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Information sources of emergency physicians in the Covid-19 crisis

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Abstract

Introduction. Our research is set in the context of the second and third waves of the Covid-19 pandemic within the emergency medical aid service of Paris. It examines how emergency physicians seek and find information during a health crisis, which is crucial for their decision-making and ensuring effective patient care. In this paper, we study the information sources used by emergency physicians and the factors that affect their use.

Method. This qualitative study employs methodological triangulation to enhance the validity and depth of our findings. Using the sensemaking methodology and grounded theory, our data was collected through 24 hours of in situ observation and 19 interviews (totalling over 13 hours of recordings).

Analysis. The collected data was assembled and analysed using the NVivo qualitative data analysis software. The content analyses were theory-driven, according to emerging concepts relative to information behaviour.

Results. We show that, during a public health crisis, emergency physicians from our study rely chiefly on professional medical information from official sources. We also identify the various ways physicians acquire information. Trust appears to be a major factor affecting the choice of sources of information, especially in times of crisis.

Conclusion. Our study underscores the difficulties encountered in managing information redundancy, quality and sharing during crises. The results could be employed to improve information management strategies among health institutions and the provision of information sources necessary for effective health care.

Introduction

A crisis can be defined as a situation that is abnormal or unusual and one which occurs in all sorts of different contexts. Various entities and organisations are required to manage it (Avanzi et al., 2017). With the global health crisis caused by Covid-19, institutions have been compelled to rethink their methods and strategies when managing public health crises. The health systems and services of many countries were faced with an unprecedented situation and were overburdened for months. Informational obstacles (lack of knowledge and data on the disease and high levels of misinformation) were added to the already existing challenges linked to poor material, human and organisational means.

In France, the Covid-19 pandemic led to over eight months of restrictions and sanitary measures such as *non-essential* establishments closing down, curfews, limited travel, mandatory mask wearing and physical distancing, among other policies. These rules were meant to regulate the population's behaviour and to limit the spread of the virus (Sanchez, 2021). Paris's emergency medical aid services (SAMU) found themselves on the front line responding to the health crisis. National health authorities tasked them with the screening of potential Covid-19 patients over the phone (Vivien, 2020). The coordination of the flow of Covid-19 patients happened alongside everyday medical emergencies (such as cerebrovascular incidents, etc.), which overwhelmed SAMU personnel (Telion et al., 2020). The SAMU emergency service's all-time peak of activity in the Paris region was reached on 13 March 2020, with a total of 26,000 calls, 8,400 of which occurred in the Paris SAMU service alone. This number represents over four times the maximum activity observed before the Covid-19 crisis (Telion et al., 2020).

