


TECHNICAL REPORT



**Community engagement
and institutional collaboration
in Iceland during a norovirus
outbreak at Úlfsljótsvatn Outdoor
and Scout Centre
(10–15 August 2017)**

Country visit report

ECDC TECHNICAL REPORT

Community engagement and institutional collaboration in Iceland during a norovirus outbreak at an outdoor/scout centre (10–15 August 2017)

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This report was commissioned by the European Centre for Disease Prevention and Control (ECDC), coordinated by Judit Takács and produced by Umeå University, Sweden

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Abbreviations

CBRN	Chemical, Biological, Radiological, and Nuclear
DoH	Directorate of Health (Iceland)
ECDC	European Centre for Disease Prevention and Control
FGD	Focus group discussion
HSU	Healthcare Institution of Selfoss, Iceland
ICE-SAR	Icelandic Association for Search & Rescue
IHR	International Health Regulations
JRCC	Joint Rescue and Coordination Centre
PHEP	Public health emergency preparedness
NCIP	National Commissioner of the Icelandic Police
NFP	National Focal Point
PPE	Personal Protective Equipment
RCCC	Regional Crisis Coordination Centre
RUV	Icelandic National Public Broadcasting Service (Ríkisútvarpið)

Executive summary

Background

Within the context of EU Decision 1082/2013/EU on serious cross-border threats to health, the European Centre for Disease Prevention and Control (ECDC) has initiated a case study project¹ to investigate the synergies between communities affected by serious public health threats and the institutions (both health- and non-health-related) mandated to prepare for and respond to them. The premise of the project is that affected communities are increasingly recognised as key resources that can be used during public health emergencies, and that the concerns, understanding and experience of the public should be harnessed as an important part of the response.

Aim

The aim of this case study project was to identify enablers and barriers for community and institutional synergies related to preparedness and control of infectious diseases. The case chosen for exploration was gastro-enteric disease. The report focuses on an outbreak of norovirus in Iceland that occurred during the period 10–15 August 2017. The study aims to:

- identify good practices and patterns of cooperation between affected communities and the official institutions mandated to deal with infectious disease outbreaks;
- identify inter-sectoral collaboration between health and non-health-related sectors with regard to infectious disease outbreak control (e.g. norovirus);
- identify models for community engagement action that could be useful for other EU countries.

Methods

A case study research design included the following methodologies:

- Review of official documents and media reports;
- Interviews with a range of experts working at national and community level (n=15);
- Two focus group discussions with community representatives (n=23);
- Stakeholder mapping.

Fieldwork was conducted during a visit to Iceland during the period 1–5 October 2018. The data were subjected to thematic analysis in Nvivo qualitative data analysis and UCINET social network software. The analytical framework of the preparedness cycle (pre-incident, incident and post-incident phases) was used to organise the findings.

Findings

Case description

On Thursday 10 August 2017, at 16:30 hours, Úlfjótstvatn Outdoor and Scouting Centre in southern Iceland contacted the 112 emergency phone number to report 13 sick children (aged 10–17) and request assistance. At 21:30 a regional crisis coordination ambulance arrived with a medical team, and 38 children were identified as sick. The decision was made by the regional response crisis team to evacuate all 181 international (mostly UK and USA) teenagers to Hveragerdi primary school. On Friday (11 August), laboratory analysis confirmed norovirus within 24 hours. On Saturday (12 August) the children were relocated, and the designation 'fit to fly' was given to those who were no longer sick so that they could fly home. The school had to be cleaned due to the fact that children with an infectious disease had been accommodated there. The cleaning started on Sunday (13 August). On Monday (14 August) ten scouts who had returned to the scout camp fell ill with the same symptoms. All recovered.

Pre-incident

There was little experience of infectious disease outbreak events in Iceland. However, there was a high level of public trust and a strong volunteer community, along with a culture that emphasised learning, transparency, owning of decisions and a willingness to 'fix' problems independently. National preparedness plans had been developed. General preparedness planning was used to accommodate shortages of staff. Inter-sectoral participation in preparedness planning was common. A few general disease outbreak exercises had been held.

¹ See: www.ecdc.europa.eu/en/news-events/how-communities-can-collaborate-institutions-during-public-health-emergencies-case and www.ecdc.europa.eu/sites/portal/files/documents/literature-review-preparedness-synergies-feb-2017.pdf

Incident

- Hesitation to activate the civic response system: all respondents agreed after the event that while the actual response did effectively deal with the outbreak, the full civic response system should have been activated, either at regional or national level.
- Coordination with the local authorities and community-based organisations: the mayor first heard about the evacuation of children to the town's primary school through the media the following morning. In accordance with a government contract the Red Cross managed the shelter, but they did so without sufficient experience and training, while the scouting organisations became involved in the communication loop relatively late.
- Using a civil shelter for outbreak containment: overall there seemed to be agreement among all respondents afterwards that using a school for infectious disease patients may not have been the best idea.
- Guidelines for community stakeholders: the lack of experience with a disease outbreak led to a need for guidance about how to clean transportation vehicles or buildings which had housed infected patients. There was no immediate access to or guidance regarding personal protective equipment (PPE). Local clinical staff who joined the response remedied these knowledge gaps.
- Media coverage and general sources of information: overall media coverage was intense, thorough, efficient and short-spanned, mirroring the strategy put in place to manage the event. The Icelandic national broadcaster, RUV, has a special agreement to always cover press releases provided by the Chief Epidemiologist office. During the norovirus outbreak, no negative rumours or reports were found on social media.
- Staffing: the regional epidemiologist was unavailable to provide a field response and there was no agreed replacement of this function when the outbreak commenced. In addition, a bus accident which had occurred at the same time caused local delays in availability of staff. At the national level there is a shortage of staff. Decentralised preparedness planning helps to alleviate this problem.
- Vulnerable populations: the case involved international guests (young people) who were very vulnerable but the impact on them was softened by the extraordinary efforts made by the scouting organisations who hosted them. Clinical staff involved were all sufficiently trained in infectious disease control.

Post-incident

Post-case reviews happened among all stakeholders. Evaluation in the field started with an immediate 'hot wash' of feedback from first responders, obtained following a national 'after action review' that included government and health actors, but no community actors. A regional 'after action briefing' was also organised by the Regional Rescue Centre. The scouting organisations involved and the Red Cross conducted internal evaluations, but appeared to require further debriefing and communication concerning lessons learned with the authorities, particularly in relation to the financial costs that resulted from the school and camp cleaning. A national level ministerial investigation into the consequences of non-activation has not been carried out.

Lessons learned and good practices

As a result of this study, a number of lessons learned and good practices have been identified by respondents to promote collaboration and synergies between communities and institutions working on public health emergency preparedness. With the exception of the last two on the list, the target audience for these lessons learned is the public health authorities. The lessons learned include points that have already been implemented to a greater or lesser extent, but which remain as options for other Member States. Each of the points below was suggested by one or more respondents of the study.

Promoting inter-sectoral collaboration and synergies between the authorities

- Personal relationships strongly facilitate the flexibility required for a resilient response system;
- Ensure that the history and lessons learned from previous disease outbreaks are archived and accessible;
- Understand the difference between natural disasters and disease outbreaks when using an 'all-hazards' approach;
- Clarify and disseminate information about the process for activating the civic response system;
- Encourage relevant ministries to designate a specific contact person in relation to International Health Regulations.

Promoting collaboration and synergies between the authorities and the community

- Engage community stakeholders through participation in preparedness planning in order to encourage ownership, collaboration, volunteering and trust;
- Include long-term recovery as a focus in preparedness planning to integrate longer-term social concerns and community needs;
- Prioritise confidence in health communication by using trusted spokespeople and developing special media relationships;
- Make generic preparedness plans flexible and adaptive to specific situations and involve key community stakeholders in implementation of such plans ;
- Provide clarity regarding retroactive financial compensation for unintended costs incurred by community stakeholders, such as cleaning and disinfection;
- Learn from and empathise with the experiences of community partners to alleviate grievances;
- Distinguish between community shelters for natural disasters and infectious disease outbreaks
- Provide easily accessible guidance on appropriate cleaning, PPE and food preparation;
- Store PPE both centrally and locally through response networks;
- Ensure that health authorities are in charge of registering affected groups or populations;
- Train emergency response operators (e.g. 112 telephone operators) to expect community members not to use appropriate technical terms or to understand the procedures necessary to activate a response;
- Provide simulation exercises (SIMEX), particularly when there is little experience of health-related outbreaks or changes in protocols;
- Ensure easy access and entry to the communication loop for affected community-based partners.

Other lessons learned not directly related to synergies

- Develop clear backup schedules and processes for replacement staff in the event of responsible staff members being absent;
- Promoting an all-hazards approach combined with a focus on improvisation and a collective openness to after-action reviews helps to develop the capacity to adapt to surprise situations;
- Motivating a strong learning culture both within institutions and the community benefits future response capacity.

Introduction

Background and context

Public health emergency preparedness (PHEP) refers to 'the capability of the public health and healthcare systems, communities, and individuals, to prevent, protect against, quickly respond to, and recover from health emergencies, particularly those whose scale, timing, or unpredictability threatens to overwhelm routine capabilities' [1]. Since the 2014–2016 West African Ebola outbreak, the potential role of communities in PHEP has been increasingly recognised, as has the fact that communities can be seen as resources that may be effectively utilised by the authorities during public health emergencies [2]. 'Community' here refers to populations that are directly affected by, or that may be at risk from the disease in question. Thus, the community is seen as distinct from the government authorities who are tasked with addressing disease control.

In order for community-oriented PHEP efforts to be successful, it is necessary to understand how and the extent to which institutions in the health and relevant non-health sectors may collaborate with the community, and to identify good practices that have worked in one setting and that may therefore also be applied in others. This approach reflects the call by the 2015 Sendai Framework for Disaster Risk Reduction for a broader, more people-centred preventive approach through engagement with all relevant stakeholders [3]. Similarly, the need for the different public sectors to work together more closely and to create opportunities for collaboration is also emphasised in EU Decision 1082/2013/EU on serious cross-border threats to health [4].

A critical starting point for any sort of successful community preparedness activity is that it should be based on mutual respect between the various institutional and community-based actors. This requires bringing together a wide range of organisations and people and nurturing collaborative relationships between them. However, realising such an ideal is invariably a complex undertaking in any setting. In order to capture lessons learned, four EU/EEA countries, Spain, the Netherlands, Iceland and Ireland, have been selected for inclusion in case studies to discuss community preparedness using specific health threats as cases. The countries selected these cases in agreement with ECDC and authorities in the countries concerned.

As part of the process of increasing inter-sectoral preparedness for serious cross-border public health threats, the European Centre for Disease Prevention and Control (ECDC) has initiated a case study project to investigate the synergies between communities affected by serious public health threats and the institutions (both health- and non-health-related) mandated to prepare for and respond to them. Findings have been published in separate reports [5-8]

Aims and objectives

The main aim of all case studies is to collect evidence and share good practices related to community preparedness for public health emergencies by examining what has worked in different contexts. The work also aims to support the implementation of EU Decision 1082/2013/EU on serious cross-border health threats.

Specifically, the studies aim to:

- identify what has worked successfully in different contexts, as well as what may *not* have worked, with particular attention paid to practices and patterns of cooperation between affected communities and the official institutions mandated to address and control the health threat;
- identify and analyse inter-sectoral collaboration as well as community-institutional synergies, and to provide examples of collaborative efforts between health and non-health-related sectors;
- to produce guidance for EU/EEA Member States on community engagement for public health emergency preparedness, based on all case studies and a literature review that preceded the work [5].

It is hoped that this case study will directly benefit the participating country, by raising awareness among important stakeholders of the need for inter-sectoral collaboration and the development of community-institutional synergies; by providing a situation analysis of their preparedness status (e.g. for gastro-enteric diseases), indicating areas that may need additional attention and, by identifying good practices, provide the means for strengthening inter-sectoral and community-institutional collaboration. The guidelines that are produced through the work will be shared among other EU Member States, who will therefore also benefit from this process.

Norovirus

Norovirus infection can cause vomiting, diarrhoea, and stomach pain, as well as low fever, chills and headache [9]. Fluid loss can be significant as a result of sudden and frequent vomiting and diarrhoea. Recovery usually takes one or two days. Sometimes symptoms can be milder and last for a week. No chronic infection has been reported [8]. In developed countries, death is rare but remains a risk, particularly for the elderly or persons with a weakened

immune system. Around 25% of individuals infected by norovirus may remain asymptomatic [10]. In symptomatic cases, the incubation period ranges between 12 and 48 hours.

Noroviruses are the leading cause of epidemic gastroenteritis in all age groups, causing more than 90% of non-bacterial and half of all-cause epidemic gastroenteritis worldwide [11]. Noroviruses cause 12% of severe gastroenteritis cases among children under five years of age and 12% of diarrhoea cases among persons of all ages. In industrialised countries noroviruses are estimated to cause 64 000 episodes of diarrhoea requiring hospitalisation and 900 000 clinic visits among children each year. In developing countries noroviruses lead to 200 000 deaths of children under five years annually[9,12].

Noroviruses are also called 'winter-vomiting disease' or 'stomach-flu' because of their rapid spread in human populations during winter months in environments where people are close to each other, such as hospitals or healthcare institutions [9]. Infections are also common in pre-school environments, on cruise ships and in hotels. The viruses can survive freezing as well as high temperatures (up to 60°C) and can live for long periods on different surfaces. Noroviruses are highly contagious. They are transmitted either by consumption of contaminated food or water, or by being spread directly from person to person, such as through contact with aerosolised particles from vomiting, or by direct exposure to contaminated surfaces. During one single outbreak of norovirus gastroenteritis, there are usually several modes of transmission and the origin of the outbreak is often difficult to confirm. For example, initial food- or waterborne transmission is often followed by secondary person-to-person transmission to close contacts. Virus shedding usually starts with the onset of symptoms and may continue for two weeks after recovery. Infection can occur several times in a lifetime and affects individuals of all ages.

