp. media training, everyone on the team should be comfortable in front of the camera)
	Communication strategies and materials
	· Be quick & flexible in your communication/ responses
	· Keep it simple and action oriented:
	   · Main point
	   · State what do you want people to do and why
	   · Repeat
	· Expectation management: (e.g. that you can get infected while vaccinated; that the virus will remain among us, thus vaccination remains valuable)
	· To tackle online rumours: Respond via the same media in time in two-way communication
	· Provide visually attractive materials, i.e. infographics with the main message
	· Have communication materials available on national level that regional/local institutions can use (both for public health and healthcare providers)
	   · Meet the needs of the media including local media
	   · Establish an information hub for the media (who needs to be part of it? Experts, National Public Health)
		· Be clear and always explain why measures/restrictions are lifted; why some things are still needed
		· Admit mistakes were made; admitting to issues that were not handled properly and addressing them
		· Support groups that were disproportionally affected
		· Improving communication channels where they have been shown to be insufficient
		· Prepare for obstacles such as backlash/engagement/technical
		· Set up a system for collecting public feedback
		
		· Be transparent on why decisions were made
		· Manage expectations
		· Measurement and evaluation should be delegated to someone on the crisis communications team
		· Focus on outcome as well as output
		· Avoid blaming

	Collaboration
	· Listen to the worries of the community and match communication to this
	   · When working in hospital, listen to what is on the minds of health care workers
	   · Good relationships to the medical professionals are crucial
	· Local hospital districts and close relationships are important. More co-operation might be needed with organizations working with the elderly, children etc.
	   · Create mutually beneficial relationships with first-responders
	   · Create maintain contacts with non-profit organization
	   · Engage with non-profit organisations for distributing translated material to minority groups
	· Actively de-nerve rumours and misinformation by a respected member of community, alongside with e.g. a public health doctor	

	Communication to vulnerable or minority groups · Adjust your communication materials to people with lower literacy levels, or who speak different nationality/language	

	· Analyse target audience · Make sure you know where people get their information from: e.g. certain groups can be reached by Facebook and not the website of the national public health · Make sure collaboration with organisations that translate materials for 'marginalised groups' are already in place before pandemic hits · During response: collaborate with them because they know what language to use	

Table 5: Knowledge Base IV Requirements Statement: Practical Application of Pandemic Communication