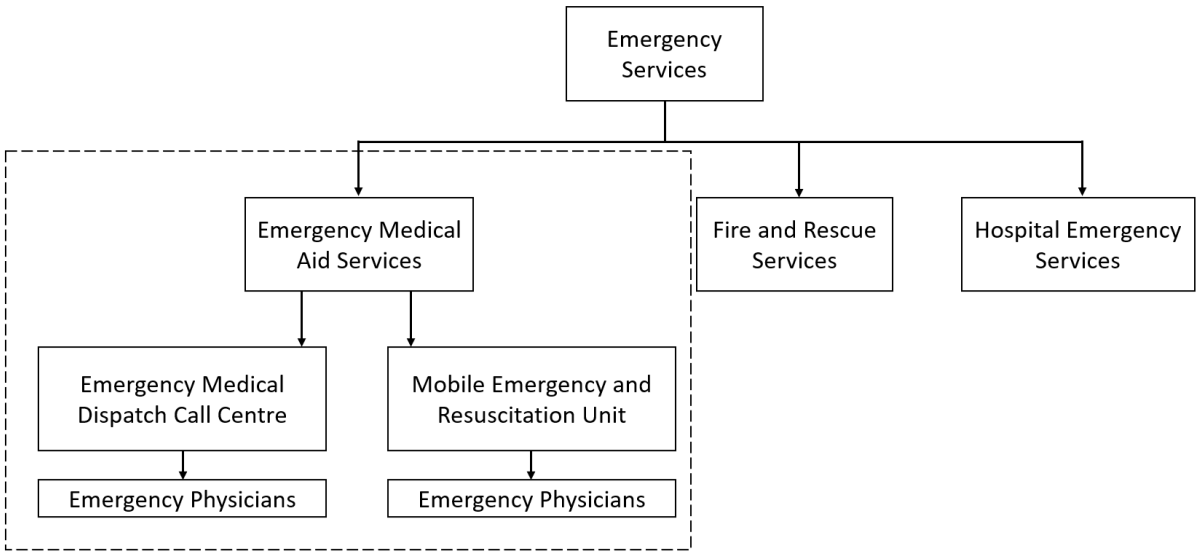

Figure 1. Medical emergency entities in France

Emergency services are paramount when organising and managing health crises. In the French health system, two public services are responsible for pre-hospital rescue and emergency care: the emergency medical aid services (SAMU), administered by the Ministry of Health (Figure 1), and the fire and rescue services, administered by the Ministry of the Interior (DDSC and DHOS, 2008). The fire and rescue services operate as a complement to the emergency medical aid services to ensure optimal coverage of territories in matters of public health and emergencies. Rescuing

people is one of the firefighters' missions. This encompasses victim rescue services, roadside rescue and human assistance. Victim rescue alone amounts to 82 per cent of their assignments (BSPP, 2022). In addition to these two types of emergency entities, hospital emergency departments are also involved in urgent medical aid.

The object of the emergency medical aid service is to provide '*emergency care that is appropriate to the condition of the sick, injured or parturient, wherever they may be*' (DDSC and DHOS, 2008, p. 13). This service responds to unscheduled care needs in emergency situations with means that are exclusively medical. Each branch is equipped with a dispatch call centre (CRRA) and mobile hospital units (means of transportation), also known as the mobile emergency and resuscitation unit (SMUR) (Figure 1).

Whether during a dispatch call or in a mobile unit, the emergency physician confirms or decides on the medical response one must give to a patient. That said, the emergency physician assesses the situation based on the information they have obtained and sets in motion the response best suited to a patient's condition. This medical decision is supported by a set of elements (information, knowledge, available means) which the physician accesses with the purpose of providing the patient with *appropriate care* (Hamelin and Arzalier, 2018; HAS, 2011). Appropriate care means that a balance must be found between *individual interests* (systematically sending a SMUR mobile emergency unit) and *collective interests* (cost-saving measures) (Hamelin and Arzalier, 2018).

Due to the complexity of crisis situations, the amount of produced and shared information significantly increases (Hagar, 2012). Information management and the ways in which institutions operate are, as a result, greatly disrupted. Managing a crisis therefore means deciding which information sources and providers should be trusted (Hagar, 2012). In times of crisis, which are characterised by uncertainty, organisations can pursue their mission and continue to make decisions when they have access to information. Information and its sources are some of the most important resources for physicians, '*essential to … providing quality care to patients*' (Letang and Espitia, 2019, p. 13).

Considering the aforementioned elements, we chose to focus on the information behaviour of emergency physicians, seeking to answer the following questions: How do emergency physicians access information, and which information sources do they rely on in crisis situations? In addition, what factors impact the use of those sources? To answer these questions, we conducted an empirical study at the Paris SAMU. The results of this qualitative study expand the scope of knowledge on the information sources physicians need to perform their duties as well as the factors influencing how those sources are utilised. By revealing difficulties related to information, our findings can be employed to enhance professional medical information management strategies and facilitate information sharing among health professionals.

Information behaviour of emergency physicians

Many researchers have been interested in the information behaviour of health professionals. While general practitioners have been closely observed, studies focusing on the information behaviour of other specialists, such as emergency physicians, are less common. Our work focuses on information sources used by emergency physicians and the factors influencing their use within the constraints of their professional space-time. In France, emergency physicians are trained as general practitioners and subsequently specialise in emergency medicine. This speciality was officially recognised in 2015 (Riou, 2017). We have therefore chosen to concern ourselves with existing studies related to this specific population.

In the 1990s, one literature review demonstrated that physicians prefer written sources of information such as journals and books, but that they also turn to their colleagues when searching for answers to their clinical questions (Haug, 1997). With the advent of digital technologies, the

scope of works includes the Internet and digital devices and sources. Numerous studies focus on the search for online medical information (Foubert, 2014) and use of social media (Farsi, 2021).

