

# Linking healthcare and societal resilience during the Covid-19 pandemic

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## Abstract

Coronavirus disease 2019 (Covid-19) has highlighted the link between public healthcare and the broader context of operational response to complex crises. Data are needed to support the work of the emergency services and enhance governance.

This study develops a Europe-wide analysis of perceptions, needs and priorities of the public affected by the Covid-19 emergency. An online multilingual survey was conducted from mid-May until mid-July 2020. The questionnaire investigates perceptions of public healthcare, emergency management and societal resilience.

In total, N=3029 valid answers were collected. They were analysed both as a whole and focusing on the most represented countries (Italy, Romania, Spain and the United Kingdom). Our findings highlight some perceived weaknesses in emergency management that are associated with the underlying vulnerability of the global interconnected society and public healthcare systems. The spreading of the epidemic in Italy represented a ‘tipping point’ for perceiving Covid-19 as an ‘emergency’ in the surveyed countries. The respondents uniformly suggested a preference for gradually restarting activities. We observed a tendency to ignore the cascading effects of Covid-19 and possible concurrence of threats.

Our study highlights the need for practices designed to address the next phases of the Covid-19 crisis and prepare for future systemic shocks. Cascading effects that could compromise operational capacity need to be considered more carefully. We make the case for the reinforcement of cross-border coordination of public health initiatives, for standardization in business continuity management, and for dealing with the recovery at the European level.

# Introduction

Covid-19 represents a wake-up call for systemic risk: interdependencies between the healthcare sector and other societal functions require the implementation of broader actions to reduce vulnerability beyond that which is directly related to the primary hazard.<sup>1</sup> Research and development on public health need to integrate holistic strategies into the management of concurrent, interacting, interconnected and cascading events.<sup>2-6</sup>

This process has different operational implications. First, the mitigation of the peaks of the emergency needs to be connected to improvements in the ability to respond to future epidemics and must strengthen the policy, technical and organizational aspects of health care systems.<sup>7,8</sup> Secondly, healthcare response needs to be integrated with lessons learned on disaster resilience strategies, including risk governance, humanitarian coordination and response by communities.<sup>9</sup>

Research on Covid-19 has explored the role of individual and collective risk perception.<sup>10,11</sup> The psychological impacts of Coronavirus disease have been subjects of investigation since the early phase of the unfolding in China.<sup>12</sup> However, few studies have stressed its role in improving operational crisis management, in both healthcare and other front-line activities. This paper reports a European survey (N=3029) that is focused on understanding how Covid-19 could be amplified by vulnerability to cascading and interconnected risks.<sup>3,13</sup> Our study explores individual perceptions of essential services, information and gaps in response and recovery in order to support the prioritization of responses during both waves of the pandemic and recovery actions. Our goal is to derive additional evidence and lessons learned, whose value could go beyond Covid-19 and help manage future systemic crises.

## Methods

### Study design

The survey entitled “*Covid-19: Emergency, Recovery and Improvement*” was jointly developed in Spring 2020 by researchers from University College London’s Institute for Risk and Disaster Reduction and the European Commission’s Joint Research Centre Directorate for Space, Security and Migration. Targeting the general population at a European-wide level (EU countries and UK), the study was meant to improve the framing of similarities in and differences between risk and emergency perceptions across the countries that experienced the first wave of the Covid-19 pandemic.

In contrast to other studies that have focused on the acute phase of the first wave, our data collection was planned for a later stage. This allowed us to gauge perceptions related to recovery aspects and explore options

for improvement. The questionnaire (see Appendix 1) investigated aspects of general and individual perception of the emergency, crisis communication and management, and possible future developments. We benchmarked the answers to a Likert-Scale based model to identify “performance gaps” or “capacity gaps” that were reflecting undesirable states of resilience.<sup>14</sup> We emphasized the link between social, psychological and organizational vulnerabilities driving cascading and interconnected risks associated with the pandemic.<sup>15</sup> In particular, we explored how the progression of the pandemic could be challenged by access to healthcare services and other critical infrastructure, along with reliable information about complex scenarios and associated learning in society.

### **Dissemination, data collection and analysis**

The survey was administered online in a multilingual format, with dedicated pages for each EU country and the UK, according to the country of residence indicated by each respondent.<sup>16</sup> Participation was voluntary and anonymous and took place between mid-May and mid-July 2020. The questionnaire was disseminated using our institutional social networks (e.g. Twitter, LinkedIn and Facebook), and through news headlines and mailing lists. Additionally, it was supported by partnering organizations such as Europe Direct and the London Climate Change Partnership, and by individuals.

We accumulated N= 3029 valid questionnaires on the basis that 90% of questions had been answered in each case. These were processed statistically both as a whole and with reference to the four countries which supplied the greatest number of questionnaires: Italy (1190), Romania (252), Spain (676) and the United Kingdom (293). In the discussion that follows, percentages are rounded. See Appendix 2 for supplementary data.

## **Results**

### **Demographics**

Almost two-thirds of survey respondents (61.1%, N=3023) were female, and males constituted 37.6%. Among the different age groups, the largest concentration came from the 45-64 years group (41.3%, N=3022), followed by 35-44 years (23.3%), 25-34 (19.1%), 18-24 (8.1%) and 65+ (8.3%). In terms of education, the most represented options were master's degree or equivalent level (38.3%, N=3025) and bachelor's degree or equivalent (26.4%). People whose highest level of education was from secondary school or equivalent accounted for 18.9% and those with a doctorate or equivalent constituted 14.8%. This distribution may depend somewhat on the structure of the dissemination campaign which was performed through our institutional social media and professional networks. The majority of the respondents were employees (60.4%, N=3024), followed by self-employed (11.4%), retired people (8.8%) and students (8.6%). Unoccupied or unemployed people accounted for 4.2% of the total, while home-makers totalled 1.9%.

## General perception of the emergency

Many respondents (30.1%, N=3022) began to see Covid-19 as an ‘emergency’ when outbreaks started in other countries in Europe. Some 22.7% reached this point when outbreaks started in their own country and 20% reached this conclusion upon hearing the news of the contagion in China. The moment when the outbreak started in the respondents’ own region was identified as the start of the emergency by only 4%. It is clear that the event in Italy represented a critical ‘tipping point’ which changed the perception of Covid-19 from being a faraway event, to a collective and European ‘emergency’ (see Figure 1). This is confirmed by the cases of Romania, Spain, and the United Kingdom.

When asked to identify the most important reasons for the spread of the virus, a majority of respondents (61%, N=3023) indicated international mobility, followed by lockdown measures that were implemented too late or not restrictively enough (43.3%); indifference, carelessness or lack of caution among the population (34%); cuts to health services and research (28.6%); contradictory information (28.4%); lack of personal protective equipment (25.6%); and the deadliness of the virus (19.9%). Only a few answers (6.5%) identified the violation of lockdown measures, while 5.4% reported other factors.

Before the outbreak of the Covid-19 emergency, respondents considered an epidemic in Europe to be rather unlikely ( $M=2.29$ ,  $\sigma^2= 1.24$ ,  $s= 0.79$  on a five-level scale of importance). Other saw their national civil protection services as inadequately prepared for such an event ( $M=2.37$ ,  $\sigma^2= 1.07$ ,  $s= 0.42$  on a five-level scale of importance). Country comparisons reveal some differences in perception of the role of preparedness, but, with the exception of Spain, the general tendency is to indicate lower values (see Figure 1).