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7   Appendices

7.1   PANDEM Scenarios Mind Map
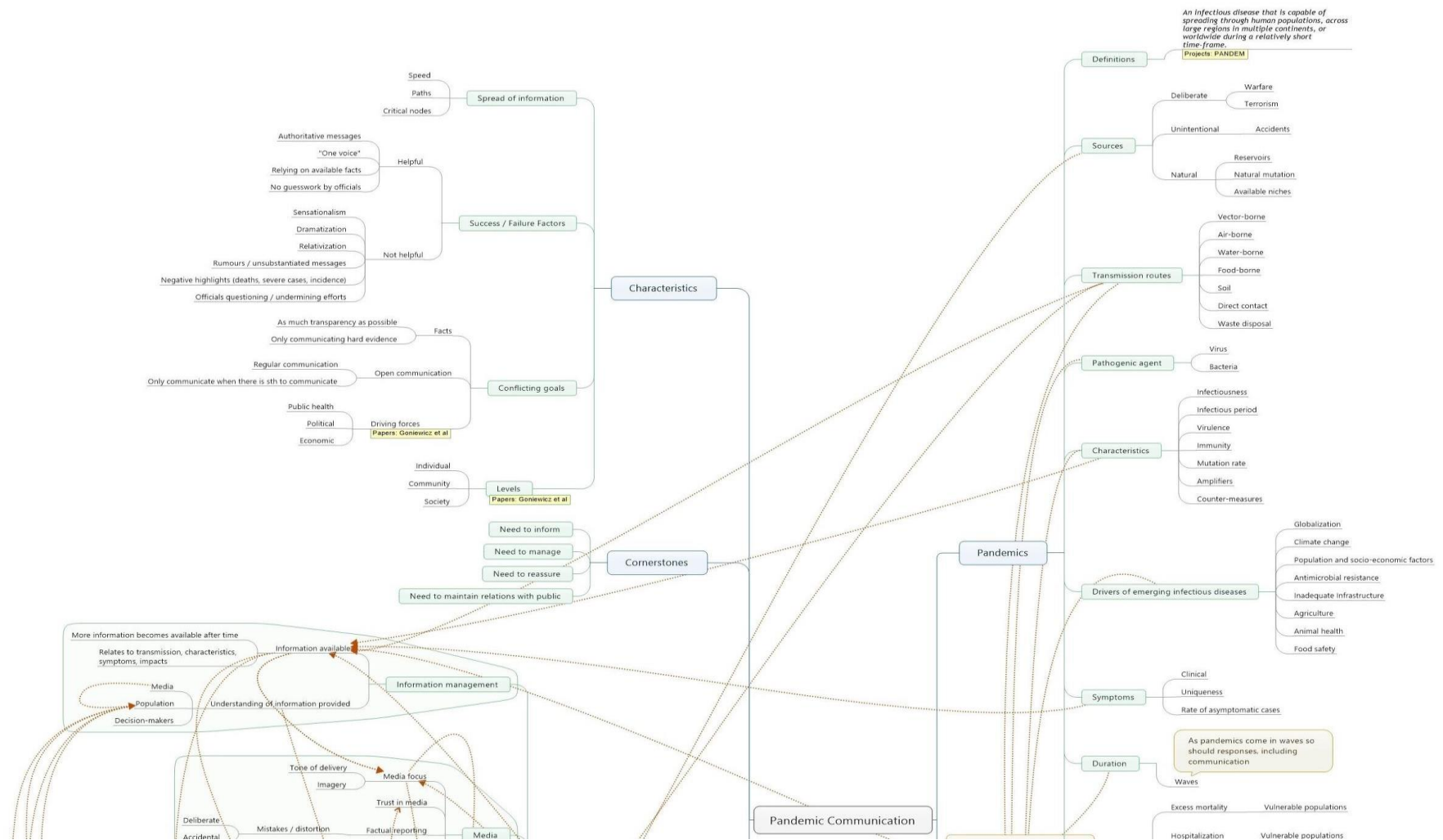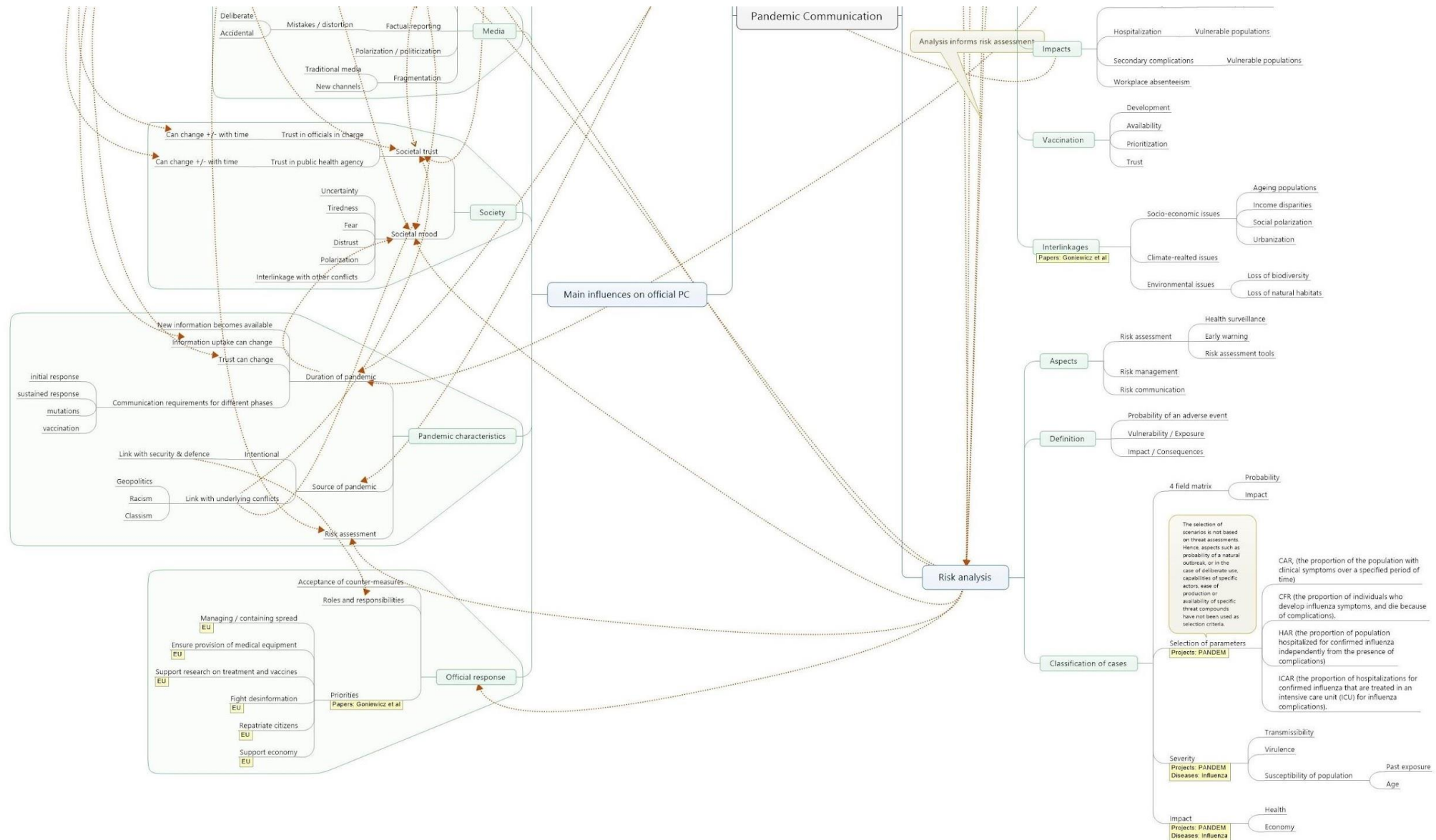
7.2 End-User Questionnaire

