COALESCE

Co-creating the EU Competence Centre for Science Communication

Deliverable 4.3

Guidelines for non science journalists in times of crisis

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DISCLAIMER

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1 Introduction

Chapter 1 – KEY MESSAGES

- These guidelines are part of COALESCE project, funded under Horizon Europe, which is establishing the European Competence Centre for Science Communication, offering resources, services and training to improve science communication programmes and projects in all domains and contexts.
- These guidelines are dedicated to generalist journalists who are not specialised in science topics but can be asked, more or less frequently, to deal with news that involve scientific information as well as ethical and social implications of new research methodologies or results.
- It aims at helping journalists to understand and tackle complex issues emerging around the communication of science and technology, especially in relation to crises, such as, climate change, soil and water related emergencies, pandemics, and AI and its impact on society. Moreover, complex issues may come under circumstances of polycrisis, including economic and geopolitical. All this happening concomitantly with a voracious pace of misinformation, disinformation and fake news spreading.
- In Chapter 1, the structure of the document and its use are illustrated.

1.1 About COALESCE

The Coordinated Opportunities for Advanced Leadership and Engagement in Science Communication in Europe (COALESCE) project is funded by the European Commission (EC) to establish a European Competence Centre for Science Communication and an associated Science Communication Academy. The Competence Centre operates under a virtual platform, offering services, tools and resources, connected to a network of physical National and Regional (N&R) hubs. The Competence Centre is being developed through consolidation of research and practice from past and ongoing research projects, including those funded under the 'Science with and for Society' (SwafS-19) programme as part of Horizon 2020, namely TRESCA, NEWSERA, PARCOS, GlobalScape, QUEST, ENJOI, CONCISE and RETHINK. The role of the Competence Centre is to further develop and mainstream science communication knowledge and to foster connections between science and society. In this context, the term science also refers to the related fields of technology, engineering, arts and mathematics (together known as STEAM).

The project has initial funding for four years (April 2023 – March 2027) but the Competence Centre is being developed to be sustainable beyond the project's duration.

1.2 Risk society and science and technology communication

Risks play a central role in shaping our world. They do so in different ways and at different scales. Not only do we constantly **face natural risks** that can be difficult or impossible to predict, but even when predictable, some of these risks can become complicated to manage. Moreover, as a modern contemporary society increasingly relying on technology and scientific advances, we also contribute to **creating new risks** that might prove even harder to control.

This second category of risks is so relevant that in the mid-1980s the German sociologist Ulrich Beck proposed a definition that has become very popular since, that of a **Risk Society**[1]. Beck's argument is that from the 20th century onwards, human societies have had to deal with risks generated by industrialisation, technological development, and globalisation. These risks are often global, invisible, and even harder to predict or know than the natural ones. The concept suggests that as societies become more advanced and reliant on technology, **they also create new kinds of risks** that they struggle to fully control. In particular, Ulrich Beck refers to **five types of risks** that are interconnected, global, and difficult to control. Beck's examples can also be integrated and updated, taking the advancements of the past 30 years into consideration. As a result, the five types include:

Environmental risk, such as pollution, climate change, deforestation, biodiversity loss.

Technological risk, such as chemical and nuclear energy accidents, unethical applications in biotechnology and in the biomedical sector, the overwhelming and often unregulated diffusion of AI systems.

Health risk, such as pandemics, antibiotic resistance, and unsafe industrial practices, such as the case of the PFAS dissemination, the tobacco industry coverage of the health consequences, the thalidomide case, among others.

Economic risk, such as global financial crises, economic instability, and the growth of inequality.

Social and political risk, like terrorism, cyber threats, the erosion of democracy and the growth of autocracies.

[1] Ulrich Beck, Risk Society: Towards a New Modernity. 1986

To see how these risks can become real threats, we can draw **examples from some of the major accidents** that have had huge impact on the environment and human communities at a local and global level in recent years:

1. **Nuclear proliferation** and the undermining of the Treaty of non-nuclear proliferation, bringing back the nuclear threat as a means of resolution of ongoing conflicts.
2. Two major **nuclear disasters**: Chernobyl, in 1986, when a reactor at the nuclear power plant exploded, releasing large quantities of radioactive material across Europe, and the failure at the Fukushima Daiichi nuclear power plant in Japan in the aftermath of the March 2011 tsunami.
3. The Seveso **dioxin industrial accident**, in 1976, at the Italian plant of ICMESA, owned by the Swiss company Givaudan and controlled by the major pharmaceutical company Hoffmann-La Roche. The accident resulted in the release of a large amount of toxic dioxin (TCDD) into the atmosphere, contaminating the surroundings, causing health effects and skin lesions on the residents and forcing them to relocate and never return to their homes. This incident led to the creation of the Seveso Directive, a major piece of EU environmental legislation.
4. **Bhopal in India**, in 1984, when a leak from the Union Carbide industrial plant released 40 tons of methyl isocyanate gas, killing well over 10.000 people and exposing another half a million to toxic chemicals. To this day, the site remains contaminated.
5. The **Exxon Valdez oil spill,** which took place off the coast of Alaska in 1989, released 11 million gallons of crude oil into Prince William Sound, killing wildlife and affecting the livelihoods of fishing communities for decades.
6. The **massive oil spill** caused by the Deepwater Horizon oil rig, operated by BP, in the Gulf of Mexico, in 2010, when over 4.9 million barrels of oil were spilled, devastating the ecosystem and affecting coastal economies for years.

In all of these cases and many more, **the crisis management** needs to go hand in hand with the **communication of the risks in an open and transparent effort** to give proper information to the affected communities. That is, it needs to deal with the estimation of the risk that might be associated with a specific event, phenomenon, or long or short-term human activity.

To estimate the risk, we need to consider that **risk is not synonymous with hazard**[2]. A phenomenon can pose a hazard when it can potentially produce harm or have other undesirable consequences to people or objects. The hazard can have different magnitudes, depending on the amount of potentially resulting harm: number of people exposed, amount of damaged objects, duration and persistence of the damage, etc. Depending on its probability, **the same hazard can yield very different risks**: an area where an earthquake usually strikes every 500 years faces the same hazard but not the same risk as another

[2] Understanding hazards and risks. National Library of Medicine.

area where an earthquake strikes every 100 years. Or, regarding the climate domain, the risk associated with an extreme event impacting a densely populated area is quite different from that of a similar extreme event affecting an area where very few people live. In other words, hazards of the same magnitude do not always pose equal risks depending on different factors.

Calculating the risk implies estimates of **the hazard** and **the impact** of the associated damage. Without a solid amount of data, this calculation might become less accurate. This is another very important piece of information that journalists should be capable of conveying during a crisis.

1.3 Methodology: how we have built these guidelines

In fast-paced newsrooms, or when working as freelance collaborators, generalist journalists tend to cover **a broad range of topics**, handling diverse stories daily, ranging from local news to international crises, often working **under tight deadlines**. Deontological codes make it clear that the **main goal of journalism is that of informing the public,** providing timely and accurate news, and engaging diverse audiences while **maintaining journalistic integrity and independence**. A central key responsibility is to **work in the public interest**—ensuring that the reporting serves society by holding power to account, shedding light on important issues, and helping citizens make informed decisions. This ethical commitment requires journalists to **prioritise truth and fairness** over sensationalism or commercial interests.

Especially during times of crisis, journalists face a very serious challenge, that is **to balance speed with accuracy**, ensuring that their reporting is both accessible and comprehensive. When the crisis touches issues such as the environment, a natural disaster, a health emergency or an impacting tech innovation, **generalist journalists need to adapt quickly**, sourcing credible experts and navigating complex subjects such as science or technology. In many cases, in fact, science journalists are not involved in covering ongoing **breaking news**, which are most often **assigned to generalist journalists**. In these cases, the work undertaken by generalist journalists is even more crucial for providing the public with the information they need to understand and act to manage and mitigate the impacts of the crisis.

In order to write these guidelines, therefore, we not only refer to **knowledge produced by research projects** in the field of science communication**,** reports and scientific publications dealing with crisis communication and crisis management, but our starting point was the **collection and understanding of needs** expressed directly by non-science journalists who have found themselves in the situation of covering crises and emergencies which have to do with a science topic.

We explored the needs in three separate steps:

- A first workshop, held in Italy, involving journalists who work in local newsrooms or as freelancers for local outlets. During the workshop, using a participatory methodology, we facilitated the collection of their inputs, both describing the type of problems they face, their needs and the type of solutions that might support their work.
- A second workshop was held at ESOF 2024 in Katowice to discuss communication issues related to different phases of a crisis from the point of view of different stakeholders including journalists (see Crisis Navigator § 1.4). Also this workshop was conducted using a participatory methodology to collect participants' inputs.
- A series of in-depth interviews with over 10 generalist journalists from different EU countries was held covering a broad range of media outlets and working methodology, to collect their inputs and better understand their needs.

Results from the two workshops and the interviews have been nurturing the building process of these guidelines, which have been designed also to be used in connection with the **Crisis Navigator**, produced within the COALESCE consortium, as detailed in the next section.

