University of Stavanger

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Comparative report of the COVID-19 Pandemic Responses in Norway, Sweden, Germany, Switzerland and the United Kingdom

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Executive summary

The purpose of this report is to compare the risk communication strategies and public health mitigation measures implemented by Germany, Norway, Sweden, Switzerland, and the United Kingdom (UK) in 2020 in response to the COVID-19 pandemic based on publicly available documents. The report compares the country responses both in relation to one another and to the recommendations and guidance of the World Health Organization where available. The comparative report is an output of Work Package 1 from the research project PAN-FIGHT (*Fighting pandemics with enhanced risk communication: Messages, compliance and vulnerability during the COVID-19 outbreak*), which is financially supported by the Norwegian Research Council's extraordinary programme for corona research.

PAN-FIGHT adopts a comparative approach which follows a "most different systems" variation as a logic of comparison guiding the research (Przeworski & Teune, 1970). The countries in this study include two EU member States (Sweden, Germany), one which was engaged in an exit process from the EU membership (the UK), and two non-European Union states, but both members of the European Free Trade Association (EFTA): Norway and Switzerland. Furthermore, Germany and Switzerland govern by the Continental European Federal administrative model, with a relatively weak central bureaucracy and strong subnational, decentralised institutions. Norway and Sweden adhere to the Scandinavian model—a unitary but fairly decentralised system with power bestowed to the local authorities. The United Kingdom applies the Anglo-Saxon model, characterized by New Public Management (NPM) and decentralised managerial practices (Einhorn & Logue, 2003; Kuhlmann & Wollmann, 2014; Petridou et al., 2019).

In total, PAN-FIGHT is comprised of 5 Work Packages (WPs), which are research-, recommendation-, and practice-oriented. The WPs seek to respond to the following research questions and accomplish the following:

- **WP1:** What are the characteristics of governmental and public health authorities' risk communication strategies in five European countries, both in comparison to each other and in relation to the official strategies proposed by WHO?
- **WP2:** To what extent and how does the general public's understanding, induced by national risk communication, vary across five countries, in relation to factors such as social capital, age, gender, socio-economic status and household composition?
- **WP3:** Based on data generated in WP1 and WP2, what is the significance of being male or female[1] in terms of individual susceptibility to risk communication and subsequent vulnerability during the COVID-19 outbreak?
- **WP4:** Based on insight and knowledge generated in WPs 1 and 2, what recommendations can we offer national and local governments and health institutions on enhancing their risk communication strategies to curb pandemic outbreaks?
- **WP5:** Enhance health risk communication strategies across five European countries based upon the knowledge and recommendations generated by WPs 1-4.

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[1] While we acknowledge that some may define themselves as neither male nor female, we will in this study focus on these two genders.

Pre-pandemic preparedness characteristics

- All five countries had pandemic plans developed prior to 2020, which generally were specific to influenza pandemics but not to coronaviruses. All plans had been updated following the H1N1 pandemic (2009-2010).
- During the SARS (2003) and MERS (2012) outbreaks, both of which are coronaviruses, all five countries experienced few cases, with notably smaller impacts than the H1N1 epidemic (2009-2010).
- The UK had conducted several exercises (Exercise Cygnet in 2016, Exercise Cygnus in 2016, and Exercise Iris in 2018) to check their preparedness plans; the reports from these exercises concluded that there were gaps in preparedness for epidemic outbreaks. Germany also simulated an influenza pandemic exercise in 2007 called LÜKEX 07, to train cross-state and cross-department crisis management (Bundesanstalt Technisches Hilfswerk, 2007). In 2017 within the context of the G20, Germany ran a health emergency simulation exercise with WHO and World Bank representatives to prepare for potential future pandemics (Federal Ministry of Health et al., 2017).
- Prior to COVID-19, only the UK had expert groups, notably the Scientific Advisory Group for Emergencies (SAGE), that was tasked with providing advice during emergencies. It had been used in previous emergency events (not exclusively limited to health). In contrast, none of the other countries had a similar expert advisory group in place prior to the pandemic.

COVID-19 waves in 2020
- All five countries experienced two waves of infection in 2020. The first wave occurred during the first half of the year and peaked after March 2020. The second wave arrived during the final quarter.
- Norway consistently had the lowest number of SARS-CoV-2 infections per million. Germany's counts were neither the lowest nor the highest. Sweden, Switzerland and the UK alternated in having the highest numbers per million throughout 2020.

Implementation of measures to control the spread of infection
- In Germany, Switzerland and the UK, health policy is the responsibility of regional states, (Länders, cantons and nations, respectively). However, there was a strong initial centralized response in all five countries to mitigate the spread of infection. Later on, country responses varied in the degree to which they were centralized or decentralized.

Risk communication
- In all countries, a large variety of communication channels were used (press briefings, websites, social media, interviews).
- Digital communication channels were used extensively.
- Artificial intelligence was used, for example chatbots and decision support systems.
- Dashboards were used to provide access to and communicate data.

Special Thanks

Contents

1. Introduction

In this report, important aspects of five countries' preparedness and responses to the COVID-19 pandemic in the period from 1 January 2020 until 31 December 2020 are compared both to each other and to the guidance issued by the World Health Organization (WHO). The five countries are Germany, Norway, Sweden, Switzerland, and the United Kingdom. This report was developed as part of the PAN-FIGHT (*Fighting pandemics with enhanced risk communication: Messages, compliance and vulnerability during the COVID-19 outbreak)* project. Individual country reports have also been produced as part of this project for each of the five countries. They provide a more detailed overview of each of the countries. The majority of the information in this report can be referenced to the original five country reports (Comrie, 2021; Deml et al., 2021; Sparf & Petridou, 2021; Farnaz, 2022; Arora and Koval, 2022).

PAN-FIGHT adopts a comparative approach which follows a "most different systems" variation as a logic of comparison guiding the research (Przeworski and Teune 1970). The countries in this study include two EU member States (Sweden, Germany), one which was engaged in an exit process from the EU membership (the UK), and two non-European Union states, but both members of the European Free Trade Association (EFTA): Norway and Switzerland. Furthermore, Germany and Switzerland govern by the Continental European Federal administrative model, with a relatively weak central bureaucracy and strong subnational, decentralised institutions. Norway and Sweden adhere to the Scandinavian model—a unitary but fairly decentralised system with power bestowed to the local authorities. The United Kingdom applies the Anglo-Saxon model, characterized by New Public Management (NPM) and decentralised managerial practices (Einhorn & Logue, 2003; Kuhlmann & Wollmann, 2014; Petridou et al., 2019).

Since 2000, all five countries have developed, revised, and updated plans preparing for, responding to, and recovering from potential pandemics. All five countries were affected by the H1N1 2009-2010, and attempted to implement mass vaccination campaigns. Switzerland in particular referred to SARS outbreaks in updating its legislation guiding its response to epidemics. Additionally, since 2000, the UK, Germany, and Switzerland have been affected by resurgences of measles outbreaks due to locally low rates of vaccination coverage (Keenan et al., 2017; Richard & Masserey Spicher, 2009; Takla et al., 2014). Given each country's past recent history, or lack thereof, with these infectious agents, it is not surprising to see these outbreaks' prominence in the various pandemic preparedness planning documentation and guidelines in each of the countries. That said, the majority of the preparedness plans gathered in the preparation of these reports were designed in response to potential influenza pandemics. Whereas Switzerland's pandemic preparedness is summarized in one single document, the other countries had several pandemic preparedness plan documents available online. Furthermore, the United Kingdom and Germany had incorporated scenario building and pandemic exercises as part of their pandemic preparedness strategy.

Table 1: Main pandemic plans

	Germany	**Norway**	**Sweden**	**Switzerland**	**United Kingdom**
Document title	(1) Nationaler Pandemieplan Teil I (2) Nationaler Pandemieplan Teil II	(1) The National Health Preparedness Plan, (2) The National Preparedness Plan for Pandemic Influenza, (3) The	(1) Pandemic preparedness: How we prepare ourselves—A state of the art, (2) Pandemic preparedness:	Swiss Influenza Pandemic Plan 2018	(1) UK Influenza Pandemic Preparedness Strategy 2011 (2) UK Pandemic Influenza Communications Strategy 2012

	(3) State Pandemic Plans	Outbreak Handbook, (4) Various Contingency Plans, (5) The Circular on Municipal Infection Control	How we communicate—A state of the art, (3) Pandemic preparedness: Access to and usage of medicine—A guiding document [translations from Swedish]		
Pandemic type(s)	Influenza	Influenza	Influenza	Influenza	Influenza
Year published	(1) 2017, (2) 2016	(1,2) 2014, (4) 2018, (5) December 2020, updated on February 2021	(1-3) 2019	2018	(1) 2011, (2) 2012

The SARS-CoV-2 variant of the coronavirus virus, causing COVID-19 disease, is similar to coronaviruses associated with SARS and MERS and was first acknowledged in Wuhan, China, in late 2019[2]. When symptomatic, the virus can cause dry cough, loss of smell and taste, fever, respiratory problems and in more severe cases also pneumonia. In extreme cases, these Covid-19 related symptoms have been deadly, especially for specifically at-risk groups (i.e. persons above 65 years old, those with underlying health conditions such as asthma, cardiac disease, diabetes, immunosuppressed persons, obesity, etc.)

The WHO Director-General Dr. Tedros Adhanom Ghebreyesus declared[3] the COVID-19 outbreak a Public Health Emergency of International Concern on 30 January 2020. On 31 December 2020, there were cumulatively 83.73 million confirmed cases and 1.88 million confirmed deaths globally since the beginning of the pandemic (Ritchie et al., 2020). The WHO official recommendations for mitigation measures were issued on 4 February 2020[4]. Such recommendations are similar to those used during other recent pandemics, including contact tracing for known cases, quarantine and self-isolation when possible, closing of public spaces where infections are identified, sanitizing surfaces, and extensive use of PPE by both health professionals and the general public, mainly masks[5].