The following questionnaire was devised and then distributed among PANDEM-2 end-user partners.

WP-5 Communications End-User Questionnaire

Dear end-user, for our WP-5 we kindly ask you to fill out the questionnaire below. All results will be anonymized before further analysis. Thank you very much for you cooperation!

1. *Does your organization have any communications guidelines/strategy?*

   Yes ☐   *No* ☐

2. *If Yes, when was it last updated?* _____

3. *Which other relevant guidelines (e.g. international) are you aware of and/or are used by your organization?*

   _____

   _____

   _____

4. *Is public communication considered in your emergency response planning?*

   Yes ☐   *No* ☐   *Don't know* ☐

5. *What kind of communications instructions and training have you received, especially in terms of crisis communication and how would you say has it improved your ability as a crisis communicator?*

   _____

   _____

   _____

6. *Would you need/want more training? If yes, please specify what kind you be interested in.*

   Yes ☐   *No* ☐

7. *Please indicate your organization's use of the following public communication channels:*

   Organization's webpage ☐
   News media ☐
   Press conference ☐
   Social Media ☐
   (Virtual) Public Events ☐
   Other (please specify below) ☐

   _____

8. *Does your organization have a system to engage in a dialogue with the public directly?*

_____
_____
_____

9. *What is your experience in using these means of communication?*

_____
_____
_____

10. *How do you make use of social media?*

_____
_____
_____

11. *How relevant are "fake news", disinformation and misinformation for your daily work in communicating with the public?*

_____
_____
_____

12. *How do you deal with "fake news", disinformation and misinformation?*

_____
_____
_____

13. *How do you ensure that your organization is seen as trusted voice by the public?*

_____
_____
_____

14. *Please consider the following communication goals and rate them according to their relevance to pandemic response:*

   - *Convey information to the public about current events or developments*

   | Not Important | ◯ ◯ ◯ ◯ ◯ | Very Important |

   - *Dispute false information that has been circulating*

   | Not Important | ◯ ◯ ◯ ◯ ◯ | Very Important |

   - *Exchange of ideas and concerns with members of the public and get their feedback (e.g. on policy decisions)*

   | Not Important | ◯ ◯ ◯ ◯ ◯ | Very Important |

15. *Based on the current COVID-19 pandemic, how would you summarize your organization's ability to communicate with the public?*

   _____
   _____
   _____

16. *What do you consider areas within the field of crisis communication in general that could be improved upon in your organization?*

   _____
   _____
   _____

17. *Would you be available for a follow-up phone-interview?*
   Yes ☐   *No* ☐

18. *Do you have any further remarks or concerns?*

   _____
   _____
   _____

7.3 Agenda End-User Requirements Workshop

# PANDEM-2 End-User Pandemic Communication Requirements Workshop
24 June 2021
(via MS Teams videoconference)

Thursday, 24 June 2021, 10:00 – 13h00 (CEST)	
	Plenary Session
10:00-10:15	Welcome & objectives of the workshop
10:15-10:45	Creation & discussion of a worst-case communication approach, *(Miro whiteboard tool and discussion in Teams)*
	Breakout to parallel web-sessions
	Parallel Session
10:45-12:00	World-Café: exchange of best-practices and lessons learnt to address pandemic communication challenges *(3 virtual Teams rooms, groups rotate to Miro boards targeting preparedness, response and recovery)*
12:00-12.15	*Coffee break*
	Plenary Session
12:15-13:00	Key findings presented by Board Hosts Discussion of relevant guidelines and final wrap-up