1.4 About the Crisis Navigator and these guidelines

To facilitate the delicate and crucial task of communicating when facing urgent emergencies or long-term crises, COALESCE has designed and produced a tool that can support the work of all those involved at different levels and steps. There is no one-size-fits-all solution to getting it right - this is the reason why the tool, called **Crisis Navigator**, is designed to offer ideas and suggestions to science communicators, scientists and other stakeholders to best manage this delicate task in accordance with their role and responsibility, to contribute to increasing trust in science-based decisions, tackling disinformation and assisting citizens in making sense of a crisis and dealing with it.

Journalists are **a special category of professionals** that play a vital and crucial role when any crisis is unfolding, be it a health emergency, a technological or industrial failure or incident, or the aftermath of an extreme event with many different impacts and consequences. Journalists are usually **well-equipped to deal with current affairs** and their specific fields of expertise, be it politics, economics, sports, music, cinema, tech, etc. However, when a crisis unfolds and the risks become critical for society, information and journalism are called to step up their ability to work and explain, to provide verified facts and data, indications and recommendations, counteracting **the dangerous effects of misinformation and speculation**. When dealing with a science-related event, such as some of the cases mentioned above, non-science journalists can find themselves navigating difficult waters. The more complex the event and its dimensions of risks and uncertainties, the more difficult its coverage. And yet, it is crucial to foster the best possible outcome.

To support non-science journalists who face these complicated tasks, COALESCE is **producing these guidelines**, stemming from the Crisis Navigator and fed with the different

contents and resources described in the previous section. The final goal is to offer non-science journalists **an overview of the basic knowledge in risk management and practical tips and tricks** to more effectively carry out their jobs in times of crises.

1.5 How to use the guidelines

These guidelines are organised in 5 chapters (2-6), as follows:
- Chapter 2. An introduction to basic concepts in scicomm: crisis, complexity, uncertainty, risk.
- Chapter 3. What journalists can do in the absence of crises, to be prepared and to prepare a favourable terrain for audiences and stakeholders.
- Chapter 4. What journalists can do (or should not do) when the crisis is imminent.
- Chapter 5. What journalists can do (or should not do) when the crisis is at its peak.
- Chapter 6. What journalists can do to learn from past experience and help the audiences to do the same.

Each chapter is preceded by a short resumé and suggestions for further readings and useful contacts, such as websites but also associations and organisations, to find help in the different phases.

These guidelines are written by professional journalists and science communicators with experience in journalism, and the indications are based on experiences and suggestions taken from real cases and situations.

The COALESCE project also involves a network of **Regional & National Hubs** which will co-create, adapt and disseminate the project results into local contexts and languages. To this end, N&R Hubs might also take inspiration and adapt these guidelines into their national languages in case they find them useful to support and engage with local non science journalists.

2 Defining crisis, complexity and uncertainty

Chapter 2 - KEY MESSAGES

- Science is complex and uncertain. Scientific knowledge is always progressing and incomplete - there is always something that is known, and something that is still to be understood. This uncertainty is difficult to tackle in the media, which prefers easy and definite messages. The situation worsens during a crisis, when people expect clear and prompt information.

- In this chapter, we define what it means for science to be complex and uncertain, and explore how to communicate trust in scientific knowledge despite these challenges. This does not imply that science is the only valid perspective or that scientists are always correct simply by the virtue of being scientists, irrespective of conflicts of interest. Rather, it highlights that knowledge generated by research institutions and universities is based on ethical and transparent processes and a shared foundation of methods and principles, often reaching consensus - unlike the idiosyncratic, unproven, and often obscure claims made by pseudo-experts.

2.1 Crisis and emergency

A **crisis** is a broader, often prolonged situation that causes significant disruption and potentially involves complex challenges that are not immediately solvable. It usually unfolds over time and may involve multiple complex situations difficult to resolve.

A crisis can develop **from an emergency** or **from longer-term issues** when they reach a critical point. In this second case, the crisis is not perceived as a novelty, which makes it difficult to put on the media agenda. For instance, the climate crisis is a long-term issue, it does relate to and impact multiple sectors of the economy and society and has yet often been perceived as uninteresting by the media due to its lack of newsworthiness – until its impacts and effects became evident to everyone.

An **emergency** is an immediate, often sudden situation that directly threatens life, health, the environment or human properties. An emergency requires swift and urgent action to minimise damage and prevent further harm or loss. Quick and thorough communication is one of the key ingredients to foster a positive outcome when dealing with an emergency.

It is far easier to prepare, also at the communication and journalistic level, to deal with a crisis than with an emergency. The journalist's role during an emergency is to provide **urgent, accurate information** that helps the public respond appropriately, particularly regarding where to seek help, what immediate actions to take, and how to stay safe. **Covering a crisis** implies focusing on a broader picture, explaining not only the **immediate risks** but also the **long-term implications**, the causes and the responses. It involves in-depth analysis, context, and often ongoing coverage as the situation develops.

2.2 What does complexity mean in the context of scientific knowledge?

The term **complexity** refers to the intricate and interconnected nature of issues, where multiple factors and variables interact in ways that are often difficult to predict or fully understand. Scientific problems often cannot be explained by simple cause-and-effect relationships and involve numerous components that influence each other. For example, climate change is not just about rising temperatures; it involves complex interactions between the atmosphere, oceans, ecosystems, and human activities.

Many scientific problems are influenced by various factors that can change over time, making outcomes hard to predict. Scientific issues rarely exist in isolation. Instead, they are part of **larger, dynamic networks where different systems influence each other in intricate ways**. These systems can be natural, such as ecosystems, the atmosphere, or oceans, but they also include human-made systems like economies, infrastructures, and social behaviours.

Climate change is the perfect example of a complex problem: it's not merely about the global rise in temperatures, it is a multifaceted issue that results from and impacts a web of interconnected systems. The atmosphere and oceans are tightly linked through the exchange of heat and gases, while ecosystems are influenced by changes in temperature and precipitation patterns. Human activities, such as deforestation, fossil fuel combustion, and agriculture, alter the natural systems, creating feedback loops that can amplify or mitigate effects. For instance, melting ice caps contribute to rising sea levels, and these in turn affect coastal communities and ecosystems, leading to further economic and social impacts.

Moreover, these interconnected systems often operate **on local, regional, and global scales**. A drought in one region can impact global food prices, which then affects economic stability and social systems far beyond the immediate area of the environmental change. This interdependence makes it difficult to predict outcomes because an alteration in one system can lead to unexpected consequences in another.

Finally, **complexity evolves in time**. Scientific knowledge grows and changes as new data and methods become available, meaning what is well-understood today may be reinterpreted tomorrow, adding an extra layer to the complexity of scientific knowledge production.

2.3 What does uncertainty mean in the context of scientific knowledge?

A **crisis** often involves **uncertainty**, with far-reaching consequences that may affect societies, economies, and the environment over an extended period. When discussing uncertainty, we refer to a lack of complete information about a specific situation. This missing information, sometimes due to the complex characteristics of a certain event or phenomenon, leads to a certain degree of **unpredictability** in the outcomes.

For example, scientists may be uncertain about the transmission routes in the early stages of a pandemic. They might also be uncertain regarding how quickly the disease will spread. In other fields, meteorologists can forecast the likely path of a hurricane, but the exact landfall will remain uncertain due to several factors that might affect the final path, the intensity and the actual impact, all of which might evolve during the hurricane's approach to land.

This is not to say that science is unreliable or that it should not be trusted. On the contrary, **science remains the best and safest approach** for addressing complex and uncertain issues, **especially during a crisis**, because it is built on **evidence, rigorous methods, and continuous inquiry**. Particularly in uncertain situations, science provides **a structured way to gather data, test hypotheses, and adapt our understanding** as new information becomes available. Unlike opinions or unverified claims, scientific processes rely on **peer review, reproducibility, and transparency**, which help reduce errors and bias.

Therefore, particularly during a crisis, such as a health emergency or environmental disaster, science offers **the most reliable guidance** because it is grounded in facts and evolves as conditions change. It is the most powerful way we have, as a collective, to assess risks and support decision-makers and communities in predicting outcomes and implementing solutions based on the best available evidence. Even when uncertainty is high and there are no immediate answers, science **provides a pathway to understanding and managing complexity**.

Therefore, particularly when **reporting under uncertainty**, journalists must clearly convey what is known and what is unknown, **which data cannot be made available, and why**. They should **never overstate conclusions**, overemphasise the risks, or give a false sense of confidence.

But, on the other hand, **they should not put science on the same level as** opinions, personal deductions, alternative bizarre, unverified and speculative conspiracy theories which unfortunately spread quickly because of fear and uncertainty. These alternative theories offer quick answers, filling gaps of information with narratives that lack scientific evidence but might be **perceived as reasonable or responding to what the public wants to hear.** They can gain traction through the media and social system especially when public figures embrace them, **enhancing confusion and undermining trust** in credible

information, which tends to be less immediate and more complex to convey and not always capable of offering a quick and ready solution to the problem.