This comparative report is structured into three main parts. First, the report outlines the role of the World Health Organization (WHO) with respect to providing health recommendations and guidance globally, and more specifically, in advising coordinated efforts during global health emergencies and

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[2] See the WHO response strategy here: https://www.who.int/emergencies/diseases/novel-coronavirus-2019
[3] https://www.who.int/director-general/speeches/detail/who-director-general-s-statement-on-ihr-emergency-committee-on-novel-coronavirus-(2019-ncov)
[4] https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance-publications?publicationtypes=01bc799c-b461-4a52-8c7d-294c84cd7b2d
[5] For the full WHO Guidance see here: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance. See here for technical advice: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance . For WHO risk communication documents on different related topics see here:https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance-publications?publicationtypes=0199b599-7664-4a36-917c-910160b68cf0

pandemics. A timeline of selected guidance issued by WHO during 2020 is provided as an external reference point for comparison. Second, an overview of the five countries is provided, including population statistics, governance structures, economic factors, organisation of health care and pandemic experience and preparedness plans. Third, the report compares some of the response measures of the five countries during 2020, including mitigation measures, emergency legislation, and risk communication strategies.

2. World Health Organization and COVID-19

2.1   The World Health Organization and its role in pandemics

Based in Geneva, Switzerland, the World Health Organization (WHO) is an agency of the United Nations (UN) which is responsible for the collection of data on global health issues, consultation to 194 Member States, training of health officials for specific interventions, and the operation of active missions aimed at alleviating health-related crises or emergencies. WHO activities are governed by its constitution, which defines the duties and responsibilities of the organization in contributing towards the promotion of public health around the world. The constitution determines that the WHO will actively promote a healthier environment by generating data on health risks, consulting Member States on how to prevent health hazards, and designing policies and programmes that enhance pro-poor, gender-responsive, and human rights-based approaches to health care at a global scale. To that end, the WHO also oversees the implementation of the International Health Regulations (IHR), a legal framework used as an instrument of international law "to prevent, protect against, control, and provide a public health response to the international spread of disease"[6]. All countries must report events of international public health importance. The IHR is a legally binding document that ratifies the right of the WHO to act as a health monitor and coordinator across national borders.

During the outbreak of epidemic and pandemics, the WHO is responsible for coordinating health responses across counties and for publishing constant, up-to-date information on the health situation in the different Members States. An *epidemic* is defined as the quick spread of disease to many people in a limited area or population. A *pandemic* is defined as the rapid spread of infectious agents or diseases across countries or vast regions, including continental scale spread. Seeking to address outbreaks of rapidly moving epidemics and pandemics, the WHO engages in risk communication tasks through the dissemination of transparent scientific data to the public. It uses videos, live question and answer (Q&A) sessions, webinars and other methods, all of which aim at providing the public with accurate scientific evaluations while countering any myths or conspiracy theories that might be circulating concerning the causes and effects of the health risk in question. Alongside correct information, the WHO also provides guidance to the public based on the assessments of risks that emerge in a context of an outbreak. Within the scope of this guidance, the WHO actively encourages vaccine equity and the balanced exchange of other alleviation methods among Member States.

When a suspected pandemic event begins to unfold, the WHO mobilizes its "procedures concerning public health emergencies of international concern" (PHEIC), a set of empirical steps that make part of the IHR rule book. Considering to declare a PHEIC pre-emptively determines how the WHO should act and what kinds of interventions it may carry, if at all, in different situations. The PHEIC determines that the WHO will intervene in health crises that (1) constitute a public health risk to other member states due to the potential or effective spread of a disease across international borders; and/or (2) that require a coordinated international response to combat a serious, unusual or unexpected health situation, which carries implications for public health beyond the affected State's national border.

The decision to declare a PHEIC situation is under the discretion of the WHO Director-General, who is obliged to summon the IHR Emergency Committee before any steps are taken. The IHR committee advises the Director General on the recommended measures, which are initially considered "temporary recommendations", and which include a list of health measures to be implemented by the State Party/Member experiencing the PHEIC. In some cases, the committee recommends that other States Parties should also act. Recommendations for action vary from dissemination of information to the implementation of containment measures. All temporary measures are aimed at preventing or

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[6] IHR, WHO website: http://www.emro.who.int/entity/international-health-regulations/index.html

reducing the international spread of disease while avoiding unnecessary interference with international affairs such as travel, supply-chain networks, the function of economies, or disruption to other infrastructures. Actual containment measures depend on the viral agent in question and the severity of the outbreak. They might include case tracking/contact tracing, isolation, quarantine, lockdown, prohibition of mass gatherings, screening of travellers, recommendations for improved personal hygiene and use of personal protection by means of masks, gloves, gowns, eye protectors or other Personal Protective Equipment (PPE). In more severe cases, such as the Ebola outbreaks in 2014-16, actual WHO intervention teams may be deployed to work side by side Member State health service providers in containment missions.

The Emergency Committee also gives advice on the determination of the event as a PHEIC in circumstances where there is inconsistency in the assessment of the event between the Director-General and the affected country/countries. The Emergency Committee continues to provide advice to the Director-General throughout the duration of the PHEIC, including any necessary changes to the recommended measures and on the determination of PHEIC termination. WHO regularly maintains an IHR roster of experts and the members of an IHR Emergency Committee are selected from this roster and/or WHO expert advisory panels and committees. At least one member of the Emergency Committee must officially be an expert nominated by a State Party within whose territory the event arises.

2.2   World Health Organization interventions and guidance in recent pandemics

Prior to 2020, the WHO recommended that all countries develop preparedness plans for a potential pandemic and provided support to countries through the development of a suite of 'evidence-based' guidance. These preparedness plans were primarily based upon potential responses to, and lessons learnt from, influenza epidemics. A range of documents published by the WHO related to influenza pandemic preparedness existed prior to 2020, including: (1) in 2013, Pandemic influenza risk management: WHO interim guidance (WHO, 2013); (2) in 2017, Pandemic influenza risk management: a WHO guide to inform & harmonize national & international pandemic preparedness and response (WHO, 2017); (3) in 2018, A checklist for pandemic influenza risk and impact management: building capacity for pandemic response[7]; (4) in 2018, Essential steps for developing or updating a national pandemic influenza preparedness plan[8]; and (5) in 2019, Non-pharmaceutical public health measures for mitigating the risk and impact of epidemic and pandemic influenza[9].

Since the turn of this century, the WHO has so far been pivotal in identifying and combating the spread of at least six major outbreaks of health situations it defined as pandemics[10]. These include: (1) the 2002-2003 SARS; (2) the 2004 Avian Flu (H5N1 variant and similar); (3) the 2009-10 Swine Flu (AH1N1 variant and similar); (4) 2012 SERS; (5) the 2014-16 Ebola outbreak; and (6) the current COVID-19 pandemic.

WHO successive director generals regularly advocated for sustained efforts in pandemic preparedness. Margaret Chan's famous line: "the World is ill-prepared to respond to any severe, sustained, and threatening public health emergency" (Chan, 16.09.2014, 64th session of WHO Assembly) brings back

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[7] Available from:
https://www.who.int/influenza/preparedness/pandemic/influenza_risk_management_checklist_2018/en/
[8] Available from: https://www.who.int/influenza/preparedness/pandemic/essential_steps_influenza/en/
[9] Available from: https://www.who.int/influenza/publications/public_health_measures/publication/en/
[10] The WHO maintains and updates a thorough database with full details of major contemporary health threats that are defined as pandemics. Information can be obtained on each of them separately. See here: https://www.who.int/emergencies/diseases/en/

the exact same comment made in 2010 after H1N1 pandemic by the IHR Review Committee convened to assess the response to the 2009 influenza pandemic.

2.2.1   SARS (2002-2003): A Serious Pandemic Alert

Severe Acute Respiratory Syndrome (SARS) was identified for the first time in the Chinese region of Guangdong in November 2002. It became a global pandemic by March 2003, as it spread quickly to other countries, including Singapore, Canada, and Hong Kong. The SARS disease included symptoms of dry coughs, fever, headaches, and body pains, and it was quickly established that it was transmitted through droplets propelled from the body by sneezes and coughs. The WHO monitored the spread of the disease from its onset and quickly declared an international travel warning. It recommended several containment policies, which were largely implemented by the Member States. These included: case tracking, quarantine, the dissolution of mass gatherings, travel bans and recommendation for use of personal protection. Although SARS affected 29 countries across five continents, the containment operation successfully limited the outbreak. Overall, SARS infected 8,098 people, caused 774 deaths, and brought about only minor disruption to international travel. The WHO announced the end of the pandemic in July 2003. This global response has been considered a success Observers and experts noted that the swift management of this crisis helped WHO's leadership to regain status and strength at the turn of the 21st century.

2.2.2   The Avian Flu (2004): The Zoonotic Paradigm

The H5N1 virus has caused outbreaks of flu in birds in the 1950s and later in the 1990s, but its mutation in 2004 resulted in a major health event. It was first identified in January 2004 in Vietnam's and Thailand's chicken stocks, spreading quickly to other species of birds as far as Indonesia, South Korea, China and Japan. It was established that this strain of the flu could be transmitted to humans and could prove to be fatal. The WHO containment strategies consequently included a ban on the import and export of poultry to and from affected countries and a case tracking registry of new infections. The Avian Flu continued to mutate in the following years and recurred in several places around the world until 2007. The overall death toll was measured in the hundreds. The WHO experts still consider the H5N1 agent to be a potential threat for a future outbreak. Zoonotic highly pathogenic influenza viruses regularly cause human infections since 2007.