Preventive measures include:

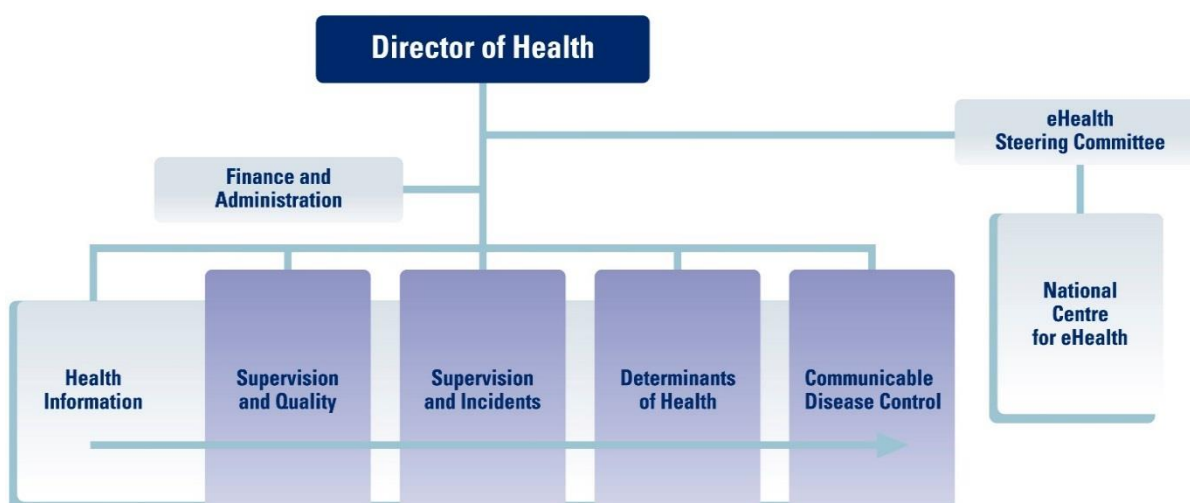
- proper hand hygiene, particularly after using the bathroom/toilet and before food preparation;
- isolation of sick patients;
- careful environmental cleaning and disinfection of public places, including toilets, where vomiting has occurred - disinfectants should have high virucidal effect;
- while cleaning up vomit it is advisable to use light masks to prevent infection through aerosols and gloves should be used when cleaning and disinfecting the environment;
- avoiding food handling if experiencing gastrointestinal symptoms and for at least 48 hours afterwards - for healthcare workers, intensified hand disinfection with virucidal disinfectant is recommended for 14 days after the end of symptoms.

Icelandic health system

Hospitals in Iceland are owned and run by the state, with no payment by patients. The biggest hospital is Landspítali University Hospital in Reykjavik with 1 000 beds. Others are Akureyri, 200 beds, Akranes 75 beds and 17 other small institutions around the country; altogether 600 beds [13]. Primary care is delivered from healthcare centres, also run by the state with minimal co-payments by patients. There are 38 healthcare centres with at least two doctors (H2), 18 healthcare centres with one doctor (H1), and 28 affiliated healthcare centres.

The Directorate of Health consists of six divisions, including one for health security and communicable disease control ('Communicable Disease Control' in Figure 1) which is led by the Chief Epidemiologist.

Figure 1. Organigram of Icelandic Directorate of Health, operative as of 1 March 2018

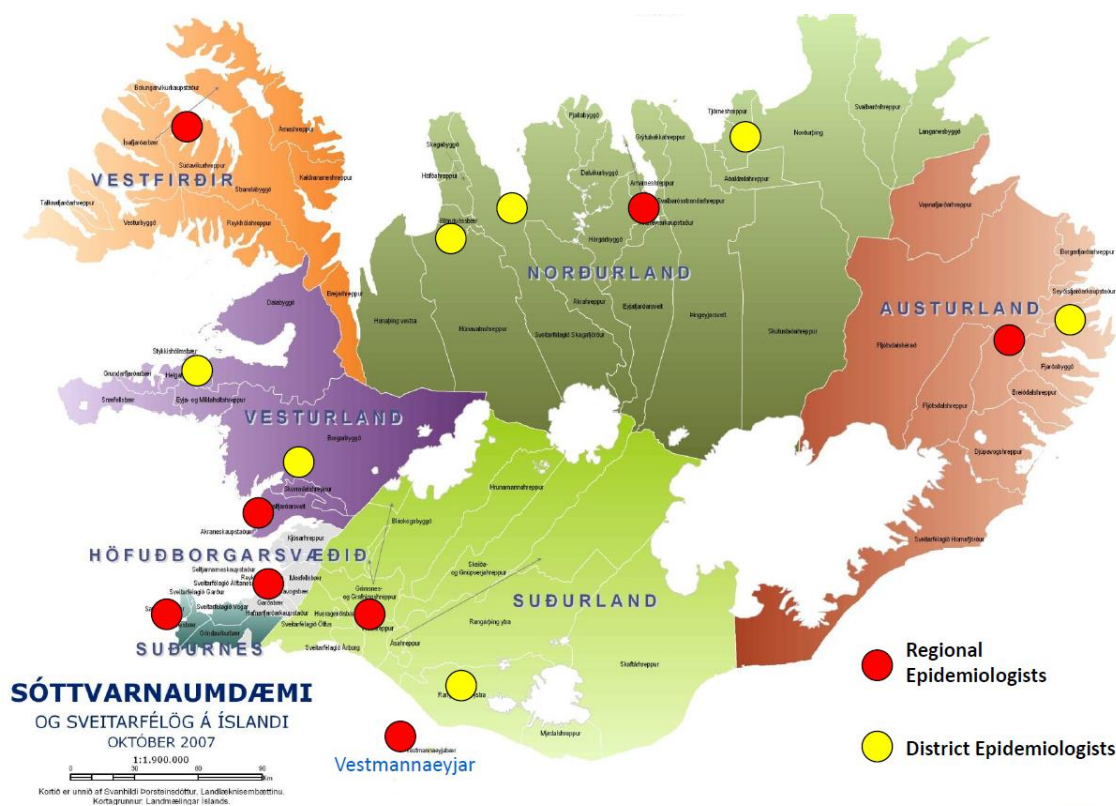


Source: <https://www.landlaeknir.is/english/organisational-chart/>

The Icelandic Act on Health Security and Communicable Diseases [14] sets up the responsibilities of the Chief Epidemiologist which include monitoring and surveillance (including national registries), analysis, risk assessment and public health event response. According to the legal framework the Office of the Chief Epidemiologist manages the stockpile of PPE. As the country faces the challenge of being a small market, investments in equipment have been made. Currently a Directorate of Health group (with representatives of regional health districts) works on estimates of the quantity and distribution of PPE.

The Chief Epidemiologist reports to the Minister of Health, but can act independently without his or her approval if necessary. The Chief Epidemiologist cooperates closely with an intergovernmental committee on health threats that includes representatives from the Civil Protection Agency, Food and Veterinary Agency, Environmental Agency, Icelandic Radiation Safety Authority and the Icelandic Medicines Agency; regional health officers, and external experts. The Chief Epidemiologist is also the international contact point for ECDC, the Health Security Committee (HSC), World Health Organization's International Health Regulations (IHR) and the Early Warning and Response System (EWRS), as well as the Nordic health preparedness group (Svalbard) and the Nordic preparedness group for vaccines, anti-toxins and immunoglobins. There are five full-time staff members and two part-time members working for the Chief Epidemiologist and assistance is also received from the health information department at the Directorate of Health. The country is divided into seven health regions with 15 regional/district epidemiologists (there are nine civil protection regions) (Figure 2).

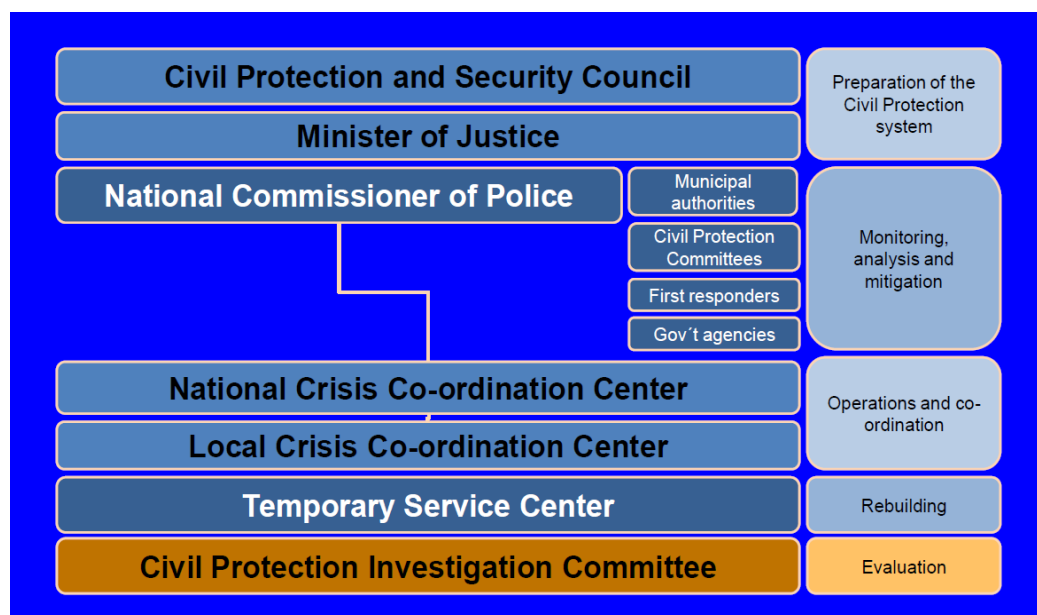
Figure 2. Seven health regions with 15 regional/district epidemiologists



Source: [13]

The country applies a one-health/one-hazard approach to crisis preparedness and management, using the principle 'one area – one force'. According to the Health Security Act 82/2008, health crisis preparedness planning and management is conducted in close coordination with the civil protection system that falls under the Ministry of Justice. The civil protection system is managed by the National Commissioner of the Icelandic Police (NCIP) (see Figure 3) and includes several community linkages, such as municipal authorities and the civil protection committees, including mayors, as well as first responders, many of whom are volunteers (e.g. Red Cross, Icelandic Association for Search & Rescue (ICE-SAR)).

Figure 3. Civil protection in Iceland



Source: [15]

This system coordinates hazard and risk assessments, mitigation (including education, contingency planning, building resilience), training, operational command and coordination (including risk communication) and international relations. The National Commissioner of the Icelandic Police (NCIP) takes decisions regarding civil protection alert levels at any given time, where possible in consultation with the relevant regional police commissioner, and informs the Minister of Justice of these decisions. A state of emergency may be declared if an emergency is likely to occur (for example due to a volcanic eruption), is imminent, or has occurred, or if similar circumstances apply. The NCIP operates a National Crisis Coordination Centre in Reykjavik.

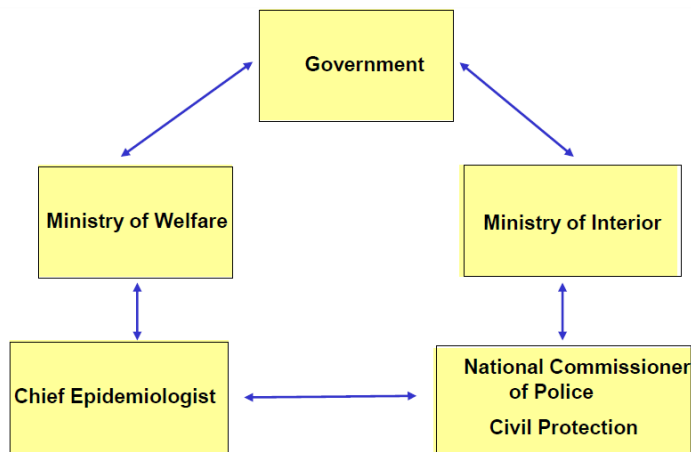
According to the information provided, activation of the civil protection system occurs for several reasons [15]. In the event of a natural disaster or war/conflict in the jurisdiction, when the Civil Protection Department requests assistance between jurisdictions, upon request from the Government of Iceland, and 'for 'other incidents', such as mass casualty incidents, major fires, explosions and infrastructure failures'. Interestingly, infectious disease outbreaks are not specified as one of the reasons, although diseases are not excluded. The history of activations in Iceland, shown in Table 1, probably explains this, as experience has mainly been with natural disasters.

Table 1. Civil protection system activations 2010–2017

Year	Operation	Length of operation
2017	Unrest in Öraefajökull volcano	45 days
2016	Bus accident at Mosfellsheiði	5 hours
2015	Eruption in Holuhraun	59 days
2014	Eruption in Holuhraun	137 days
2013	Earthquakes off north coast	21 days
2012	Winter storm in December	3 days
2011	Eruption in Grímsvötn	9 days
2010	Eruption in Eyjafjallajökull	49 days

Source: [15]

Infectious disease outbreaks automatically fall under the joint responsibility of the Ministry of Welfare and Ministry of Justice (formerly Ministry of Interior), as illustrated in Figure 4.

Figure 4. Joint responsibility in the event of infectious disease outbreaks

In each local government area there is a civil protection committee appointed by the local authority, with the local authority determining the number of committee members. The civil protection committee consists of the district commissioner for civil protection in the district where the local government area lies, representatives of the local authority and the authorities who provide emergency services [16]. These include police, ambulance services, and fire and rescue services. The civil protection committee also includes the Red Cross which, although a community-based organisation, has a contract with the Icelandic government to service around 100 shelters around the country in the event of evacuation (by providing lodging, food and psychosocial support). As a result, the Red Cross has staff operating in national and regional crisis coordination centres. In Iceland the Red Cross has around 20 000 members, 3 000 volunteers and 120 staff. Since 1974, after the eruption of a volcano in 1973, the Red Cross has focused mostly on humanitarian assistance, psychosocial support, and first aid. The Red Cross participates in the crisis coordination centres and liaises with the relevant consulates to provide updates on foreigners affected by disasters. In larger scale incidents they are also involved in the early recovery phase. They have a disaster operation centre with 20 trailers around the country that contain beds, blankets and other first aid equipment.

At community level, mayors participate in the regional civil protection committees linked to the Regional Crisis Coordination Centre, which in the case of the Selfoss region includes eight mayors, the police, healthcare representatives, the Red Cross, ICE-SAR and the Fire Chief as director. The group is chaired by the mayor of the largest town. There are 29 such committees in the country. However, in Iceland not all mayors are chosen in the same way. Some mayors are elected politicians, while others are hired by the community, which means that town councils are more politically influential. In this report, we consider any mayor to be part of the community (see definitions below).