2.4 Where to find help

Crisis management at the EU level - In cases of a serious cross-border threat that endangers public health in the European Union (including pandemic situations), the European Commission may recognise a public health emergency at the Union level and work with member states ensuring their coherent and well-coordinated response. The Commission can also mobilise EU-level instruments of direct support to Member States, such as joint procurement.
https://health.ec.europa.eu/health-security-and-infectious-diseases/crisis-management_en

The emergency cycle - WHO

The WHO Regional Office for Europe aims to build and maintain capacities across prevention, preparedness, response, and recovery from public health threats. Each phase is equally important, and WHO invests in all stages to reduce the impact of disasters, focusing on rehabilitation as well.
https://www.who.int/europe/emergencies/emergency-cycle

Intergovernmental Panel on Climate Change - IPCC

For environmental risks, particularly climate-related, the IPCC offers detailed reports and communication guides that help journalists understand the complexity of climate science and how to effectively report on it.
https://www.ipcc.ch

Dart Center for Journalism and Trauma

The Dart Center offers resources and training to help journalists cover crises, including natural disasters, environmental catastrophes, and health emergencies, with an emphasis on ethical reporting and trauma-informed practices.
https://dartcenter.org

Poynter - Journalism can help communities with these five pillars of ethical disaster reporting

The combined effects of the global pandemic and disasters caused by natural hazards mean that it is critical for citizens and those in power to understand compounding factors when two forms of crises collide to impact communities. Moreover, Poynter also offers a number of resources to do reporting work when there are trauma victims involved.

https://www.poynter.org/reporting-editing/2020/how-journalism-can-aid-communities-through-ethical-coverage-of-disasters/

https://www.poynter.org/shop/ethics/journalism-and-trauma/

Internews - Reporting on Humanitarian Crises

Internews' Humanitarian Reporting Manual supports journalists in dealing with timely and effective local reporting in crisis and response scenarios.
https://internews.org/sites/default/files/resources/IN140220_HumanitarianReportingMANUAL_WEB.pdf

IJNet Pamela Howard Forum on Crisis Reporting

A project of ICFJ, these series of webinars and resources are designed to equip journalists with the expertise to provide meaningful coverage of critical global issues of local importance.
https://www.icfj.org/our-work/ijnet-pamela-howard-forum-crisis-reporting

3 Pre crisis - Preparedness

Chapter 3 - KEY MESSAGES

- Crises will always happen, either as urgent emergencies - temporary but severe issues that significantly impact local or global communities, such as earthquakes - or as long-term problems that pose substantial risks to society, such as climate change.
- We can use periods of relative calm between emergencies to prepare for worst moments:
    - Creating and nurturing a network of individuals and organisations to find help in understanding relevant and trustful science (the journalist address book).
    - Offering spaces for discussion between researchers, policy makers and citizens to create mutual understanding whilst respecting the different priorities, values and points of views. Moreover, giving voice to the differences, so as to avoid clashes when the emergencies arrive.

3.1 The journalist address book - The experts

In the last century, especially since the end of World War II, **science has become increasingly complex and specialised.** Each discipline has branched into a wider range of subdisciplines, with highly specialised and specific knowledge. This is not to underestimate the importance of multidisciplinary approaches and the cross-pollination of knowledge, but – to use a familiar example – we know well how medicine today is divided into areas that may seem closely related but actually require skills and training that are sometimes quite different from each other. Staying in the context of the COVID health emergency, virologists, epidemiologists, infectious disease specialists, pharmaceutical and vaccine researchers, and many others were involved. Similar examples can be found in other fields and types of crises (earthquakes, climate crisis, etc.).

This introduces points for reflection regarding who journalists consider experts, and when and how they involve them. The fragmentation of scientific knowledge makes it clear that even scientists themselves cannot cover all the knowledge related to a specific crisis, and even more so, journalists cannot always be up-to-date and understand the scientific field they are addressing. This is why it is necessary to seek the help of experts. If chosen and

guided well, **an expert can help convey rich, relevant, and interesting information to the public**. Sometimes, though, the use of experts seems to be a fallback option, perhaps because the figures involved are very famous or familiar faces to the public, but not necessarily well-prepared on the topic being addressed. An interview can even complicate or unnecessarily weigh down the information that is important to convey to the public, which could instead be delivered more succinctly and clearly by the journalist directly. In these cases, **the expert's help can still be valuable "behind the scenes" during the preparation phase**. Therefore, it is not always the best choice to use a researcher's voice directly. All of this must be considered and evaluated by the journalist during the preparation of the article.

In any case, the journalist needs skills (or help) to choose the expert with the most appropriate specialisation for the type of information they want to deepen and offer to the public. Faced with the vastness of fields and subfields in scientific research, this can seem daunting. How should one proceed?

During their career and the practice of their profession, journalists **must build a database of contacts with experts in various fields** with whom there is a relationship of **mutual trust**. This will not only be directly useful for interviewing them but also, when the journalist is not clear on which specific scientific area or expertise is relevant to the current situation, to seek advice on which other professionals might be the right ones to consult. Returning to the example of COVID, if one has a trusted doctor who has proven to be an honest, clear, and competent interlocutor in the past, one should not hesitate to contact them for help with recommendations on materials to study for preparation and on identifying the relevant experts: a virologist might not be the best person to talk about vaccines, but they might know another researcher who is more knowledgeable in that field and refer to them.

One last issue, regarding the choice of experts, is the fact **that experts are not neutral players**. They are involved and engaged in institutions and/or private enterprises, they need to receive funding for their research and activities and often enjoy a certain degree of public exposure. In other words, experts, as any other societal stakeholder, might have their own agenda and not always be transparent about it. As for any other type of expert a journalist might be consulting, there might be potential conflicts of interest that might influence the experts' views and recommendations.

Therefore, journalists should always approach experts with due diligence, understanding that a conflict of interest can bias even highly credentialed individuals and it is not necessarily an index of malpractice. **Conflicts of interest are quite common and should be made clear, leaving the audience to decide on having all the key information**. By asking direct questions, doing background research, and consulting multiple sources, journalists can ensure they are delivering accurate, balanced information to the public.

As crises tend to exacerbate disparities, gender should be one of the angles one should give special attention to. In this matter, it is important to acknowledge the lack of source diversity in science-related media, specifically the underrepresentation of women researchers as

primary sources, as well as those researchers that produce evidence with a gender dimension focus. One example that was built specifically to support connections with women researchers is the Open Database on Women Experts in Science and Technology, created by the Spanish Association of Women in Science and Technology (https://cientificas.amit-es.org/). At the EU level, GenPort (https://www.genderportal.eu/) lists extensively experts and projects on many different scientific fields, including the social sciences and humanities working specifically with gender studies.

3.2 The journalist address book - The organisations

Another way to find the right experts (and other pertinent information) is through **science media centres**. Some countries, such as the United Kingdom, have established science media centres that offer support to journalists who need to communicate science to the public. These media centres also have extensive databases of contacts with researchers. In addition to national media centres, there are more localised or specialised ones, confined to certain scientific sectors (such as the medical field). In § 3.4 many of them all around the world can be found. It is important, also in this case, **to check who funds these centres** and, as for the individual experts, **to be transparent as to potential hidden interests that might influence the contents** produced by the centre, even when most of these centres declare to enjoy editorial independence from their funders.

Another resource not to be underestimated — but again, to be approached with caution — are the **press offices of universities and research institutions**. While these offices are naturally inclined to highlight, and sometimes even exaggerate, the expertise of researchers affiliated with their institution (and may therefore steer journalists away from other potentially more interesting or competent experts working elsewhere), they are generally well-informed and know the institution's staff well (they can also provide journalists with insights into individuals' communication skills alongside their scientific expertise). Here, too, the general principle of trust and knowledge built over time applies: based on one's experience, one should strive to understand how much one can rely on the press and communication offices of various institutions, building one's own elective database.

The consideration of press offices involves another important element in choosing experts to interview: **the local/national/international dimension**. A journalist working on a national or international level can choose experts who work in institutions and universities spread over a wide area. A journalist working at a local level might want to prioritise, when possible, researchers working in the local region. For a local journalist reporting on the situation in hospitals during the COVID emergency, it will be important for their audience to know what is happening nearby; in other cases it will help them to highlight the research system in their local region and provide an opportunity to introduce the public to competent but perhaps lesser known figures. It is also important to note that gradually **building one's database of local experts will help solidify the relationship of trust with the relevant scientific**

community, from which original insights may come in the future that could enrich one's work.

A final tip for finding experts: If discussing a specific piece of research, perhaps just published in a paper in a journal, it is possible to directly refer to the publication, where the corresponding author and their email address are usually indicated. While this person may not always be a great public speaker (or may not want to be in the spotlight), they can help find other useful contacts relevant to that specific research.

3.3 Know your audiences to better deal with potential conflicts during the crises

Journalism should always act in the public interest: its primary responsibility is to serve the needs and well-being of society by providing accurate, unbiased, and essential information. This involves holding power to account, informing the public on matters that affect their lives, and ensuring transparency. Particularly during a crisis, or in preparation for crisis management, journalists **should prioritise truth and ethical reporting over sensationalism, commercial interests, or personal bias,** and empower citizens to make informed decisions for the common good. Since the main goal of journalism is that of acting as a watchdog of people in power, by informing the public on their actions and holding them to account, journalists **should never be asked to stay on the side of institutions**. On the contrary, their role is to maintain a professional distance from any people in power and to foster critical thinking by providing accurate, balanced information without taking sides. At the same time, **their reporting should not intentionally fuel distrust between the public and institutions, particularly when this can lead to damage and harm for part of the population**.