2.2.3   H1N1 (2009-2010): A Trial Run for COVID-19

The 'Swine Flu' (H1N1) initially spread from the town of La Gloria, Mexico, where several cases of a severe respiratory illness were reported since March 2009. By April 2009, 1,800 cases of swine flu had been recorded in Mexico along with 149 deaths. The virus was established to be easily transmitted between humans, and it quickly spread to countries around the world, from the USA to Spain and United Kingdom. The WHO declared the spread of the H1N1 variant to be a pandemic in June 2009 and recommended several safety and preventive steps. These included the closing of schools and public places which experienced outbreaks, the implementation of self-quarantine when possible and the strengthening of local health service responses to suspected cases of infection. China, which is one of WHO Member States, introduced screening of travellers in airports to detect arriving foreign nationals with high temperatures, and enforced quarantine on those suspected to be infected. Chinese nationals returning from severely affected countries were placed in quarantine for ten days, irrespective of their health condition. The pandemic is estimated to have infected at least 700 million people around the world and to have caused around 284,500 deaths (less than the death toll of a seasonal influenza epidemic). The pandemic began to decline by the end of 2010 and the WHO Director-General at the time Margaret Chan announced the end of the pandemic in August 2010.

From the 2000s onwards, global public health experts, as prompted by the WHO and as a result of lessons learned from the SARS outbreak, continued to devote efforts to a vast operation to prepare pandemic plans. This investment in pandemic planning also signaled the move from the WHO to regain status in world health leadership. The largest preparedness operation in the history of public health was applied at all levels and brought people on board from different professions who during these years learned to get to know one another and to work together (Keck, 2010; Lakoff, 2017; MacPhail, 2014; Zylberman, 2013). In April 2009, the WHO had just published its new Pandemic Influenza Preparedness and Response plan.

To a large extent, these plans proved, at least according to retrospective declarations (Bourrier et al., 2019), to be helpful when logistics were involved. They were used as a coordination mechanism but were ultimately set aside because the plans compelled action based on a severe crisis, but the threat would prove to be of a lesser magnitude than anticipated (Keller et al., 2012). Various investment logics were in the works. They concerned the resources that needed to be mobilized, resources that were not only financial in nature, but also organizational, communicational and cognitive. The establishment of pandemic plans along with contingency and business continuity plans within administrations, hospitals, schools, public transportation, the private sector, airports and places with high concentrations of people fell upon the responsibility of hundreds of individuals in order to get ready for the preparedness war front. All the hype about the rolling out of the thought-out plans for one of the most severe pandemics as well as the difficulty of leaving behind a worst-case-scenario logic, have characterized the response at the time. Many of the responders throughout the world, particularly those who worked in national public health services, attributed this escalation to the strong injunctions provided by the international echelon represented by the WHO. WHO top leaders were accused of having a "cry wolf attitude."

The variation in H1N1 pandemic responses was striking across European countries, even between countries with very similar profiles. This is one of the puzzles of H1N1 research. Despite strong international impetus, resources invested at the country level and similar threats, European countries offered a picture of contrasts. This is especially clear when considering vaccination campaigns (Baekkeskov, 2016; Mereckiene et al., 2012). These campaigns were met with very different acceptance. To summarize, the response to H1N1 was mainly geared towards the production of a vaccine. However, the time it took to produce it, and the difficulties encountered in convincing populations to get vaccinated provoked social controversies, which consistently made the headlines in the press.

After the crisis, and in line with the observations made in the retrospective feedback reports, the Member States adopted an ambivalent position: one that allowed them to free themselves of the supervision of the WHO in matters of risk evaluation, while at the same time recognizing its central role. One can take note of a change in the vocabulary: checklists and steps are now preferred as plans. Finally, some countries have also moved away from specific pandemic preparedness plans to incorporate a wider range of emergencies, and have built more generic plans, that could be of use in several emergencies and not only health emergencies. The "All-hazards" doctrine is gaining ground.

There is no doubt that this recent past history with H1N1, only 10 years prior to the Covid-19 pandemic, has played an influential role in the early days of the global response in 2020.

2.2.4   MERS (2012): Here comes a coronavirus

The Middle East Respiratory Syndrome Coronavirus (MERS-CoV) was first detected in Saudi Arabia. The virus is carried by bats, but it can spread to other animals, including camels. It is believed that humans in Saudi Arabia were infected from camels. The virus can be transmitted between humans via droplets expelled by sneezing and coughing. Like other coronavirus variants, the virus affects the respiratory

system and causes fever, cough, diarrhea, breathing difficulties and pneumonia, which can be lethal. Until September 2019, the WHO had identified 2,468 laboratory-confirmed cases of MERS-CoV related infections and 851 deaths, which amounts to a deadly 35% death rate. Several countries in Middle East – Saudi Arabia, United Arab Emirates, Qatar, Jordan, Oman and Kuwait – remain the centre of MERS-CoV's primary infections. However, travel related incidents have been detected in France, Germany, Italy, Tunisia and the United Kingdom. To date, a total of 27 countries have reported cases of MERS-CoV. To contain the pandemic, the WHO recommended the use of basic intervention and containment strategies. These include keeping hygiene rules at large, avoiding contact with infected people, routinely washing hands, sanitizing surfaces, and abstinence from camel-derived edible products[11].

2.2.5 Ebola (2014-2016): Evidence of a fragile and fragmented global health

Ebola (EVD) is a severe viral disease whose symptoms include very high fever, bodily pain, vomiting, dehydration, skin rash, reduced functionality of the liver and the kidneys, as well as internal bleeding that can be fatal. The average case rate fatality in Ebola is around 50%. The virus was first detected in 1976, during two outbreaks in Sudan and the Democratic Republic of the Congo. These outbreaks resulted in 151 deaths and 280 deaths respectively. Fruit Bats are known to be the carriers of the virus, but like other infectious agents, they can be transmitted to other animals. Transmission to human takes place due to contact with contaminated bodily fluids, such as blood. The main known outbreaks took place in 1995 (254 deaths in the Democratic Republic of the Congo), 2000 (224 deaths in Uganda), 2003 (128 deaths in the Congo) and 2007 (187 deaths in the Democratic Republic of the Congo). According to the WHO, until the 2014 outbreak occurred, the virus had claimed 1,590 lives.

The 2014-2016 outbreak in West Africa is considered the largest Ebola outbreak to date. It began in Guinea's forest region, spread to Liberia and Sierra Leone, and reached their urban centers. Nigeria and Senegal experienced cases transmitted through air travel and road travel, respectively. By June 2016, when the WHO officially declared the end of the pandemic, declared cases were at least 28,000 with more than 11,000 deaths. Containment measures included a complete travel ban from and to the infected areas, and the use of PPE both for healthcare workers and people living in affected areas. The WHO along with first responders, mainly the large NGO, *Médecins sans frontiers (Doctors without borders)*, builds its containment strategy on rigorous contact tracing of people infected with Ebola, treatment of the sick in specialized wards, safe burials or cremation of bodies, compulsory quarantine for people flying away from infected areas[12]. The NGO was used to intervening in these situations. It had developed protocols, could count on trained personnel and on powerful logistics. However, MSF would eventually find itself overwhelmed (MSF, 2015). In addition, isolation, searching for infected individuals and acceptance of intervening medical teams proved to be recurring challenges in almost all of the afflicted regions and countries. Humanitarian aid workers were regularly met with hostility. The WHO has initially carried out treatments with antibodies and in 2020 it recommended the European Medicines Agency to grant authorization for a 2-component vaccine[13]. The WHO announced the end of the 2014-2016 Ebola pandemic in March 2016. The image of WHO during and after the Ebola Crisis has long been tarnished.

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[11] See more info here:
https://www.who.int/health-topics/middle-east-respiratory-syndrome-coronavirus-mers#tab=tab_1

[13] See the granting of authorization here: https://www.ema.europa.eu/en/documents/press-release/new-vaccine-prevention-ebola-virus-disease-recommended-approval-european-union_en.pdf

2.2.6   Measles (2019): Emblematic of Europe's resistance to vaccination

Despite having made measles eradication a goal by 2015 (WHO, 2010), the WHO noted how many European countries, notably Ukraine, Kazakhstan, Georgia, Russia, Turkey, and Kyrgyzstan, had many large measles outbreaks in 2019 (WHO, 2019a). Such resurgences in measles were so widespread globally, despite the availability of measles vaccination, that the WHO listed *vaccine hesitancy* among 10 threats to global health in 2019 (WHO, 2019c). Vaccine hesitancy would prove to remain a pressing issue as the world faced the enduring COVID-19 epidemic and new vaccinations against the coronavirus began showing signs of efficacy and safety toward the end of 2020 (Dubé & MacDonald, 2020; Polack et al., 2020; Ward et al., 2020).

2.3   An overview of WHO's 2020 guidance and communication around COVID-19

Throughout 2020, the WHO issued guidance and conducted a range of activities in response to the COVID-19 pandemic[14]. We provide a timeline of key actions in 2020 (see Figure 1). During 2020, the WHO published 11 pieces of technical guidance under the theme "Risk communication and community engagement"[15]. We summarized these Technical Guidance Documents in Annex 1. The WHO also provided reviews of the situation in different countries while also actively delivering equipment such as PPE (especially masks and gowns) and medical oxygen supplies to poorer regions of the world. In the context of the COVID-19, the WHO employed various communication methods and strategies to spread evidence-based information on mitigation measures and sanitary recommendations. These strategies included reaching out to people via traditional press conferences and mainstream media. The WHO extensively used social media to spread information on a global scale via the main social media channels (e.g. Facebook, Twitter and Instagram) and expanding to include the dissemination of information via WhatsApp, LinkedIn, TikTok and text messaging (SMS) in more than 50 countries. This WHO information dissemination campaign is the organization largest in scale and scope to date.

Again, at the beginning of the crisis, WHO's position, especially with regard to the way the Director General, Dr. Tedros Adhanom Ghebreyesus, dealt with Chinese government's (un)-disclosure of information about Covid-19 has been heavily criticized. This initial controversy in the early days of 2020 is in line with past crisis: WHO is not an uncontestable leader of global health.