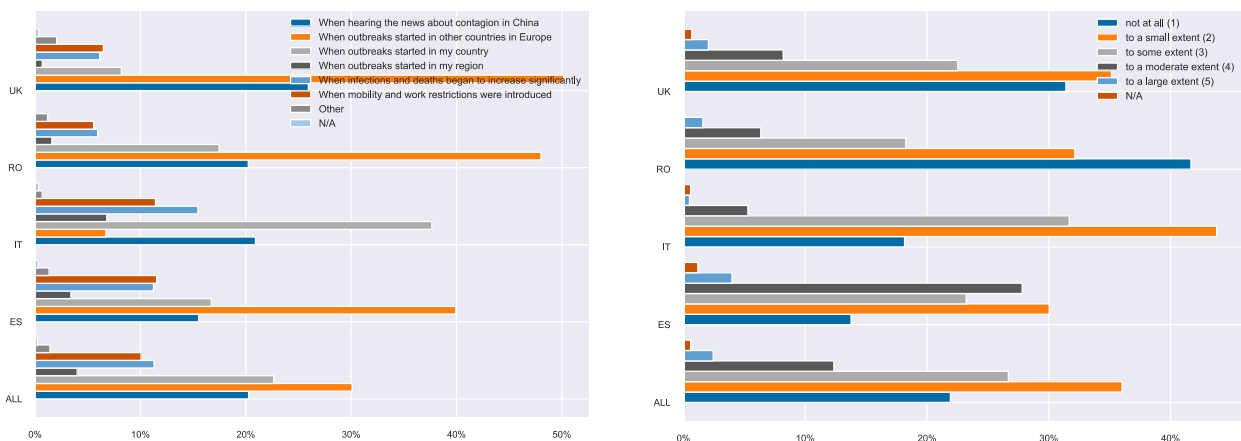


Figure 1. Left: results for Question 1 (“When did you start to see Covid-19 as an ‘emergency’?”). Right: results for Question 3.2 (“Did you think the civil protection services were adequately prepared for such an emergency?”). Abbreviations: ALL (all countries), ES (Spain), IT (Italy), RO (Romania), UK (United Kingdom).

## **Individual perception of the emergency**

We queried the participants about some typical emergency preparedness measures taken at the individual and household levels. Table 1(A) shows that the largest proportion of respondents did not take any measures, but there is a significant difference in the minority that did, which is highest for reading official information about the pandemic and organising for working/studying remotely.

We addressed changes that occurred prior to the lockdown and worries (see Table 1(B)). In terms of mean values, psychological well-being appears to bear the most significant impact. The other factors (workplace, family and economic well-being) are less affected. Compared to the situation before the lockdown, the daily consumption of food, water, electricity and heating appears to have increased and the use of telephone and internet services even more so. Conversely, for most respondents the use of transport significantly decreased, together with the use of health services, hospitals, banking and financial services. The respondents were mostly worried about the direct consequence of the primary emergency, such as the shortage of economic recovery measures and the possible occurrence of a second wave. However, much lower concern was expressed about the disruption of essential services, the concurrence of events such as flooding, and the risk of intentional damage actions such as terrorist acts or riots.

Among the concerns experienced during the peak period of Covid-19, respondents stressed the impacts of the event on their personal health and that of their families (74.9%, N=3025). They were also concerned about the impact upon the economy, work and study (57.6%) as well as the shortage of hospital and emergency facilities (53.7%). Less significance was attributed to the risk that information was unreliable (24.4%), to social distancing (18.0%), to the shortage of personal protective equipment (17.6%) and to other citizens' reactions to the state of emergency (17.1%). Shortages of essential goods and services (9.7%) and sanctions for infringing restrictive measures (3.6%) were at the bottom of the scale.

## **Emergency communication and management**

The main sources of information during the Covid-19 emergency were the Internet (including on-line journals and news media; 89.1%, N=3026) and television (61.4%), followed by social media (36.4%), radio (25.3%), printed newspapers (14.5%), word of mouth (4.8%) and other (4.9%). Among the news (real or fake) identified as more worrying, respondents indicated the blockage of imports of protective equipment such as gloves and masks (49.7%, N=2967), conspiracy theories (e.g. Covid-19 as a biological weapon; 35.9%), priority care being reserved for the younger population (33.3%) and total closure of supermarkets and pharmaceutical services (30.6%).

Table 1(C) reports the answers to questions that investigated emergency communication and emergency support tools. Referring to the adequacy of communication, restriction of free movement and measures to

prevent the infection dominate the list. Conversely, recommendations about physical and psychological well-being are at the bottom of the list. Among the emergency support tools, the feedback we received was highly variable. Top scores were attributed to symptom-tracking apps and the free distribution of videos that teach good practice.

### Future developments

Nearly half of the respondents thought that they could sustain restrictive measures for a few months (46.6%, N=3024) and a further third for a few weeks (31.1%). A minority (12.8%) were unable to say or claimed not to be able to sustain such measures (9.5%). There are significant differences between countries (see Figure 2). Specifically, the responses from the United Kingdom seem more optimistic than elsewhere. Considering the evolution of the pandemic, this viewpoint may have changed subsequently.

There was strong agreement (84.3%, N=3,020) with the idea that activities could be revived through a combination of measures to promote a progressive restart, rather than no measures or total lockdown strategies. As illustrated in Figure 2, we also observed homogeneity between countries.

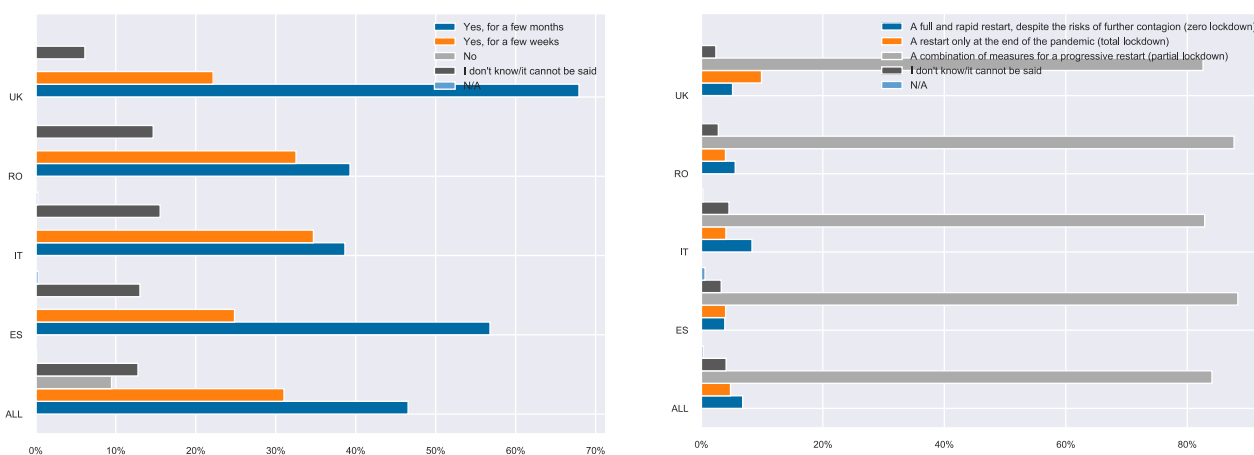


Figure 2. Left: results for Question 13 (“In case of a second wave of Covid-19, could you sustain a further lockdown over time?”). Right: results Question 14 (“In your opinion, how should the restart of activities be organized?”).

When asked about personal priorities after the lockdown (see Figure 3), major importance was attributed to a return to regular study or work conditions (50.5%, N=3019), getting back together with one’s family (49.5%), mobility without geographical restrictions (41.3%) and full access to health services (37.4%). These aspects were followed by the access to social, cultural and recreational facilities (30.3%), access to economic incentives (16.6%), and access to social assistance and childcare services (11.8%). Importantly, priorities vary strongly by country, especially in terms of societal aspects. This may be the result of cultural factors, along with the characteristics of the respondents and differences in the phases of the pandemic as experienced in each country at the time of the survey.