Definitions

This case study project uses a few key terms that require definition.

- 'Community' refers here to populations that have been directly affected by or may have been at risk from the disease in question. The 'community' is seen as distinct from the government authorities who are tasked with addressing the disease, but includes the mayor and local health and non-health authorities.
- 'Community engagement' describes the 'direct or indirect process of involving communities in decision making and/or in the planning, design, governance and delivery of services, using methods of consultation, collaboration and/or community control' [18].
- 'Synergy' refers in this report to the added value that derives from the process and outcome of two or more stakeholders or sets of stakeholders working together towards a common goal. The stakeholders could be either from the community, or institutional. Any synergy that arises through their collaboration can be seen as something that is greater than the sum of its parts. In other words, the benefits gained through working together are more than either could have achieved alone, and these benefits are most probably also mutual.
- 'Public health emergency preparedness' is defined as the 'capability of the public health and healthcare systems, communities and individuals to prevent, protect against, quickly respond to, and recover from health emergencies, particularly those whose scale, timing, or unpredictability threatens to overwhelm routine capabilities. Preparedness involves a coordinated and continuous process of planning and implementation that relies on measuring performance and taking corrective action [1].

Study methodology

Study design and participants

This project applies a qualitative case study approach, based on four data sources: (a) documents; (b) interviews with a range of experts; (c) focus group discussions (FGDs) with representatives from the communities affected by the outbreaks and (d) stakeholder mapping. Details of each of these data sources are given below. The research team collected all data in Iceland during the period 1–5 October 2018.

Study participants were recruited for (b), (c), and (d) by the Icelandic national focal point (NFP) and his team, who produced the agenda for the one-week country visits (see Annex 1).

A provisional number of possible interviewees/focus-group-discussion participant categories were developed, both at national and county/regional/municipality level, and discussed with the Icelandic NFP and ECDC. The following categories were proposed:

- Professionals at national level
 - Ministry of Health/Directorate of Public/Regional Epidemiologist
 - Hospitals
 - Civil protection
 - Surveillance system
 - Environmental health
 - Occupational health
 - Education sector
 - Agriculture sector
 - Food supply/control
 - Water supplies
 - Media.
- Professionals at county/regional/municipality level
 - Municipal/provincial authorities
 - Local public health authorities
 - Civil protection
 - Primary healthcare
 - Education sector
 - Food supply/control
 - Water supplies
 - Agriculture
 - Environmental health
 - Occupational health.
- Affected communities
 - Teachers in kindergarten/schools
 - Parents
 - Scout troop leaders
 - Tourist operators.

Table 2 sets out the study participants. A detailed list can be found in Annex 1. Four focus group discussions were held (n=23), with an average of eight participants: national level Reykjavík, regional coordination centre Selfoss, community Hveragerdi, and the Icelandic Boy and Girl Scout Association plus the Ulfjotsvatn Outdoor and Scouting Centre. Eleven interviews were held (n= 15), with one to two people. In total, we consulted 32 individuals. Six respondents participated in both the focus group discussions and interviews.

Table 2. Number of focus group and interview participants

	Focus groups (number of participants)	Interviews (number of participants)	Total number of participants
National level	1 (8)	4 (6)	14
Regional level	1 (7)	3 (3)	10
Community level	2 (8)	5 (6)	14
Total number of participants	23	15	32

Six respondents participated in both in FGD and interviews

Data collection

Research team

The core research team consisted of a senior medical anthropologist affiliated to Umeå University who led the interviews and an anthropology PhD candidate who took notes and supported analysis. A representative of the Directorate of Health's Division of Health Security and Communicable Disease Control joined all interviews during the week and hosted the researchers. Two ECDC public health preparedness experts (a senior expert in monitoring and evaluation and an expert in outbreak response, food- and waterborne diseases) joined the core team for the first two days (1–2 October, 2018). The availability and openness of the Icelandic leadership team at the Division of Health Security and Communicable Disease Control was a great help in the preparation of this report.

Documents

A documentary review and analysis was conducted. The documents were derived from government, EU and other official documentation on the respective outbreaks, provided by the Icelandic NFP and where available supplemented by material in the peer-reviewed literature. Using the lens of the preparedness cycle (pre-incident, incident, and post-incident phases – see Section 6) the documentary review sought to identify:

- policies concerning the prevention of acute gastroenteritis, including community engagement;
- reports concerning challenges faced in preventing, diagnosing (clinically and in the laboratory) and treating acute gastroenteritis;
- lessons learned from any simulation or training exercises on infectious diseases and acute gastroenteritis in particular that may have been held in the last five years (both national and international), as well as from actual cases and events;
- documents (preparedness plans, 'after action review' of the event) on any recommendations relating to clinical and laboratory skills, interventions, or other capacities.

Documents in Icelandic language were either translated by the Icelandic host team, or processed using translation software in order to understand the main issues.

Interviews and focus groups

After discussion and agreement between the study team and the Icelandic counterparts on the general categories of respondents, a preliminary list of participants for interviews and focus groups was drawn up by the counterparts and participants were recruited. After a formal invitation letter explaining the study and informed consent procedures, participants were involved in the study. During the course of the study, a few additional stakeholders were added at the request of the study team. Interviews were conducted at the Joint Rescue and Coordination Centre (JRCC) in Reykjavík, the Regional Crisis Coordination Centre (RCCC) in Selfoss, at various locations in Hveragerdi, and at the Úlfjótswatn Outdoor and Scouting Centre.

An initial set of questions for the interviews and focus group discussions was derived from a literature review previously conducted for ECDC [5]. The questions were structured in a format similar to a theoretical preparedness cycle, based on pre-incident, incident, and post-incident phases [17], and then adapted according to comments received from Icelandic counterparts. In this framework, the pre-incident phase involves preparation, preparedness planning; the incident phase involves management, monitoring, investigation, and intervention and the post-incident phase involves recovery and identification of lessons learned. The final version of the questionnaire is presented in Annex 2. In order to facilitate the interview and focus group discussion process, some of the questions were translated into Icelandic and sent to the participants in advance. Questions were designed to be broadly relevant to all categories of interviewees, but the focus of the questioning varied, depending on the position and particular expertise and experience of the individual interviewee or focus group discussion participant.

Stakeholder mapping

A number of interviewees and focus group participants were asked to take part in stakeholder mapping. Participants were selected to maximise diversity of perspectives but minimise intrusion in time and effort. Respondents were asked if they could map on a blank piece of paper the different stakeholder/interest groups or groups that have previously been involved in response to the norovirus outbreak. We used the information to collect data about which stakeholders were considered to belong to the community-based or governmental categories, and which stakeholders were thought to be missing during the response. This exercise was both a means of engaging with stakeholders and facilitating communication, and a way to obtain an overview of the 'whole community' social network [5].

Ethical considerations

We obtained written informed consent from all respondents during site visits. The consent form is included in Annex 3. The objective of the case study was explained to the interviewees, and they were assured of their right to withdraw from the interview/focus group discussion at any time. Unless respondents explicitly confirmed in writing that they were willing to go on record, they remained anonymous within any reports and/or subsequent publications resulting from the study. All interview and field note materials were stored securely, and only the study

team (including ECDC staff who were involved) had access to it. Anonymity was ensured for all interviewees. We complied with Regulation (EC) No 45/2001 on the storage of personal data and ensuring citizens' privacy. ECDC is the data controller of this processing operation, and the data were collected and stored on its behalf, in its role as processor of the data. All interview and documentary material was provided to ECDC at the end of the study.

Data analysis

During qualitative analysis, notes from the interviews and focus group discussions were subjected to thematic analysis, using Nvivo qualitative data software². A set of pre-defined codes was used as a starting point, based on the questions from the interviews, with additional codes included as they emerged. Stakeholder maps were collected and their data compiled into UCINET software³.

The analysis sought to identify lessons learned, good practices, and outstanding gaps and challenges. The analysis placed the data into the context of the theoretical preparedness cycle, based on pre-incident, incident, and post-incident phases [17]. Within this framework, the pre-incident phase involves preparation and preparedness planning; the incident phase involves management, monitoring, investigation, and intervention; and the post-incident phase involves recovery and identifying lessons learned. As far as possible, given the limited sample size for our interviews and focus group discussions, we also distinguish between the national and county/regional/municipality levels in the analysis.

To a limited extent the use of data from documents, interviews, focus group discussions and stakeholder mapping permitted triangulation, which facilitated validation of data through cross-verification from two or more sources. Triangulation in relation to specific points was facilitated since we asked more than one respondent about each of the major issues of concern, thereby obtaining different perspectives on them. Thus, our analysis identified points where there was a convergence of evidence.

Finally, the draft report was reviewed by Icelandic country teams for their comments and input. Such a validation exercise is an essential part of the case study analytical process.

Findings

Case incident

On Tuesday 8 August 2017 a foreign scout visiting an international scouting event - mostly attended by UK and USA scouts aged 10–17 years - at the Úlfjótuvatn Outdoor and Scout Centre in southern Iceland vomited while out hiking. Group leaders took care of the scout, but the next day two more scouts showed signs of acute gastroenteritis. On Thursday 10 August at approximately 16:30, a staff member reported that about 13 scouts had fallen sick and the management confirmed their suspicion of an outbreak [20]. Norovirus etiology was discussed because one week prior to this during a different event at the same camp—the World Scout Moot, a larger international scouting event with over 5 000 participants—a few individuals had shown similar symptoms and norovirus infection had been suspected. However, formal confirmation had not been sought by the scouting medical team at that time. Based on this suspicion and in consultation with one of the nurses from the Moot, camp management separated scouts with symptoms from those without and the Icelandic Boy and Girl Scout Association was approached to request medical assistance. After receiving information from the Moot's health and safety director, the nurse requested external assistance by calling 112 emergency services, the local hospital and ambulance service in Selfoss, and the national Red Cross. Management also closed the kitchen. Since there was no further communication as a result of the 112 call, 112 was contacted again. Meanwhile, case numbers increased to 25. One younger child was taken to the local hospital by car and quarantined there.

At 21:30 a regional crisis coordination ambulance arrived with a medical team, and 38 children were identified as sick. The scouts were told a major bus accident appeared to have occurred at the same time in the region and all ambulances in the vicinity had been summoned to assist. The health authorities made the decision to evacuate the camp in consultation with the Department of Civil Protection of the National Commissioner of Police and the acting Chief Epidemiologist. A predetermined 'civic disaster shelter' was then sought to provide comfort and a friendly environment for the children – these shelters are often schools. After trying schools in two other nearby communities, a school principal from Hveragerdi agreed to provide access to the school to serve as a shelter at 22:00. Red Cross and ICE-SAR were summoned to assist and set up a quarantine shelter at Hveragerdi primary school, divided in half for sick/non-sick children. Nurses and a physician from a nearby local hospital came to the shelter. At midnight the first bus (provided by the fire brigade) transported the sick children. The media turned up at Úlfjótuvatn and in Hveragerdi, trying to film the event. By 02:00 on Friday 11 August, 60 children had fallen ill. A commercial transportation company was hired to take the non-sick children to the school, the last ones were taken at 04.15 (see Figure 5).

² <https://www.qsrinternational.com/nvivo/home>

³ <http://www.analytictech.com/archive/ucinet.htm>

Figure 5. Úlfjótsvatn Outdoor and Scouting Centre during the 2016 National Scout Jamboree

Source: [19]

In the morning, a press release was issued from the Healthcare Institution of South Iceland and samples were sent to the laboratory for testing. Clinical diagnosis suggested norovirus infection. A consultation meeting was held at 10:00 including representatives of the Department of Civil Protection of the National Commissioner of Police, the Division of Health Security and Communicable Disease Control and the local hospital in Selfoss. At 12:00 a press release was issued by the District Commissioner of Police and the regional epidemiologist but pressure was increasing from journalists who had arrived on the scene and photographed children through school windows. At 15:00 the diagnosis of norovirus infection was laboratory confirmed and at 16:00 a status meeting was held by the response group. Those children who had been asymptomatic from the beginning of the incident were discharged from the shelter. The Chief Epidemiologist sent 150 protective overalls from the Division of Health Security and Communicable Disease Control's emergency equipment stock to the ambulance services in the district. An analysis was made of the water supply at the Outdoor and Scout Centre at Úlfjótsvatn, but no signs of the virus or other pathogens were found. The environment and health inspector concluded that the most likely explanation for the outbreak was that an infected person had brought the disease to the centre two days prior to the outbreak [22].

Figure 6. Evacuation from the scout camp to the primary school in Hveragerdi (11 August 2017)

Source: [21]

On Saturday 12 August, another consultation meeting was held with responders. In total, 181 individuals had been moved to the primary school, 71 of whom had developed symptoms. Of these, 66 were still in the school, four of them still with symptoms. Part of the group had already been discharged and several of them had left Iceland. The regional epidemiologist and town mayor asked that children without symptoms should relocate to a nearby agricultural university, but only part of the group left. Some of those who had fallen ill but were recovering were granted permission to fly home by the regional epidemiologist ('fit to fly' designation). An external company began cleaning and disinfecting the school on Sunday and continued into Monday, delaying the opening of the school after the summer holidays by one day. The shelter was closed down on Sunday evening 13 August when no-one was ill anymore.