Journalists can help guide responsible crisis responses by preventing the spread of misinformation and promoting collaboration. This makes it easier for the public and other stakeholders to hold authorities and organisations accountable for their actions. Clear and honest reporting also encourages public engagement, and empowers people to make informed decisions.

Before a crisis emerges, journalists can get prepared **by understanding their audience's diverse needs in order to deliver information that is not only informative but also actionable and trustworthy.** This means recognizing the different segments of the population served by each media and crafting messages that speak to their specific concerns, while maintaining empathy and clarity. Conflicts arise from disagreements often rooted in differing values or interests among the various groups or people in society. These hidden tensions are not always obvious, but they still heavily shape behaviours, attitudes, and interactions and might lead, when not properly addressed, to an open conflict during a crisis.

To ensure journalists are prepared to tailor information for diverse audiences before a crisis, these key steps can be taken:

Know your audience: research audience demographics, understanding the different segments of your audience (**age, gender, education level, socio-economic background, language proficiency, and geographic location**). This is a crucial step in crafting messages that are relevant to their needs. Identify **vulnerable groups** and the communities that may need special attention, such as the elderly, low-income groups, or non-native speakers, and consider their specific information needs during a crisis. Moreover, audiences' opinions**, values, attitudes and emotions** are as important as established knowledge, and even more impactful in their perception and understanding of a crisis. Thus, it is important to reflect on these issues, too, and to look for data when available (see § 5.1).

Build relationships with experts and local sources: establish contacts and build a network of reliable experts (e.g., scientists, healthcare professionals, local authorities) who can provide accurate, real-time information during a crisis. On the community level, establish connections with local community leaders who have insights into specific audience concerns and serve as intermediaries to help disseminate information effectively.

Know your beat and prepare clear communication strategies: at the local level there might be recurrent types of crises. In these cases, it is advisable to get to understand the basic facts and data regarding these events, becoming familiar with some of the key topics and practising jargon-free messages that can be easily understood by non-experts. More in general, media and newsrooms should get prepared with templates and formats for different types of crises (health, environmental, etc.) to be quickly adapted when needed.

Test communication tools and platforms: when getting ready with a plan to communicate during emergencies, it is important to identify which platforms (TV, radio, social media, print) are used most by different parts of the audience. It is extremely useful to familiarise with tools that can help monitor public sentiment and collect feedback, allowing the journalists to adjust messaging based on audience reactions during a crisis.

3.4 Where to find help

The **match-making tool** of COALESCE which will be available during 2025 on the virtual platform of the Competence Centre, will act as a collaborative space, enabling the connection of researchers, journalists, policymakers, science communication professionals, and citizens, fostering long-term relationships.

European Science Media Hub (ESMH)

ESMH is a project of the European Parliament's Panel for the Future of Science and Technology (STOA). It was launched in 2017 and works under the guidance and the political

responsibility of the STOA Panel. It creates a network between scientists and the media, setting up and maintaining contacts within and among the science and media communities.
https://sciencemediahub.eu/

European Digital Media Observatory (EDMO)
EDMO is a multidisciplinary community that tackles online disinformation to foster media literacy, public trust and quality information. It involves 14 national and multinational hubs and offers a wide range of resources (e.g. fact-checking briefs, training courses, etc.).
https://edmo.eu/

SciLine - Help from the USA
SciLine is a free service for journalists and scientists based at the American Association for the Advancement of Science (AAAS, USA), the world's largest multidisciplinary scientific society. The website includes an Expert Matching Service, fact-sheets, quote from experts and much more:
https://www.sciline.org/

The World Health Organisation - A newsroom in several languages
The WHO is an organisation of 194 Member States, source of a large range of data, information, and policy advice. One section, "Emergencies", is dedicated to help users understand the current health crises, global or local. The section "Newsroom" offers content highly usefull to journalists, including dozens of fact-sheets that include data, glossaries and explanations.
https://www.who.int/
https://www.who.int/news-room/fact-sheets/

U.S. Geological Survey
USGS is part of the Department of the Interior of the United States of America and provides scientific information related to planet Earth. Among its activities, USGS monitors and reports 24/7 on earthquakes in the US and all over the world and provides useful information, documents and fact sheets regarding the science of earthquakes.
https://www.usgs.gov/programs/earthquake-hazards/education
https://www.usgs.gov/news/im-a-reporter
https://earthquake.usgs.gov/earthquakes/map

The Oxford Climate Journalism Network (OCJN)
OCJN is a programme that supports a global community of reporters and editors across beats and platforms to improve the quality, understanding and impact of climate coverage

around the world. It is a programme of the Reuters Institute for the Study of Journalism at the University of Oxford.

https://reutersinstitute.politics.ox.ac.uk/oxford-climate-journalism-network

The Science Media Centres

The Science Media Centre was born in the UK "to provide, for the benefit of the public and policymakers, accurate and evidence-based information about science and engineering through the media, particularly on controversial and headline news stories when most confusion and misinformation occurs"[3]. It offers various services for journalists, including online quick reactions from scientists to current issues, but also contacts for deeper interviews or consultancies. There are other national versions of the Media Centre, some of which are linked to the UK Science Media Centre:

https://www.sciencemediacentre.org/

https://www.sciencemediacenter.de/en/

https://sciencemedia.nl/

https://sciencemediacentre.es/en

https://www.scimex.org/

http://www.sciencemediacentre.ca/

https://www.asiaresearchnews.com/content/science-media-centre-japan

Example of magazines and platforms co-produced by scientists and journalists useful as source

The Conversation

The Conversation is an online platform that publishes papers on research-based news and analysis that are produced by academics. Digital experts and professional editors work with researchers to turn knowledge and insights into easy-to-read articles, and make them accessible to general readers. All of The Conversation's work is free to read and free to republish under Creative Commons, with the aim to provide access to high-quality explanatory journalism that makes for better decision making. There are different editions of The Conversation in a selected number of languages, accessible through the global edition.

https://theconversation.com/

Undark

Undark is a non-profit, editorially independent digital magazine exploring the intersection of science and society. It is published with funding from the John S. and James L. Knight Foundation, through its Knight Science Journalism Fellowship Program at MIT.

[3] https://www.sciencemediacentre.org/about-us/

https://undark.org/who-is-undark/

Carbon Brief

Carbon Brief (CB) is a UK-based website covering the latest developments in climate science, climate policy and energy policy. It specialises in clear, data-driven articles and graphics to help improve the understanding of climate change, both in terms of the science and the policy response. On CB one can find a wide range of content, including explainers, interviews, analysis and fact checks, as well as a range of popular email newsletters.

https://www.carbonbrief.org/

Climate outreach

Climate outreach is a British charity focusing exclusively on public engagement with climate change. They offer research and advice, workshops and training, and they produce a range of reusable climate visuals.

https://climateoutreach.org/

Climate foresight

As an international magazine curated by the Euro-Mediterranean Center on Climate Change, Climate foresight is an observatory for climate policies and futures. https://www.climateforesight.eu/

Newsletters

A great source of contacts and connections can come from newsletters curated by scientific institutions and scientific journals as well as directly by individual scientists, health experts, and science journalists. Selecting a feasible number of well curated newsletters might support the journalist's work when in need to quickly identify an expert or other voices to interview.

EU Competence Centre for Scicomm Academy

The Academy on science communication is under construction to offer training and exchange services to support the development of skills and competences to be prepared to tackle science communication also in times of crises.

https://scicommcentre.eu/

4 Imminent crisis - Framing and sensemaking

Chapter 4 - KEY MESSAGES

- The ways in which a crisis is narrated in the media, the words and expressions that journalists use - what is called *framing* - determine the ways in which the information is received by the audiences. Some ways of framing can create undesired reactions and undermine further dialogue and understanding. Journalists must be careful in framing, but can also amend the current frame when somebody else produced it.
- Journalists need to understand who are the actors involved in the crises - who is in charge of what, who knows what, who has the authority to say what, etc. Interpreting the scenario is fundamental to make good journalism whilst helping audiences to understand what is going on.

4.1 Time waits for no journalist

Everyday, journalists face the tyranny of time. They need **to answer quickly to a crisis, too quickly to leave enough time to explore, deepen and reflect comfortably**. When working in radio, tv or newspapers, they might have just a few hours to produce news, to find an interviewee, to check the sources. If working with social media, this can be even worse. There are also other features related to the internal organisations of media that make this job difficult in emergencies; for instance, according to our interviewees:

- when working in shifts, the journalist might have to continue the work of a colleague, or pass the job to another colleague - in both cases there is rarely the opportunity to follow a topic from the beginning to the end;
- the colleague specialised in science (when there is one) might be on holidays or out of office, and therefore the reporter might be obliged to face the situation without their help;
- a specific framing, and in general a communication strategy, defined by the editor in chief or another higher-ranking colleague, is limiting the freedom of the reporter to work and find their own way. Moreover, the publisher can have a particular political position which can affect all communication approaches.