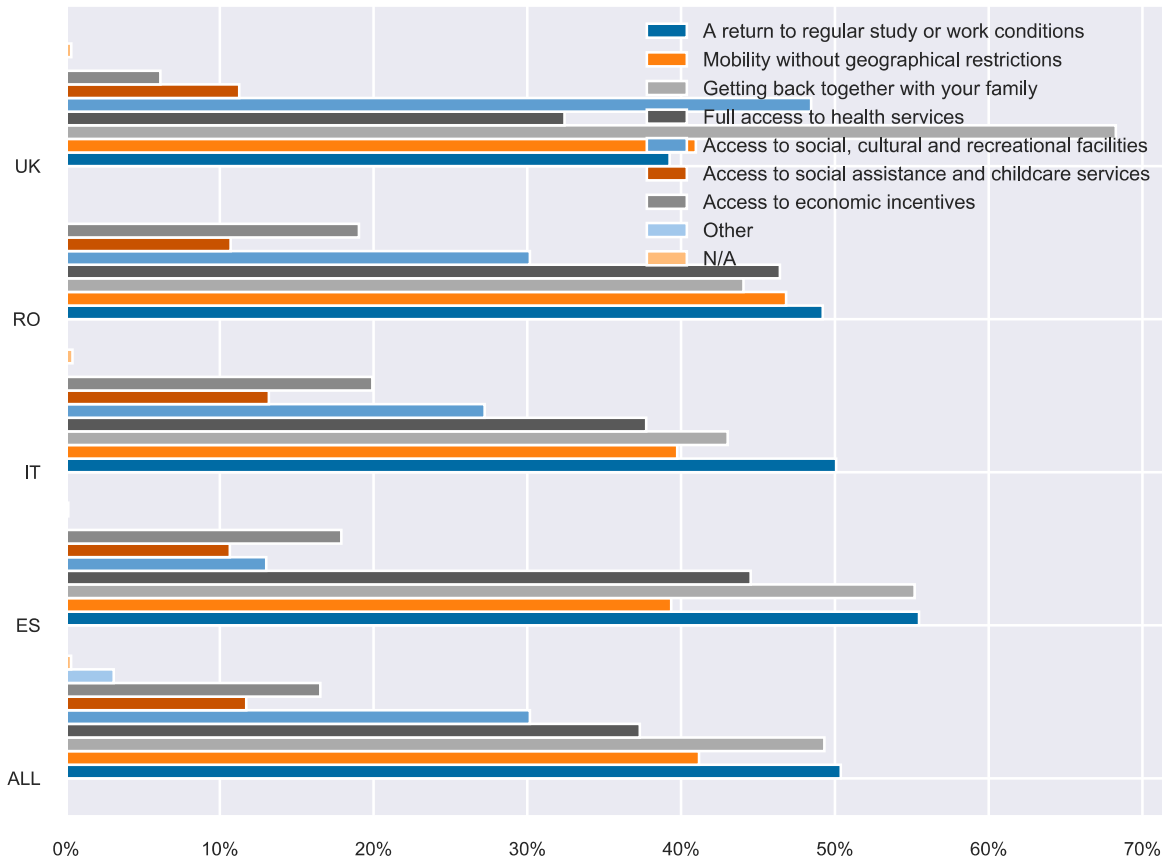


Figure 3. Results for Question 15 (“On a personal level, what will be your priorities during the recovery?”).

Some 39.5% (N=3021) of respondents were fully aware of national social and economic measures, while 42.3% claimed to have limited information, 14.2% had no awareness and 4% did not know. At the same time, we received significant feedback on the social and economic priorities that were deemed to be the most important. These were topped by investment in health and research (52.6%, N=3,021) and financial support for families and vulnerable categories (52.5%), followed by support to businesses (41.8%) and financial support for essential needs (34.4%). In terms of priorities, there are significant differences between countries (see Figure 4).

Table 1(D) illustrates the linkage between the experience gained during Covid-19 and the improvement of disaster management and societal resilience. In general, there is a tendency towards optimism, in particular regarding emergency support technology and logistics. Finally, with respect to participation in forms of volunteering, 43.1% of the respondents (N=2,989) said that they were not contributing to the categories mentioned, while 27.4% claimed they were donating money. Home care was indicated in 6.5% of cases, health assistance in 8.0% and blood donation in 10.1%. Delivery of food to the needy (9.7%) was more common than delivering medical supplies (3.4%).

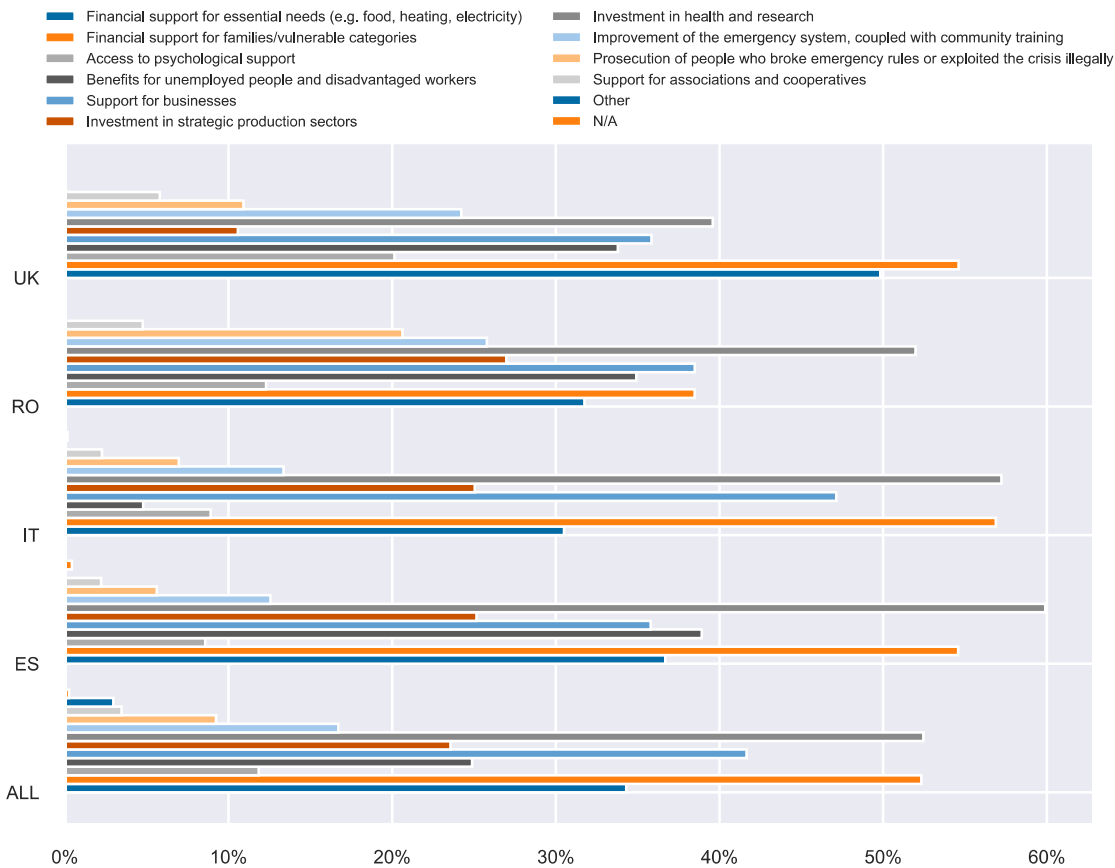


Figure 4. Results for Question 17 (“What do you think the social and economic priorities should be?”).