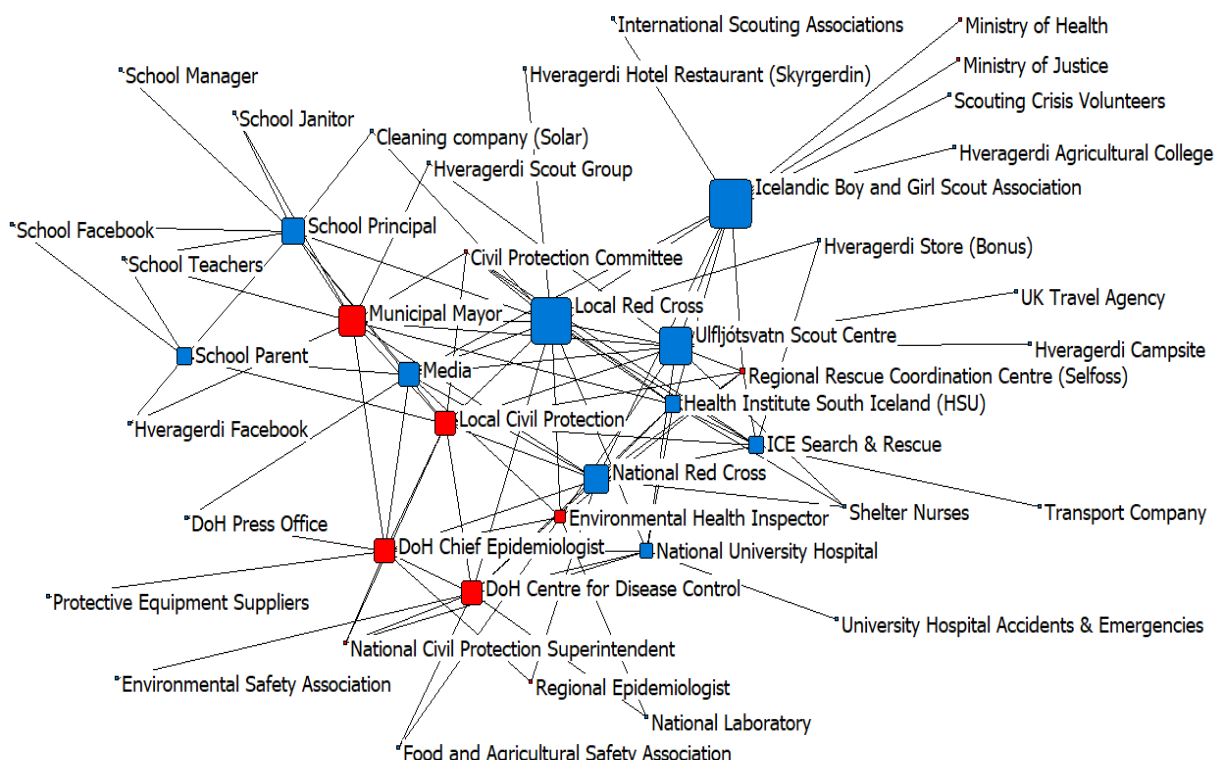
On Monday 14 August ten scouts who returned to the scout camp fell ill with similar symptoms. The emotional burden of this was significant for the scout management at Úlfjótstvatn and consequently a decision was taken to close the Centre for three weeks and clean for a second time. All the children who fell sick recovered. No further contamination and spread of infection in the community was reported.

Stakeholder map

In the Directorate of Health post-event analysis report [23], the group of listed responders included the police, ambulance services, healthcare personnel from the Healthcare Institution of South Iceland and the associated Selfoss Hospital, the local authorities' Sanitation Inspectorate, the Chief Epidemiologist for Iceland and staff, the civil protection authorities, the Icelandic Food and Veterinary Authority, the staff of the Úlfjótstvatn Outdoor and Scout Centre, the Icelandic Red Cross, ICE-SAR squads and staff from the Hveragerdi local authority.

All of these actors also appear on the stakeholder maps collected which are shown in the form of a social network in Figure 7. Each study participant was asked to provide a list of other actors they had interacted with during the event. This led to the identification and mapping of a few additional, mostly community-level stakeholders, such as a local hotel, grocery store, a private cleaning company, transport company, parents and Facebook communities, local campsite and a number of connections made through the national Icelandic Boy and Girl Scout Association. The Environmental Health Inspector also features in the network as an additional authority, although not part of the post-event analysis report.

Figure 7. Social network of stakeholders mapped in the norovirus outbreak



Size of the nodes indicates brokerage. Colour indicates either a government authority (red) or community-based actor (blue).

The size of the nodes in Figure 7 indicates the extent to which an actor is a broker⁴ or the amount of influence they have on others based on their unique connectedness [24]. Removal of brokers from a network will disrupt communication between other nodes. From this perspective, it can be seen how the local Red Cross, Úlfjótavatn Outdoor and Scout Centre and the Icelandic Boy and Girl Scout Association played the most important role in linking those actors involved to one another. The Icelandic Boy and Girl Scout Association had many interactions with groups outside of the response, including ministries. This was a result of inquiries on how to obtain compensation for their costs. As regards the authorities, the municipal mayor appears to have been the largest broker. The smaller size of the nodes for the other authorities indicates how their communications were mostly within the same networks, and linked fewer other actors. This suggests that community-based actors provided important linkages to other actors who would otherwise probably not have been included in the flow of information.

Another significant factor is the relative disconnectedness of the regional epidemiologist. Although this can be explained by the absence of the regional epidemiologist as a respondent in the study, the social network also reflects the extent to which *other* stakeholders mentioned an actor as relevant in their response communications. Overall, the mapping shows the large extent to which the response was actually community-led. While the national Red Cross can be seen as an institution with a government mandate to run the shelter, the local Red Cross chapter that supported the response is mostly dependent on local volunteers.

Pre-incident

Situational awareness

Before the norovirus event, evacuation experience in Iceland had been uniquely connected with mass casualties due to natural disasters and traffic incidents. Due to the small size of the population (350 000) and its geographical isolation, the participation of citizens in disaster response is necessary and popular, resulting in a high level of community volunteering. Since the 2010 eruption of the Eyjafjallajökull volcano, which stopped international air traffic, Icelandic eruptions have also become an issue of international concern. The expected eruption of the larger Katla volcano and associated flooding in southern Iceland, together with the rise of mass tourism, has made disaster preparedness a continuous issue of concern [16].

Despite this concern, community engagement in preparedness has not been systematic. For example, farmers, who were greatly affected by the ash fall from the Eyjafjallajökull volcano, were found to not have been included in the pre-eruption coordination by civil protection authorities [25]. In addition, there had been little experience of large infectious disease outbreaks in Iceland prior to the event discussed in this report. A 2004 norovirus outbreak affecting over 20 people in Húsafell (Borgarfjörður) was mentioned by only one respondent⁵. Another respondent remembered a large norovirus outbreak in a Christian camp 'during the 1970s' with 'around 1 500 cases', but no documentary confirmation was found of this event. Nevertheless, isolated cases of norovirus infection have occurred in health settings, including one death in a nursing home in Hveragerði in 2010. Factors that people related to norovirus included food poisoning and cruise ships.

Preparedness planning

Several preparedness plans have been developed, including influenza pandemic preparedness plan (2008/amended in 2016)—which also function as generic plan—a plan for ships and harbours (2017) and aircrafts and airports (2018). Plans have to be updated every 5 years. Updates could be made also after simulation exercises. A list of plans is shown in Table 3.

⁴ Measured using UCINET's 'betweenness centrality' statistics.

⁵ News reports from this event noted that the virus had become 'tougher' and that infections were a growing problem, particularly in hospitals, nursing homes and for weaker people. See: <https://www.landlaeknir.is/um-embattid/frettir/frett/item16773/Norwalk-veira-i-Husafelli>, and <https://www.mbl.is/greinasafn/grein/804141/>

Table 3. Preparedness plans, guidelines and specific response plans

Category	Year	Type
Official preparedness plans	2008	Pandemic influenza
	2016	Pandemic influenza
	2017	Ships and harbours
	2018	Aircrafts and airports
	2019	CBRN - chemical, biological radiological and nuclear (in preparation)
Guidelines	2002	Smallpox
	2012	Severe acute respiratory syndrome
	2014	Ebola
	2015	Middle East Respiratory Syndrome-coronavirus
	2016	Food poisoning
	Various	Infection control ⁶
Specific response plans		Volcanic eruptions (Katla, Eyjafjallajökull/Hekla)
		Road tunnel accident (Hvalfjarðargöng)
		Dam collapse (Kárahnúkastífla/Desjarárstífla)
		Avalanches (Evacuation plans for 16 towns)
		Airport emergency plans (6)
		Pandemic regional plan (15)
		Healthcare mass casualty response plans
		Psychological first and extended aid
		Maritime (4)

Source: [13,15]

Stakeholders from relevant sectors (e.g. financial, transport, electricity) have been involved in preparedness planning and also been responsible for developing their own plans, taking into account the general (pandemic) plan. Crisis response plans for the impact of natural disasters on schools have been under development by Civil Protection, including representatives of national schools. Currently, the authorities are working on a plan for chemical, biological, radiological, and nuclear (CBRN) threats of exposure and taking measures in relation to stockpiling. Many key stakeholders have been involved in preparedness planning, including the tourist industry. Mayors have also taken part in civil protection committees to discuss community resilience. Moreover, many evacuation plans have been discussed with communities at specific meetings dealing with the recovery phase.

Study participants saw the planning process as more important than the plans themselves. One national respondent noted: 'The most important part is not to have a plan but to work on a plan. Plans with many pages nobody reads; instead it's about people working together, to get people to think about how to communicate and what to do if things happen.' Due to the small size of the relevant professional population, it has not been possible to have specific plans for everything. Instead, the strategy appears to have been to devolve planning responsibility. Another respondent noted: 'It would not be manageable to have specific plans for everything, there are not enough people, and it would be a mistake, it's better to have a plan that you can tweak and manage depending on the crisis. Make them responsible for their own thing.'

In the past few years, efforts have been made to strengthen community participation in long-term recovery planning at the municipal level ('Long term contingencies plans for events of high impact on society). The planning process has included awareness weeks and an all-hazards approach. The motivation for this approach was a study by the University of Iceland on a series of earthquakes and avalanches in 1995 and 2000 showing that good preparedness and recovery assistance helped reduce suffering and impact at community level [25]. This led to some decentralisation of preparedness planning to municipalities and the inclusion of representatives from relevant public sectors in community-based preparedness planning. Non-official guidelines that emerged as a result of the

⁶ For the public: <https://www.landlaeknir.is/smit-og-sottvarnir/sykingavarnir-fyrir-almennig/>. For healthcare staff: <https://www.landlaeknir.is/smit-og-sottvarnir/sykingavarnir-innan-heilbrigdisthjonustu/>.

University of Iceland study provide a template for local governments and their employees to develop their own relief and recovery guidelines in response to disasters in their communities [26].

In order to develop the long-term contingency plans, local residents are contacted through special 'awareness meetings' which have so far been held in 14 communities. These meetings combine risk and impact analyses and contingency planning with education and awareness-raising for employees working in the communities and also include public meetings with representatives from Civil Protection and scientists [27]. Respondents believe that the process has been experienced locally as a success. Officials often conduct a stakeholder mapping process to identify those responsible for schools, sewage, communication, etc. in collaboration with a local mayor. Plans are also published on websites for input from the general population. This community engagement is seen as important. One regional respondent noted: 'If we just write up a plan and send it to the people they will just throw it away, if they are not involved in the process they will not follow the plan. These details make people think this is their plan and feel engaged'.

Despite community level preparedness planning, respondents generally perceived preparedness to be less central than response. One national-level respondent pointed out: 'Contingency planning - evacuations, safety and security of population and property - is mostly focused on what to do in an emergency and who should do that, but less on what do to in the aftermath. I think that is the weakness.'

In the English abstract of the 2016 pandemic influenza preparedness report [28], references are made to community engagement and inter-sectoral collaboration. Under risk communication strategy it is noted that the management of critical infrastructure within the local area (as well as feedback to the district epidemiologist and the police commissioner) is the responsibility of the mayor (p.5), and a list of important critical infrastructure sites ('community capacity') within the districts (p.6) is provided. On pages 8 and 9 there is a list of responders who have a role in the Icelandic Pandemic Influenza Preparedness Plan. This list includes a large number of community-based institutions/organisations/companies that have a registered role in the preparedness plan. These include grocery distributors, oil companies and gas stations, the Farmers' Association of Iceland, the Icelandic Tourism Board, the Central Bank of Iceland and other financial services, the Icelandic National Broadcasting Services (RUV), the Federation of Energy and Utility Companies in Iceland, the Confederation of Icelandic Employers, the Icelandic Red Cross, the Icelandic Association for Search and Rescue, the Bishop of the National Church of Iceland and funeral homes. However, there is no further guidance in the abstract on how to best engage with these entities.

Training and simulations

A few general disease outbreak exercises have been held in Iceland. In 2017, 15 table top exercises were performed with ports and airport authorities to test the plans. Another exercise mainly involved networking between regional epidemiologists. There had been no public outbreak simulation carried out by the Red Cross (with 120 paid staff and 3 200 volunteers), local civil protection (police, fire) or ICE-SAR. The main airport has run its own disaster simulation exercise. However, most exercises have been about natural disasters (e.g. a large volcano exercise in 2006). Public and local communities did not participate in the planning of these simulations, but merely as players.

Within the Directorate of Health, trainings have been performed for staff on the use of PPE. Videos are currently being produced to facilitate public training, for Red Cross volunteers for example. There has been regular media training at the national level, during which national respondents highlighted the importance of choosing one person as spokesperson, as well as the difficulty of managing media for two incidents occurring at the same time in different areas. With respect to communication, there has been a monthly exercise involving regional epidemiologists using Terrestrial Trunked Radio (TETRA) and teleconferencing, in an effort to keep communications fluid during crises. The Chief Epidemiologist keeps in regular contact with regional epidemiologists (face-to-face meetings, e-mail exchange, and regular teleconferences) to discuss lessons on outbreaks and to ensure that training is being provided on outbreak investigation.

There has been no specific training on how to deal with two contingencies at the same time. With respect to norovirus, most health professionals were aware of the biomedical implications of norovirus as a result of professional training and isolated experiences with norovirus in clinical settings. The only specific norovirus exercise done previously involved a scenario on a ship.

Pre-existing relations with and between communities

A high level of public trust exists in the response community, attributable to a long history and experience with natural disasters and the fact that response communities are largely made up of volunteers. As a professional respondent from the health sector pointed out: 'we are lucky to come from organisations that are highly trusted, but also the civil protection authorities are more trusted than in other places.' This public trust influences the response. For example, respondents who participated in the response at Hveragerdi noted that 'people trust us, and the emergency services; nobody got scared.' To some extent this is also the result of a well-developed media strategy in which a trusted spokesperson keeps 'everything under control'. The specific spokesperson is a former Chief Epidemiologist and, according to respondents, he has a very reassuring way of addressing the press. As one person noted: 'He has gained a lot of trust, he is even called 'the heart of the pandemic''.