More recent studies identify colleagues, guidelines and online platforms as commonly used information sources (Lee et al., 2024; Daei et al., 2024). Some conclude that emergency healthcare professionals rely primarily on human information sources, particularly colleagues and peers (Ayatollahi et al., 2013; Scott et al., 2018). Digital resources appear as key information sources, including specialised health websites, internal information systems, databases and general Internet searches. Paper-based sources are mentioned in both of the cited studies: ambulance sheets, patients' hospital medical records, guidelines and protocols, professional and academic journals. Ayatollahi et al. (2013) observe that verbal communication is the primary channel used to access information, followed by digital systems (such as databases) and visual devices (such as whiteboards). Moreover, verbal communication increases during intense periods of activity, when healthcare professionals do not have the time to search for information. Scott et al. (2018) conclude that the participants in their study prioritised evidence-based sources, such as protocols and clinical practice guidelines, in critical situations (e.g., paediatric care). The authors note that physicians rely heavily on colleagues to obtain new information. Conversely, academic and professional journals are at the bottom of their ranking.

Trust is identified as one of the main factors residents and general practitioners in France prioritise when choosing their sources (Foubert, 2014). The greater trust is placed in institutional sources of information: benchmark sites, institutional sites, or major (scientific) journals. Likewise, Letang and Espitia (2019) observe a link between an information source's perceived reliability and its authority. The authors note that general practitioners are especially reassured when information comes from health organisations or from recognised agencies (such as, for example, the national health authority, a university hospital or academic professors). Letang and Espitia conclude that general practitioners favour credible sources but that they do not always take the time to verify their quality. The credibility of the source, relevance, unlimited access, speed, and ease of use figure among other critical factors influencing information-seeking behaviours of physicians (Bennett et al., 2004).

The extent of the Covid-19 pandemic presented an opportunity to study information-related aspects of crises, including information management in crisis contexts and information behaviour within healthcare institutions. One German study shows that the most important sources of information of Germain physicians were official websites, newsletters and professional journals (Holzmann-Littig et al., 2023). Physicians trusted professional societies and evidence-based medicine organisations. They also preferred concise, user-friendly information formats. Lack of time and information access issues are identified as the main barriers for interviewed physicians. Furthermore, information overload represents a significant constraint identified in studies involving health professionals, especially during crises (Majid and Rahmat, 2013; WHO, 2024).

Regarding information sources used by medical students and physicians in India, Datta et al. (2020) identify two major categories: formal sources (including, in descending order, official government websites, health education, peers/physicians, scientific literature / journals) and informal sources (including, in descending order, online news, television, social media, friends and family, print media). To share precise and correct medical information and to mitigate the spread of disinformation, Datta et al. (2020) highlight a need to develop informational ethics as well as standards and regulations for crisis situations. Raynaud et al. (2021) conclude in their literature review that most early Covid-19 studies lacked original data and present a high risk of bias, highlighting the need to balance research speed with the quality of findings during crises.

In France, medical ethics texts (article R. 4127-32 of the Public Health Code) require physicians to be committed to providing patients with care '*based on data acquired through science*' (Legifrance,

2022). Therefore, medical research and scientific publications should be a major source of information for these practitioners. Moreover, the work resources of emergency physicians and their teams are described in detail in professional literature. Most notably, the types of information and data that must be included in patient medical files are well-specified (SUdF and SFMU, 2013). However, these materials do not delineate any specific sources of information or how sources can be used. The following question necessarily arises: which sources of information do emergency physicians rely on for their daily activities, especially during crises? The literature presented in this section constitute a theoretical foundation upon which we build our study.

Methodology and participants

Our study took place from 15 September to 20 October 2020, and from 19 January to 8 February 2021, at the Paris emergency medical aid service (SAMU 75), one of the four services of Paris and its neighbouring administrative departments. This data collection period corresponded to the second and third waves of the Covid-19 pandemic in France.