7.4   Case Study: New Zealand – An example in crisis leadership

While the world was struggling to understand and fight against the novel virus, Prime Minister Jacinta Ardern announced after only about two months after the first recorded infection in February 2020 that there were no new community cases recorded (McGuire et al., 2020). Ever since then, New Zealand has had no more significant surges of infections, comparable to the first initial wave (Ministry of Health – Manatū Hauora, 2021). This success has been rewarded in large part to the leadership displayed by Prime Minister Ardern and her government, especially in regards to their communication throughout the pandemic (Hunt, 2021).
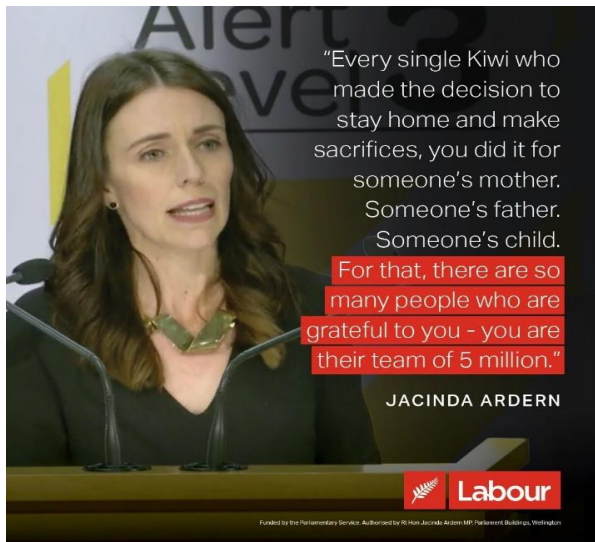
Figure 9: In her speech, New Zealand Prime Minister Jacinta Ardern reflects and reinforces the nations sense of shared identity – the team of 5 million. The social norms of the group are evident (staying home to protect others) and she acknowledges the sacrifice made in order to realise the norms

At the start of the pandemic, New Zealand imposed harsh restrictions well before most other government leaders, with only a few confirmed COVID-19 cases (Kerrissey & Edmondson 2020). But not only was the speed of the actions taken of significance, the manner in which they were communicated were also instrumental in New Zealand's success, "Ardern's explicit step system meant that people knew in advance that escalation was coming. They knew what would be required of them — and they accepted the challenge." (Kerrissey & Edmonson 2020). It emphasised solidarity and a "need to maintain collective resilience and momentum confronting COVID-19" (McGuire et al. 2020) even as cases were becoming fewer in late April 2020.

A crisis leader must also be able to guide on practical decision-making. Although humans have a natural tendency to succumb to cognitive bias there have been some applauded examples in the COVID-19 era including New Zealand, Prime Minister Jacinda Ardern who was praised for the government's clear 'stepwise escalation and de-escalation plan' (Beilstein et al., 2020). This saw the country close its borders to incoming travellers which successfully steered the island into a COVID-19 free zone by early June 2020. Some have hallmarked this as an elimination rather than a mitigation control strategy but nevertheless, it was a noteworthy case of adaptive and decisive leadership (Nicola et al., 2020).

During the first few months of the COVID-19 pandemic, Prime Minister Jacinta Ardern engaged with the public on a variety of platforms and communication channels. At the end of March and during April 2020, for example, Ardern took part in six Facebook Live events, providing the public with important information surrounding the government's response to COVID-19. What makes these events significant is that Ardern upheld a widely informal and relaxed atmosphere, while providing the public with important updates. Additionally, as McGuire et al. point out, "she encouraged individuals to be kind and compassionate towards others and repeatedly referred to 'our team of five million', indicating unity in the battle against COVID-19" (McGuire et al, 2020). The image of the 'team of five million' was reiterated in other speeches (see Figure 9), emphasising the notion of teamwork and togetherness (McGuire et al., 2020). In solidarity with workers who had lost their job because of COVID-19 and the

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statement

health care workers on the frontline, she announced to the citizens of New Zealand that she and her ministers would be taking a 20% pay decrease for 6 months (Ainge-Roy, 2020).

Especially during the first wave of the pandemic, the measures taken and the way they were communicated to the public ensured one of the lowest infection and death rates among developed countries (McGuire et al. 2020). Kerrissey and Edmonson characterized Prime Minister Ardern's way of communicating as "clear, honest, and compassionate: It acknowledged the daily sacrifice to come and inspired people to forge ahead in bearing them together" (Kerrissey & Edmonson, 2020).