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[14] The WHO provides a selective overview of these responses here: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/interactive-timeline.
[15] Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance-publications?publicationtypes=0199b599-7664-4a36-917c-910160b68cf0
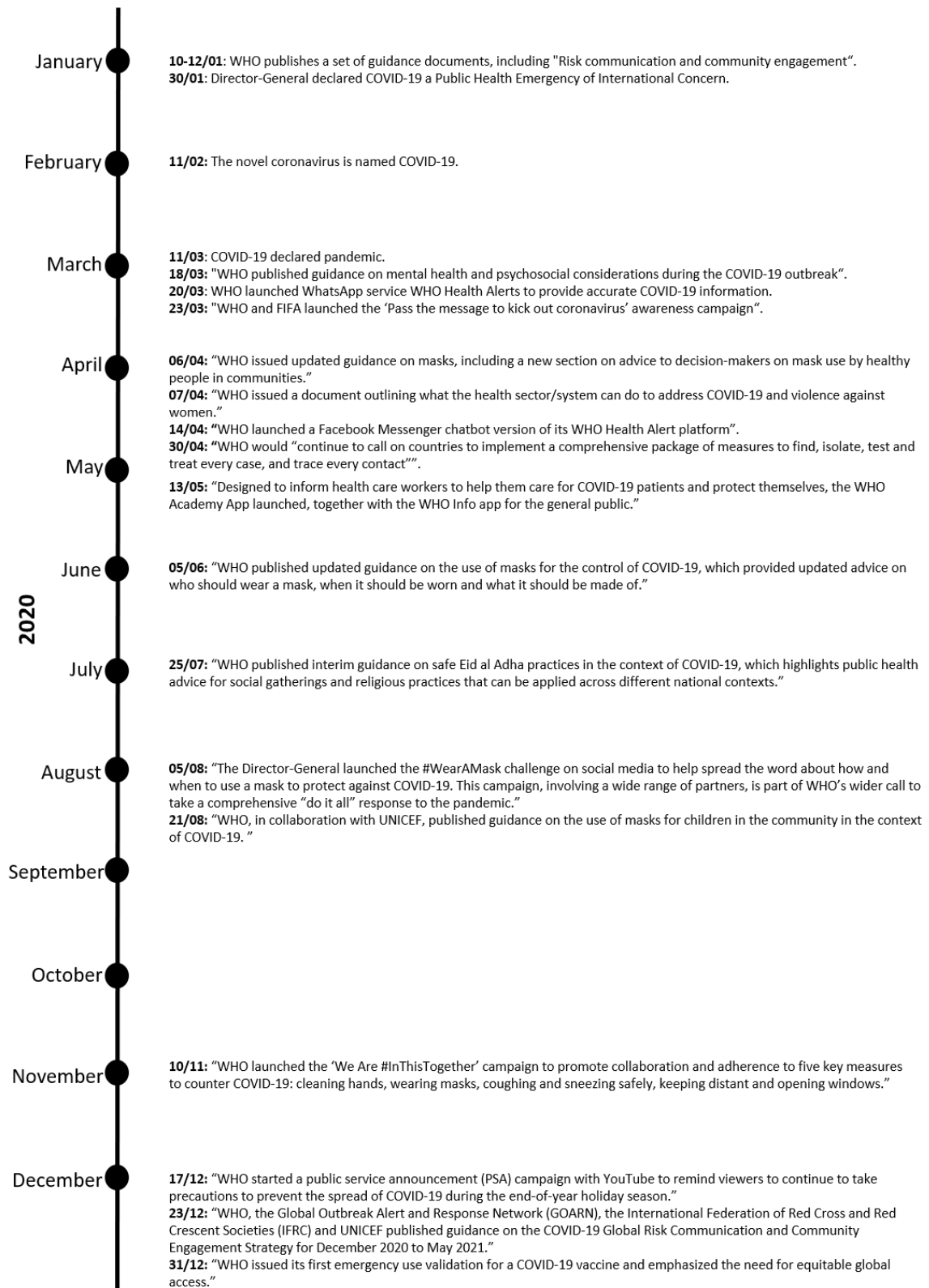
2020

January
10-12/01: WHO publishes a set of guidance documents, including "Risk communication and community engagement".
30/01: Director-General declared COVID-19 a Public Health Emergency of International Concern.

February
11/02: The novel coronavirus is named COVID-19.

March
11/03: COVID-19 declared pandemic.
18/03: "WHO published guidance on mental health and psychosocial considerations during the COVID-19 outbreak".
20/03: WHO launched WhatsApp service WHO Health Alerts to provide accurate COVID-19 information.
23/03: "WHO and FIFA launched the 'Pass the message to kick out coronavirus' awareness campaign".

April
06/04: "WHO issued updated guidance on masks, including a new section on advice to decision-makers on mask use by healthy people in communities."
07/04: "WHO issued a document outlining what the health sector/system can do to address COVID-19 and violence against women."
14/04: "WHO launched a Facebook Messenger chatbot version of its WHO Health Alert platform".
30/04: "WHO would "continue to call on countries to implement a comprehensive package of measures to find, isolate, test and treat every case, and trace every contact"".

May
13/05: "Designed to inform health care workers to help them care for COVID-19 patients and protect themselves, the WHO Academy App launched, together with the WHO Info app for the general public."

June
05/06: "WHO published updated guidance on the use of masks for the control of COVID-19, which provided updated advice on who should wear a mask, when it should be worn and what it should be made of."

July
25/07: "WHO published interim guidance on safe Eid al Adha practices in the context of COVID-19, which highlights public health advice for social gatherings and religious practices that can be applied across different national contexts."

August
05/08: "The Director-General launched the #WearAMask challenge on social media to help spread the word about how and when to use a mask to protect against COVID-19. This campaign, involving a wide range of partners, is part of WHO's wider call to take a comprehensive "do it all" response to the pandemic."
21/08: "WHO, in collaboration with UNICEF, published guidance on the use of masks for children in the community in the context of COVID-19. "

September

October

November
10/11: "WHO launched the 'We Are #InThisTogether' campaign to promote collaboration and adherence to five key measures to counter COVID-19: cleaning hands, wearing masks, coughing and sneezing safely, keeping distant and opening windows."

December
17/12: "WHO started a public service announcement (PSA) campaign with YouTube to remind viewers to continue to take precautions to prevent the spread of COVID-19 during the end-of-year holiday season."
23/12: "WHO, the Global Outbreak Alert and Response Network (GOARN), the International Federation of Red Cross and Red Crescent Societies (IFRC) and UNICEF published guidance on the COVID-19 Global Risk Communication and Community Engagement Strategy for December 2020 to May 2021."
31/12: "WHO issued its first emergency use validation for a COVID-19 vaccine and emphasized the need for equitable global access."

Figure 1: Selected WHO responses in 2020 to the COVID-19 pandemic. Sources: https://www.who.int/news/item/29-06-2020-covidtimeline and https://www.who.int/emergencies/diseases/novel-coronavirus-2019/interactive-timeline#event-230

3. Pre-pandemic comparative overview of study countries

In the following subsections, a comparative overview featuring of statistics and facts about the five countries is provided and discussed. The purpose is to provide high-level contextual aspects about the demographic characteristics, governance structure and health systems in each of the five countries.

3.1 Population characteristics

In Table 2, a summary of the population characteristics is provided. The five countries have a wide range in population size, from Norway's 5.3 million, Switzerland's 8.6 million, and Sweden's 10.4 million, to the UK's 66.8 million and Germany's 83.1 million. Of the five, Norway has the lowest population density, 15 per square kilometre, and the UK the highest at 275 per square kilometre. Population densities within the five vary significantly due to the combination of urbanised and rural locations. Life expectancy (both sexes together) is highest in Switzerland at 84 and lowest in Germany and the UK at 81. In all countries, the life expectancy for females is longer than males, with the largest difference between the two in Germany (over 4 years), and the smallest differences in the UK and Sweden (3 years). The average household size (persons) is lowest in Sweden, 1.99 persons, and highest in the UK, 2.4 persons. Living space per person is highest in Norway and Germany, 47m^2, and lowest in the UK at 35.2m^2.

Table 2: Population characteristics[16]

Indicator	Germany	Norway	Sweden	Switzerland	United Kingdom
Population size	83.1 (Destatis, 2019)	5.295 (SSB, 2021) Ref period- 2018	10.38 million (SCB, 2020)	8.6 (2020) (Federal Statistical Office, n.d.)	66.8 (2019) (Office for National Statistics, 2021a)
Life expectancy (at birth)	Female: 83.3 Male: 78.6 Both sexes: 81 (2019) (WorldBank, n.d.-f, n.d.-g, n.d.-h)	Female: 85 Male: 81 Both sexes: 83 (2019) (WorldBank, n.d.-f, n.d.-g, n.d.-h)	Female: 84 Male: 81 Both sexes: 83 (2019) (WorldBank, n.d.-f, n.d.-g, n.d.-h)	Female: 86 Male: 82 Both sexes: 84 (2019) (WorldBank, n.d.-f, n.d.-g, n.d.-h)	Female: 83 Male: 80 Both sexes: 81 (2019) (WorldBank, n.d.-f, n.d.-g, n.d.-h)
Population aged 65+ years (%)	21.1 (2015) (WHO Regional Office for	16.3 (2015) (WHO Regional Office for Europe, 2019)	19.6 (2015) (WHO Regional Office for Europe, 2019)	18.8% (2020) (Federal Statistical Office, n.d.)	18.5% (2019) (Office for National Statistics, 2020)

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[16] Most of the data for all five countries are collected from WorldBank, WHO Regional Office for Europe, United Nations. Additional references include: for Germany, Destatis and Gaertner; for Norway, SSB and Statista; for Sweden, SCB, Eurostat, Socialstyrelsen and Ekberg; for Switzerland, BFS, OECD and Peter & Schut; and for the UK, ONS, Gleeson and Competition & Markets Authority.