In the context of the emergency medical aid service, physicians work with patients who are in a '*state that requires urgent medical expertise and emergency or resuscitation care and their transfer*' (SUdF and SFMU, 2013, p. 4). With that in mind, emergency physicians treat a wide array of illnesses and injuries. They take care of people who are injured or who experience acute pain, the latter of which can quickly devolve into the impairment of an essential function or to death (FHF, 2015). They work directly on the ground or by regulating calls at the emergency medical dispatch centre. When a physician dispatches calls, they assess the patient's condition and make an appropriate medical decision in accordance with the patient. The physician can send a team on the premises, provide advice or direct the patient towards an alternative solution. When an emergency physician is sent on site, they coordinate the work of the mobile emergency and resuscitation team and ensure that the patient receives the right form of care. There are two types of field operations: primary missions, in which patients are cared for away from a health facility and in an emergency situation, and secondary missions, or transfers, which involve caring for a patient in a health facility, often in order to transfer the patient to another establishment (FHF, 2015). These health professionals care mainly for patients with serious clinical signs that fall under the category of urgent medical aid.

Emergency physicians in the SAMU emergency medical aid service do not have control over their place of work. They can be called to intervene on public thoroughfares, at the home of patients or in at-risk areas. They constantly face new environments and must therefore adapt to achieve their main mission: keeping the patient alive until they can reach a hospital. Essential aspects of the profession revolve around respecting protocols and complying with medical instructions and recommendations.

With the help of grounded theory and sense-making methodology (Dervin et al., 2003; Guillemette and Luckerhoff, 2012; Glaser and Strauss, 1967), we used the following methods to collect data: we examined reference materials pertaining to emergency medical aid services and emergency management, we made in situ observation, and we conducted interviews. Several professional medical resources (such as websites, videos and reference materials) were examined during the study's preparatory phase. Such preliminary work was done to understand the structure and workings of French emergency services. It also allowed us to grasp the specific vocabulary used by our interlocutors when structuring our investigation and preparing our discussions with physicians. We also completed the investigation by attending two guided tours (separately for two researchers) of the Paris SAMU emergency medical aid service. One of the physicians in the service provided information on the various people involved, their missions, the service's organisation, the facilities and the available work resources.

Twenty-four hours of in situ observation, over the course of eight days, took place at the medical dispatch centre of the SAMU 75 with the emergency physicians who dispatched calls. We focused particularly on the information behaviour of physicians when regulating calls as well as on the interviews they conducted with patients. We also took note of the exchanges among the different professionals regulating the calls (physicians and dispatch assistants) and we examined the informational work devices in use (computerised systems and business tools). The collected information was primarily used for a more detailed understanding of physicians' activities and subsequent interview responses. Due to its sensitive nature, this data cannot be directly cited or presented in our publications.

Interviews with physicians were coordinated in conjunction with our observations, either before the physician left for a mission with the SMUR mobile unit or upon their return. Since such emergency work cannot be predicted, we had to be flexible during the data collection stage. We alternated between observations and interviews based on each physician's availability. Although formal ethical approval was not required for this study, the research was conducted with official authorisation from the head of the SAMU. The interviews were recorded with the consent of the participants, transcribed and rendered anonymous for the purposes of our study.

We conducted a total of nineteen interviews with over thirteen hours of recordings. With the data from these interviews, which were collected using sense-making methodology (Dervin, 2008), we studied the information behaviour of emergency physicians and, more specifically, the information sources gathered through lived experiences. Considering the SAMU physicians' missions, our unit of analysis was either an intervention on site or a dispatch call. Because the activity of emergency physicians cannot be dissociated from spatial-temporal concerns (Aboueljinane, 2014), we tried to capture the information behaviour of physicians in context. The description of the chosen example of an intervention was built on their knowledge, experiences and personal values (Dervin et al., 2003).

The results presented here stem from a data analysis conducted using the NVivo qualitative data analysis software. Compiled as an NVivo project, the collected data were encoded based on emerging concepts related to information behaviour (e.g. information gap, information sources, information sharing, etc.). The results presented here pertain to the sources of information emergency physicians used during the Covid-19 pandemic crisis and the associated factors influencing their use.

Results: emergency physicians' activity during a crisis

Emergency physicians reported an increase of their activity during the first wave of the Covid-19 pandemic. Their challenge at the outset of the crisis was an information gap, including a lack of knowledge about the virus itself, as well as a lack of clear procedures for crisis management. Therefore, many procedures physicians carried out were ultimately turned into protocols. In turn, these protocols steadily became a significant source of information in their practice.