Also noteworthy is the communication campaign the Prime Minister and her government launched in March 2020 which has proven to successfully bring across the message of caution and unity to New Zealanders. As opposed to other countries, the New Zealand strategy was not to alarm or scare citizens to obey the rules but instead to inspire a movement characterized by team spirit and unity. One very clear and simple, the official "Unite against COVID-19" campaign communicated correct behaviour (https://covid19.govt.nz/). The advice and guidance given was mirrored both in tone and content by the Prime Minister, reinforcing the calm and cohesive messages (Hunt, 2021).

7.5 Additional Examination of Misinformation & Disinformation

7.5.1 Sender

Strategic planning

The article by Fakhruddin and colleagues outlines (Table 6) the strategies that are crucial to effective response, recovery times, and financial and political stability during a pandemic (Fakhruddin et al., 2020):

Effective Strategies	Ineffective Strategies
1) Transparent governance	1) Top-down governance, bureaucratic structures
2) Efficient and effective information dissemination	2) Lack of knowledge of to disseminate information correctly
3)Well-developed communication channels	3) Fragmented communication channels
4) Transparent information dissemination leads to trust and engagement by public	4) Inadequate/inconsistent information or misinformation leading to distrust
4) Strong community vigilance by public education and incentives	5) Poor community vigilance and lack of education
5) Strong collaboration of major stakeholders e.g. city councils, citizens, volunteers	6) Lack of collaboration – lack of risk management integration into major sectors e.g. health, infrastructure, tourism
6) Evidence-based decision making	7) Lack of data interoperability
7) Stringent hospital infection control measures	8) Inadequate PPE and hygiene practices
8) Continuing support during lockdown	9)Lack of support

Table 6: Effective & ineffective strategies according to (Fakhruddin et al., 2020)

Table 7 outlines how the leaders in two European countries approached the first wave of the COVID-19 outbreak, how they engaged with communities, and what were the positive/negative outcomes of their actions (Lilleker et al., 2021). While it may not be directly linked to misinformation, the lessons learned will contribute to the PANDEM-2 guidelines.

	Italy	Ireland
Context	Coalition government formed in 2019. Led by Prime Minister Giuseppe Conte, who only got involved in politics in 2018. Gave rise to	In February 2020 there was a general election. The three biggest parties received 20-25% of the vote and therefore no clear

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statement

	a weak image of the leader and doubts about his leadership qualities. Italy did not have a reference point to help them tackle COVID-19's spread.	winner. In the interest of public health, a caretaker government was appointed, headed by the outgoing Taoiseach (Prime Minister) Leo Varadkar.
Communication Strategy Implemented	Daily press conference started 23rd February Launched Official Social Media Page on 4th March – launched #iorestoacasa (I stay at home) on 9th March Conte made TV appearance around COVID-19 before the situation got worse – His frequent TV press conferences, speeches to the nation and videos on Facebook were central, solemn moments for providing information.	National Public Health Emergency Team (NPHET) established in January 2020 1st COVID19 case Feb 29th and start of daily NPHET briefing Varadkar made first TV appearance on 12th March. Another one on 17th March (St. Patrick Day) which was referred to as a career-defining speech. 1st May announced five-phase reopening roadmap
Issues	● Leadership style better suited to a father of the nation than to a commander-in-chief. ● Use of personal & government Facebook page led to the uncertain management of the emergency and inadequate communication of the crisis. ● Announcing measures before their approval ● Absence of opportunities for questions from media – collaborative relationship between government & media not achieved. ● Lack of clarity and precision and the lack of punctuality in television events ● Lack of coordination between national & local institutions slowed the health response - the communication of these three actors –political institutions, media and scientific experts – was not always coordinated & convergent.	● Some scrutiny that this five-phase announcement was a public address instead of a press conference as no opportunity for questions ● The Taoiseach and ministers repeatedly said they based decisions on public health advice, but this led some critics to suggest that unelected NPHET officials – not the government – were running the country ● No clear guidance on wearing of face masks - 'I accept that the evidence, and maybe even the messaging on this, has changed over time. Perhaps it has been confusing for people and has not got through in the clear way it needs to' declared by Harris, Minister of Health. ● Slow response initially - In late February, no formal government decisions had been taken regarding closures or cancelling events
Positives	● Conte's speeches illustrated an understanding of the difficulties and suffering, highlighted the exceptionality and seriousness of the moment, emphasised community spirit, national pride and his commitment. ● Social networks helped to communicate the crisis, manage the emergency, and share segregated sociality	● The public responded positively to the outgoing government's handling of the pandemic, with popularity rising from 21% of first-preference votes in February 2020 to 37% in June 2020. ● A lot of national campaigns and initiative promoted the sense of community: 'Answer Ireland's call'; 'sending love' free postcards from national post office; 'Feed the Heroes'; 'Home School Hub'