## Limitations

Our study has some limitations, and it must be considered indicative rather than representative of general populations in Europe. On the one hand, the decision to disseminate it when most of the lockdown measures were lifted implied that the answers would not be strongly influenced by the status of the emergency. On the other hand, this reduced the breadth of the dataset. A limited number of responses could plausibly have been attributed to ‘questionnaire fatigue’, and changes could have been due to variations in mood.<sup>17</sup> Other limitations can be traced to the limited set of questionnaire translations available, to the unfunded nature of the study, to dissemination by social media and to gathering responses exclusively on line. Finally, given limitations of space, correlations and open responses will be analysed in a subsequent paper.

## Discussion

Our results provide some new insights for discussing emergency response and recovery to Covid-19, adopting a systemic risk perspective that could be meaningful beyond the pandemic itself.

The data show that Covid-19 was perceived as an ‘emergency’ when it started spreading in Italy, more than through its association with the global or local scales. This ‘tipping point’ seems to stress the importance of



reinforcing the supranational governance of a pandemic. It echoes the observation that non-conventional transboundary threats, such as pandemics and cyber-attacks, call for “extreme adaptation and unprecedented cooperation”<sup>18</sup> to overcome limitations of existing country-level protocols and plans.<sup>19</sup> In this interpretation, the survey results are an important wake-up call for change, because cross-border crisis management represents a long-lasting challenge associated with cascading and interconnected risks.<sup>20</sup>

The respondents indicated that the prevailing approach to preparedness and response was inadequate and the possibility of a pandemic was considered unlikely. The root causes for the spread of the disease were attributed to factors that reflected global interdependencies or general mismanagement, rather than to the magnitude of the hazard itself. This points to a substantial shortage of resilience to systemic shocks and interconnected risks. Existing strategies for emergency preparedness and response may need significant revision.<sup>13,21</sup> By promoting cross-cutting capabilities, new actions could integrate the recommendations of the United Nations’ Global Risk Assessment Report.<sup>1</sup>

Another core insight concerns the interdependencies between the healthcare sector and other critical infrastructure. Our dataset reveals changes in the use of essential services. These were expected but they demand further consideration.<sup>22,23</sup> The emergency triggered some behavioural changes that may affect the healthcare system in the long term, for example regarding reticence in accessing healthcare structures or the rise of internet-based services.<sup>24,25</sup> Moreover, the wider networked system of which the healthcare infrastructure is part must also be considered, in terms of both functional dependencies and their implications for society.<sup>26,27</sup> Increasing resilience for complex scenarios may require a better use of stress testing<sup>3,28,29</sup>, more awareness of supply chain vulnerabilities<sup>30,31</sup> and enhancement of public-private partnerships.<sup>32</sup>

There is a need to identify means of raising public awareness of scenarios involving concurrent events. In our data, public concerns were mostly centred on the primary impacts of Covid-19, such as those on health and the economy or on the possible occurrence of further waves. Other elements that could escalate the pressure on healthcare and response services, such as the concurrency of natural hazards or societal unrest, were not perceived as primary concerns, and low priority was attributed to the issue of fake information. In general, our responses confirmed the presence of discrepancies in communication across the countries, in particular that destined for vulnerable groups.<sup>33</sup> This recalls how “various aspects of social and cultural contexts influence the extent and speed of behaviour change”<sup>11</sup>. This should be considered in developing communication strategies.<sup>34</sup>

New actions are needed to facilitate recovery and long-term resilience. Our data suggested that, before the pandemic, household preparedness for multiple risks was limited. This is complementary with the evidence provided in a recent Japanese study, where it has been found that past disaster experiences did not ensure a

better preparedness for other crises happening during Covid-19.<sup>35</sup> In the long run, it could be worth promoting information on the tools and skills needed in order to acquire better societal resilience against complex events. A preference for phased recovery was suggested by the respondents and that may be a very valid approach, especially when combined with improved psychosocial capacity building for a sustainable recovery process.

In conclusion, our data on Covid-19 present evidence of a shift towards a new approach to emergency management and improved societal resilience. This includes context-driven and context-dependent integration between public healthcare and other emergency services, which should better exploit the interconnectivity of our technologies, infrastructures and societies. It could be argued that limits to this data collection should be the starting point for a targeted use of research, where the assessment is adapted to the needs of local authorities and used to support a decision-making process that is more inclusive of the bottom-up perspective.

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Table 1. Selected survey response statistics (*N*: number of valid answers; *M*: mean;  $\sigma^2$ : variance; *s*: skewness).

<b>(A) Adoption of emergency preparedness measures at the individual and household levels</b>				
	<b>N</b>	<b>Yes</b>	<b>Yes, but limited</b>	<b>No</b>
<b>4. Before the Covid-19 emergency, did you take any of the following actions?</b>				
Keeping a supply of medicines	2,978	9.8%	32.2%	57.9%
Keeping a supply of food	2,991	11.3%	32.5%	56.1%
Reading official information of what to do in a pandemic	3,009	31.4%	21.5%	47.1%
Reading official information of what to do in other disasters or crises	2,962	19.9%	33.0%	47.2%
Organizing yourself for teleworking, working at a different location, remote study	2,979	28.5%	20.1%	51.4%
<b>(B) Individual and household behaviours</b>				
	<b>N</b>	<b>M</b>	<b><math>\sigma^2</math></b>	<b>s</b>
<b>5. How has your personal situation changed during the lockdown?</b>				
Well-being at work	2,956	2.67	1.1	0.23
Family well-being	3,018	2.88	0.94	0.14
Psychological well-being	3,016	2.42	0.88	0.58
Economic well-being	3,015	2.75	0.67	-0.26
<b>6. How has the following changed during the lockdown?</b>				
Daily consumption of food, water, electricity and heating	3,015	3.60	0.53	-0.18
Use of public/shared transport (e.g. bus, train, car sharing)	3,002	1.52	0.73	1.29
Use of private transport	3,004	2.14	1.48	0.72
Use of health and hospital services	3,017	2.00	0.94	0.40
Use of banking and financial services	3,007	2.43	0.90	-0.09
Use of phone and internet services	3,019	4.29	0.57	-0.86
<b>8. Currently, how worried are you about the following aspects?</b>				
Lack of economic recovery measures	3,015	3.68	1.04	-0.37
Possible occurrence of a second wave of Covid-19 contagion	3,016	3.73	1.04	-0.50
Possible disruption of essential and basic services (e.g. blackout, telecommunications failure, lack of food supply)	3,007	2.35	1.2	0.7
Possible concurrence of events such as earthquakes, floods, landslides or storms	2,990	2.10	1.10	0.87
Possible concurrence of intentional damaging actions such as terrorist attacks, cyber-attacks, riots	3,006	2.40	1.11	0.59
<b>(C) Emergency communication and management</b>				
	<b>N</b>	<b>M</b>	<b><math>\sigma^2</math></b>	<b>s</b>
<b>10. Has the following information on Covid-19 been adequately communicated?</b>				

Data on contagion, number of victims, and their geographical location	3,021	3.22	1.45	-0.16
Restrictions on free movement and social events	3,014	3.64	1.06	-0.43
Identification of the essential commercial and productive activities	3,001	3.25	0.96	-0.03
Status of essential and basic services	2,998	3.27	0.99	-0.10
Measures to prevent infection (e.g. social distancing, use of gloves and masks)	3,013	3.72	1.20	-0.58
Economic support measures (e.g. tax measures)	3,008	2.78	1.13	0.19
Recommendations on physical and psychological well-being	3,008	2.67	1.19	0.28
Recommendations on the protection of children and vulnerable categories	3,011	3.05	1.38	0.03

