WORKING GROUP 1

REPORT M1-M24

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1. Aim and the first phase of the WG1 work

Working Group 1 (WG1) was set up to map existing data and research on disaster communication and warning systems in Europe. The original AlertHub work plan included collection and comparison of available data, a review of existing research, and work on good practices in warning communication.

During the first two years, WG1 increasingly focused on the mapping. We prepared both a literature review and a comparative mapping, but the mapping became the main activity. The literature review was therefore not carried out as a full WG activity during this period. This is also because WG2 have conducted a literature review, with a similar perspective. Instead, most of the work went into developing a common research protocol and collecting comparable information from different countries on warning communication.

WG1 has also grown considerably since the start of AlertHub. At the time of writing, the group has 105 members from 36 countries. Most members are based in Europe, but WG1 also includes members from countries outside Europe. This geographical spread has been useful because the mapping depends on knowledge of national legislation, warning systems and authorities.

The WG1 leadership took part in the AlertHub kick-off meeting in Brussels on 16–17 September 2024. During the following months, we discussed how the work should be organized. A smaller group then took responsibility for developing the first research protocol.

2. Developing the research protocol

During the first months of 2025, much of the WG1 work concerned the research protocol. We needed a common set of questions that could be used in countries with very different legal systems, political structures and warning systems.

A first version of the protocol was presented and discussed at the AlertHub meeting in Cologne on 25–26 February 2025. Comments from AlertHub members were then used to revise the protocol before the main data collection started later in 2025.

The protocol covered two main areas: **Procedures** and **Practices**. Procedures concern how warning communication is formally organized: who is responsible, which laws and guidelines apply, which warning systems are used, and what the stated purposes of warning communication are. Practices concern how warning communication works in actual situations and specific events.

It soon became clear that collecting both Procedures and Practices for many countries would require too much work. We therefore decided to concentrate the first mapping on Procedures. This made the work manageable and gave us a common basis for comparing countries.

We also prepared the literature review during this period. Search strategies and databases were discussed and Rayyan was tested as a possible tool for screening literature. This work did not develop into a full literature review during the first two years. The main focus remained the country mapping.

3. Researcher-led mapping

The main data collection took place during autumn 2025 and spring 2026. WG1 members were asked to complete the Procedures part of the protocol for countries where they had relevant knowledge. AlertHub members from other WGs also contributed, since not all European countries were represented in WG1.

The current comparative report includes researcher-led mapping from 26 countries. The protocols cover three main questions: how disaster communication is organized, which warning systems and channels are used, and what purposes are given for warning communication.

The work showed the importance of country knowledge. Official information is often spread across different authorities, laws, administrative levels and languages. It is therefore not always easy to understand a national warning system from documents alone.

At the same time, the country protocols differ in length and detail. Some contain many sources and detailed descriptions. Others are much shorter. Contributors have also used somewhat different ways of checking their material.

For this reason, we later asked contributors to describe how they had verified the information they collected. Several have responded, but not all. Verification therefore remains part of the continuing work.

4. Developing an LLM-supported mapping method

WG1 also started to develop an LLM-supported method for the country mapping. The reason was practical. Researcher-led mapping gives us important country knowledge, but it takes time and depends on having researchers who can work on each country. We therefore wanted to test whether LLM-supported searches could help us collect the same type of information across a larger number of countries.

This developed into a structured workflow rather than a single AI search. We used the same research protocol across countries. The workflow included translation of the questions into national languages, development of search terms for each question, repeated searches, and a common format for storing the results. The method was used for 32 countries and 35 languages. The aim was not to replace researchers. We wanted to see what LLM-supported searches could add to the researcher-led mapping.

The comparison showed clear differences between the two approaches. The LLM searches were good at finding legal documents, EU-level links, sub-national documents and recent information available online. The researcher-led protocols were often better at identifying whether systems actually worked as described, local differences, incomplete implementation and uncertainty in the available information.

The weaknesses of the LLM searches also became clear. Countries with good online government information may appear to have more complete warning systems simply because more documents can be found. The searches can also give too much weight to formal rules when actual practice is less clear.

This is one of the most interesting parts of the WG1 work so far. The two methods do not produce exactly the same type of knowledge. Used together, they can give a fuller picture than either method alone.

The workflow was also designed so that it could be used in other cross-country studies. In Sten Torpan's presentation, it is described as a "recipe for cross-country research". The computational social science research in AlertHub on LLM-mediated data retrieval has laid the foundation for numerous studies within and parallel to the AlertHub initiative, such as studies on data accessibility problems, LLM-mediated reperesenation and scientific validity, and horizons for algorithmic search exposure of contemporary researchers.

5. Verification and testing

The LLM mapping raised an obvious question: how should the results be checked? We therefore worked with two forms of verification. First, researchers who had completed the manual country protocols were asked to explain how they had checked their information. Second, AlertHub members in countries where we did not have a researcher-led mapping were asked to review the LLM-generated material for their country.