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	● The WHO Director-General officially praised the response of Italy highlighting "a combination of leadership, humility, active participation by every member of society, and implementing a comprehensive approach."	● Varadkar's leadership was praiseworthy, especially his early communication - 'decided that communication and laying all the cards of the table was key to bring everybody along with them' ● Varadkar 'knows how to speak to people around medical issues and there's an empathy there, but there's also a strictness there…he did it really brilliantly.' – as a doctor he gained public trust ● Taoiseach advised people to 'seek information only from trusted sources' & social media outlets tackled misinformation

Table 7: Political Communication in Europe during COVID-19 pandemic (Lilleker et al., 2021)

7.5.2 Information & Messaging

Content

There are two types of uncertainty according to Paek & Hove (Paek & Hove, 2020):

- *Epistemic* (Markon & Lemyre, 2013) or *Deficient* (Gustafson & Rice, 2020) uncertainty is lack of data or knowledge about the causes and characteristics of a risk. Examples in relation to COVID-19 include virus source and virus transmission.
- *Ambiguity* (Markon & Lemyre, 2013) or *Consensus* (Gustafson & Rice, 2020) uncertainty relates to divergent or contradictory views from experts managing a risk. Examples in relation to COVID-19 include mask-wearing at the stage of the outbreak, with some experts recommending it on a precautionary basis and others (WHO) suggesting not to wear masks unless one felt ill.

The study by Han *et., al* (2021) provided some practical guidelines on how to communicate uncertainty and to reduce at least some aversive psychological responses to the communication of uncertainty (Han et al., 2021). The study explored the effect of adopting an "uncertainty-normalizing" communication strategy on reducing ambiguity aversion (preference for known risks over unknown risks) and how it compares to traditional public communication strategies (promoting hope and prosocial values). A "uncertainty-normalizing" strategy is theory-based: to emphasize that existing uncertainty is an expected experience that does not indicate an unusual deficit in people's abilities. The 1500 participants in this study were randomly allocated to 5 groups: (1) control, (2) uncertainty, (3) **uncertainty + uncertainty-normalizing**, (4) *uncertainty + hope-promoting*, and (5) uncertainty + prosocial. The difference between groups will be briefly described below through the communication of one piece of information:

1) Anybody can get COVID-19, and nobody is risk-free.
2) Anybody can get COVID-19, and nobody is risk-free. It's impossible to say exactly where it will spread and who will become infected or not.

3) Anybody can get COVID-19, and nobody is risk-free. <u>It's impossible to say exactly where it will spread and who will become infected or not.</u> **But this is true of all diseases; there are always risks and the goal of medicine is to reduce these risks.**

4) Anybody can get COVID-19, and nobody is risk-free. <u>It's impossible to say exactly where it will spread and who will become infected or not.</u> *But staying alert and watchful will help you reduce your risk of becoming infected and spreading COVID-19 to others.*

5) Anybody can get COVID-19, and nobody is risk-free. <u>It's impossible to say exactly where it will spread and who will become infected or not.</u> <u>That means we all need to prevent spreading the COVID-19 to each other.</u>

From a lessons learned perspective, the grey literature on communicating uncertainty suggests that communication of uncertainty is not just about content of the message but the <u>way</u> it is communicated (World Health Organisation, 2017). An example was provided on how the USA public overestimated their risk to the Ebola virus disease, due to lack of clarity around the breaches in infection prevention and control protocols and failure of scientists to indicate the true level of risk to different sectors.