	Europe, 2019)				
Population density (people per sq. km of land area)	237 (2018) (WorldBank, n.d.-k)	15 (2018) (WorldBank, n.d.-k)	25 (2018) (WorldBank, n.d.-k)	215 (2018) (WorldBank, n.d.-k)	275 (2018) (WorldBank, n.d.-k)
Average household size (number of persons)	2.1 (UN, 2019)	2.2 (UN, 2019)	One or two dwelling buildings: 2.6, Multi dwelling building: 1.9, special housing: 1.3, Other housing: 1.9 (SCB, 2019)	2.2 (2019) (UN, 2019)	2.4 (2017) (Office for National Statistics, 2017)
Single person household	42.3 % (Destatis, 2019	18 % (Statista, 2020)	52 % (Eurostat, 2016)	15.8% (2020) (Federal Statistical Office, n.d.)	29.5% (2019) (Office for National Statistics, 2019)
Living space per person	47 m^2 (Destatis, 2019)	58 m^2 (Statistics Norway, 2014)	42 m^2 (SCB, 2019)	46 m^2 (BFS, 2019a)	38.1 m^2 (Gleeson, 2021)
Living in care homes	4.2% of the population 65 years and older and 11.5% of the population 80 years and older (Gaertner et al. 2019)	45,138 persons in 2019. In 2017 it was about 42,000 persons, 67 years or older, registered as living in care homes 30,845 of them living there permanently (Statistics Norway, 2020)	In 2019, 108,500 people lived in special housing (institutional care) at some time during the year. 66 % were women and 34 % were men (Socialstyrelsen, 2019)	Accommodation rate in nursing homes among persons aged ≥ 80 years: 15.1% (BFS, 2019) In 2012, 8% of the population aged 65 and over were in longterm care in a nursing home 80+ population living in care home: 16.8 (BFS, 2019b; OECD, 2017;	410,000 (Competition & Markets Authority, 2017)

				Peter & Schut, 2019)	
Urban population (%)	77 (2019) (WorldBank, n.d.-m)	83 (2019) (WorldBank, n.d.-m)	88 (2019) (WorldBank, n.d.-m)	74 (2019) (WorldBank, n.d.-m)	84 (2019) (WorldBank, n.d.-m)
Languages	German	Norwegian (Bokmål and Nynorsk), Sami	Swedish is the main spoken Language. Five officially recognized national minority languages: Finnish, Meänkieli (Tornedalian Finnish), Yiddish, Romany and Sami (Ekberg, 2011)	German (both High German and Swiss German) is spoken by about 63% of the population, French by about 23%, and Italian by about 8%. Romansh is spoken by less than 1% of the total population. (BFS, 2021)	English and Welsh are both official languages.

3.2 Prevalence of risk factors and population health

Several health factors/conditions were selected for comparison based on identification of these as risk factors for developing severe illness from COVID-19 infection. We recognize that there are important social determinants, such as race, ethnicity, and socioeconomic deprivation, that are associated with increased probability of COVID-19 incidence and hospitalisation (Upshaw et al., 2021), but due to lack of systematically collected evidence, we have not included social determinants in this part of the report. The prevalence of diabetes was highest in the UK at 7.7% and the lowest in Switzerland at 5.6%; the prevalence of obesity was highest in the UK at 29.8% and lowest in Switzerland at 21%; the UK also had the highest percentage overweight, 66.7%, and Switzerland the lowest at 58.2%; the prevalence of cancer was highest in Switzerland and lowest in Sweden. Age was also considered a risk factor for severe illness and Germany had the highest percentage of the population aged 65 and over, with 21.1%, and Norway the lowest at 16.3%.

Table 3: Risk factors for severe illness from COVID-19

Risk factors	Germany	Norway	Sweden	Switzerland	United Kingdom
Prevalence of diabetes	7.4% (WHO, 2016a)	6.6% (WHO, 2016b)	6.9% (WHO, 2016c)	5.6% (WHO, 2016d)	7.7% (WHO, 2016e)
Prevalence of obesity	22.7% (WHO, 2016a)	24.8% (WHO, 2016b)	22% (WHO, 2016c)	21% (WHO, 2016d)	29.8% (WHO, 2016e)
Percentage overweight	59.7% (WHO, 2016a)	61.6% (WHO, 2016b)	59.2% (WHO, 2016c)	58.2% (WHO, 2016d)	66.7% (WHO, 2016e)
Prevalence of cardiovascular disease (%)	37% (WHO, 2018a)	28% (WHO, 2018b)	35% (WHO, 2018c)	31% (WHO, 2018d)	25% (WHO, 2018e)
Percentage mortality with respiratory illness	6% (WHO, 2018a)	8% (WHO, 2018b)	6% (WHO, 2018c)	5% (WHO, 2018d)	8% (WHO, 2018e)
Estimated number of prevalent cases (5-year) as a proportion in 2020, all cancers, both sexes, all ages	2611.7 (International Agency for Research on Cancer & World Health Organization, n.d.)	2219.3 (International Agency for Research on Cancer & World Health Organization, n.d.)	2158.8 (International Agency for Research on Cancer & World Health Organization, n.d.)	2663 (International Agency for Research on Cancer & World Health Organization, n.d.)	2230.7 (International Agency for Research on Cancer & World Health Organization, n.d.)

Population aged 65 and over	21.1 (2015) (WHO Regional Office for Europe, 2019)	16.3 (2015) (WHO Regional Office for Europe, 2019)	19.6 (2015) (WHO Regional Office for Europe, 2019)	18.8% (2020) (Federal Statistical Office, n.d.)	18.5% (2019) (Office for National Statistics, 2020)
Physical inactivity	23.4% (WHO, 2016a)	28.8% (WHO, 2016b)	31.1% (WHO, 2016c)	35% (FOSPO, 2013)	40% (WHO, 2016e)

3.3   Government and economy

In Table 4 aspects about government and economy are provided. Of the five high-income countries, Switzerland had the highest GDP per capita at $72,372.2 and the UK the lowest at $49,930.2. Unemployment rates ranged between 4.4% in Norway to 7.7% in Sweden. The GINI index[17], a measure of income inequality, was lowest in Norway at 27 and highest in the UK at 34.8. The GINI value compares the cumulative proportions of the population against cumulative proportions of income; the closer the value is to 0, the closer it is to "perfect equality", and the closer it is to 100, the closer it is to "perfect inequality" (OECD, 2021). Poverty headcount ratio at national poverty lines (% of population) was lowest in Norway 12.9% and highest in the UK at 18.6%.

Table 4: Government and economic related factors

Factor	Germany	Norway	Sweden	Switzerland	United Kingdom
Member State of WHO	Yes	Yes	Yes	Yes	Yes
EU Member	Yes	No	Yes	No	In exit process in 2020
Number of states/regions	16 federal states	4 regional health authorities, 11 counties, 356 municipalities	21 counties (regioner), 290 municipalities (kommuner)	26 cantons	4 nations
GDP per capita, PPP (current international $)	57,557.9 (2019) (WorldBank, n.d.-c)	70,005.9 (2019) (WorldBank, n.d.-c)	56,668.3 (2019) (WorldBank, n.d.-c)	72,372.2 (2019) (WorldBank, n.d.-c)	49,930.2 (2019) (WorldBank, n.d.-c)
Unemployment level	3.2%	4.4% (NAV,2020)	7.5% (SCB, 2021)	5.3%	3.8% (2019)

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[17] More information on the GINI index: https://databank.worldbank.org/metadataglossary/gender-statistics/series/SI.POV.GINI

	(Destatis, 2021)			(Federal Statistical Office, 2020)	(Office for National Statistics, 2021b)
Sick pay	When people fall ill and have been employed continuously for four weeks beforehand, then they are entitled to sickness benefits from the day on which medical doctors determines they are is unable to work for six weeks. Health insurance companies pay for a maximum of 78 weeks for the same illness. However, if employers pay for sickness benefits for the first 6 weeks, health insurance companies pay said benefits for 72 weeks. Sick pay is 70 percent of gross earnings, but a maximum of 90 percent of net earnings.	Employed persons will receive sick pay that equals their regular salary (up to a set level) from day one of the sick leave. The first 16 days are covered by the employer. For the days beyond that, the employer will continue to pay sick leave but is entitled to reimbursement from the state. The maximum period of sick pay is 52 weeks.	If you cannot work as a result of the fact that you are sick, you can normally obtain compensation through the whole sick period. How much you receive in compensation depends on your income. Sick pay from employer: 80% of salary. With a collective agreement it can be higher. (European Commission)	Daily allowance in case of incapacity to work due to sickness The insurer agrees with you or your employer on the amount of daily allowance: Payment made by the majority of insurers: 80% of your salary. Waiting period and duration of payment: Waiting period of 3 days. In general, allowances are paid for at least 720 days over a period of 900 days. (European Commission)	£95.85 for 28 weeks paid for by the employer (in 2020). (GOV.UK, n.d.)

	Anyone who is unable to work after 78 weeks, should register as unemployed - if he or she is entitled to a disability pension. (Vdk, 2020)				
Sick pay (self-employed)	Starting the 7th week of being ill for up to 78 weeks under public health insurance. In case someone wants to receive payment also before the 7th week, the person would need to buy additional health insurance to cover that period	People are entitled to sickness benefits from the seventeenth day of absence. For the first sixteen calendar days, they can receive sickness benefits if they have signed an insurance. For self-employed, the sickness benefit amounts to 80% of the sickness benefit basis. For freelancers, the sickness benefit amounts to 100% of the sickness benefit basis. (nav, 2019)	Self-employed people can also obtain sickness cash benefit from the Swedish Social Insurance Agency after a waiting period.	Self-employed persons need to take out a paid sick leave insurance to cover the loss of income in the event of illness. Payment made by insurers may vary, similar to the case as above (ch.ch)	No sick pay
GINI Index	31.9 (2016) (WorldBank, n.d.-d)	27.6 (2018) (WorldBank, n.d.-d)	30.0 (2018) (WorldBank, n.d.-d)	33.1 (2018) (WorldBank, n.d.-d)	35.1 (2017) (WorldBank, n.d.-d)
Poverty headcount ratio at national poverty lines (% of population)	14.8 (2018) (WorldBank, n.d.-l)	12.7 (2018) (WorldBank, n.d.-l)	17.1 (2018) (WorldBank, n.d.-l)	16.0 (2018) (WorldBank, n.d.-l)	18.6 (2017) (WorldBank, n.d.-l)

3.4   Healthcare System Characteristics

In Table 5, several indicators are provided about the health systems in five countries. The highest value for each indicator is noted with an asterisk. One notable aspect is the number of beds per 1,000 people in Germany compared to the other four countries. Germany has a much higher number than the other countries, almost double the country with the second highest value. Another aspect of interest is the number of physicians and nurses and midwives per 1,000 individuals in the population; the UK is highest in terms of midwives and nurses, and Switzerland is the highest in terms of physicians.