Physicians described their experience of work during the first wave of Covid-19 as '*blurry*' and '*foggy*'. As they faced a rapid increase in activity and a worldwide shortage of protective gear, the strategy rested on maximising the identification of '*potential Covid*' patients. Phone dispatching represented a form of prevention and a way of protecting the teams operating on the ground. With time, professional medical information was shared at a global level and, most importantly, reliable information sources were made available nationally to support physicians. In this context, we examined the sources of information used by emergency physicians.

Information sources and factors affecting their use

The physicians from our study indicated that their way of working during the Covid-19 crisis was all the same. However, these actors experienced a significant information deficit at the beginning of a crisis, which was subsequently supplanted by an information overload.

> *At the beginning we had an obvious lack of information, then later we had too much information, and I manage all of that in the same way as I managed it before, but simply with some additional information that can help me make a choice in my decision orders.* (EN0034EP)

Regarding information sources, physicians emphasise the importance of professional information and sources to their practice. This information is presented in writing (protocols, decision-making orders, open letters), orally (feedback from experience, oral presentations on peers' new studies and on the scientific literature) and visually (lists of reference institutions written on whiteboards and the monitoring of activity on screens).

Operating on the ground and in emergency situations, emergency physicians have little to no time to search for information on their own, especially during intense crisis periods. Consequently, they report receiving pre-processed information from higher authorities in the form of decision-making orders, protocols, etc.

> *I am in an active phase, my nose to the grindstone, focused on healing people in the moment. What's happening from a national point of view, from an organisational point of view, etc., I don't have time to do research on my own. So, the information is given to me by experts, often doctors, who have a broader perspective of the situation and whose job it is to process and share 'digested information' with us.* (EN0048PB)

During the public health crisis, a variety of communication channels were used to transmit information to all staff members: meetings, emails, phones, apps, screens, etc. Sometimes, the same information arrived through multiple communication channels, contributing to information overload.

> *At SAMU, we have a lot of things. We have both conference calls and phone calls. Everyone at home, our head of department, and other eminent specialists speak. We listen and ask questions. Sometimes we share our experiences and difficulties. Then, we have emails quite regularly from some of our colleagues, who are working to develop protocols, to review different studies … and send us work that is already 'chewed'.* (EN0048PB)

Moreover, our study reveals a contradiction regarding information flows. Emergency physicians point out that formal directives changed daily during the crisis, making their monitoring more complex. However, some of the information they received was already obsolete. The actors explain this discrepancy by significant delays between the feedback from frontline personnel, decision-making by higher authorities and the dissemination of updated directives.

> *The DGS (general directorate of health), the ARS (regional health agency) – it is up to them to draw up regulations and that is what they did and that is what they changed every two seconds. In fact, the ARS and the DGS adapted to what they were told, they were necessarily late … by the time the information reached them, they wrote their text, which they sent to the SAMU manager, and the SAMUs hold the meeting among themselves and decide to broadcast it to the regulator.* (EN0073PJ)

Of all the available information, only scientific sources and information stemming from public health authorities were used for medical and decision-making purposes. That is why the typology of sources presented below (Table 1) takes this essential parameter into account. Based on the collected data, we organise sources of information into three categories: (1) official sources, (2) additional sources, and (3) informal sources. It is important to note that these examples stem from the testimonies of the physicians we interviewed and that they are not meant to be comprehensive. All identified information sources are arranged according to their origin: firstly, by organisational level and, secondly, by the space (geographical coverage) or perimeter of the activity.

Organisational level	Space	Examples
Official sources of information		
Intra-organisational	Team	Direct hierarchy (head of department and managers) Peers
Inter-organisational	Regional/zonal	SAMU of departments and regions Regional Health Agency (ARS) Hospitals Experts/heads of other services
	National	Ministry of Health Other ministries/government French Medical Board Directorate General of Health (DGS) General Directorate for the Provision of Care (DGOS) Other organisations (Pasteur Institute, French National Authority for Health (HAS), French National Public Health Agency, French Society of Anaesthesia and Intensive Care (SFAR), French Paediatricians Society (SFP))
Additional sources of information		
Intra-organisational	Regional/zonal	SOS doctors (on-call primary care physicians)
Inter-organisational	National	Union of private practice physicians (SML) Scientific research
	International	Scientific research
Informal sources of information		
Individual	Regional/zonal	Entourage (rumours)
	National	Traditional media (television, radio)
	International	Acquaintances, contacts

Table 1. Typology of information sources during the Covid-19 crisis

Official sources of information chiefly include sources containing specialised medical content meant for professional use and created by individuals, instances and organisations in the field of health. At the intra-organisational level, the information sources cover the perimeter of the Paris SAMU team. At the inter-organisational level and in the category of official sources, a distinction

is made between the national level and the regional or zonal (zone of activity) levels. This classification mirrors the way in which the health system and its members operate in France. That said, the Ministry of Health represents a source of information and guidelines that are to be applied nationally. Designated entities (such as the regional health agency, for example) make the information available and adapt it to the regional and zonal levels.