7.6   The Irish SciComm Collective

The Irish Department of Health have collaborated with members of the science and health community to break down the complex nature of COVID-19 public information communicating through a TikTok account. The so-called SciComm Collective aims to address misconceptions and misunderstandings around COVID-19 and encourage getting vaccinated. This includes short-form videos created by a younger cohort of influencers which will engage with the typically younger audience on the viral social media platform. Example topics include 'long-covid', 'herd immunity' and 'what to expect' when receiving your vaccine. The Collective has started its work in April 2021 and their videos published by the collective can be found at: https://www.tiktok.com/@scicommcollective_ire

7.7 Communication Guidelines

Emitting organisation	Date (mm/yyyy)	Title	(Executive) Summary	Direct link to pandemics / public health

ECDC	08/2014	Measles and rubella elimination: communicating the importance of vaccination	The goal of this project is to support EU Member States in their fight against measles and rubella. More specifically, this project aims to:
			  dispel the myths about measles vaccination;
			  offer scientific, evidence-based corrections of misperceptions on measles
			  inform about rubella infections in pregnancy; and
			  discuss the risks and benefits of vaccination against rubella for women of childbearing age.
			This report should enable Member States to engage in effective, evidence-based risk communication. Information on measles and rubella is presented in a modular fashion, so it can be easily used in customised leaflets, flyers, or web pages. The facts presented in this report are intended to lower the barriers to measles and rubella vaccination and raise awareness for congenital rubella syndrome (CRS), including awareness for ante-natal screenings and post-partum vaccination.
				yes

ECDC	01/2013	A literature review on effective risk communication for the prevention and control of communicable diseases in Europe	This review highlights the particular challenges faced by a multi-cultural and multi-lingual Europe when designing effective risk communication strategies. National and international collaboration is identified as being vital to deal with these challenges as well as further development of cross-sectoral risk preparedness strategies. Although there are many resources available to risk communicators today, limitations have been exposed once they have been tested. Gaps which the report identified include risk communication messages often failing to reach the intended targets and a lack of resources to meet the new and changing needs of more web-based societies.	yes
ECDC	10/2011	A literature review of trust and reputation management in communicable disease public health	The evidence base was found to be in an emergent phase and is therefore somewhat limited, although largely consistent. Elements of good practice identified included the need for long-term and proactive planning of trust and reputation management; strong media relations skills; proactive relationship building with key stakeholders; integration with technical disease prevention and control functions; and enhanced commitment to transparency and two-way dialogues. A focus on crisis communication, mass (undifferentiated) communication and communication to support technical functions was apparent in the literature. A limited understanding of the role and nature of risk communication; the benefits of adopting a strategic, rather than reactive approach to trust and reputation management and the potential benefits of full integration with immediate and long-term public health goals was also apparent. Recommendations for future research and development of good practice are evaluations specifically focused on the impact of public health activities on trust and reputation; adopting a strategic approach to trust and reputation planning which coordinates the full range of communication functions and objectives; plus organisational capacity building in communication functions such as risk communication, environmental scanning and mass media relations.	yes
ECDC	11/2019	Influenza communication guide: How to increase influenza vaccination uptake and promote preventive measures to limit its spread	The communication guidelines contains different types of campaign material (logotype, pins, posters, leaflets, factsheets, banners) to support national communication campaigns on seasonal influenza. The material provides priority audiences with information on seasonal influenza and the benefits of vaccination, and is designed to ensure that consistent and clear messages are conveyed to the audiences effectively. The guidelines aim to provide support for national health professionals who are responsible for planning and developing communication activities on influenza prevention. The campaign material can be translated or adapted to cultural specificities and campaign focus.	yes
ECDC	04/2016	Let's talk about protection: enhancing childhood vaccination uptake	Helping parents to understand vaccination and supporting their choice to get their children protected is one of the most important aspects of the work of a primary healthcare professional. Effectively communicating and addressing patients' concerns is a task that could require effort, skills and time. Family doctors, nurses and other vaccination providers should feel comfortable when discussing vaccination and motivating carers to get children protected. Research into the reasons behind a decision on whether or not to vaccinate, identified three key recommendations for healthcare providers: 1. Make vaccine communication more of a two-way information exchange 2. Keep the focus of discussions on the benefits of "getting protected and protecting" 3. Make the settings and systems in which people obtain vaccinations simpler, more accessible and easier to navigate	yes