**12. How useful do you think the following emergency support tools can be?**

Drones for aerial monitoring	2,995	2.58	1.48	0.33
Displacement tracking apps	2,996	2.96	1.55	-0.04
Health- and contagion symptoms- tracking apps	3,000	3.38	1.51	-0.37
Self-assessment questionnaires of the symptoms of contagion	2,995	3.00	1.24	0.05
Free videos and courses to learn good practices for infection prevention	3,001	3.37	1.23	-0.21

**(D) Future developments**

	N	M	$\sigma^2$	s
<b>18. Can the experience gained during the Covid-19 emergency help to improve any of the following?</b>				
Safety practices, including for other events (e.g. a flood or a blackout)	3,018	3.18	1.18	-0.04
International emergency management cooperation	3,004	3.37	1.31	-0.25
Emergency support technologies	3,011	3.54	1.02	-0.35
Emergency support logistics	2,993	3.58	1.02	-0.38

# Supplementary Appendix

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## Appendix 1. Questionnaire outline

The questionnaire, developed using non-technical language, was made available in six languages (English, French, German, Greek, Italian, Spanish). It was piloted and administered online through European Commission’s platform EUSurvey (<https://ec.europa.eu/eusurvey/home/welcome>). It includes five sections; in particular,

- Section 1 (“*General perception of the emergency*”) contains questions on the overall perceptions of Covid-19 emergency to define the issues in pre-existing communication of risk;
- Section 2 (“*Personal perception of the emergency*”) explores the changes in the uses of essential services, key concerns to address, and pre-existing household preparedness;
- Section 3 (“*Emergency communication and management*”) focuses on emergency communication and management, exploring how information were disseminated, the role of fake news, and the perceptions of mitigation measures;
- Section 4 (“*Future developments*”) explores future developments including the capacity of sustaining future lockdowns, recovery process, and possible lessons learned to build upon future events;
- Section 5 (“*Demographic information*”) includes questions on demographics.

The full list of items is available in the table below. Where relevant, the answers adopted a standard Likert scale from 1 to 5. In other cases, we included single/multiple choice answers and semi-open response fields. For each question, the survey allowed to provide no answer (N/A). For the survey administered in Sweden, expression “lockdown measures” was replaced by “(implementation of) containment measures”.

Table 1- Questionnaire outline

Section 1 - General perception of the emergency	
1	When did you start to see Covid-19 as an ‘emergency’? [single] <ul style="list-style-type: none"> <li>• When hearing the news about contagion in China</li> <li>• When outbreaks started in other countries in Europe</li> <li>• When outbreaks started in my country</li> <li>• When outbreaks started in my region</li> <li>• When infections and deaths began to increase significantly</li> <li>• When mobility and work restrictions were introduced</li> <li>• Other (please specify below)</li> </ul>
2	What do you think were the most important reasons for the spread of the virus? [multiple, 1-3 choices] <ul style="list-style-type: none"> <li>• Deadliness of the virus</li> <li>• International mobility (e.g. tourists and workers)</li> <li>• Cuts to health and research</li> <li>• Contradictory information</li> <li>• Indifference/carelessness/lack of caution of the population</li> <li>• Lack of personal protective equipment (PPE - for example, gloves and masks)</li> <li>• Lockdown measures implemented late or not restrictive enough</li> <li>• Violation of lockdown measures</li> <li>• Other (please specify below)</li> </ul>
3	Before the Covid-19 emergency,
3.1	Did you consider an epidemic in Europe to be a likely occurrence? [Likert] <ul style="list-style-type: none"> <li>• not at all (1) / to a small extent (2) / to some extent (3) / to a moderate extent (4) / to a large extent (5)</li> </ul>
3.2	Did you think the civil protection services were adequately prepared for such an emergency? [Likert] <ul style="list-style-type: none"> <li>• not at all (1) / to a small extent (2) / to some extent (3) / to a moderate extent (4) / to a large extent (5)</li> </ul>
Section 2 - Personal perception of the emergency	
4	Before the Covid-19 emergency, did you take any of the following actions?
4.1	Keeping a supply of medicines [single] <ul style="list-style-type: none"> <li>• yes (1) / yes, but limited (2) / no (3)</li> </ul>
4.2	Keeping a supply of food [single]



	<ul style="list-style-type: none"> <li>• yes (1) / yes, but limited (2) / no (3)</li> </ul>
4.3	<p>Reading official information of what to do in a pandemic [single]</p> <ul style="list-style-type: none"> <li>• yes (1) / yes, but limited (2) / no (3)</li> </ul>
4.4	<p>Reading official information of what to do in other disasters or crises [single]</p> <ul style="list-style-type: none"> <li>• yes (1) / yes, but limited (2) / no (3)</li> </ul>
4.5	<p>Organizing yourself for teleworking, working at a different location, remote study [single]</p> <ul style="list-style-type: none"> <li>• yes (1) / yes, but limited (2) / no (3)</li> </ul>
5	How has your personal situation changed during the lockdown?
5.1	<p>Well-being at work [Likert]</p> <ul style="list-style-type: none"> <li>• much worse (1) / worse (2) / unchanged (3) / better (4) / much better (5)</li> </ul>
5.2	<p>Family well-being [Likert]</p> <ul style="list-style-type: none"> <li>• much worse (1) / worse (2) / unchanged (3) / better (4) / much better (5)</li> </ul>
5.3	<p>Psychological well-being [Likert]</p> <ul style="list-style-type: none"> <li>• much worse (1) / worse (2) / unchanged (3) / better (4) / much better (5)</li> </ul>
5.4	<p>Economic well-being [Likert]</p> <ul style="list-style-type: none"> <li>• much worse (1) / worse (2) / unchanged (3) / better (4) / much better (5)</li> </ul>
6	How has the following changed during the lockdown?
6.1	<p>Daily consumption of food, water, electricity and heating [Likert]</p> <ul style="list-style-type: none"> <li>• much less (1) / less (2) / unchanged (3) / more (4) / much more (5)</li> </ul>
6.2	<p>Use of public/shared transport (e.g. bus, train, car sharing) [Likert]</p> <ul style="list-style-type: none"> <li>• much less (1) / less (2) / unchanged (3) / more (4) / much more (5)</li> </ul>
6.3	<p>Use of private transport [Likert]</p> <ul style="list-style-type: none"> <li>• much less (1) / less (2) / unchanged (3) / more (4) / much more (5)</li> </ul>
6.4	<p>Use of health and hospital services [Likert]</p> <ul style="list-style-type: none"> <li>• much less (1) / less (2) / unchanged (3) / more (4) / much more (5)</li> </ul>
6.5	<p>Use of banking and financial services [Likert]</p> <ul style="list-style-type: none"> <li>• much less (1) / less (2) / unchanged (3) / more (4) / much more (5)</li> </ul>
6.6	<p>Use of phone and internet services [Likert]</p> <ul style="list-style-type: none"> <li>• much less (1) / less (2) / unchanged (3) / more (4) / much more (5)</li> </ul>
7	<p>Can you indicate your key concerns during the peak period of Covid-19? [multiple, 1-3 choices]</p> <ul style="list-style-type: none"> <li>• Impacts on your health and that of your family</li> <li>• Impacts on economy, work and study</li> <li>• Social distancing</li> <li>• Saturation of hospital and emergency facilities</li> <li>• Unavailability of personal protective equipment (e.g. gloves and masks)</li> <li>• Lack of availability of essential goods and services</li> <li>• Other citizens' reaction to the state of emergency</li> <li>• Possible sanctions for infringing restrictive measures</li> <li>• Unreliability of information</li> <li>• Other (please specify below)</li> </ul>
8	Currently, how worried are you about the following aspects?
8.1	<p>Lack of economic recovery measures [Likert]</p> <ul style="list-style-type: none"> <li>• not at all (1) / to a small extent (2) / to some extent (3) / to a moderate extent (4) / to a large extent (5)</li> </ul>