Table 1: Health indicators for the five countries

Indicator	Germany	Norway	Sweden	Switzerland	United Kingdom
Health expenditure per capita (current US$) (WorldBank, n.d.-b)	5,472.20 (2018)	8,239.10 (2018)	5,981.71 (2018)	9,870.66* (2018)	4,315.43 (2018)
Current health expenditure (% of GDP) (WorldBank, n.d.-a)	11.43 (2018)	10.05 (2018)	10.90 (2018)	11.88* (2018)	10.00 (2018)
Nurses and midwives (per 1,000 people) (WorldBank, n.d.-i)	13.2 (2017)	18.2* (2018)	11.8 (2017)	17.5 (2017)	8.2 (2018)
Physicians (per 1,000 people) (WorldBank, n.d.-j)	4.2 (2017)	2.9 (2018)	4.0 (2016)	4.3* (2017)	2.8 (2018)
Hospital beds (per 1,000 people) (WorldBank, n.d.-e)	8.0* (2017)	3.5 (2018)	2.1 (2018)	4.6 (2018)	2.5 (2019)
Acute care beds per 100,000	621* (2014) (WHO Regional Office for Europe, n.d.)	343 (2014) (WHO Regional Office for Europe, n.d.)	235 (2014) (WHO Regional Office for Europe, n.d.)	375 (2014) (WHO Regional Office for Europe, n.d.)	228 (2014) (WHO Regional Office for Europe, n.d.)

3.5   Organisation and funding of health systems

The health systems in Norway, Sweden, and the United Kingdom are predominantly publicly funded through taxes, with differing degrees of out-of-pocket payments. In contrast, in Germany and Switzerland, healthcare is funded through mandatory health insurance schemes which are heavily regulated by the respective governments. In Switzerland it is offered by private (non-governmental) organisations, and in Germany it is offered by statutory insurance for almost 88% of population and through private schemes. Similar to Norway, Sweden, and the UK, there are additional out-of-pocket payments required in Switzerland, either through co-payments/deductibles or services not covered by basic mandatory health insurance schemes. All five systems aim to provide universal coverage for their populations.

Each of the five countries have at least one body responsible for public health, including infectious diseases. These are the Robert Koch Institute in Germany; the Norwegian Institute of Public Health in Norway; the Public Health Agency of Sweden in Sweden; the Federal Office for Public Health in Switzerland; and Public Health England, Public Health Agency, Public Health Wales, and Public Health Scotland in the UK. The UK, unlike the other four countries, has four public health bodies, with one in each nation. Vaccine regulation in each country is the responsibility of Paul-Ehrlich-Institute (PEI) in Germany, the Norwegian Medicines Agency in Norway; the Swedish Medical Products Agency in Sweden; SwissMedic in Switzerland; and the Medicines & Healthcare products Regulatory Agency (MHRA) in the United Kingdom. In addition, approval for vaccinations may also be provided by the European Medicines Agency (EMA) for members of the European Union and the WHO also reviews vaccines and can issue approvals.

In Norway, the Norwegian Parliament collaborates with the Government and its ministries in making recommendations, propositions, questions, and interpellations around health. The Ministry of Health and Care Services is tasked with overseeing the four regional health authorities, which provide the channel for exercising governmental hospital ownership of specialist health care services. Several coordinating mechanisms operate vertically, most notably when it is a question of involving county governors who follow national government policies and regulations. These governors are the main instrument for implementing policies at the municipal level. An Overview of the Norwegian health system is shown in Figure 2.
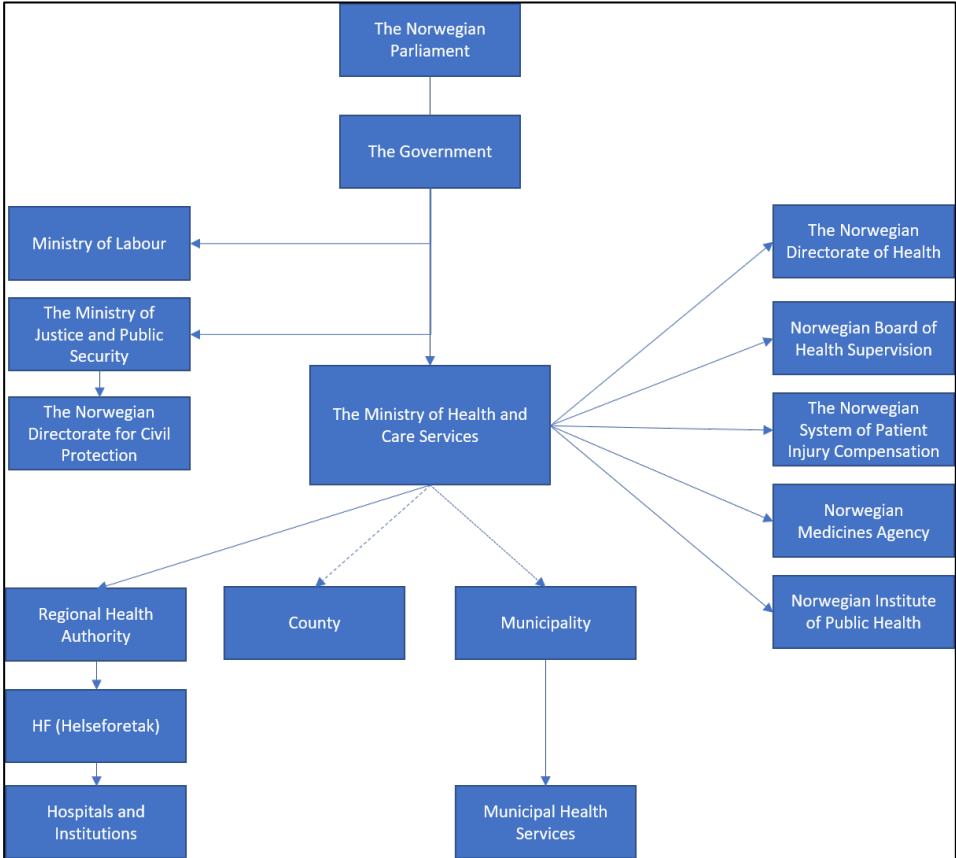
Figure 2: Organisation of the Norwegian health system. The Parliament coordinates with the Government in making health recommendations and propositions. The Ministry of Health and Care Services oversees four regional health authorities. County governors follow national government policies and regulations.

In Sweden, all three levels of governance are involved in the healthcare system. At the national level, the Ministry of Health and Social Affairs sets healthcare policy, regulation, regulates finances for government agencies and works in parallel with eight government agencies. At the regional level, 21 regional entities are tasked with financing health-related costs and delivering health services to residents. At the local level, 290 municipalities take responsibility for caring for the elderly and disabled (CommonWealthFund, 2020). An overview of the Swedish health system is shown in Figure 3.
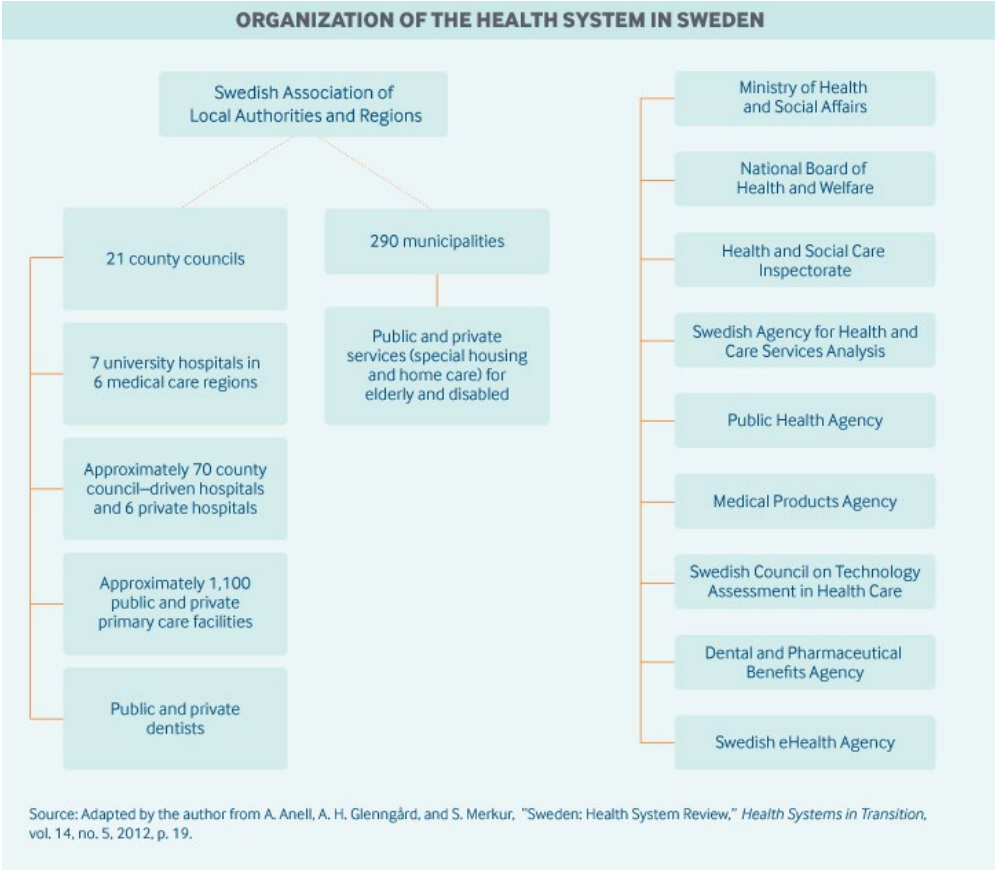
Figure 3: Organisation of the Swedish health system. The national, regional, and local levels coordinate, and all levels have specific tasks and responsibilities. Source: (CommonWealthFund, 2020).