Icelandic culture has adapted to the frequent interaction with disaster events by developing a culture of learning that emphasises ownership of decisions made and an avoidance of being judgmental towards others, or not taking criticisms personally. Conversations during fieldwork between stakeholders who had had disagreements remained amicable. There was a consistent willingness not to hold grudges and to try to see the issue from other perspectives. For example, reflecting on a series of decisions made by others during the outbreak event, one community respondent noted: 'I understand. It's the middle of the crisis, and I can easily put myself in their shoes, they rescued the kids without thinking of the procedures, I can see myself doing the same thing, but it could have been done better. Probably I would have made the same decision.' The type of response reflects the Icelandic saying *þetta reddast*, or 'it will be OK, we will figure it out'. It means that everyone is willing to work towards a solution. As one community level respondent noted: 'That is how the community works, how we do things, we are not that many in the nation so we have to do things ourselves.' One regional official referred to this type of culture as a strategy of no regrets: 'We are trying to build the strategy of no regrets, you make the decision and maybe if it was not the best, you should just accept it and don't regret, but learn from it and improve.'

Inter-sectoral collaboration

There are strong ties between the Directorate of Health and the Civil Protection Department. There is a clear legal basis on how and what to do in respond to a health threat. However, according to one of our community respondents, the Civil Protection Department used to be more independent. Since 2003 has it been placed under the police force as part of the Ministry of Justice. While this reflects the natural disaster history of the country and facilitates an all-hazards approach, it also tends to emphasise that response is mainly about physical rescue. This can potentially affect the social issues associated with disaster response, such as psychosocial care, as well as the timely and effective inclusion of community-level actors, such as mayors. As one community respondent explained:

'The focus is so much in the immediate response, and the response is very good, maybe not perfect but really good, but the focus is too narrow, and it falls under the responsibility of the police. So what the community, or the town council is focusing on is not what the police is focusing on.'

By way of example, it was noted by community respondents that during the 2010 Eyjafjallajökull volcano eruption one local mayor was very active, but mostly in terms of life-saving policing issues rather than longer-term community needs. 'So when the ashes came he realised that the drains would get clogged and he realised he was not responding with the community in mind. I realised we were focusing too narrowly and too short, we are not focusing on the community level and not going far enough into recovery assistance.'

One national respondent noted that the organisational hierarchies used by the Ministry of Welfare and the Ministry of Justice for cooperation purposes are not the same. While the Chief Epidemiologist is directly accountable to the Minister of Health, this is not the case for the Head of Police of the Civil Protection Department, with whom the Chief Epidemiologist typically coordinates outbreak investigations. Instead, the Head of Police for the Civil Protection Department reports to the National Commissioner of Police who then is accountable to the Minister of Justice. In addition, a national respondent pointed out that coordination between ministries is 'random' and could be improved.

Incident

Hesitation to activate the full response system

All respondents agreed after the event that the full civic response system should have been activated for this outbreak. This would have activated a national co-ordination/command centre run by the National Commissioner of the Icelandic Police (NCIP) including a press office, as well as coordination and clarification of institutional responsibilities for covering the various costs incurred by local community partners. However, most respondents emphasised that the actual response did effectively deal with the outbreak and that the full response system was 'informally activated'. The system can be activated in two ways, either at the national (Civil Protection) or regional levels. However, the fact that the full response was not activated at either level suggests that the reluctance was not the result of personal decisions. A number of different factors seemed to have worked together to create this situation, discussed below.

At both levels, the hesitancy can be explained by a lack of experience with infectious disease outbreaks. Indeed, this was the first disease outbreak event in a long time, with little institutional memory relevant to this scenario as hardly anyone could recall lessons learned from previous cases (e.g. the 2004 norovirus outbreak at Húsafell). As a result, it seemed difficult to activate the system for a viral disease outbreak. As one national respondent involved in the outbreak noted: 'The first call [decision] is key. It is easier to call something off than on'. In fact, the first call made by the nurse/midwife volunteering for the scouting organisation to the emergency number 112 could have activated the full system, but it did not. One implication of having no historical reference may have been that the initial decision taken was followed, regardless of changing signals from the field. The result, as one national level respondent explained, was: 'At the 10 am meeting [Thursday morning] the Chief of Police and Higher Commissioner decided not to activate. But at 16:00 the situation had changed and they might have. We could have, but did not do it.' Cultural issues also played a role, in particular the Icelandic spirit of self-reliance mentioned earlier, and the relatively small community of people involved. One regional-level respondent shared his observation: 'We know each other so well

that we assume many things. It's a good thing not to get stuck in the structure, but you can also miss things if you don't follow the structure.'

Activation introduces a specific set of rules that need to be followed, including activation of media outreach system. Although it is speculation to what extent events would have developed differently with activation of the full system, it could have been expected that the national coordination and planned coordination and communication might have remedied some issues. If the system had been activated, specific instructions to designate a spokesperson would have been followed and a full press office would have been organised. In addition, financial resources may have compensated costs made by some community-based partners and the Red Cross, as detailed below. Overall, and despite these issues, it should be emphasised again that the response was effective, and that all those involved in the incident showed strong willingness to cooperate and act in the best interests of the children, which was the primary concern.

Regional level hesitation

At the regional level, initial information suggested a relatively low level of urgency. Moreover, there was a bus accident in the area at the same time which required resources and attention. In other words, two contingencies were competing for emergency response attention. Some of the respondents dealing directly with the outbreak said that they would have expected a timely situational assessment to be conducted. Matters were complicated by the fact that the regional epidemiologist was travelling the day the outbreak began and was not actually able to join the coordination efforts until one day later (Friday) because no regional backup had been agreed. When the two ambulances arrived at the scout camp four hours after the first 112 call by the scouting organisation, the situation appeared to have escalated. However, during the days that followed, the regional team remained reluctant to activate a full-scale crisis response as they felt they could handle the outbreak locally. A representative from the coordination committee said: 'It's probably an Icelandic thing to do things yourself, instead of activating the whole plan.' This staff person further explained:

'We first sent two ambulances, two kids were physically ill, then we contacted a bus company [Brunavörnum Árnessýsla] and got two buses. [Chief epidemiologist] was on vacation but he had a substitute, our [regional epidemiologist] was on a flight, so we had to contact the replacing chief epidemiologists. It was a decision made with the representative of the National Commissioner; we thought it was a regional thing, so we didn't turn on the red lights. Looking back maybe we should have activated the plan.'

The possibility of regional activation was new to the system and had not happened before. One coordinating respondent noted that training would have been necessary to successfully implement full activation at that level. Those actors involved felt that the system was activated, but just not officially.

A request to formally activate the full system was also not made by the community-based actors involved. Red Cross staff and volunteers noted that they had thought about it and knew it was possible to request activation locally, but they felt some resistance to the idea: 'I was at this meeting two times a day with the civil protection committee, and they just didn't do it. Maybe next time I will say 'you have to do it.' Two community representatives from Hveragerdi village noted:

'A: When things happen people get so absorbed by the event itself, we forget about what is outside the immediate circle involved in the rescue. We need to be able to step back to reflect on how to react. Mechanisms are in place, but the system was not activated, it was considered to be a transportation problem, but it was a health crisis.

B: People didn't realise how serious this was.

A: I'm not saying I would have done anything differently. I would have probably done the same thing.'

However, the scouting organisations concerned, particularly those dealing with the situation at the camp, presumed that the call to 112 had in fact activated the system: 'We thought that by opening the shelter in Hveragerdi the system would be activated, and by calling 112. That's why we used it.'

National-level hesitation

At the national level, the first 112 call could have provided sufficient information for the decision to activate the full system. A few issues may have prevented this. For one, the system had never before been activated as a result of a disease outbreak. In addition, respondents indicated that some communication problems appear to have prevented immediate action when 'someone called 112 and asked for the Red Cross but couldn't get connected.' According to respondents, the physician on duty dealing with 112 calls was new to the system. It remains unclear why the initial description of symptoms in the first call was insufficient to activate the system and why a second call was necessary, as no transcript was available to evaluate this. However, staffing issues may also have played a role. One national-level health respondent noted that 'Usually we know what is going on medically by calling the regional epidemiologist. That's how we get information from the scene and then we can react, and know if we can handle it locally, or not. In this case the regional epidemiologist was not available due to international travel.' The information about the incident which reached two national-level civil protection respondents in the middle of the night did not yet seem serious enough to activate the system, and in addition there was some lack of clarity as to which preparedness plan to

activate. With hindsight, national-level respondents said: 'We should have met after the first call to evaluate how many people should have been involved, and to see if things could have been handled locally.'

Coordination with community-based organisations

Red Cross

Although the national Red Cross is a large institution with government agreement to support evacuation shelters, local Red Cross branches are very dependent on community volunteers, and they are not a formal health authority. Red Cross staff and volunteers felt that they partly ended up coordinating the response on behalf of the health authorities. They called the health authorities and organised a shelter for the young scouts without proper training in infectious disease prevention and control. One Red Cross respondent said:

'You might argue that we were taking the role of the health authority, when we have an auxiliary role to civil protection. We ended up running the shelters and it wasn't really clear who ran it, when we thought the shelter should be run by the local epidemiologist. The local epidemiologist was not available, but then the Chief Epidemiologist should have stepped up.'

In the regional review report from Selfoss [29], it was noted that communication and guidance was needed which was initially lacking and there was no immediate access to PPE. Furthermore, local Red Cross volunteers said they felt isolated. They needed a contact person for information or a phone number to dial. They also thought that people should have been registered and that there was a lack of clarity as to what needed to be recorded. Some actions could have been taken differently – e.g. at the primary school 'shelter', food was distributed from the same location to both sick and healthy children. However, this issue was quickly remedied by the clinical staff from the local hospital. In addition, the experienced volunteer-run ICE-SAR organisation stepped in to coordinate the initial organisation of the shelter, set up a road block (because the police had not arrived yet), and initiate contact with a local store (Bónus) to explain the need for water and food for 181 children at a school in the middle of the night.

Scouting

The rapid deterioration of the situation during the first four hours without governmental support and the delay in the arrival of help from the authorities caused significant anxiety among scouting staff. Two of the staff explained as follows:

'A: At the time we requested help 13 people were sick, three hours before there were three, when the ambulance arrived 38, by the time they arrive in Hveragerdi 62. That is why the four hours between the request and when we got help were very long.

B: I was quite nervous because it was windy that day and quite late in the summer, most people were in tents, we didn't have room for everyone and it could have spread quickly, the thought of people throwing up and not controlling bowel movements in a crowded space...'

Moreover, as previously explained, the scouting organisation initially tried to coordinate finding shelter for the children through the Red Cross (outside of the official channels) before a call was eventually made to 112 for the second time. In an internal scouting report it was noted that, after the evacuation was completed on Friday, a few scouts who had volunteered to go back to Úlfjótuvatn were surprised to find six scouts sleeping in one of the buildings. They had apparently been left behind during the evacuation [20]. The six scouts were transported to the school. In addition, after the Úlfjótuvatn management set up an office in the school, it took 12 hours before the scouting manager and head of the Icelandic Boy and Girl Scout Association were included in the information loop. In the regional review report, the scouts indicated that they 'were not involved in decision making, and that they felt communication between themselves and the respondents was lacking. There was insufficient information sharing' [29]. Some of the information received by the Úlfjótuvatn scout group from the Red Cross emergency responders appeared contradictory, including the fact that scouts had been released from the shelter, which later proved not to be the case.

The scouts also indicated that they felt insufficiently supported when the second outbreak occurred among the scouts who returned to the Úlfjótuvatn scout camp (10 more cases on Monday 14 August). In particular, the unexpected second round of camp cleaning had a strong emotional impact on the volunteers who were exhausted and overstretched. In addition, Venture Abroad, the UK travel agency that coordinated the British visitors, and Scouting UK (the national association) called repeatedly to complain about the showers, food and services. Meanwhile the atmosphere at the agricultural university, where many of the scouts had been relocated from the primary school, was 'heavy' with guests being tired, disappointed and angry at the circumstances [20].

Clinical personnel

The nurses who went to the scouting camp initially noted that there was a lack of information on the number of patients until they arrived. In addition, the regional review report stated that up until the Friday, after evacuation, there was still no overview of who exactly was in the scouting group, and the situation remained a little chaotic. The regional evaluation meeting report stated that there was a 'lack of patient registration, labelling and information on who was in charge of medical factors and decisions' [29]. The nurses also said that they were lacking cleaning and hygiene equipment. The university hospital deployed nurses to support the outbreak right from the first night.

Municipality

In an effort to find shelter for 181 scouts late in the evening, the regional crisis coordination team determined that an elementary school – these are often designated as Red Cross shelters – would be a fitting location. In the process of attempting to secure permission, the team received refusals from two municipalities because the new school year was due to commence the following week (and Selfoss was hosting a large soccer tournament that had filled up their school). However, the principal of the Hveragerdi primary school agreed late in the evening. Unfortunately, the mayor was not involved in this decision and this left no time for the municipality to negotiate alternative locations. The mayor was also not at the first information meeting the next morning, and did not hear about the evacuation through the news media that morning. As a result, she felt excluded from the decision-making process from the start even though, according to the Icelandic Civil Protection Act, permission is not required to open a predesignated emergency shelter. However, as one national level respondent noted: ‘...[this] was for a volcano eruption or earthquake, not as a quarantine centre.’ Reflecting upon the situation, municipal representatives pointed out: ‘If we had talked about it at least for 2 minutes we could have found other solutions. If you think about the cost of cleaning, and the costs for the community, all the personal belongings...plus the risk of having this in a highly populated place.’ Therefore it appears that activation of the system may have made a difference here. One community member argued:

‘If you had activated the whole system, you would have had more stakeholders, the police would have been more involved, and we would have had less problems with the school, because the mayor would have been part of the system as well and be less angry about us going to the school.’