Emitting organisation	Date (mm/yyyy)	Title	(Executive) Summary	Direct link to pandemics / public health
WHO (+GOARN, IFRC, UNICEF)	12/2020	COVID-19 - Global Risk Communication and Community Engagement Strategy	COVID-19 is more than a health crisis; it is also an information and socio-economic crisis. The pandemic and the associated response are prompting the deepest global recession in nearly a century and pushing an estimated 70-100 million more people into extreme poverty. Until biomedical tools such as vaccines or treatments are developed and widely available people's behaviours and their willingness to follow public health and social measures remain the most powerful weapons to stop the spread of the virus. Consequently, there is an unprecedented need to elevate the role risk communication and community engagement (RCCE) plays in breaking the chains of transmission and mitigating the impact of the pandemic. A revised RCCE strategy was needed to reflect this and the learning from the response to-date. The new strategy will cover six months from December 2020 to May 2021. Analysis of socio-behavioural data shows us some broad trends. In general, people know about COVID-19 and the preventive measures necessary. However, people are becoming complacent and risk perceptions are lowering. In general, people are feeling less confident in what they can do to control the virus. As the pandemic becomes more protracted, pandemic fatigue is increasing. The growing fatigue, the stress caused by uncertainty, loweing risk perceptions and reducing trust in government responses, is taking its toll on the fabric of our communities.	yes
WHO	2015	Effective Communications Participant Handbook: communications training programme for WHO staff	The WHO Effective Communications Participant Handbook was created to support WHO staff around the world in enhancing their communications skills as part of the global communications capacity-building efforts of the WHO Department of Communications (DCO)	yes
WHO	2018	Managing epidemics: Key facts about major deadly diseases	Epidemics of infectious diseases are occurring more often, and spreading faster and further than ever, in many different regions of the world. The background factors of this threat are biological, environmental and lifestyle changes, among others. A potentially fatal combination of newly-discovered diseases, and the re-emergence of many long-established ones, demands urgent responses in all countries. Planning and preparation for epidemic prevention and control are essential. The purpose of this "Managing epidemics" manual is to provide expert guidance on those responses. Although this publication is open to a wide readership, it is primarily intended to help the World Health Organization (WHO) country representatives (WRs) to respond effectively and rapidly at the very start of an outbreak. The manual provides concise and basic up-to-date knowledge with which WRs can advise Ministries of Health in all countries. Specifically, it examines and explains in detail a total of 15 different infectious diseases and the necessary responses to each and every one of them. These diseases have been selected because they represent potential international threats for which immediate responses are critical. Nearly all of them are subject to WHO's International Health Regulations (2005) monitoring, and are part of the Global Health Security Agenda. Perhaps the greatest threat outlined in the manual is an influenza pandemic, which is both unpredictable and inevitable. In the worst-case scenario, there will be no protective vaccine for six months or longer after the virus is identified, and even there will be a global shortage of doses. On this and other threats, the manual focuses on practical and indispensable things to know about infectious diseases that are most important for national political and operational decision-makers; it also links readers to more exhaustive WHO guidance. It has been developed in parallel with the creation of the WHO MOOCs (Massive Open Online Courses) on open WHO (https://openwho.org).	yes
WHO	01/2018	Communicating risk in public health emergencies	Recent public health emergencies, such as the Ebola virus disease outbreak in West Africa (2014-2015), the emergence of the Zika virus syndrome in 2015–2016 and multi-country yellow fever outbreaks in Africa in 2016, have highlighted major challenges and gaps in how risk is communicated during epidemics and other health emergencies. The challenges include the rapid transformation in communications technology, including the near-universal penetration of mobile telephones, the widespread use and increasingly powerful influence of digital media which has had an impact on 'traditional' media (newspapers, radio and television), and major changes in how people access and trust health information. Important gaps include considerations of context – the social, economic, political and cultural factors influencing people's perception of risk and their risk-reduction behaviours. Finally, guidance is needed on the best approaches for strengthening emergency risk communication (ERC) capacity and sustaining them for potential health emergencies. The recommendations in these guidelines provide overarching, evidence-based guidance on how risk communication should be practised in an emergency. The recommendations also guide countries on building capacity for communicating risk during health emergencies.	yes
UNISDR (now: UNDRR)	2017	Public Communication for Disaster Risk Reduction	Advances in technology have improved scientific risk information dramatically in recent years. Yet this valuable information can too easily go to waste if it's not effectively communicated to people who need it to make decisions. Effective communication helps technical experts develop and share data, it enables professional users to understand the data, and it influences how ordinary people take actions to reduce risk in their everyday lives. Communication is a process and should be considered throughout every stage of risk assessments. This section focuses on communication with the general public. It provides guidance on how government officials and other professionals can communicate with general audiences to reduce the risk of disasters.	no
IFRC	12/2018	A guide for the media on communicating in health emergencies	In a health crisis, the media has the power to save lives. Effective communication can help to prevent or reduce the spread of disease, and guide those affected towards health services and treatment. This manual provides tips for media practitioners on how to help audiences during health emergencies. It was created by BBC Media Action for the International Federation of Red Cross and Red Crescent Societies in the framework of the Community Epidemic and Pandemic Preparedness Programme. BBC Media Action offers additional manuals for humanitarians on working with broadcasters and on media programming for communities affected by humanitarian crises on its website.	yes