The response to the second request has so far been limited. At the time of writing, Cyprus is the only country for which we have received a completed verification of the LLM mapping. The response to the verification questions for the researcher-led mapping has been better, but it is still incomplete.

This has been a useful lesson in itself. Verification across many countries requires people who know the national system and who also have time to read and check quite detailed material. We have also found concrete errors and uncertainties in the LLM material. This confirms that LLM searches cannot replace human checking.

During this work, we also tested ways of making the material easier to search. A source-limited NotebookLM environment was created containing both the researcher-led and the LLM-generated material. This allowed us to search within the collected material rather than relying on open web searches.

6. A second question: how easy is information to find?

The mapping also showed another problem. Official information about warning communication is much easier to find in some countries than in others.

In some countries, laws, guidelines and descriptions of warning systems are easily available online. In others, the information is spread across different authorities, levels of government, languages and websites.

This led to a separate WG1 analysis on the **data accessibility knowledge gap in civil protection**.

The issue is highly relevant for comparative research in general. A country may look well organized simply because its documents are easy to find. Another country may look less developed because relevant information is difficult to locate, even if working systems exist.

This question became closely connected to the LLM work. LLM-supported searches depend on what can be found online. We therefore need to distinguish between differences in the warning systems themselves and differences in how well those systems are documented.

7. Presentations and discussions

WG1 work has been presented both within AlertHub and at international conferences.

One early contribution was made at the International Crisis and Risk Communication Conference (ICRCC) in Clemson in 2025. Bengt Johansson organized and moderated the panel *Alerting the Citizens: Warning Communication in an International Comparison*. The panel included researchers working on warning communication in different countries and regions.

At the same conference, Bengt presented *Warnings in Europe – disaster risk awareness and preparedness of the EU population*. The presentation used Eurobarometer data from 27 EU countries to examine differences in risk awareness, preparedness and knowledge about warning systems.

During 2026, the country mapping and the LLM-supported method became a main part of the WG1 presentations.

Sten Torpan presented the work at the AlertHub meeting in Murcia in February 2026 and at ICRCC in Clemson in March 11. The presentation focused on the data accessibility problem, the LLM workflow and the comparison between researcher-led and LLM-generated mapping.

The same work was later presented at BledCom on June 25 and at the ECREA conference in Brno in September 10 2026. The WG1 work was also discussed during the AlertHub meeting in Portugal in June.

By June 2026, WG1 activities included the researcher-led mapping, the LLM mapping, the report on data accessibility, the comparative report on warning systems, and work on Country Profiles together with WG3.

Based on the findings and lessons from WG1 work, AlertHub organised a training school in Switzerland on July 8 to 10. WG1 co-lead Sten Torpan presented and facilitated a 3 hour workshop on the possibilities and pitfalls of using LLM-based tools in international comparative research. The workshop was well received.

The fact that the LLM work has been presented at several conferences has also given us opportunities to discuss the method with researchers outside AlertHub and to receive comments on how it could be developed further.

8. Work with other AlertHub groups

The WG1 mapping is also being used in work with other AlertHub working groups.

One example is the development of **Country Profiles** together with WG3. The idea is to use material from the country mapping to produce shorter and more accessible descriptions of national warning systems.

WG1 has also started work connected to a White Paper together with WG4.

These activities are important because the mapping should not remain only as a research dataset. The material should also be useful for other parts of AlertHub and for researchers and practitioners who want an overview of warning communication in different countries. Specifically, we are working with WG3 on the country profiles, where Helene Liisi Keis and Roberta Raducu have worked on this since June 2026. The profiles build on the data collected on WG1 and designed a new specialized data structure for the country profiles that show visually how the warning systems compare. On October 7-9, 2026 an AlertHub Hybrid workshop on warning system country profiles will be held in Buchaerest. The hybrid session is being held on October 8, from 10:00 to 12:00 CET. WG1 co lead Sten Torpan will participate online.

9. Where we are now

After two years, WG1 has moved from planning to collecting and comparing data across countries.

We have developed a common research protocol. We have researcher-led mapping from more than 20 countries and LLM-supported mapping from 32 countries. We have compared the two methods, started work on verification, produced initial reports and presented the work at several conferences and AlertHub meetings.

The mapping is not finished. Warning systems, legislation and responsibilities change. The country material therefore needs to be updated.

One possibility is to use repeated LLM-supported searches to identify changes in laws, warning systems and official documentation. Such searches could make updating easier, but the results would still need to be checked against official sources and, where possible, by people with knowledge of the country.

The next step may also be to move from **Procedures** to **Practices and Cases**. This would allow us to compare not only how warning communication is supposed to work, but also how it works in actual events.

The main result so far is therefore not only the country mapping itself. WG1 has also developed and tested a way of combining country expertise with structured LLM-supported searches. The two approaches have different strengths and weaknesses. Our experience so far suggests that they are most useful when they are used together.