The lack of input in the decision-making process caused some tensions between the scouting organisations and the municipality. After the arrival of the regional epidemiologist on the scene, the decision was quickly made to ask the healthy children to leave the school. The scouts were asked to relocate the healthy children to three different alternative locations, leaving the Úlfjótssvatn and national scouting organisations with more coordination difficulties. Unfortunately, ten of the children who left the primary school shelter and went back to the scout camp then became ill, which undermined the trust between the scouting organisation and the medical decision-makers. According to the scouts, the medical evaluation was simply that ‘if you are not showing symptoms you are not sick’. Scouting respondents also felt that there was a lack of ownership of the situation. They felt that the mayor had gone against their interests by asking the children to vacate the school again. It was noted that: ‘There were different stakeholders. The problem is that no one took ownership of the situation. There should be a system in place that is able to deal with all of this, so that if something like this happens, these are the procedures. So that the fact that the school is closed is accepted.’ Finally, during the regional evaluation meeting at Selfoss [29], it was also noted that the municipality would have wanted police to close the area, if only to prevent the media photographing sick children (see section entitled ‘Media’).

General public

Overall, there was low level of concern among the local community of Hveragerdi. Some of the local people volunteered to help at the shelter. The first day people were unsure how close they could get to the school, but they trusted the communication they received from the authorities and the community wanted the school to be closed in order to prevent further spread of the virus. Since Hveragerdi was a small village, news spread quickly, also through the (closed) Hveragerdi Facebook group. Neither the school nor the community organised any meetings with parents or community members, because it was summer and many villagers were away. In fact, for the most part the event took place outside the view of the community. The scouts were all international and, other than some support from the local scouting group at Hveragerdi, the scouting staff involved came from other Icelandic communities and foreign countries. As one Icelandic parent noted: ‘Since they were foreigners, the community was not as involved as they would have been if they had been Icelandic kids. Parents would have picked up their kids.’ Generally, there was little concern in relation to lingering contagion at the school after it reopened, however, it was noted informally that a few parents had some misgivings at the beginning of the new term. By way of example, one community respondent commented: ‘One mother of a kid at the school got noro[virus] 20 years ago. She was very afraid of her daughter going back to the school.’ Respondents from the service industry said that their hotel/restaurant provided food and utensils for the school, and some of them helped the Red Cross as volunteers. They informally discussed with each other the importance of washing and sanitising hands, but the outbreak did not have any further effect on the hotel business in the village.

Using a civil shelter for outbreak containment

The response protocol suggests using predesignated shelters for emergencies and often these are schools. According to the agreements, no formal approval is needed from a municipality to use a predesignated shelter during an emergency. The regional coordination team who decided on this course of action made sure to follow this protocol and they felt that the Hveragerdi primary school (Figure 8) was an appropriate and familiar location for the young scouts. As one of them stated: ‘You have to make them feel secure. The school was the right place. But it’s expensive and then you need to clean, and we had to postpone the opening of the school.’ In the regional after-action review [29], Red Cross volunteers also felt that the school was a good location: ‘The school was a very suitable accommodation to classify people and fit well for the project. It was very easy to provide food, etc. for all patients and the Bónus [local grocery store] opened for them in the middle of the night.’

Figure 8. Hveragerdi primary school, used as shelter during the outbreak

Source: [30]

In the communication to the school, the local Red Cross volunteer who called the school principal around 22:00 said that 'there were some boy scouts sick, that they would bring them to our school because it's marked as a shelter for crisis.' Once the principal had agreed he called the caretaker to open the school. The caretaker then called the principal later and said that 'it was probably noro[virus]'. The next day when the mayor found out, the media was already in front of the school.

As already noted, the mayor was not involved in this decision-making, although she would have preferred having the opportunity to discuss alternative locations. The mayor herself had agreed previously on the use of the school for mass emergencies, but a viral disease outbreak had simply not been considered as a possibility. The Hveragerdi primary school has almost 400 students. For the mayor, this posed a problem as it meant that potentially a large community would be unhappy that their primary school was closed. However in the end there was only one day's delay before the school reopened. A school employee explained some of the consequences of using the school for this purpose:

'On Tuesday we came to work. The cleaning went OK, but on Monday, when the school was supposed to be sterilised, my things were under a blanket, then one of our cleaning guys came and said this room had not been disinfected, and when I came back the next day I was told that everything had been thrown away, my personal things, my shoes, my sweater, my books. We were already working and the cleaning wasn't finished.'

Although there was some discussion on this topic, overall there seemed to be agreement in retrospect that using a school as a shelter for people with an infectious disease may not have been the best idea, if only due to the large number of items needing disinfection and the damage that occurred in the process.

Guidelines for community stakeholders

The lack of experience with a disease outbreak of this kind meant that several community-based groups were in need of guidance. There were no guidelines available to the scouting organisations or the Red Cross on how to clean camps or shelters. The Úlfjótuvatn report states that 'during the outbreak our staff walked in and out of affected spaces, even before we knew what was causing the sickness. In hindsight, I feel we shouldn't have been allowed to ask our staff to do that' [20]. The fire brigade also had to figure out how to clean transportation vehicles (see Figure 9) and the Environment and Health Inspector had no instructions on how to approach the investigation of an outbreak source at a scout camp. One scouting respondent described the difficulties encountered when trying to obtain the correct information:

'I called the local HSL [South Iceland Health Authority] to know how to clean and they said they did not want to answer the question because they were not the proper authorities, and I think they probably did not know how. Then I contacted the hospital, and Regional Rescue Centre in Selfoss... I think they didn't have a clue about how to clean, and then after many calls we finally got some guidance. Some mom volunteer ended up giving us some guidance, someone who had been in the health team at the Moot [international scouting event].'

Similarly, the Red Cross contacted hospitals in Reykjavík and Selfoss to obtain guidance on how to use the PPE they had received in Hveragerdi. Many of their volunteers had no background in health. Local hospital staff generally assisted in

these cases. It is unclear how the private school cleaning company obtained appropriate guidelines. In response to the event, the Red Cross decided to start including food safety and infectious diseases in its training protocol.

Figure 9. Ambulance disinfection at the Regional Rescue Centre, Selfoss



Source: [31]

WHO guidance on crisis communication is incorporated in preparedness planning and was used during the response to the event. When the environmental and public health inspectors entered the site for inspection, one of them spoke to the media. It was later noted that the inspectors do not have a protocol covering who is supposed to talk with the media, nor had they received any media training. However, they do generally know that they should not disclose details of a case.

One issue in particular which had lasting impact was the high financial costs incurred by both the Red Cross and the scouting organisations for disinfection cleaning (claimed to be ISK 10/11 million respectively, or approximately EUR 71 000/78 000). With respect to the Red Cross, contractual arrangements with the Icelandic government mean that the organisation is responsible for shelter coordination and management. However, these expectations were based on mass casualty situations and not viral disease outbreak scenarios. As one Red Cross respondent explained:

'If it's a disaster, the local and national Police Commissioner jointly declare a disaster. When it's a health issue the Chief Epidemiologist should declare it too. In this case there weren't signs that they wanted to do it [to declare emergency]. If it's an official emergency the national treasure covers. If not it's the Red Cross. We thought that was unjust.'

The scouting organisations involved believed that by calling 112 they had activated the system. 'When you contact the emergency line they take over, that's what we thought in this case.' They also believed that activation of the system would help them cover some of the costs incurred, such as disinfectant cleaning of both the Úlfjótuvatn Centre and the agricultural university that housed their guests, reimbursements to guests for equipment that was burned as part of the disinfection process, and loss of income due to the closure of the Úlfjótuvatn Outdoor and Scouting Centre.

Media coverage and general sources of information

The Chief Epidemiologist and Civil Protection Department work very closely. They communicate with the public during crises using their website⁷, through media (radio, television, newspaper) and Facebook (several thousand followers). The Directorate of Health Facebook page has about 2 000 followers. This, however, is very few compared to the 87 000 followers of Iceland's police force. The Icelandic National Public Broadcasting Service 'Ríkisútvarpið' (RUV) has even fewer followers.

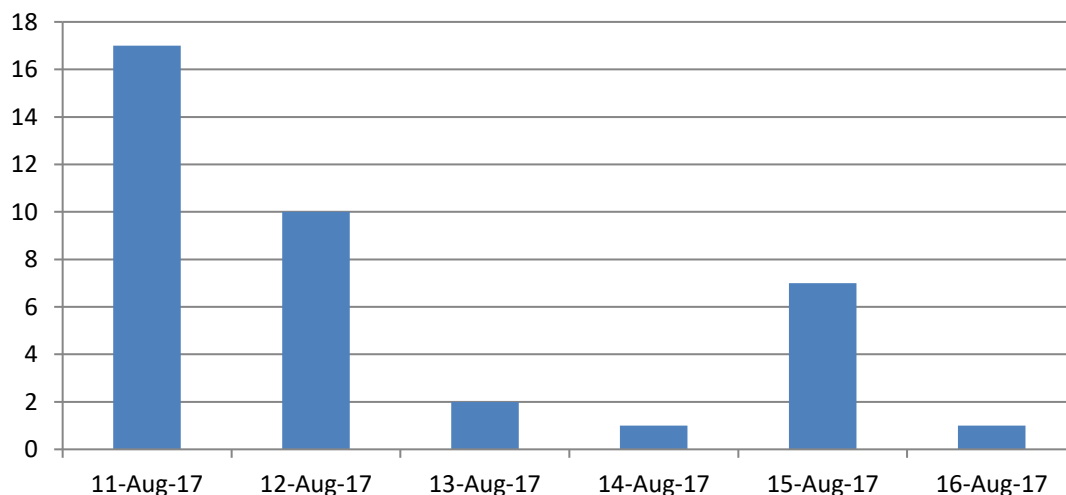
RUV has a special relationship to emergency response, because when there is a warning they are obliged to cover it on radio, TV and the internet. Respondents experienced the RUV reporters as being easier to work with. It was pointed out that: 'At RUV they have procedures, they have an agreement with the government that they can go to the site and they should cover, but they know they should not go and show people who are crying, they have their

⁷ <https://www.landlaeknir.is/english/news/>

ethics. They have a priority pass, and they have to use it in a proper way.' Generally, the media are considered to be responsible when reporting on health threats. The media call when there is something interesting and new on the news website. The press office for the Division of Health Security and Communicable Diseases monitors social media but does not have any special software to do so. During the norovirus outbreak, no negative rumours or reports were found on social media. The press officer was in direct contact with the acting/stand in for the chief epidemiologist, who is a trusted, specialist from a high authority in the country who has an excellent track record in keeping the media calm. In accordance with the preparedness plan guidelines, in the event of an outbreak the Chief Epidemiologist takes over as a spokesperson.

On 11 August 2017 at 14:00 a press release was published on the Division for Health Security and Communicable Diseases website. Figure 10 shows the number of media reports resulting from the release [32]. No calls were received from the international media.

Figure 10. Number of media reports resulting from 11 August 2017 press release



Source: Directorate of Health Press Office [32]

The main Icelandic newspapers and news broadcasters (RUV, Visir, NBL, DV) covered the viral disease outbreak during its five-day duration, from the time the scouts were transferred to the school in Hveragerdi (11 August 2017) until the last group of scouts had reportedly recovered, been released and sent back home on flights from Keflavik Airport (15 August 2017). Coverage was most intense during the first day, when over a dozen news pieces were produced to keep the public updated in real time on what the authorities were doing to establish the nature and cause of the outbreak. The media arrived almost instantly in the area and interviewed health authorities, police, paramedics, the scout spokesperson, etc. Some of the staff at the shelter reported feeling overwhelmed:

'A: I went to the shelter in the beginning and came back the next day. Reporters were outside the windows of the shelter to try and take photos. We put something in the windows to cover them.

B: We told them it was inappropriate to use pictures of sick kids. We weren't happy with them.

C: They managed to take one of a kid lying in a bed. Of course we weren't happy about that.'

Although the photo has been taken down and replaced, it can still be found in the archive of the Visit.is Facebook page. The first public commentary reads: 'Is it possible to take a picture of a sick child (through a window!)? There is something wrong with that!'. The second commentary agrees.

Twenty-five available press reports (see Annex 4) were analysed based on a review provided to us by the Directorate of Health press office. News pieces reported on the hypothetical diagnosis based on symptoms, which indicated a norovirus infection from early on; the laboratory analysis carried out at the regional hospital to confirm this diagnosis and the sampling performed at the camp site to determine the source of contamination. It was mentioned repeatedly by respondents that the outbreak was widely featured on TV news as well, and that it was virtually impossible to miss it. News reports used official sources but the tone was not alarming and there was no speculation beyond official statements. Most news items emphasised the authorities' plans for containment and disinfection, the speedy return of the scouts – first to the camp site and then to their home countries – and the negligible risks for the wider population thanks to the appropriate management of the situation. Headlines such as 'No crisis here' [33] are a reflection of this. After 15 August 2017 coverage virtually ceased. There were some news items reporting on the 10 scouts that fell ill a few days after the main outbreak, but since the cause had been established and the main outbreak successfully contained, these new infections received much less media attention. Overall we can say that media coverage of the norovirus outbreak was intense, thorough, efficient and short-spanned, mirroring the strategy put in place to manage the event.

The Division of Health Security and Communicable Disease Control's press office was surprised at the low volume of calls. One reason was that the media bypassed the national office and went directly to the local area and contacted people on the ground because the event happened close to Reykjavík. The media also appeared to have called the spokesperson directly instead of through the press office. If the system had been activated, a press office would have been opened and more people would have been assigned to write press releases and coordinate calls to the spokesperson.

The Icelandic Boy and Girl Scout Association and the Red Cross had their own spokespeople who received calls, even though the formal spokesperson was the regional epidemiologist, supported by the Red Cross spokesperson. The scouting organisations experienced a lot of pressure in dealing with the media and coordinated this with the crisis coordination team. As one representative of the scouting organisation explained:

'Most of my time was spent in talking with the press, I stayed up 38 hours to talk to the media, to say the kids are ok, please don't take pictures of them, I was taking interviews every 4-5 hours. I activated the PR persons at the scouts. I asked not to tell anything to the media before we did, because we are running a business and these are children.'