What can you do? First of all, one can be prepared, as illustrated in Chapters 3 and 6. When in a hurry, good contacts and previously established valuable relations help to understand the science and technology involved in the crisis, or the events, and therefore facilitate to give clearer, more correct and useful information to the public. Also, even when being a generalist journalist, some topics, such as climate change, earthquakes, vaccines, etc. cannot longer be ignored because of their broad and common relevance.

Organisations such as Science Media Centres and other national and international organisations (see § 3.3) can help to make sense of what is going on and to find other experts who are not yet part of one's address book. The Science Media Centre UL, as an example, writes on its website: *"When science hits the news agenda,* it's our job to pass on to journalists as much accurate information as we can, as quickly as possible. In order to do this, it is possible to send out quotes from experts and statistical analyses of scientific studies, in addition to running regular press briefings on the latest hot topics"[4].

4.2 Careful with the framing

"**Framing**" refers to the way information is presented, "**sensemaking**" is about how individuals make sense of the information they receive. With framing, senders structure information to highlight certain aspects of a topic while downplaying others.

For example, a common frame when discussing medical research is "war", typically the "war against cancer". But this is a war that never ends, because there are many kinds of tumours and we do not know much about some of them. Adding to the complexity of the issue, advancements in cancer research now make it possible for many to live longer, high-quality lives while managing the disease. Therefore, the term "war" does not cover all the aspects of medical research and medicine, and can produce frustration or fear, when instead there is hope and comfort.

In case of crises, it is important to be mindful when using terms such as "urgent," "crisis," and "issue", as this can lead to **too many repetitions and a bored and disconnected public**. Or, on the contrary, people can get **too scared and keen to make irrational decisions**. Whereas these terms help to emphasise the exceptionality of a situation, they may remove from view that some problems could have been avoided or that a situation is the result of political neglect of a structural or bigger issue.

In the case of climate change, an initial communication that is too emotional and stresses catastrophic scenarios and uses "end-of-the-world"-like phrases, disturbed a large part of the Western public opinion. This led to reduced attention and communication on the problem, such as "If I cannot do anything about that, better not to know"; while others reacted with denialism, e.g. "They are manipulating us, it is not true". Given the scale of the climate crisis, many people have developed **a condition of climate or eco-anxiety** in

[4] https://www.sciencemediacentre.org/working-with-us/for-journalists/

recent years. In other words, these people, particularly the younger generations, are distressed emotionally and mentally since they feel powerless in the fight against environmental crises and they perceive that too little is done globally. It is important to consider eco-anxiety, as overly alarming reports can intensify this fear, leading to feelings of hopelessness or disengagement.

When a conflict **also has political dimensions and implications**, the political debate tends to obscure the scientific and/or technological complexity and uncertainty of the crisis (its interpretation, its solutions, the related policy making, etc.). Various political factions take opposing stances on issues like mask-wearing during COVID or vaccines, leading to a **public debate that becomes increasingly polarised**, harsh, and ultimately unproductive.

Journalists need to investigate and tell these political stories, but they should also clearly highlight **what science has to say** and **how scientists produce the involved knowledge**, to help the audiences to distinguish between the different levels of debate. Especially when dealing with controversial issues or focusing on a situation where the scientific knowledge is in the making and evolves quickly, as was the case with COVID, **journalism plays a crucial role in helping audiences make sense** of what is established and **validated** and what is still **unknown** or uncertain.

Public institutions are not always prepared to **admit the degree of uncertainty** associated with a certain problem. They might be influenced or even, depending on the situation, **controlled by the political framework**. In this case, journalism becomes even more central in highlighting the **contradictions** and in explaining what piece of information is scientifically validated and what is still uncertain.

4.3 Building bridges with experts, sources, audiences

Journalists need to reflect on how they frame the news, or how they use (or amend, or correct) the framing introduced by other actors, considering the impacts that this frame can produce in their audiences. They need to reflect on how different stakeholders frame and make sense of scientific information and science communication, using their experience, the experience of colleagues, and also good sources of information on the public perception of science and technology (see §4.5).

One way to enhance journalists' capability to frame a specific piece of information is **a thorough collaboration with researchers**. Without giving up the **editorial independence** that should always be granted to journalists in their work, a **collaborative approach** can help avoid misunderstandings and ensure that research findings are presented precisely and engagingly. Science institutions can benefit from this collaborative effort as well. Journalists can in fact contribute to making research processes transparent, preventing misconceptions that lead to misguided beliefs about the nature and infallibility of science.

Dialogical formats of communication (such as, for example, radio programmes open to citizens phone calls, citizens panels, public debates etc.) can help the different stakeholders to understand how all actors make sense of the situation and of the related knowledge. Considering the society at large, and not only the specific job of journalists, dialogical formats of communication can help to produce a common ground, necessary for the development of a democratic society.

Results from both NEWSERA and ENJOI projects show that building a long-lasting relationship between journalists and scientists, not during a crisis but before it, is pivotal not only to a better coverage during the crisis but also, for journalists, to receive instant updates during the crisis. An ongoing project which can also contribute to fostering this type of relationships, although focused on science journalists, is the residency program from the ERC-funded FRONTIERS project. If trust has been nurtured, the scientists and experts are more inclined to discuss with the journalist at the time of crisis because they are aware of the important and crucial role played by public information. On the contrary, **improvised communication can be detrimental** not only in terms of the relationship with scientists, who tend to be sceptical of the ability of journalists to cover complex scientific issues, but, even worse, in terms of the possibility to convey useful and crucial fact-based pieces of information to the audience.

When covering a crisis, journalists need to be **responsible without being alarmist**. Beside explaining the science in accessible, straightforward language without exaggerating or sensationalising, the coverage should always highlight the importance of individual and collective action, offering a sense of agency rather than helplessness to the public.

4.4 Where to find help

SciDev.Net Opinion - Listening stakeholders voices

SciDev.Net is an international online platform that offers reliable and authoritative news, views and analysis about science and technology for global development. One of its sections, Opinion, covers the positions adopted by various stakeholders in global, or regional, debates on key issues relating to science and technology for development. Each Opinion article is a personal statement by an authoritative author, expressing a point of view on a particular controversy. They aim to highlight important issues and present different perspectives. Opinion pieces may include reported facts or quotes, but emphasise the author's own thoughts, personal preferences and conclusions.
https://www.scidev.net/global/content/opinions/

Eurobarometer - Public opinion in the European Union

Since 50 years ago the European Union periodically assigns to professional researchers the production of surveys on the opinions of European citizens (all countries represented) on different topics, from economical regulations to new technologies and their impact to very

specific issues such as biodiversity or digital security. All surveys can be downloaded from the Eurobarometer website. One of the last "Attitudes of Europeans towards the environment", May 2024.
https://europa.eu/eurobarometer/screen/home

Other sources of public opinion studies

Many governments and other national and international organisations periodically produce studies on the public perception of science. To name a few:

National Science Foundation (USA) - https://ncses.nsf.gov/pubs/nsb20244

UK Government - https://www.gov.uk/government/collections/public-attitudes-to-science

Institut d'études opinion et marketing en France et à l'international - https://www.ifop.com/publication/le-rapport-des-francais-a-la-science-et-au-progres-scientifique/

FECYT (Spain) - https://www.fecyt.es/es/publicacion/percepcion-social-de-la-ciencia-y-la-tecnologia-en-espana-2022

IPSOS - Polls and global trends

Ipsos Group S.A. is a multinational market research and consulting firm with headquarters in Paris, France. Often organisations commission IPSOS polls with large samples on science and technology related issues. Summaries are usually available open access. The national pages can be accessed through the international page.
https://www.ipsos.com/en

OBSERVA

Observa Science in Society is an Italian research centre promoting the study and discussion of the interaction among science, technology and society, with the aim of stimulating dialogue among researchers, policy makers and citizens. Every year, they publish the Science, Technology and Society Yearbook, based on the survey that Observa's Observatory carried out annually in Italy.
https://www.observa.it/en/

5 Actual crisis - Empowering

Chapter 5 - KEY MESSAGES

- Values and emotions are part of our understanding of the world. Values, attitudes and emotions are often even stronger than knowledge to shape our reactions and decisions - journalists need to understand and consider them when communicating.
- To convey important messages, journalists, science communicators and policy makers use eminent personalities as ambassadors. This is useful, but backfires very often - if it is a person to be listened to, and not a community (e.g. of scientists), why not listen to influencers and gurus who can be uninformed and misleading? To create and sustain the authority of a voice is one of the most important (and dangerous) aspects of journalism.
- Misinformation and disinformation spread widely and quickly during a crisis, especially on social media. Journalists can help audiences to recognize what is false and identify what is worthy.

5.1 Values and emotions

Our **understanding of the world** is not only made by words, concepts, and information on facts, but also by values, emotions, attitudes, feelings. Communication works if, consciously or unconsciously, also these dimensions of our understanding are considered. During crises and in relation to urgent, serious societal problems, **values and emotions play an even bigger role**. Considering that, all stakeholders, including scientists and journalists, should try and understand their own and others' feelings, recognise them, and address them when communicating.