In Germany, making policy at the federal level is the primary responsibility of the Federal Ministry of Health which is regulated by the Joint Federal Committee (Expatica, 2021). The supervision of the institutions which deal with higher-level issues of public health is with The Federal Ministry of Health. These institutions include: 1) the Federal Institute for Drugs and Medical Devices (BfArM), which manage the approval of pharmaceuticals, 2) the Paul-Ehrlich-Institut (PEI), which is the Federal Institute for Vaccines and Biomedicines, 3) the Robert Koch Institute (RKI) which is the government's central scientific institution in the field of biomedicine, and 4) the Federal Centre for Health Education (BZgA) (Federal Ministry of Health, 2020; NCBI, 2015; Robert Koch Institut, 2021).

In Germany each state defines the framework of responsibilities for medical care. Healthcare is a self-administered system which is carried out jointly by four leading organizations: 1) the National Associations of Statutory Health Insurance, 2) representatives of doctors, dentists, psychotherapists, 3) the German Hospital Federation, and 4) representatives of the insurance sector. Its supreme decision-making body is the Federal Joint Committee which defines the guidelines for healthcare services and what treatments are covered by statutory health insurance or so-called Gesetzliche Krankenversicherung (GKV) (Federal Ministry of Health, 2020; Gemeinsamer Bundesausschuss, 2021). Figure 4 illustrate the organization of German healthcare system.
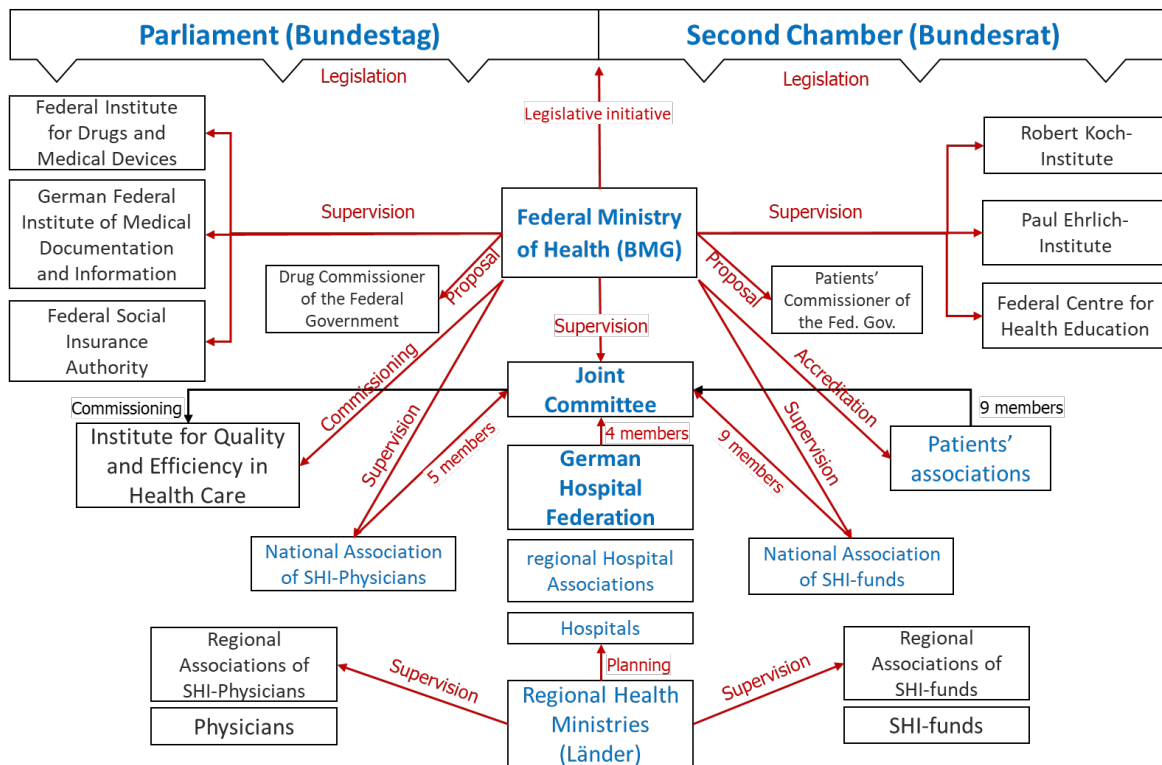
Figure 4 German System of Healthcare (Federal Ministry of Health, 2021)

In the UK, the health system is collectively known as the National Health Service (NHS) which consists of four different organisations: NHS England, Health and Social Care, NHS Scotland and NHS Wales. The UK Government (in England) and the Devolved Governments (in Northern Ireland, Scotland and Wales) are responsible for health in each of the nations and the organisation of health differs in each nation.
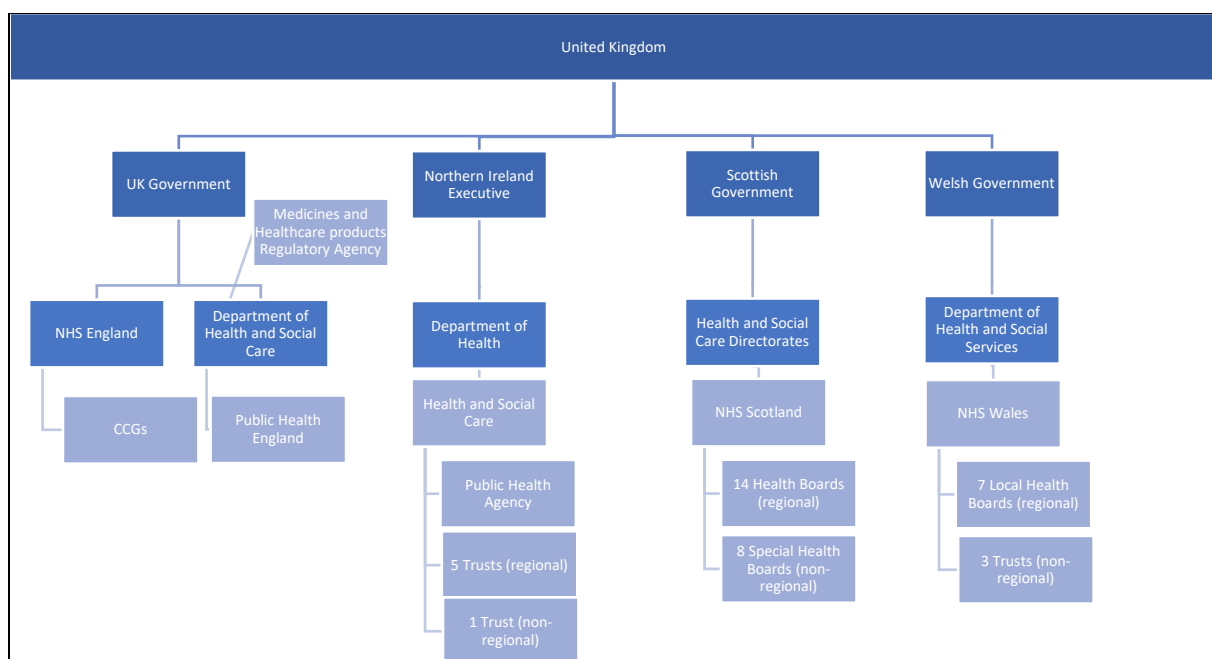

Figure 4: Organisation of health in UK, showing the different organisation of health in each of the four nations.

Note that Public Health Scotland is one of the eight special health boards and Public Health Wales is one of the three trusts in NHS Wales. Some organisations serve the whole of the UK including the Medicines and Healthcare products Regulatory Agency.

In Switzerland, there is a federal public health body, the Federal Office of Public Health (FOPH), which sets public health policies and decides on public health measures. The FOPH describes how it is "responsible for public health in Switzerland; it develops Switzerland's health policy and works to ensure that the country has an efficient and affordable healthcare system in the long term" (FOPH, 2020). At the cantonal level, similar structures are replicated across the 26 cantons, in that a General Health Administration (GHA) and an Office of the Cantonal Doctor (OCD) take charge of local health affairs. An overview of the Swiss health system is shown in Figure 5.
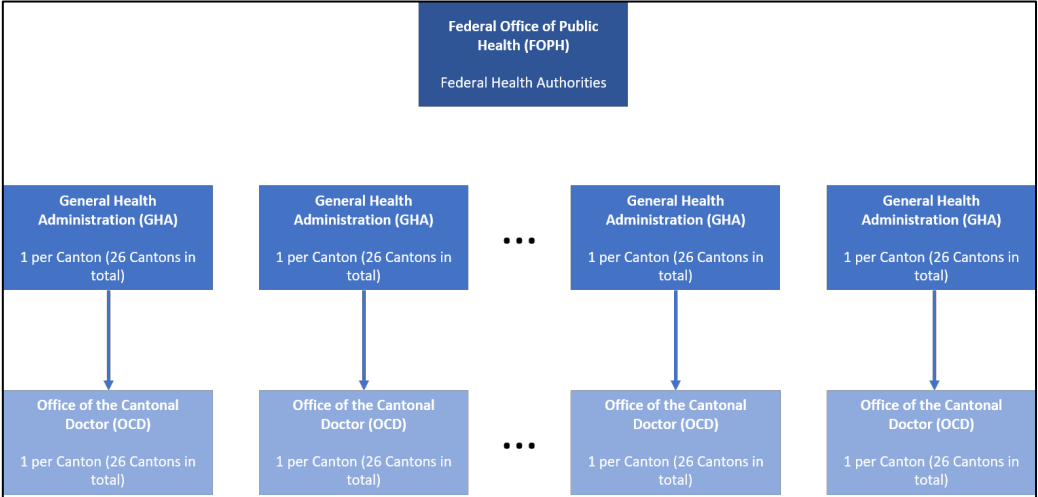

Figure 5: Organisation of the Swiss health system. The Federal Office of Public Health services all of Switzerland. At a cantonal level, there is an Office of the Cantonal Doctor in each of the 26 cantons.