According to the internal scouting report [20], overall Úlfjótsvatn staff experienced the media coverage as positive and they enjoyed the sympathy they received from the reporters. The scouting organisations felt that they had approached the media positively and accurately, without speculation, applying the motto 'tell everything and tell it right away.' By offering the media regular updates, and pointing the media towards one source of information, they successfully ensured that the news was largely correct and neutral. 'Instead of trying to hide the truth, the coverage was on a high plane and mostly fact based. This helped in preventing our reputation from suffering to any degree, and some reporters were actually rooting for us' [20].

Staffing

Although the coincidence of a bus accident occurring at the same time as the outbreak delayed the sending of an ambulance, in general there were no major staffing problems noted in the Suðurland region. The only exception was that one of the nurses from Reykjavík was stuck in Hveragerdi. The police could not drive her back because they were attending the accident although she had to get back to Reykjavik to receive the injured. With regard to health inspection, a network of people exists that can support local outbreaks when numbers exceed 20. However, a staff shortage developed at the Úlfjótsvatn scouting camp as a result of the need to arrange alternative locations for healthy scouts, deal with the media and the international relations and clean the camp twice. Without the larger resources of the Icelandic Boy and Girl Scout Association and volunteers, this situation would not have been managed adequately.

At the national level, the five full and two part-time staff at the Division of Health Security and Communicable Disease Control shouldered many of the responsibilities. In particular, it is difficult to meet all the requirements from international partners such as WHO or ECDC. With a small staff, the unavailability of one person due to vacation could result in a gap in coordination. Examples have already been provided with respect to back-ups for the epidemiologists. In addition, there is also one person in charge of central distribution of PPE and in her absence there are only written instructions.

The solution to use decentralised planning in order to deal with staff shortages had the added benefit of involving the local community, for instance, through community level plans for long-term response to social disruption. This tended to boost the numbers of volunteers for community organisations. For example, after the outbreak, the community-level preparedness awareness week supported by the Civil Protection boosted local Red Cross volunteers from 35 to 70. As one community respondent explained: 'after the outbreak the police went to all these towns in south Iceland, and people in the communities asked how they could help.'

Vulnerable populations

The case involved young people from a number of different countries who needed appropriate shelter and evacuation. On the one hand, the scouts were visitors who, like tourists generally, are an especially vulnerable population. It has been previously concluded in the context of natural disasters that in Iceland there is a growing need to collaborate with the tourist sector. Tourists are often located in high-risk regions yet have no knowledge of hazards or appropriate emergency response procedures [34]. For infectious diseases, this case study showed that the visitors placed enormous pressure on the Icelandic Boy and Girl Scouting Association to manage communication with international partners in the US and UK. This poses the question as to what might have happened if this had been a group of tourists who had not been overseen by national and local scouting organisations. On the other hand, these scouts were particularly vulnerable in that they were children. It was mentioned several times that if they had been Icelandic scouts, the situation would have developed differently as parents would probably have brought their children home.

With regard to the protection of health workers, all the clinical staff involved had been trained in infectious disease control. However, the Red Cross and Iceland Search and Rescue organisations needed on-site training in the use of PPE, which was provided by clinical staff. Red Cross staff explained: 'We told all our volunteers that if they were afraid to come they should not come, and told them that when they went home they should take off their clothes, take a shower and

then talk to their families.' Neither organisation had protective equipment as standard prior to this event, which meant it had to be distributed via the health authorities which meant that the Red Cross and ICE-SAR workers were vulnerable initially. No other vulnerable groups (elderly, very young children) came in contact with the virus.

Post-incident

Overall, the response was considered as fairly good by all parties involved, but it was noted by one of the national respondents that 'a health issue was approached with a mass casualty toolbox'. Post case reviews were carried out among all stakeholders. One regional-level respondent explained how this related to novelty of the case:

'We discussed this incident for quite some time to tell you the truth [he laughs]. It was so new to us, we had only read about this kind of thing on the news. Our impression is that it was a good case to learn from, maybe I won't see another case like this before I retire.'

Evaluation in the field started with a 'hot wash', where responders (e.g. healthcare personnel, ambulance, fire and police, Red Cross, ICE-SAR) were asked immediately what they thought of the response. A few days after the response, on 6 September 2017, the Chief Epidemiologist conducted an after-action review which included government and health actors, but no community actors. The review concluded that the response 'was successful and so were the measures taken. Cooperation between responders was productive and communication effective. Consultation in the initial stage could have been more extensive. Work was carried out in accordance with the Icelandic Incident Command System although it was never formally activated' [23]. It was also noted in the same source that no further investigation had been conducted at ministerial level. Several national-level respondents discussed whether a ministerial investigation committee should have been organised to look at the consequences of non-activation. It was pointed out by national respondents that the Ministers of Interior and Justice had not provided the committee with the budget to recruit a district judge to conduct further investigation.

A regional after-action briefing was also organised by the Regional Crisis Coordination Centre (RCCC) a few days later on 8 September 2019 [29]. The meeting included government representatives, police from southern Iceland, local clinical stakeholders, and also community actors, such as the scouting organisation, ICE-SAR, and the Red Cross. It is unclear from the document if school representatives attended. Some of the relevant findings of this meeting have already been noted. There was no local parent or teacher evaluation, either at school or community level. A system does exist at the municipal level for community-wide evaluation, which was activated after the Eyjafjallajökull earthquake of 2010⁸, but not for this event.

Both the scouting organisations involved and the Red Cross conducted internal evaluations, but expressed a need for further debriefing and communication about lessons learned with the authorities. In particular, the financial costs that resulted from the cleaning motivated both organisations to seek further clarity with government authorities. The scouting organisations in particular also reported having experienced many closed doors. They explained:

'A: We talked to people and only found closed doors. People should have come to talk to us about what had happened, ask us if we wanted something from them and why, ask about our losses mental and material.

B: When the Health Authorities ruled out that the cause was infected food or water, they were never willing to state this publicly.... to say it was not caused by the Centre. We had to do it ourselves. I still have to answer questions about the water and tell people 'no you don't have boil the water'.

The scouts learned that government actors did not see themselves as being under any legal responsibility for financial costs. During the scouting focus group meeting, respondents agreed that they had expected a more thorough follow-up on their experience by the epidemiologist, 'a follow up about the fact that an outbreak occurred.' In addition to their financial grievances, this study appeared to be a welcome opportunity for the scouting organisations to tell their story and be heard.

⁸ The school then participated in academic research on community resilience that motivated the preparedness plans for long-term response to social disruption and resulted in local guidelines on how to respond in a major crisis.

Lessons learned and good practices

This final section outlines a set of 21 good practices and lessons learned for promoting collaboration and synergies, as identified in this study. Nearly all of them are based on suggestions by respondents. The target audience for these lessons learned is, with the exception of the last two on the list, the public health authorities. They include actions that have already been implemented in Iceland to a greater or lesser extent (e.g. back-up for regional epidemiologists) as well as areas where improvements could still be made. These actions are presented as suggested options that may be considered in other EU Member States.

Promoting inter-sectoral collaboration and synergies between the authorities

- Personal relationships strongly facilitate the flexibility required for a resilient response system. Despite non-activation of the full-scale emergency response system, there was good collaboration between authorities and community-based actors because of the relatively small size of the social network. For example, support from different stakeholders was provided quickly for crisis management action.
- Ensure that the history and lessons learned from previous disease outbreaks are archived and accessible. Experience of previous infectious disease outbreaks can help provide information on potential scenarios and clarity on when and when not to fully activate response systems at multiple levels. Memory of previous events, such as information captured in after-action reports, should be archived and easily accessible, including media analysis.
- Understand the difference between natural disasters and disease outbreaks when using an all-hazards approach. The all-hazards approach is efficient and allows for response structures with limited staffing. However, the hesitancy to activate the full national response system in the event of an infectious disease outbreak illustrates differences in perception and process between infectious disease outbreaks and other emergency events.
- Clarify and disseminate information about the process for activating the civic response system. A situational analysis of an infectious disease outbreak needs a standardised consultation meeting with responsible parties at the beginning of an incident; a risk assessment and formal discussion on the activation of preparedness and response plans as a follow-up. Once activated, key responders should be defined and informed and the most relevant plan set in motion. If changes are made to activation protocols, such as the possibility of a local activation, training should be offered to stakeholders so that they can adapt to the new process. One solution to hesitancy in relation to activation of emergency systems may be to have more than one level of activation, with different intensities and the ability to scale-down and up.
- Encourage relevant ministries to designate a specific contact person responsible for International Health Regulations.

Promoting collaboration and synergies between the authorities and the community

- Engage community stakeholders through participation in preparedness planning to motivate ownership, collaboration, volunteering and trust. For many stakeholders, the process of being involved in preparedness planning is more crucial than the actual plans. Communities learn to prepare and collaborate when they are engaged and they experience a sense of ownership. In Iceland's southern region, community preparedness planning for long-term recovery includes a system for recruiting the relevant community members.
- Include long-term recovery as a focus in preparedness planning to integrate longer-term social concerns and community needs. Often, when the direct emergency is over other issues come up (e.g. psychosocial care, costs occurred at community level, etc.) that tend to be left out of the planning cycle because most preparedness plans are written from the perspective of direct response. Long-term recovery planning places more emphasis on community needs, while lessening the dominance of response planning.
- Prioritise reliable health communication by using a trusted spokesperson and special media relationships. In Iceland communities generally trust the health authorities. During the norovirus outbreak, one contributing factor was the use of a trusted health spokesperson and close collaboration between response coordinators and the Icelandic public broadcaster (RUV). RUV generally approaches crises by calming public anxiety rather than whipping it up.
- Make generic preparedness plans flexible and adaptable to specific situations and involve key community stakeholders in the operationalisation of such plans. Local ownership of sector-specific plans means that the parties involved are actually aware of the existence and usefulness of such plans.
- Clarify the issue of retroactive financial compensation for unintended costs incurred by community stakeholders, such as cleaning and disinfection.

- Learn from and empathise with the experiences of community partners. Local or regional debriefs, including after-action reviews, are an effective means for learning, listening and sharing the experiences of community-based partners that supported response coordination (e.g. scouting organisations). If a forum is provided to listen, community partners can be heard and this may prevent or soften grievances.
- Distinguish between community shelters for natural disasters and infectious disease outbreaks. Processes need to be developed to ensure that local authorities are engaged in decision-making regarding the most suitable places for outbreak control quarantine shelters in advance of any disease outbreak. Factors influencing the choice of a suitable shelter are related to community-level issues, such as ownership, schedules and perceptions. If public places are used, areas within such shelters that are not in use need to immediately be closed off to reduce cleaning needs and costs.
- Provide easily accessible guidance on appropriate cleaning, PPE and food preparation. Regional authorities and community-based volunteers need to have easy access to guidance on the use of personal protective equipment, routes of transmission and protective measures. For example, publically available video-based instructions on using PPE and cleaning, or a list of competent (or certified) cleaning companies.
- Store protective equipment both centrally and through local response networks. Ideally, protective equipment should also be distributed regionally with community-based partners, particularly when there are large distances involved. The Red Cross has been introducing training for volunteers on food safety issues and included protective equipment in mobile wagons with evacuation equipment, stored at local fire brigade premises.
- Ensure that health authorities are responsible for registering affected groups or populations. Registration should not be the responsibility of community-based partners, even if they are formally coordinating an evacuation or quarantine shelter. In addition, assistance should be provided at all outbreak sites to ensure that everyone is accounted for (e.g. the Úlfjótsvatn Outdoor and Scouting camp evacuation left six scouts behind).
- Train emergency response operators (e.g. 112 telephone operators) to expect that community members will not use appropriate technical terms or understand the procedures necessary to effectively activate a response. Many community-based organisations are not entirely aware of appropriate procedures or language required to trigger activation of the response system. For example, they may believe simply calling 112 will suffice and they may use words or jargon that are not appropriate in an emergency response discourse. In addition, the increase in mass tourism in Iceland further complicates language challenges. Emergency call responders need to be trained to expect this and to be able to clarify by asking probing questions and building in mechanisms that double-check assumptions.
- Provide simulation exercises, particularly when there is little historical experience with health-related outbreaks or changes in protocols. A need for more simulation exercises was acknowledged – in the context of how to communicate in the event of a health crisis but also for infectious disease health threats generally. This need is particularly urgent when there is little historical experience with infectious disease outbreaks or when changes have been made to response systems (e.g. regional activation). Maintaining regular connection with local or regional epidemiologists via video or phone helps test communications, while small simulation exercises help test specific issues. In addition, training on how to deal with two incidents at the same time should be considered.
- Ensure easy access and entry to the communication loop for affected community based partners. An organised entry into the response communication loop on the ground may benefit from one central telephone number.

Other lessons learned not directly related to synergies

- Develop clear backup schedules and processes for replacement staff in the event that responsible staff members are absent. Since immediate consultation is a must, replacement staff must always be available and accessible via pre-agreed (regional) phone numbers. This is now a requirement in Iceland among regional epidemiologists in order to ensure smooth operations at regional level, but may also be required for PPE distribution and use.
- Promote an all-hazards approach allowing improvisation and collective openness towards after-action reviews to build the capacity to respond to unexpected situations. Despite the surprising outbreak, the co-occurrence of another emergency, and the non-activation of the full civil protection system, the event was dealt with effectively. The all-hazards approach to preparedness planning resulted in a focus on having key people in the right places, expecting improvisation, and being willing to be open in the after-action review.
- Motivate a strong learning culture both within institutions and within the community to benefit future response capacity. Several meetings were organised and written reports produced both at the community level and involving community-based actors. It would be beneficial to archive and share these reports.