Additional sources complement the first category of sources and encompass the international scope. While the information from these sources can be official, it comes second, or rather as a complement, to the information from the previous category. Our subjects chiefly mention scientific publications and research from around the world. Health authorities operating at a global level, such as the World Health Organization, could be included in this perimeter. However, the physicians we interviewed did not mention this specific source.

Informal (unofficial) information sources are identified on an individual level. They are contingent upon the interviewed subjects' personal practices and context. This category includes '*general public*' sources like the media (at the national scale) or sources from the individual's entourage (family, friends, personal contacts). Health professionals could follow the news and learn about the Covid-19 pandemic in an informal manner through these sources. The information presented in the media could provide an *overall picture* of the situation in France. It could also serve as an *alert*, prompting SAMU officials and physicians to find out more. An interviewed actor offers one such example wherein the media identified a cluster of contaminations.

> *Sometimes the media are useful … in the style of the clusters that happened in the Grand Est [region] … in a village in the Alps, so there we know that something is happening thanks to the media. But then, if we want information, we call our colleagues at the local SAMU who give us the info. It's simply an alert, but then we go fishing for information in a much more efficient way.* (EN0066VB)

Since the information obtained in this way does not stem from official sources, it is not verified and can often be incomplete or incorrect. These professionals are hence not inclined to rely on it fully. Higher ranked staff members therefore turn to official sources of information (such as medical data, research studies or reports published by public authorities) to carry out in-depth research on a given topic. In this specific case, the manager who was interviewed explains that he searched for reliable information by turning to official entities: the local SAMU service directly involved in the situation.

In the following example, a physician indicates that their personal network of Chinese physicians became a significant source of information. Chinese physicians who were working in the first country affected by the SARS CoV-2 virus shared with this SAMU physician their initial assessments of treatments tested in China, as well as symptoms and results.

> *I have a lot of colleagues who work on the patient side: intensive care physicians and emergency physicians. They've been sending me information on a regular basis telling me what has happened over there, what treatments have been tested, what methods they tested, and what works, what doesn't work.* (EN0063NN)

The same physician adds that their peers do not perceive the information from this type of source in the same way. The value of the information is conditioned by the level of trust that a person has granted to the source.

It appears that, for emergency physicians in times of crises, national or regional health authorities and organisations are first-tier sources of information. These official sources are viewed as credible and reliable when they are combined with a direct or indirect hierarchical structure and with experts in the health sector. Scientific research and other entities (such as associations or

unions) come as a complement to official sources. While these sources are professionally recognised and perceived as reliable, they are seen as secondary or supplementary. This could be explained by the fact that official sources contain essential information. Finally, some information may come from unofficial or general public sources. However, the interviewed physicians placed little value in these, turning instead to official information and to the officials verifying it. We noticed that physicians relied heavily on the hierarchical structure as an information source in the context of a public health crisis.

Certain factors influence the emergency physicians' information activities and their use of the aforementioned information sources, observed from the standpoint of their space-time. By the very nature of the profession, time is characterised by rapid and urgent action. Space corresponds to the geographical area covered by the emergency medical service to which it belongs. We find that uncertainty and trust are critical for the interviewed physicians when choosing information sources in the context of the Covid-19 crisis. They faced great uncertainty regarding a new disease and therefore prioritised official sources of information emanating from hierarchical structures they trusted. In addition, the emergency physicians preferred reliable sources of information providing access to complete, credible and up-to-date information.

Discussion and conclusion

In this paper, we examine emergency physicians' information sources and the factors that determine their choices and uses in the context of the Covid-19 crisis. We find that during a public health crisis, emergency physicians rely chiefly on professional medical information from official sources such as national and regional health organisations and authorities. Additional sources complement the first category of sources, while informal (unofficial) information sources operate at the individual level and can provide some limited insights.