Journalists are able, more than many other professionals, to **decipher audiences emotions,** and have an important role in setting the tone of the communication around a crisis.

Moreover, on the one hand, emotions are an important source of information about the **values at stake** in times of crisis. On the other hand, giving space to emotions and values in communication can render it more effective because it enables connecting with audiences and spurs action.

As in many other situations, journalists need **to find a balance between using emotions** also to arise from the noise of an infodemic, without enhancing the level of emotivity so that data, facts and knowledge become irrelevant.

One of the most relevant emotions when talking about communicating is trust: **who trusts whom**? TO what extent can journalists help people trust those who are worthy to be trusted?

5.2 Authorities, ambassadors, role models and influencers

In the context of science communication, **'power' refers to the ability to influence**, shape, and control the framing and sensemaking of stakeholders. These processes involve various actors, including researchers, communicators, policymakers, media, and the public, each with differing levels of influence and authority.

During a crisis, journalists need to understand who is **competent** to talk about something, and who has the **authority** to talk about something (e.g. given by a government, but also a research institute or a university), and competence and authority can belong to different people. **Authority, competence, fame and trust do not necessarily go together**.

During COVID we have globally witnessed the transformation of some scientists towards public figures and finally to influencers and media stars. On the other hand, some influencers became references on scientific or technical issues despite their incompetence. Another interesting phenomenon observed during the pandemic (but quite common in all crises and emergencies), was that **anecdotal information** through the social networks, both physical and digital (a friend who knows somebody who knows somebody who says…), could have a stronger impact on some societal groups than official communications. This happens because, as we mentioned in §5.1, one of the most important variables in communication is the ***trust* we give to a source**, and the closer a source is, the easier it is to trust it.

Taking this into consideration, journalists should be extremely careful in using existing influencers or contributing to the emergence of new public figures. There is the need to find a balance between attracting audiences but endorsing incompetence, and promoting real scientists and experts. If we have a good understanding on who is reliable on a certain domain, it is easier **to look for the right ambassador** (see Chapter 3).

At the same time, there is also the risk of transforming **a scientist (or expert) into a know-all public figure.** This something happened, for instance, during the pandemic, when some scientists, evidently with media appeal, were asked to comment on any kind of issue, from regulations to socio-economic aspects, and participated in prime-time talk shows giving opinions well beyond their domain of expertise. This practice hinders building trust in the scientific community and prevents understanding of the limits, but also the powerfulness, of scientific knowledge.

5.3 Disinformation and misinformation: navigating through the scientific process

Times of crisis are fertile ground for the spread of wrong information, generally known under the umbrella term of "fake news". Many factors (e.g. the fast pace of social media, political and social values, the emotional involvement, etc.) favour the birth and dissemination of misleading, wrong or just false information, which can ultimately lead to polarisation and conflicts and the incapacity to fully understand the crisis and distrust in science and technology.

The definition of "fake news" includes an ample range of different types of content and situations. Some wrong bits of information may result from unintentional mistakes, either in the writing of the news or in its sharing; while in other cases false content is deliberately created, with the specific aim of deceiving the audience. In the first case we talk about **misinformation**, in the second about **disinformation**.

It is **not easy to tackle misinformation, disinformation, and fake news** because the spreading mechanism involves and relies on various actors and factors, from access to information to the emotional characteristics of the public. Fake news is not new in the information landscape, but its impact is **overly amplified by the fast pace of sharing** and distribution through the social media platforms. People today are overexposed to information in a continuous flow. A **transparent information process**, strengthened by an accountable media player, would help **citizens appreciate** reliable sources. On the contrary, it is not rare that **media become part of the problem** amplifying the **clickbait** mechanism that pushes citizens to share information even in the absence of a reliable source just to increase the scale of traffic, and ultimately the visibility of a certain website over another one. Journalists should be aware that **clickbait is particularly dangerous** at times of crisis since it relies on the emotions and fears that contribute and fuel alarmism, opposition or even denial making the management of the crisis much harder to deal with.

In the last couple of years there is an additional source of potential infinite disinformation flows: that of **generative AI**. According to EDMO, the European digital media observatory, "the ability of AI to generate content that can be used to promote disinformation is, according to research papers and various experts, one of the most concerning developments in the field in recent years"[5]. Until now, as EDMO states, the **AI-generated disinformation content** is still a small minority of the total detected disinformation in the EU. However, journalists, even before the audiences, need to be aware that growing numbers

[5] https://edmo.eu/publications/prebunking-ai-generated-disinformation-ahead-of-eu-elections/

of **AI-generated images, audio, video and text** are circulating, particularly when delicate situations unfold, be them conflicts, disasters, political elections.

In recent years, **a number of initiatives** have spun to support journalists in assessing the real value of a piece of information, its truthfulness or the supporting facts and data. Connecting with these platforms and building an attitude to **prebunk**, **rather than debunk**, might better equip and support journalists also during those times when information flows quickly and the degree of uncertainty is high. Besides EDMO collaborative platform, that allows not only access to fact checked information but also to tools and resources to become actively involved in pre/debunking, there are other global initiatives such as the Poynter International Fact-checking network or the European fact-checking standards network.

Choosing an unambiguous and structured crisis communication is not easy, and it has to do much more with **the role of institutions**, political and academic, than that of the media. However, the media are strongly called to prevent the spreading of bad and harmful information and to make the effort **to counter the spread of fake news**.

One of the most dangerous and debatable journalistic practices, for instance, is that of fostering the so-called **false balance.** False balance happens when two opposing views are presented as equally valid, even when the overwhelming evidence supports only one side over the other. In the context of science or crisis reporting, this can create confusion and mislead the audience by giving undue credibility to fringe or unsubstantiated opinions. Under the pretence of 'listening to all sides', which is indeed part of journalistic deontology, the discussed issue (be it climate change, the origin of a virus, the validity of vaccines, etc.) appears more controversial than it actually is, and it undermines public understanding of the science behind it. False balance is a bad practice because **it distorts the truth and prevents the public from receiving clear, evidence-based information**, which is critical during crises. Instead, journalists should focus **on the weight of scientific evidence** and ensure that the coverage reflects the consensus while still being fair and transparent about **uncertainties or minority views** without overstating their importance.

The reason why false balance is not easily ruled out is that **controversy always works well** in the media, by creating a **noisy albeit captured arena**. Many journalists admit that their editors require exactly this kind of interaction, and demand the choice of guests for a TV show, for instance, on the basis of **their ability to fight in public**. However, evidence also proves that audiences can be briefly engaged by the controversy but prefer a **more substantial and accountable type of information**. During the pandemic, for instance, a number of scientists became very popular, even if not particularly capable of withstanding the public arena, for their continuous and honest effort to keep their audiences informed through a **less aggressive and more understanding attitude**. This was particularly true for

those scientists who decided to step out of the traditional media arena and to find disintermediated channels of communication, such as their social media profiles.

Media and journalists who manage to be **truthful to their original mandate**, that of working in the public interest, might be **less immediately rewarded** but will be, on the long term, considered **more trustful and reliable and will retain their audience**.

5.4 Where to find help

RETHINK - Who are our audiences? What are the barriers to connect with them?

Rethink is a European funded project aiming at rethinking science communication in face of the major current challenges, reflecting also on the audiences and their links to the scientific community as well as to science communicators. One of the project deliverables includes a survey on the links with audiences and the barriers to reach them:

https://www.rethinkscicomm.eu/wp-content/uploads/2020/06/RETHINK_-D1.3-Report-on-links-between-the-different-actors-engaged-in-science-communication-and-how-the-actors-foster-connections-with-their-audiences-1.pdf

https://www.rethinkscicomm.eu/

ENJOI - Standards, principles and indicators

ENJOI is a EU-funded project focusing entirely on the value and quality of science journalism, with a special attention to the Southern EU region. ENJOI has co-created, through participatory workshops and labs, a series of Principles, Standards and Indicators of high quality science journalism, and a Manifesto that supports the work of journalists. All materials, publications and ongoing updates are available through the ENJOI website, currently hosting the ENJOI Observatory for outstanding open science communication.
https://enjoiscicomm.eu/

EDMO - European digital media observatory

EDMO collaborative platform allows not only access to fact checked information but also to tools and resources to become actively involved in pre/debunking

QUEST - Toolkit for journalists

QUEST is a EU-funded project focusing on supporting quality science communication. QUEST has developed toolkits for journalists and other actors in science communication. The toolkits are available through the QUEST website: https://questproject.eu/toolkits/
The QUEST toolkit for journalists include:

- The Explainer of scientific concepts and statistical terms
- JECT.AI – digital support tool for science journalism
- Guidelines for quality science communication in journalism
- Checklist for science communicators on social media
- Good practices for science communication on social media

6 Post crisis - Reflecting

Chapter 6 - KEY MESSAGES

- It is crucial to learn from past experiences where a real crisis also escalated into a communication crisis, marked by conflicts and controversies, including those involving science and the scientific community. Both informal reflections and more formal analyses, grounded in impact data and expert evaluations, should be taken into account to prevent repeating the same mistakes in future emergencies.
- Often, when an emergency ends, it disappears from the news, even though less dramatic events and long-term consequences may follow. Journalists should strive to keep tracking these developments, allowing a more measured approach that fosters deeper understanding and better preparedness for future crises.
- Journalists' duty is to analyse situations and offer a critical view on processes and events, e.g. disclosing conflicts of interest. However, positive messages are also important and should be brought to the public, such as best practices in facing a crisis, successes, technological, scientific and social innovations.