8.2	Possible occurrence of a second wave of Covid-19 contagion [Likert] <ul style="list-style-type: none"> <li>not at all (1) / to a small extent (2) / to some extent (3) / to a moderate extent (4) / to a large extent (5)</li> </ul>
8.3	Possible disruption of essential and basic services (e.g. blackout, telecommunications failure, lack of food supply) [Likert] <ul style="list-style-type: none"> <li>not at all (1) / to a small extent (2) / to some extent (3) / to a moderate extent (4) / to a large extent (5)</li> </ul>
8.4	Possible concurrence of events such as earthquakes, floods, landslides or storms [Likert] <ul style="list-style-type: none"> <li>not at all (1) / to a small extent (2) / to some extent (3) / to a moderate extent (4) / to a large extent (5)</li> </ul>
8.5	Possible concurrence of intentional damaging actions such as terrorist attacks, cyber-attacks, riots [Likert] <ul style="list-style-type: none"> <li>not at all (1) / to a small extent (2) / to some extent (3) / to a moderate extent (4) / to a large extent (5)</li> </ul>
<b>Section 3 - Emergency communication and management</b>	
9.	What is your main source of information? [multiple, 1-3 choices] <ul style="list-style-type: none"> <li>Printed newspapers</li> <li>Internet (on-line journals and news media)</li> <li>Social media</li> <li>Word of mouth</li> <li>Radio</li> <li>Television</li> <li>Other (please specify below)</li> </ul>
10	Has the following information on Covid-19 been adequately communicated?
10.1	Data on contagion, number of victims, and their geographical location
10.2	Restrictions on free movement and social events
10.3	Identification of the essential commercial and productive activities
10.4	Status of essential and basic services
10.5	Measures to prevent infection (e.g. social distancing, use of gloves and masks)
10.6	Economic support measures (e.g. tax measures)
10.7	Recommendations on physical and psychological well-being
10.8	Recommendations on the protection of children and vulnerable categories
11	Which news (real or fake) have you been most worried about? [multiple, 1-3 choices] <ul style="list-style-type: none"> <li>Conspiracy theories (e.g. Covid-19 as a biological weapon)</li> <li>The possibility of catching the virus from goods coming from China</li> <li>Total closure of supermarkets and pharmaceutical services</li> <li>Total interruption of public transport services</li> <li>Priority care being reserved for the younger population</li> <li>Imports of protective equipment (e.g. gloves and masks) being blocked</li> <li>Other (please specify below)</li> </ul>
12	How useful do you think the following emergency support tools can be?
12.1	Drones for aerial monitoring [Likert] <ul style="list-style-type: none"> <li>not at all (1) / to a small extent (2) / to some extent (3) / to a moderate extent (4) / to a large extent (5)</li> </ul>
12.2	Displacement tracking apps [Likert] <ul style="list-style-type: none"> <li>not at all (1) / to a small extent (2) / to some extent (3) / to a moderate extent (4) / to a large extent (5)</li> </ul>
12.3	Health- and contagion symptoms- tracking apps [Likert] <ul style="list-style-type: none"> <li>not at all (1) / to a small extent (2) / to some extent (3) / to a moderate extent (4) / to a large extent (5)</li> </ul>
12.4	Self-assessment questionnaires of the symptoms of contagion [Likert]

	<ul style="list-style-type: none"> <li>● not at all (1) / to a small extent (2) / to some extent (3) / to a moderate extent (4) / to a large extent (5)</li> </ul>
12.5	<p>Free videos and courses to learn good practices for infection prevention [Likert]</p> <ul style="list-style-type: none"> <li>● not at all (1) / to a small extent (2) / to some extent (3) / to a moderate extent (4) / to a large extent (5)</li> </ul>
<b>Section 4 - Future developments</b>	
13	<p>In case of a second wave of Covid-19, could you sustain a further lockdown over time? [single]</p> <ul style="list-style-type: none"> <li>● Yes, for a few months</li> <li>● Yes, for a few weeks</li> <li>● No</li> <li>● I don't know/it cannot be said</li> </ul>
14	<p>In your opinion, how should activity restart be organized? [single]</p> <ul style="list-style-type: none"> <li>● A full and rapid restart, despite the risks of further contagion (zero lockdown)</li> <li>● A restart only at the end of the pandemic (total lockdown)</li> <li>● A combination of measures for a progressive restart (partial lockdown)</li> <li>● I don't know/it cannot be said</li> </ul>
15	<p>On a personal level, what will be your priorities during the recovery? [multiple, 1-3 choices]</p> <ul style="list-style-type: none"> <li>● A return to regular study or work conditions</li> <li>● Mobility without geographical restrictions</li> <li>● Getting back together with your family</li> <li>● Full access to health services</li> <li>● Access to social, cultural and recreational facilities</li> <li>● Access to social assistance and childcare services</li> <li>● Access to economic incentives</li> <li>● Other (please specify below)</li> </ul>
16	<p>At the national level, are you aware of any significant social or economic measures designed to help people recover from the lockdown? [single]</p> <ul style="list-style-type: none"> <li>● Yes</li> <li>● Yes, but I have limited information</li> <li>● No</li> <li>● I don't know</li> </ul>
17	<p>What do you think the social and economic priorities should be? [multiple, 1-3 choices]</p> <ul style="list-style-type: none"> <li>● Financial support for essential needs (e.g. food, heating, electricity)</li> <li>● Financial support for families/vulnerable categories</li> <li>● Access to psychological support</li> <li>● Benefits for unemployed people and disadvantaged workers</li> <li>● Support for businesses</li> <li>● Investment in strategic production sectors</li> <li>● Investment in health and research</li> <li>● Improvement of the emergency system, coupled with community training</li> <li>● Prosecution of people who broke emergency rules or exploited the crisis illegally</li> <li>● Support for associations and cooperatives</li> <li>● Other (please specify below)</li> </ul>
18	<p>Can the experience gained during the Covid-19 emergency help to improve any of the following?</p>
18.1	<p>Safety practices, including for other events (e.g. a flood or a blackout) [Likert]</p>

	<ul style="list-style-type: none"> <li>● not at all (1) / to a small extent (2) / to some extent (3) / to a moderate extent (4) / to a large extent (5)</li> </ul>
18.2	<p>International emergency management cooperation [Likert]</p> <ul style="list-style-type: none"> <li>● not at all (1) / to a small extent (2) / to some extent (3) / to a moderate extent (4) / to a large extent (5)</li> </ul>
18.3	<p>Emergency support technologies [Likert]</p> <ul style="list-style-type: none"> <li>● not at all (1) / to a small extent (2) / to some extent (3) / to a moderate extent (4) / to a large extent (5)</li> </ul>
18.4	<p>Emergency support logistics [Likert]</p> <ul style="list-style-type: none"> <li>● not at all (1) / to a small extent (2) / to some extent (3) / to a moderate extent (4) / to a large extent (5)</li> </ul>
19	<p>Are you participating in any of the following initiatives? [multiple, 1-3 choices]</p> <ul style="list-style-type: none"> <li>● Home care</li> <li>● Health assistance</li> <li>● Delivery of food to the needy</li> <li>● Delivery of medical supplies</li> <li>● Blood donation</li> <li>● Monetary donations</li> <li>● Other forms of volunteering</li> <li>● I am not contributing to any of the above</li> </ul>
<b>Section 5 - Demographic information</b>	
20	<p>Gender [single]</p> <ul style="list-style-type: none"> <li>● Male</li> <li>● Female</li> <li>● Other</li> <li>● I prefer not to answer</li> </ul>
21	<p>Education [single]</p> <ul style="list-style-type: none"> <li>● None</li> <li>● Primary school or equivalent level</li> <li>● Secondary school or equivalent level</li> <li>● Bachelor's degree or equivalent level</li> <li>● Master's degree or equivalent level</li> <li>● Doctorate or equivalent level</li> <li>● Other</li> </ul>
22	<p>Age group [single]</p> <ul style="list-style-type: none"> <li>● 18-24</li> <li>● 25-34</li> <li>● 35-44</li> <li>● 45-64</li> <li>● 65+</li> </ul>
23	<p>Do you have dependent family members (e.g. children or elderly people)? [single]</p> <ul style="list-style-type: none"> <li>● Yes</li> <li>● No</li> </ul>
24	<p>Do you have pets? [single]</p> <ul style="list-style-type: none"> <li>● Yes</li> <li>● No</li> </ul>
25	<p>Current employment: [single]</p>