Trust, uncertainty and reliability appear as important factors impacting the choice of information sources. Emergency physicians state not having time to search for information during crises. The information they need is provided by trusted medical authorities and their managers. In our study, direct and indirect hierarchies are considered as official and trustworthy sources of information. Such trust can be explained by the emergency physicians' attachment to the health system and, as pointed out by Weick (1995), by the ties upholding each organisation. Lezon-Rivière and Ihadjadene (2018) conclude that health professionals can swiftly intervene when they have legitimate and trustworthy sources on which to rely. For flight nurses (from their study), who also operate in uncertain and unpredictable environments, trust is built on connections in conjunction with the institutional structure and the roles within it. This relationship of trust is confirmed in our study through our subjects' choices of information sources. The hierarchical structure stands out as a reliable source of professional medical information, of major importance in times of crisis. Reliable sources of information take the shape of medical files, peer opinions, professional documents, etc.

Along with trust, uncertainty influences emergency physicians' choice of sources. They are particularly vigilant about unverified information as it could be incomplete or could be the object of variable interpretations. These results affirm a connection between uncertainty, trust and sources of information. Incidentally, the organisational culture of the emergency medical aid service relies on trust as one of its founding principles because its core activity is defined by time pressures and a changing, complex and critical environment (HAS, 2020). Through our work, we have confirmed that such a climate of trust exists based on the emergency physicians' ways of choosing official information. These sources are based, among other things, on scientific information. However, Raynaud et al. (2021) call for caution when applying medical information produced in the urgent context of a pandemic. It therefore seems important to highlight the particularity of the crisis which can weaken the reliability of – and trust felt towards – official sources of information and, more specifically, towards the hierarchical structure.

Our results complement the work of Datta et al. (2020) and, more precisely, the distinction between formal and informal sources of information. These authors wondered why medical journals were infrequently used, and the answer remains nebulous. In our study, emergency physicians do not use informal sources to support their professional practices. At such an operational level, they do not have enough time to search for information when managing emergencies (Ayatollahi et al., 2013) and even less so in a crisis situation. Our results show that information (scientific research, among other elements) is gathered and processed by others before being shared with emergency physicians as guidelines or recommendations. This could explain why scientific journals rank low in the list of official information sources in the Datta et al. (2020) study.

Moreover, our research findings demonstrate that emergency physicians need reliable sources that provide timely and complete information. These actors experienced shifts from an information gap to an information overload. They report that, in the later stages of the Covid-19 crisis, information flooded in from multiple channels and often consisted of redundant or obsolete information (Lekic-Savatic and Lezon-Rivière, 2022). Similar results come from a study conducted during the H1N1 flu pandemic by Majid and Rahmat (2013) and the World Health Organization during the Covid-19 crisis (WHO, 2024). The latter emphasises that information and guidelines frequently changed for frontline healthcare workers, making it difficult to determine which sources were reliable. These findings should be considered by health authorities, because crisis management also requires management of information redundancy, as well as the risk of obsolescence or non-transmission (delay or loss) of strategic and essential information (Couty, 2004).

To prevent information overload, information sharing should be optimised. We also propose updating professional documentation in order to consider our findings regarding the needs of emergency physicians regarding information and information sources, and their difficulties experienced during the Covid-19 crisis. Majid and Rahmat (2013, p. 53) recommend that public health agencies and organisations precisely define their '*information-related roles and responsibilities during a crisis and make necessary preparations accordingly*'. This would help eliminate or reduce repetitive information coming from multiple channels.

This research is the result of a first empirical study. As such, it has some limitations. We obtained our results on sources of information from actors we interviewed. Those results may therefore not be representative of the full variety of information sources used by emergency physicians. It would also be beneficial to widen the scope of the sample to include physicians from other emergency medical aid services, going as far as including subjects from hospital emergency services. In the context of a crisis, observing the ways in which emergency medical aid services across the same region collaborate and share information would be of major interest. Our observation and our investigation took place within the walls of the Paris emergency medical aid service. We were granted access to video reports capturing the activity of emergency physicians. However, conducting a study with physicians in the field would allow us to study emergency physicians' information sources and behaviour in more depth. By accompanying these professionals on site, we could examine the way in which meaning is built when making medical decisions in emergency situations and/or during times of crisis.

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