6.1 What went wrong? What was good? How did audiences respond?

In various fields of the communication of science, **reflective practices are common**. For example, among the staff of science museums and science centres - especially among the personnel that interacts with the public (e.g. guides, mediators) - to discuss the impact on audiences of exhibitions or activities is a widespread best practice. Thanks to the **data collected in evaluation studies**, but also based on **informal observations**, the staff reflect on how visitors reacted to the museums offers, how they interpreted the contents and what they learnt, what was successful in improving their experience and what did not work, so as to propose initiatives better tailored to audiences in the future.

While journalism does not usually deal with this **kind of reflective practice**, contemporary media are daily facing the need **to monitor and assess their impact in very practical terms**. If it is true that time is money, and very few publishers actually pay for the time to study and analyse, it is also true that media are becoming more and more **driven by data** highlighting their impact and **measuring the feedback** of their audiences.

During crises and emergencies, the pace of events rules the way a newsroom works and very little space is left for this kind of reflection.

However, once the situation becomes calmer, great media are gradually **embracing the practice of assessment and impact evaluation**. This is more relevant at a time when the media are no longer sustained only through money coming from pure publishers but are highly dependent on their ability to stay on the market. In many cases, this also translated in looking for support by external funders and third parties, be them **tech players** that invest in collaborative efforts (in the past 10 years this has been true with a number of Google or Meta supported initiatives funding national and local media), **non profit foundations** or even public funding, such as the **EU Commission that is increasingly funding independent journalistic initiatives**. In any case, especially if funding comes through a third party, there is always **the need to evaluate, estimate and prove one's impact**.

Impact assessment implies the ability of the media to look into a number of questions and evaluations, mostly reflected in **quantitative data,** although **qualitative assessments** are also crucial: how did different audiences react to the information proposed by that specific media outlet? Did they become **more engaged** and **maintain a daily interaction? Engagement** is becoming **key in journalism**, particularly for those media that rely more and more on their audiences for their economic survival, such as those whose business model is strongly based on **subscription, membership, readers' donation** and other income streams. This is particularly true for local and hyperlocal media outlets, as was shared in some of the conducted interviews in preparing these guidelines.

Real engagement is something completely different from quick, impersonal promotion of viral content. The long-term engagement of a certain readership translates into **consistent dialogue between a media outlet and its publics**[6], and can be nurtured in many different ways: through newsletters; periodic consultations and surveys; special dedicated events to one media's subscribers; social media live conversations and much more. Independent from the format and the channel that is selected for the engagement, a media or a group of journalists who are in **constant conversation with their audience** know their information needs well and, particularly at times of crisis and emergency, can use this privileged channel to design, adjust and fine tune their information to improve community response. A recent study[7], undertaken in the ENJOI project, has highlighted the growing interest and potential for engagement journalism particularly for the most innovative digital media.

On the **qualitative side**, a reflection on the way audiences perceive and react to the type of information can also be beneficial to a media outlet and the journalists working for it to better **fine tune their work for future similar situations**. Did the readers make sense of the crisis? Were their reactions caused by frames of thought, emotions, attitudes, assumptions and worldviews and which ones? Did the specific media work reinforce these attitudes and beliefs? Or, on the contrary, did the audience migrate and disconnect because the messages were too far from their mindset? What were the journalist's own emotions,

[6] ENJOI Podcast on engaged science journalism - https://enjoiscicomm.eu/engaged-science-journalism-the-enjoi-podcast/
[7] ENJOI Digital engagement focus report - https://enjoiscicomm.eu/media-landscape/

attitudes, assumptions and worldviews? It can be surprising to discover that journalists themselves also use specific frames without being conscious of them.

Without negating the practical and theoretical difficulties of a reflective practice for journalists, we should take the time to promote discussion among our colleagues and peers. Journalists associations and national councils, journalists schools, European projects and other initiatives can help to find times and tools to do so (for examples, see §6.3).

6.2 Reporting at the end of a crisis

Once the emergency or the crisis has passed its peak, it is crucial not to stop covering it because **the aftermath and long-term impacts of a crisis are often just as important as the event itself**. Health emergencies, environmental disasters, or social conflicts don't end with the resolution of the immediate problem; they **leave lasting effects on communities**, economies, and policies.

By continuing to provide updates, journalists **can help their audience understand the full story,** how recovery is progressing, what lessons have been learned, and how people and systems are adapting if need be.

Long-term coverage also holds authorities accountable for their actions and ensures that public interest in important issues doesn't fade away too soon. Long term coverage also empowers the public to stay informed, engaged, and **better prepared for future crises**. Naturally, the coverage changes and the focus shifts from the immediate events and their impact to deeper, more insightful reporting that helps people grasp the broader consequences and what it means for the future.

The aftermath of a crisis provides a lot of content that is often disregarded by the news outlets but that is actually important for the involved communities. **Journalists could focus on the recovery process**, reporting on how affected communities, industries, and ecosystems are **rebuilding**. It is also very useful to **highlight both successes and ongoing challenges** to keep the public informed about progress and setbacks, not to give just one side of the story but also to show how a certain community can find a way forward.

Although it attains more to the domain of investigative journalism, nonetheless **tracking the implementation of policies or the compliance of promises** made during a crisis will gain journalists their audience's interest and attention. Monitoring whether national or local governments, organisations, or institutions are **fulfilling their commitments and investigating accountability ensures transparency** and holds authorities responsible for long-term actions or inaction, which should be the primary goal of journalism.

Looking into how the **crisis has changed lives over time, socially, economically, and environmentally**, will also mean that the interaction with one's own public will not stop with the end of the emergency but **will continue and even potentially grow**, since the

needs of that public will hardly be fully satisfied by other media and players once the emergency is over. Covering the lasting health effects of any acute or chronic crisis, such as a pandemic or an environmental disaster, will also provide **insights into shifts in public behaviour and attitudes** that are important for the media to understand and cater for.

The long term attention to a certain topic is also crucial to avoid the idea that each event is always a unique case, a solo emergency. On the contrary, many crises are part of a larger **trend or set of interconnected issues**. For example, a climate disaster may be linked to **broader environmental degradation** or global warming. Reporting on how these underlying risks are evolving and could lead to future crises is pivotal to keep local communities prepared and informed and to avoid being surprised when another critical situation emerges.

Finally, the media can play a crucial part in the aftermath of a crisis by **providing space and time for investigating and reflecting on what lessons have been drawn** from the crisis and how they are being applied to improve preparedness for future events. Given their particular role as watchdog of local and national powers, media are in a highly relevant position to report on if and how the institutions and communities are or are not better equipped to handle similar challenges in the future.

6.3 Giving also positive messages

Journalism has a tradition to focus **mainly on bad news, problems, and disasters**. However, a number of studies have recently shown that audiences are very sensible and also require **positive coverage of events**. After a crisis, for instance, new strategies, innovations, or shifts in policy that aim to **mitigate future risks are as crucial stories** as the ones investigating crimes and malpractices.

Some media outlets have a **clear understanding** that they do not only report on the world but they also **help shape it and change it**. Even if looking at the general news we might think otherwise, "*there is a far greater tendency for good than bad in the world, and we need to reflect that*"[8]. Reporting on potential and innovation - in a rigorous, investigative way - can help **best practices spread** and provide another perspective on how journalism can impact the real world.

There are **a number of experiments in this area**, undertaken by diverse media, as recent research has highlighted[9]. But, even more, there is an entirely new field promoting a more positive approach to journalism, that of **constructive and solution journalism**.

Constructive journalism aims to provide a **balanced and accurate picture of the world by not overemphasising negative news**. It focuses on changing the way stories are told to

[8] This was stated in one of the interviews recorded during the preparation of these guidelines.
[9] ENJOI focus report on solution journalism https://zenodo.org/record/6783558#.Yw8keh3ONfQ

avoid focusing only on problems, but rather showing **a fuller context, including progress and potential improvements.**

Solution journalism is even more specific and focused on practical outcomes, reporting rigorously on responses to social, environmental, technological problems. It searches and offers evidence of the impact of specific solutions, explaining why a solution works and how it **can be adapted to similar situations**, without implying it is a one-size-fits-all answer.

Solution journalism focuses on how people, communities, and organisations **are responding effectively to a crisis,** helping the audiences to understand not only the scale of the issue but also what actions are being taken to address it, offering **concrete and documented examples of solutions that have worked**. By presenting real-world responses, this approach contributes to creating **a space for hope and practical knowledge**, countering feelings of helplessness that often arise in crises. It also helps identify strategies that can be **adapted or replicated elsewhere**, encouraging a more constructive and proactive public dialogue.