	<ul style="list-style-type: none"> <li>● Household</li> <li>● Unoccupied or unemployed</li> <li>● Employee</li> <li>● Self-employed</li> <li>● Retired</li> <li>● Student</li> <li>● Other (please specify below)</li> </ul> <p>Did you lose your job due to Covid-19 emergency? [single]</p> <ul style="list-style-type: none"> <li>● Yes</li> <li>● No</li> <li>● It cannot be said/I prefer not to answer</li> </ul>
26	<p>Place of current residence: [single]</p> <ul style="list-style-type: none"> <li>● [country-specific options]</li> <li>● Abroad</li> </ul> <p>Abroad, please specify: [single]</p> <ul style="list-style-type: none"> <li>● Residing abroad, but currently in [country name]</li> <li>● Residing abroad</li> </ul>
27	Nationality: [open]
28	<p>Because of the Covid-19 emergency, did the number of people that live with you change, even temporarily (e.g. due to relocation or hospitalization)? [single]</p> <ul style="list-style-type: none"> <li>● Yes, it increased</li> <li>● Yes, it decreased</li> <li>● No</li> <li>● I prefer not to answer</li> </ul>
29	<p>Was anybody in your family hospitalized or declared positive to Covid-19? [single]</p> <ul style="list-style-type: none"> <li>● Yes</li> <li>● No</li> <li>● I prefer not to answer</li> </ul>
30	Date of completion: [single]

## Appendix 2. Supplementary figures

In this appendix we report supplementary figures supporting our analysis.

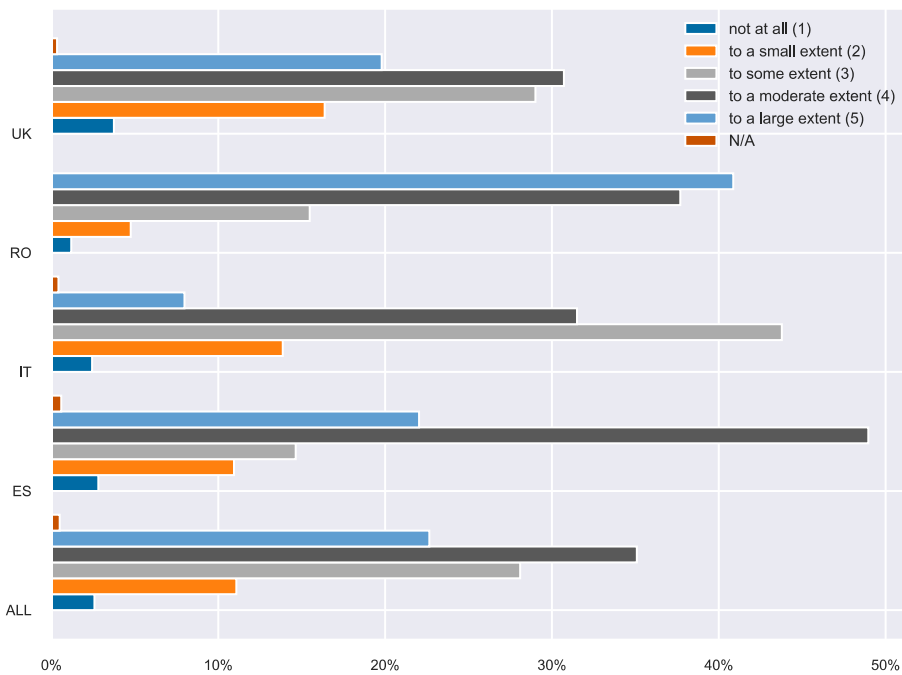


Figure 1. Results for Question 10.2 (“Has the following information on Covid-19 been adequately communicated? Restrictions on free movement and social events”).

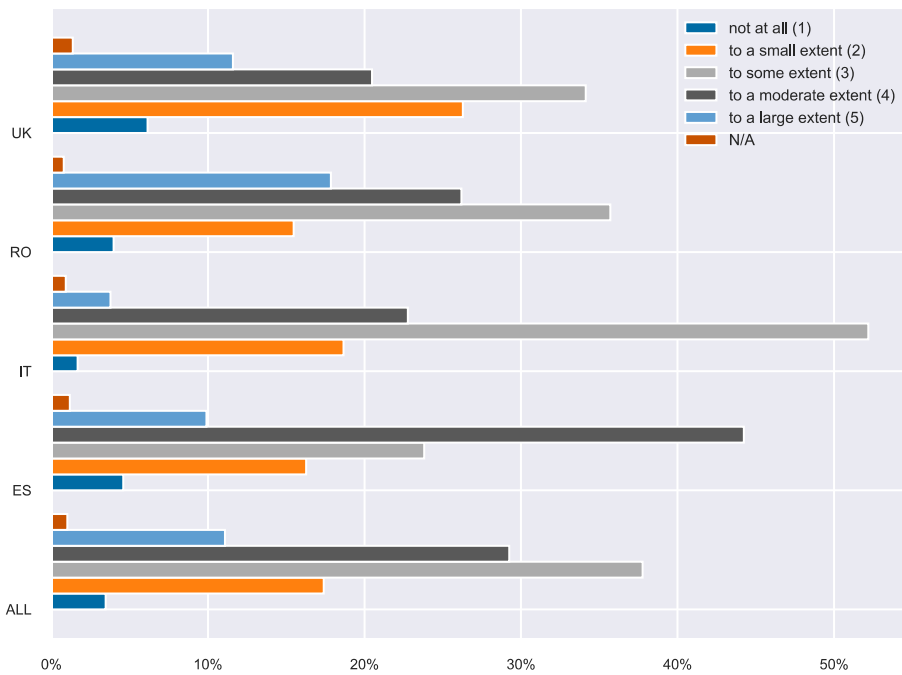


Figure 2. Results for Question 10.4 (“Has the following information on Covid-19 been adequately communicated? Status of essential and basic services”).