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Annex 1. List of participants

Category	Type	Institute Represented	Name	Professional title
National	IR/FGD	Directorate of Health Division of Health Security and Communicable Disease Control	Thorolfur Gudnadson	Chief Epidemiologist
National	IR/FGD	Directorate of Health Division of Health Security and Communicable Disease Control	Iris Marelsdottir	Project Manager
National	IR/FGD	National Red Cross of Iceland	Adalheidur Jonsdottir	Project Manager
National	IR/FGD	National Red Cross of Iceland	Jon Brynjar Birgisson	Director of Emergency Operations
National	FGD	National Civil Protection	Agust Gunnar Gylfason	Project Manager
National	IR/FGD	National Civil Protection	Hjalmar Bjorgvinsson	Superintendent
National	IR	Directorate of Health Division of Health Security and Communicable Disease Control	Hrafnhildur B. Stefansdottir	Press Officer
National	FGD	Directorate of Health Division of Health Security and Communicable Disease Control	Asa St Atladottir	Project Manager (Head Nurse)
National	IR	Environmental and Public Health Authorities of South Iceland	Agust Oskar Sigurdsson	Food Technologist
Regional	FGD	Civil Protection Municipality	Thora Kristin Ásgeirsdóttir	Civil Protection Specialist
Regional	FGD	Healthcare Institution of Iceland	Styrmir Sigurdarson	Director of Operations
Regional	IR/FGD	Red Cross South Iceland	Fjola Einarsdottir	Staff
Regional	IR	Police/Civil Protection South Iceland	Oddur Arnason	Police Officer
Regional	IR/FGD	Police/Civil Protection South Iceland	Vidir Reynisson	Project Manager
Regional	FGD	Healthcare Institution of Iceland	Margret Kristinsdottir	Nurse
Regional	FGD	Healthcare Institution of Iceland	Anna Bjork Omarsdottir	Nurse
Regional	FGD	Healthcare Institution of Iceland	Anna Maria Snorradottir	Head of Nurses
Regional	IR	Fire Department South Iceland	Petur Petursson	Chief Fire Brigade
Community	FGD	University Hospital	Gudrun Lisbet Nielsdottir	Project Manager
Community	IR	Hotel at <i>Hveragerdi</i>	Asta Bjorg Asgeirsdottir	Hotel Manager
Community	IR	Hveragerdi Primary School parents	Runa Einarsdottir	Parent
Community	FGD	Hveragerdi Primary School	Ellen Halldorsdottir	Teacher
Community	FGD	Hveragerdi Primary School	Saevar Thor Helgason	Principal
Community	FGD	Municipality <i>Hveragerdi</i>	Aldis Hafsteinsdottir	Mayor
Community	IR	Icelandic Association for Search and Rescue	Gunnar Ingi Widnes Fridriksson	Volunteer (rescue)
Community	IR	University of Iceland	Solveig Thorvaldsdottir	Researcher
Community	IR	Red Cross Selfoss	Erla G Sigurjonsdottir	Staff
Community	FGD	Úlfjótuvatn Outdoor and Scout Centre	Elin Esther Magnusdottir	Manager (at the time of the outbreak)
Community	FGD	Úlfjótuvatn Outdoor and Scout Centre	Rajeev Ayer	Volunteer (at the time of the outbreak)
Community	FGD	Úlfjótuvatn Outdoor and Scout Centre	Kristinn Olafsson	Manager
Community	FGD	Icelandic Boy and Girl Scout Association	Jakob Gudnason	Chair of the Board
Community	FGD	Icelandic Boy and Girl Scout Association	Hermann Sigurdsson	General Manager (at the time of the outbreak)

Annex 2. Interview and focus groups questions

Two sets of questions are given below: one for institutional representatives, and the other for community members. The questions relate to community-institutional synergies in the context of the specific gastro-enteric disease under investigation. They could, however, easily be adapted to a range of other public health concerns.

a) Questions for institutional representatives

Part 1: Mapping the different stakeholders

1. Please tell us how you and the institution you work for have been or are involved with the norovirus outbreak event.
2. Could you map out on a piece of paper the different stakeholders or groups that have been or are involved with preparing for and/or responding to the outbreak event? Which of these would you define as coming from the community, and which would you define as "Authorities"? Do you think there are any stakeholders – institutional or from the community – who are missing from this map, but who *should* be included in order to ensure a better response?

Part 2: Issues arising during each of the three phases of the public health event

Pre-incident phase (prior to the outbreak)

3. To what extent were there any sort of public health preparedness exercises, consultations, or training activities involving both the community and the authorities prior to this case? Please describe these. Do you consider these activities to have been sufficient? If not, what could have been done in addition?
4. In general, do you think that the community trusted the public health and scientific authorities in this area prior to the event? Had there been any prior specific events (such as other disease outbreaks) that promoted or undermined trust?

Incident phase (during the outbreak)

5. Were there sufficient numbers of dedicated professional staff in the area available to respond to the case? Were there any problems, for example with funding, that may have limited the response?
6. Was there any official guidance for the authorities on how to engage with the community in this case(s)? What form did this guidance take?
7. Were the key actors in the community clearly identified and available when the case(s) first appeared? To what extent was there clarity about who was expected to do what?
8. What were people's sources of information about the event (i.e. press and social media etc.)? How informative, coherent and consistent were these sources of information? Were there any issues that you think people felt they needed to know more about?
9. How was the communication and coordination between the community and the authorities during the response to this event [i.e. shared/democratic/top-down]? Were there any aspects that could have been improved?
10. To what extent did different parts of the community trust and cooperate with each other during the response to this event? Examples?
11. Were there any hard-to-reach or vulnerable groups? What efforts, if any, were made to reach out to them, by whom, and what lessons could be learned from this?

Post-incident phase (after the outbreak)

12. Was there any sort of post-case review of the event, including with reference to community-institutional collaboration? If so, what form did it take, who was involved, and what was the outcome?
13. How much awareness do you think there currently is in the community about this event? Do you think that lessons have been learned by the community regarding prevention and response practices for future events of this nature?

Part 3: Overview

14. Overall, how would you describe (i) the community response and (ii) the official response to the event? Were you satisfied, or do you think some aspects could have been improved?
15. In general, how do you feel the community and the authorities collaborated during this event? What would you say was the most successful aspect of any collaboration? What were the main challenges faced in the collaboration process, and what efforts, if any, were made to overcome these?
16. What do you think are the main lessons learned from this event, in terms of community-institutional collaboration and preparing for future public health emergencies or events?
17. Is there anything else you would like to add?

b) Questions for community representatives*Part 1: Mapping the different stakeholders*

1. Could you map out on a piece of paper the different stakeholders or groups that you are aware of that have been or are involved with preparing for and/or responding to the norovirus outbreak event. Which of these would you define as coming from the community, and which would you define as "Authorities"? Do you think there are any stakeholders – institutional or from the community – who are missing from this map, but who *should* be included in order to ensure a better response?

Part 2: Issues arising during each of the three phases of the public health event

Pre-incident phase (prior to the outbreak)

2. Are you aware of any sort of public health preparedness exercises, consultations, or training activities involving both the community and the authorities prior to this case? If so, please describe these. Do you consider these activities to have been sufficient? If not, what could have been done in addition?
3. In general, do you think that the community trusted the public health & scientific authorities in this area prior to the event? Had there been any prior specific events (such as other disease outbreaks) that promoted or undermined trust?

Incident phase (during the outbreak)

4. Were the key actors in the community clearly identified and available when the cases first appeared? To what extent was there clarity about who was expected to do what?
5. What were people's sources of information about the event (i.e. press and social media etc.)? How informative, coherent and consistent were these sources of information? Were there any issues that you think people felt they needed to know more about?
6. How was the communication and coordination between the community and the authorities during the response to this event? [i.e. shared/democratic/top-down?]. Were there any aspects that could have been improved?
7. To what extent did different parts of these community trust and cooperate with each other during the response to this event? Examples?
8. Were there any groups in the community who, for any reason, were excluded from the response? Details.
9. Were there any hard-to-reach or vulnerable groups? What efforts, if any, were made to reach out to them, by whom, and what lessons could be learned from this?

Post-incident phase (after the outbreak)

10. Was there any sort of post-case review of the event, including with reference to community-institutional collaboration? If so, what form did it take, who was involved, and what was the outcome?
11. How much awareness do you think there currently is in the community about this event? Do you think that lessons have been learned by the community regarding prevention and response practices for future events of this nature?

Part 3: Overview

12. Overall, how would you describe (i) the community response and (ii) the official response to the event? Were you satisfied, or do you think some aspects could have been improved?
13. In general, how do you feel the community and the authorities collaborated during this event? What would you say was the most successful aspect of any collaboration? What were the main challenges faced in the collaboration process, and what efforts, if any, were made to overcome these?
14. What do you think are the main lessons learned from this event, in terms of community-institutional collaboration and preparing for future public health emergencies or events?
15. Is there anything else you would like to add?

Annex 3. Informed consent form

An informed consent form is presented below, with small deviations depending on the type of respondents (authority/institutional or community-based).

Informed consent form

Study title: Enablers and Barriers for Community and Institutional Public Health Emergency Preparedness Synergies

As part of the process of increasing inter-sectoral preparedness for serious cross-border public health threats, the European Centre for Disease Prevention and Control (ECDC) has initiated a case study project to investigate the synergies between communities affected by serious public health threats and the institutions (both health- and non-health-related) that are mandated to prepare for and respond to them.

Two EU countries have been selected for inclusion in the case study, in agreement with ECDC and the countries concerned: Iceland and Ireland. Both of these countries were affected by disease incidents with acute gastroenteritis symptoms. These diseases will be the focus of the work, which will seek to document the perspectives and experiences of key actors with respect to them in (i) the health sector, (ii) relevant non-health sectors, and (iii) in the affected communities.

For institutional participants: You have been identified as a representative of one of the official institutional categories that are considered as being critical in preventing, preparing for and/or responding to a disease outbreak. In addition to the health sector, our official institutional respondents come from the education, agriculture, and environmental health sectors, as well as from the media.

For community participants: You have been identified as a representative of one of the community stakeholder groups that may have been affected by the disease outbreak, and as such we would like to invite you to participate in a focus group discussion with 5-7 other community stakeholders.

Your participation in the interview is entirely voluntary, and if you agree to take part, you are free to change your mind or withdraw at any time without consequences. If you agree to take part in an interview, any processing of your personal data will comply with Regulation 45/2001⁹ and Swedish national law. ECDC is the data controller of this processing operation, and the data is collected and stored by the University of Umeå on its behalf, in its role as processor of the data. The interview will be conducted by two social scientists affiliated to Umeå University in Sweden, who are working with ECDC on the project. One member of the interview team will conduct the interview with you, while the other will take notes (either by hand, or on a laptop computer) and may ask additional questions.

With your agreement, we may want to quote some of what you say in the report that we will be writing, but we will do so in a way that ensures that it cannot be ascribed to you. Furthermore, with your agreement, we may want to include your name and institutional affiliation in an annex listing the respondents who have contributed to this case study project.

As a data subject, you have the right of access and rectification of your personal data. Feel free to ask any questions you may have about the interview or the processing of your personal data. If you have questions after the interview is over, please contact Svetla Tsoлова at ECDC (svetla.tsoлова@ecdc.europa.eu).

Please check 'yes' or 'no' by each of the following statements, and then sign and date the document in the space provided below.

	Yes	No
1. I agree to having my words used as quotes in the final report, and I understand that my words will be anonymised so that it will not be possible to ascribe any of my comments to me.		
2. I agree to having my name and institution included in an annex at the end of the final report listing the respondents who have contributed to this case study project.		

Signature: _____

Name (in CAPITALS): _____

Date: _____

⁹ Regulation (EC) No 45/2001 of the European Parliament and of the Council of 18 December 2000 on the protection of individuals with regard to the processing of personal data by the Community institutions and bodies and on the free movement of such data

Annex 4. Media reports

Date	Media	Title (original) with Hyperlink	Title (English translation)
15-8-2017	mbl.is	Síðustu skátarnir á leið heim	The last scouts on the way home
15-8-2017	ruv.is	Tíu hafa veikst af nóró-veiru á Úlfjótavatni	Ten have been weakened by a noro virus at Úlfjótavatn
15-8-2017	visir.is	Tíu veikir af nóróveirusýkingu á Úlfjótavatni	Ten sick with noro virus infection on Ulfjökull
15-8-2017	mbl.is	Tíu með nóró-veiruna á Úlfjótavatni	Ten with the noro virus at Úlfjótavatn
15-8-2017	ruv.is	Búið að sótthreinsa eftir nóró-smit	Disinfected after noro virus infection
14-8-2017	mbl.is	Fimm skátar orðnir veikir	Five scouts got sick
13-8-2017	mbl.is	„Aldrei séð eins ánægt fólk“	Never seen as happy people
13-8-2017	Stöð 2	Síðustu skátarnir útskrifaðir.	The last scouts graduated
12-8-2017	visir.is	Skátarnir snúa aftur á Úlfjótavatn í kvöld	The scouts return to Úlfjótavatn tonight
12-8-2017	ruv.is	Skátarnir snúa aftur á Úlfjótavatn	The scouts return to Úlfjótavatn
12-8-2017	mbl.is	Fyrsti hópurinn snúi aftur í kvöld	The first group will be back tonight
12-8-2017	visir.is	Fimm skátar enn þá veikir	Five scouts still weak
12-8-2017	visir.is	Hægt að loka fjöldahjálparstöðinni í dag	Can close the mass call centre today
12-8-2017	visir.is	Furðu brött brátt fyrir allt	Surprisingly steep despite everything
11-8-2017	visir.is	Staðfest að um nóróveirusýkingu sé að ræða	Confirmed that there is a noro virus infection
11-8-2017	ruv.is	Vænta niðurstöðu úr sýnatöku síðar í dag	Expected outcome of sampling later today
11-8-2017	visir.is	Veikindi hjá skátum: 181 verið fluttur í fjöldahjálparstöðina	Illnesses of scouts- 181 have been moved to the shelter
11-8-2017	mbl.is	„Ekkert hættuástand hér“	No crisis here
11-8-2017	ruv.is	Haraldur Briem: Bráðsmitandi veira	Haraldur Briem: Irradiating virus
11-8-2017	visir.is	Sótthreinsunarstarf framundan á Úlfjótavatni	Disinfection work ahead at Úlfjótavatn
11-8-2017	dv.is	Sextíu skátar með stjórnlausan pípandi niðurgang	Sixty scouts with uncontrollable diarrhoea
11-8-2017	ruv.is	Tjaldbúðir auðar og sýni greind í dag	Camping camps and samples analysed today
11-8-2017	ruv.is	Öll einkenni nórósýkingar	All symptoms of neuro virus
11-8-2017	ruv.is	Fyrstu tilvikin komu upp á hádegi í gær	The first cases arrived at noon yesterday
11-8-2017	ruv.is	62 magakveisutilvik meðal skáta staðfest	62 stomach cases among scouts confirmed

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