During a crisis, providing insight into successful interventions, whether they are policies, community initiatives, or innovative technologies, can **inform decision-making, improve recovery efforts, and help prevent future crises**. Promoting the idea that people are not helpless and hopeless but, on the contrary, **have agency, potential, and can make a difference,** is an innovative way to look at reporting and has great potential that is only beginning to show its impact.

6.4 Having a strategic plan for the next crisis

One important outcome of the COVID crisis is that by being global, it affected most countries and communities more or less at the same time. Media, at local or national level, reacted in different ways to it, depending on the unfolding events around them. Journalists interviewed in preparation of these guidelines admitted that in some cases there were individual journalists who had a better understanding of the pending situation that tried to alert the newsroom to get prepared, but that in most cases this effort went underestimated.

Whether the newsroom is big or small, local or national, to have a strategy in place on how to cover an emergency and an unfolding crisis is a very important asset.

Getting prepared means to develop a strategy on both fronts:

- **Externally**: if a newsroom has a crisis management plan and guidelines, when the crisis or the emergency strikes, it takes much less effort to distribute roles and tasks, to organise the coverage, eventually to open an appropriate communication channel dedicated to the affected community (whether it is a digital channel or a local radio station, for instance).

- **Internally**: if the media outlet is directly affected by the crisis, because its premises are in the same location where the event is unfolding, or because, as it happened during the pandemic, it is impossible to access the premises and online-focused home-offices need to be put in place, having a strategy in place will reduce confusion and improve the quality of work. If and when the crisis is disruptive of normal practices, having a plan in place for alternative practices is the best way to manage and deliver the crucial information needed to cover the events properly without generating further stress at the newsroom level.

Lastly, being prepared translates into a **better working environment.** This is crucial because journalists are also people **who might be affected** during the unfolding of a crisis. Training on how to deal with a crisis is crucial, not only in terms of the content and the specific topics, but also and even more in terms of **how to keep one safe from a physical and mental point of view.**

Covering crises can take **a significant toll on journalists**, both physically and mentally. Repeated **exposure to traumatic events, human suffering, and intense situations** can lead to **burnout, stress, or even long-term conditions like PTSD**. To maintain their well-being and avoid becoming cynical, journalists should adopt practices that prioritise mental health and resilience. This could include **regular debriefs, access to counselling or peer support**, and setting boundaries to balance work and rest.

Newsrooms should also create environments that promote emotional support, offer training on how to handle traumatic reporting, and ensure safety measures for journalists in the field. By fostering a culture of care and openness about mental health, journalists can **continue doing impactful work while protecting their well-being and avoiding the emotional detachment** that may arise from constant exposure to crises. Protecting mental health allows them to remain empathetic, clear-minded, and effective in their reporting.

6.5 Where to find help

Data and analysis of the past crises

Data and analysis on science communication in times of crises, especially in relation to crises such as COVID, climate change and environmental issues, can be found by the same services, organisations and online platforms mentioned in § 3.3. Moreover, academic research output is available in the following journals and websites:

Journal of Science Communication
jcom.sissa.it

Public Understanding of Science
https://journals.sagepub.com/home/pus

The PEW Research Center

Pew Research Center is a nonpartisan fact tank that informs the public about the issues, attitudes and trends shaping the world. It conducts public opinion polling, demographic research, content analysis and other data-driven social science research. The focus is mostly on the US, but data can be inspirational and give hints to understand other contexts.

https://www.pewresearch.org/journalism/2022/06/14/many-journalists-say-social-media-helps-at-work-but-most-decry-its-impact-on-journalism/

The European Competence Centre for Science Communication

The Competence Centre will produce open-access resources and tools to achieve high quality, evidence-based and interdisciplinary science communication. As part of the Competence Centre, the SciComm Academy will provide bespoke science communication training to interested groups such as researchers, science communicators and journalists. The Centre is under construction, but It is already possible to register to be part of an international community that will also promote reflective practices with tools and contacts. https://scicommcentre.eu/

ENJOI – Tools to reflect on scicomm profession

ENJOI (ENgagement and JOurnalism Innovation for Outstanding Open Science Communication) is an European funded project whose ultimate goal is that of improving science communication by making it more consistently reliable, truthful, open and engaging. ENJOI promotes the active development of critical thinking, digital awareness and media literacy of all actors involved in the process. Here below some of the materials that can help the development of a reflective practice:

ENJOI Standard, Principles and Indicators for Outstanding Open Science Communication:
https://enjoiscicomm.eu/wp-content/uploads/2023/09/ENJOI_Standard_Principles_Indicators.pdf

ENJOI Interactive guideline "The ENJOI SPIs in practice: Examples of good science journalism in three Southern European countries and abroad":
https://heyzine.com/flip-book/313fbd858b.html#page/13

ENJOI Manifesto for an Outstanding Open Science Communication:
https://enjoiscicomm.eu/manifesto/

ENJOI Observatory article – "Slow journalism as an answer to news inflation":
https://enjoiscicomm.eu/slow-journalism-as-an-answer-to-new-inflation/

ENJOI Observatory article - "Has the Covid-19 pandemic changed how science journalists work?": https://enjoiscicomm.eu/covid-19-impact-on-science-journalist/

Solution journalism network

SJN is a non-profit network fostering a global shift in journalism focused on advancing rigorous reporting about how people are trying to solve problems and what we can learn from their successes and failures. They offer training, collaborative projects, a number of tools and resources.

https://www.solutionsjournalism.org/

7 CONCLUSIONS

These guidelines are meant as a reference tool to support the work of journalists in their day-to-day coverage of emergencies and crises. They stem from the Crisis Navigator tool developed by COALESCE to help science communicators, scientists, and other stakeholders manage crisis communication effectively. The Crisis Navigator provides suggestions to improve trust in science, combat disinformation, and guide citizens through crises. Crises, such as for instance climate change, epidemics or technological disruptions, pose significant challenges for communicators and journalists, particularly in contexts marked by uncertainty and misinformation.

Non-science journalists play an essential role while covering crises and therefore they are expected to navigate the complexities of scientific knowledge and communicate effectively with the public even if they are not specialised in science. They must strike a delicate balance between providing timely, accurate information and managing the emotional and psychological impact of crises on the public.

Crises are complex, long-term disruptions that may stem from emergencies or gradually intensify over time. Unlike emergencies, which are sudden and demand immediate action, crises often evolve and require more in-depth analysis and long-term solutions. While emergency reporting requires swift, accurate information to protect public safety, crisis coverage demands broader context. A journalist must not only explain the immediate risks but also delve into the underlying causes, long-term consequences, and the broader social and economic impacts.

Clear, thorough communication is essential for both scenarios.

To be effective, crisis communication is better approached and developed through a 4-step strategy:

1. **Pre-crisis - Preparedness**

Preparedness helps journalists navigate the pressure of fast deadlines during crises. Once having become familiar with the difference between an emergency and a crisis and having learnt how to deal with complexity and uncertainty, journalists and media should design a plan to face emergencies and crises before they happen.

Mapping and getting to know networks of reliable experts and organisations is a first crucial step. Creating strong relationships with experts facilitates quick, accurate reporting during crises. Also, working with scientists ensures accurate communication while preserving journalistic independence.

Understanding the audiences is as important, putting special care into tailoring information to the needs of different audience segments to better prepare them to understand and

manage the crisis. Newsrooms should prepare communication templates and strategies in advance to handle different types of crises.

2. **Imminent Crisis - Framing and Sensemaking**

Framing and sensemaking are critical components of crisis communication, shaping how information is interpreted and understood by the public. While framing refers to how journalists present information, influencing public perception by highlighting certain aspects while downplaying others, sensemaking involves helping audiences understand the complexity and uncertainty of a situation, allowing them to make informed decisions. Journalists should be aware that the way a crisis is framed affects how the public perceives it and reacts to it. Hence, great care should be put to language and narratives.

3. **Actual Crisis - Empowering**

Effective crisis communication considers not just facts but also the emotional responses and values of the audience. People affected by a crisis need to be empowered by balancing clear, accurate information with sensitivity to fear, anxiety, and uncertainty.

Choosing credible authorities and experts is crucial to maintaining trust, while promoting unqualified figures can lead to misinformation. In times of crisis, false information can spread quickly, fueled by emotional responses and the speed of mass media and social media. Journalists must actively engage in debunking false claims while promoting verified, science-based knowledge. This involves not only responding to disinformation but also preventing it by proactively framing accurate narratives and fostering trust in legitimate sources. With the rise of AI-generated content, verification becomes even more important.

4. **Post-crisis - Reflecting**

After the crisis peak, newsrooms, media and journalists should assess their coverage to identify what worked well and what did not, refining their strategies for future similar situations. Audience feedback is essential to understand how the public responded to the messaging and what can be improved, therefore special effort should be put in building an effective dialogue with the public. Journalists should promote transparency and emphasise lessons learned, which can build public trust.

Additionally, reporting should not only focus on the negative outcomes but also highlight positive developments to foster hope and resilience. Discussing potential solutions, recovery efforts, or successful responses helps balance the negative aspects of a crisis and encourages the public to stay engaged and to actively participate in recovery and future preparedness.

Finally, it is vital to create a strategic plan for future crises, ensuring quicker, more effective responses through better preparation and communication strategies.