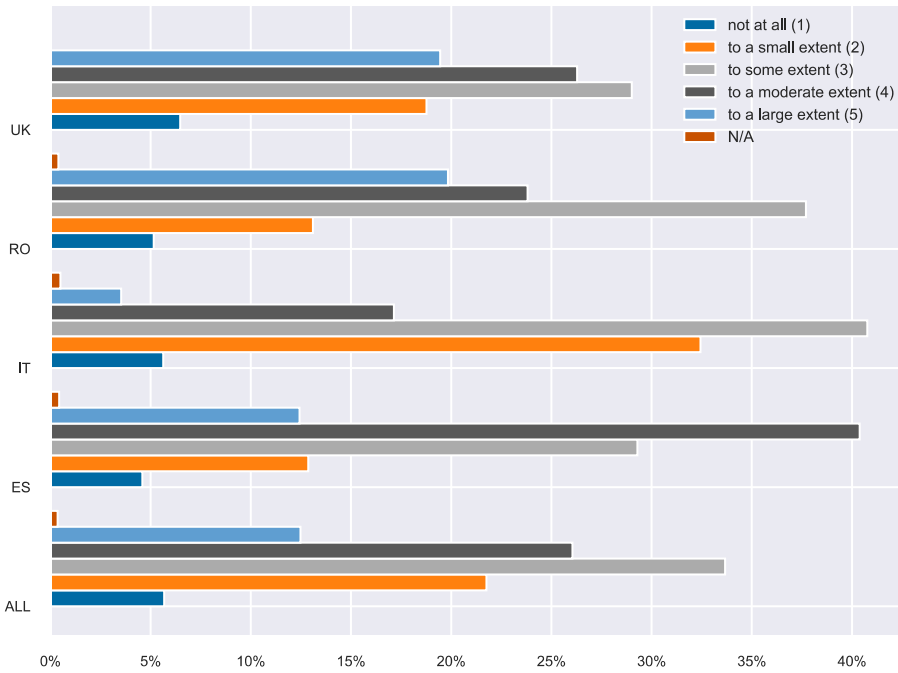


Figure 3. Results for Question 18.1 (“Can the experience gained during the Covid-19 emergency help to improve any of the following? Safety practices, including for other events (e.g. a flood or a blackout)”).

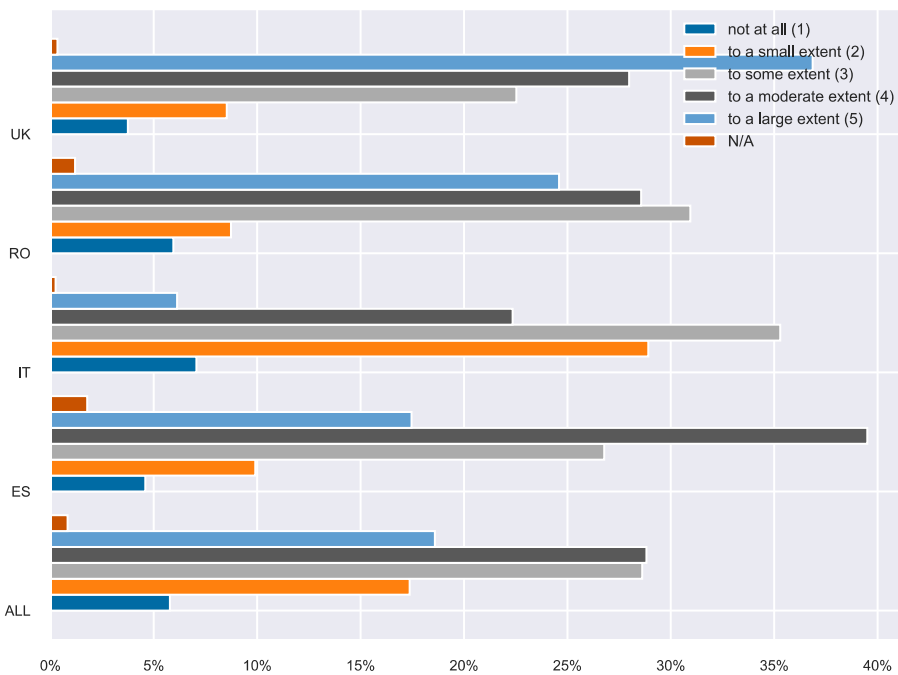


Figure 4. Results for Question 18.2 (“Can the experience gained during the Covid-19 emergency help to improve any of the following? International emergency management cooperation”).

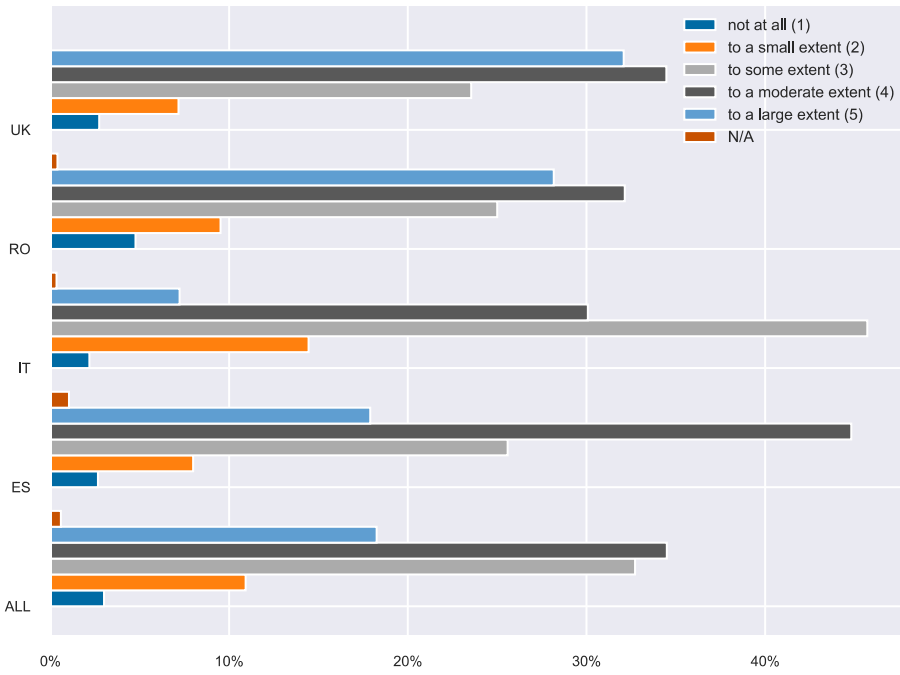


Figure 5. Results for Question 18.3 (“Can the experience gained during the Covid-19 emergency help to improve any of the following? Emergency support technologies”).

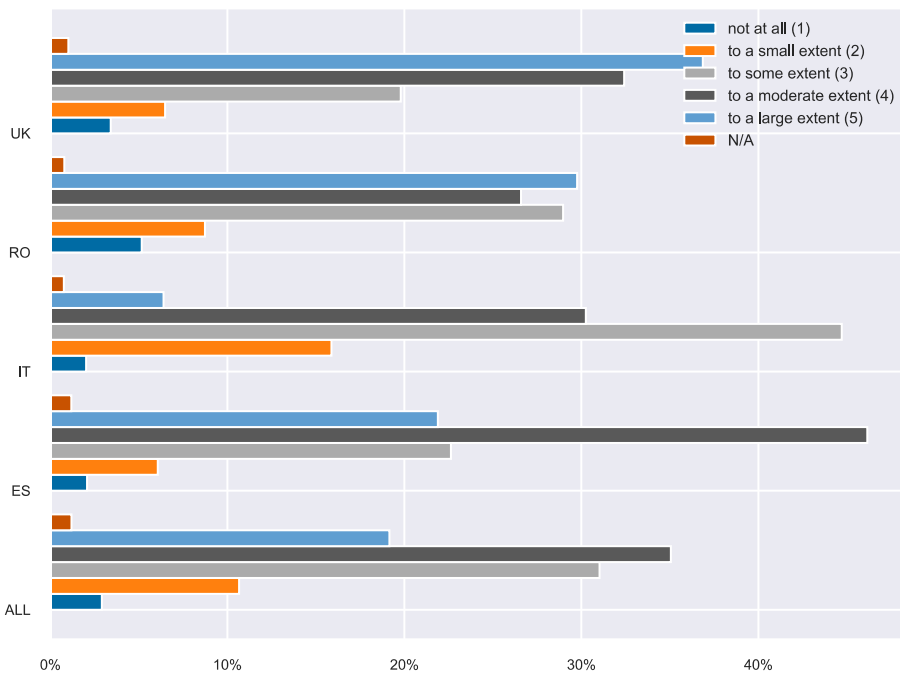


Figure 6. Responses for Question 18.4 (“Can the experience gained during the Covid-19 emergency help to improve any of the following? Emergency support logistics”).