3.6   Responsibilities and decision-making during pandemics

In times of pandemics, each of the countries compared in PAN-FIGHT has guidance and legislation regarding the need to strike the balance between centralized responses by which decisions are made at a national level and decentralized responses by which decisions are made at a local level, depending on the epidemiological realities and requirements. Pre-existing legislation, structures, and plans were put to the test throughout 2020 in the countries as the pandemic developed in each respective country. Although the responses' varied from country-to-country, the consideration of decentralized vs. centralized responses remained constant between the countries, with some countries oscillating between the two according to spikes in waves of cases, hospitalisations, and deaths prompting countries to opt for centralized, uniform responses.

Germany has a decentralized system of government, therefore during an epidemic, the Federal Government function is limited to monitoring, surveillance, research and legislation, and subnational and local institutional actors, self-governing bodies and sub-state authorities are mainly responsible for combating the pandemic. The states ministries of health are institutionally assigned with tasks such as supervision of professions and health care facilities as well as health protection and aid (Franzke & Kuhlmann, 2021).

In Norway, the responses to pandemics are similar to the coordination between governmental, health, and contingency management bodies that were described above for Sweden (see Figure 2). There are a number of coordinating mechanisms that are established for crises management, notably regulatory

and organizational mechanisms, which include basic principles, ministerial responsibilities, and the central crisis management functions (LOVDATA, 2017). These regulations are based upon four principles: (1) responsibility, (2) similarity, (3) proximity, and (4) cooperation. Throughout 2020, facing the pandemic in Norway, rules and recommendations were implemented at two levels: local (municipalities) and national. The government decided that certain measures were introduced locally when an outbreak occurred. Infection control measures were introduced for larger regions when necessary, to prevent further spread of infection.

The coordination of responses to epidemics in Sweden is meant to follow existing plans in place in order to avoid the appearance of being politicized. The idea is that there should not be any attempt to convene any kind of emergency body, including a task force. Swedish crisis management rationale is based upon a whole-of-society approach, which includes involving private and voluntary organisations and all levels of the public sector working with contingency management. Crisis preparedness is based upon four basic principles: (1) responsibility, (2) parity, (3) proximity, and (4) collaboration. There are several national organisations which are tasked with responding in times of health crises: the Public Health Agency of Sweden (PHAS), the National Board of Health and Welfare (Socialsyrelsen, NBHW), and the Swedish Civil Contingencies Agency (MSB). In response to the COVID-19 pandemic, the government remained in the background, while decisions were made by PHAS.

The decision-making in Switzerland found basis in the Swiss Epidemics Act (2016), which contains provisions detailing how health decisions should be coordinated between the Federal and Cantonal level, particularly according to a three-stage escalation model, including (1) normal, (2) particular, and (3) extraordinary situations. Switzerland witnessed, at the beginning of the pandemic, unilateral decisions made by the Federal Council in March 2020, with stringent measures being put into place as the country scrambled to control further spread of the coronavirus. The Federal COVID-19 Act, passed in September 2020, added some checks and balances to the Swiss Epidemics Act (2016) so that the Federal Council could not continue to act unilaterally as the pandemic endured. Toward the end of 2020, during the second epidemiological wave, federal-level measures were again put into place, such as the closure of restaurants, bars, and shops, and travel restrictions and mandatory quarantines for travellers entering Switzerland from high-risk countries.

The management of epidemics and pandemics in the UK can be characterized by the process of *devolution*, which refers to moving certain powers from the UK Government to the devolved UK nations: Northern Ireland, Scotland, and Wales (England is not devolved). From the outset of the pandemic, the Health Secretary stated on 15 March 2020 that herd immunity was not part of the UK strategy, and at the end of March 2020, all four nations imposed what were known as "lockdowns". Subsequent mitigation measures were not applied uniformly throughout the UK, with each devolved nation deciding measures locally. This primarily concerned non-pharmaceutical interventions. That said, some measures were centralized, such as the approval of the coronavirus vaccine, which was carried out by the Medicines & Healthcare Products Regulatory Agency (MHRA).

4. Epidemiological dynamics: Reported cases and deaths in 2020

The five countries experienced different reported cases and deaths during 2020, which are very likely influenced by the different measures that were or were not taken, among other factors. Due to the significant differences in population sizes, shown in Figure 5 (7-day averages for confirmed COVID-19 cases per 1,000,000 people) and shown in Figure 6 (7-day averages for deaths per 1,000,000 people), it is important to note, that despite the single epidemiological curves presented in the following, at a more regional level, there were differences in the underlying trends. Therefore, these are curves

aggregated at the national level. Unfortunately, they do not show the underlying variation within a country.

As reported cases and deaths are highly dependent on a range of factors, with testing availability being a prominent one, reported values should be interpreted with caution.

4.1   Reported cases

In 2020, in all five countries, there were two waves of infections. The first wave of infections peaked between late March and end of April in Germany, Norway, Switzerland and the United Kingdom, and peaked mid-June in Sweden. In the first wave, Switzerland had the highest peak of cases per million, followed by Sweden. The UK and Sweden, in comparison to the other three countries, had more sustained (longer, flatter) waves, and it took longer for cases in the UK and Sweden to return to low levels of daily infections when compared to Germany, Norway and Switzerland.

All five countries experienced a second, more severe wave of infections in the last quarter of 2020. Cases in Switzerland, in comparison to the other countries, rose rapidly from the end of September, peaking at just under 1000 at the beginning of November 2020 and then sharply declining but did not return to low levels in 2020. In Sweden and the UK cases continued to rise, until the end of 2020 with no indication that a peak had been reached. In contrast, Germany also had a sharp rise in cases but this plateaued just over 200 per million, followed by second small increase to 300 per million. By the end of 2020, it was unclear if the peak of the second wave had been reached.

During 2020, per million, Norway generally had the lowest number of daily cases (using the 7-day average), whereas the highest number of cases per million (using the 7-day average) alternated between Sweden, Switzerland, and the UK. Germany was consistently neither lowest nor highest.

When analysing and comparing these data, please note that there were changes in the availability of testing, differences in the definitions as well as other factors influencing the recorded cases and deaths. These are the reported cases only.
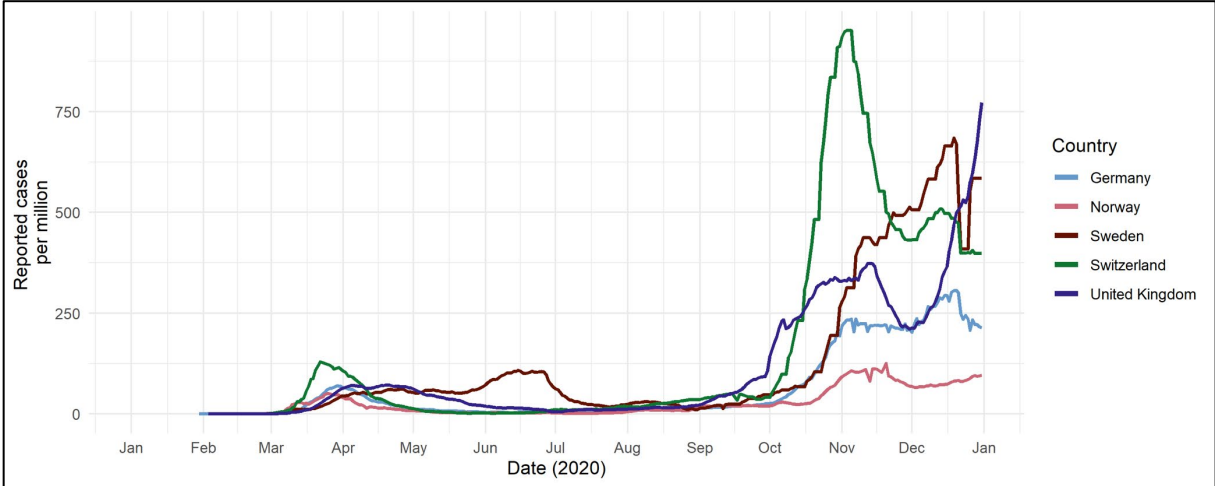

Figure 5: 7-day rolling average of confirmed COVID-19 cases per million people in Germany, Norway, Sweden, Switzerland and the United Kingdom showing two waves of infections. Source: Our World in Data (Ritchie et al., 2020).

4.2   Reported deaths

Similar to the number of infections, the five countries also recorded two waves of deaths. Unlike the recorded number of cases, where the first wave was much smaller than the second, deaths in the first wave were more similar to those in the second wave, yet with differences.

In the first wave, daily deaths per 1,000,000 rose more rapidly in Switzerland, Sweden and the UK compared to Norway and Germany. The first wave peaked between end of March and end of April 2020, followed by, comparatively, gradual declines. Norway followed by Germany and Switzerland were the first to return to low daily numbers, with UK and Sweden slower.

In the second wave, deaths in Switzerland rose rapidly in comparison to the other countries, plateauing around the beginning of November until the end of 2020. While Switzerland recorded a sharp rise in daily deaths, Germany, the UK and Sweden, experienced gradual increases. Germany's number of daily deaths per million exceed the level in the first wave.

Throughout 2020, generally, Norway had the lowest levels of daily deaths per million, whereas the UK, Sweden and Switzerland alternated between the highest recorded deaths. Germany had neither the highest nor lowest numbers of deaths per million in 2020. In the first wave, the UK had the highest daily number of deaths, falling below Sweden at the beginning of June 2020. In the second wave, Switzerland had the highest number of cases. Note that this is for 2020 only, the progression of the waves thereafter in not considered.
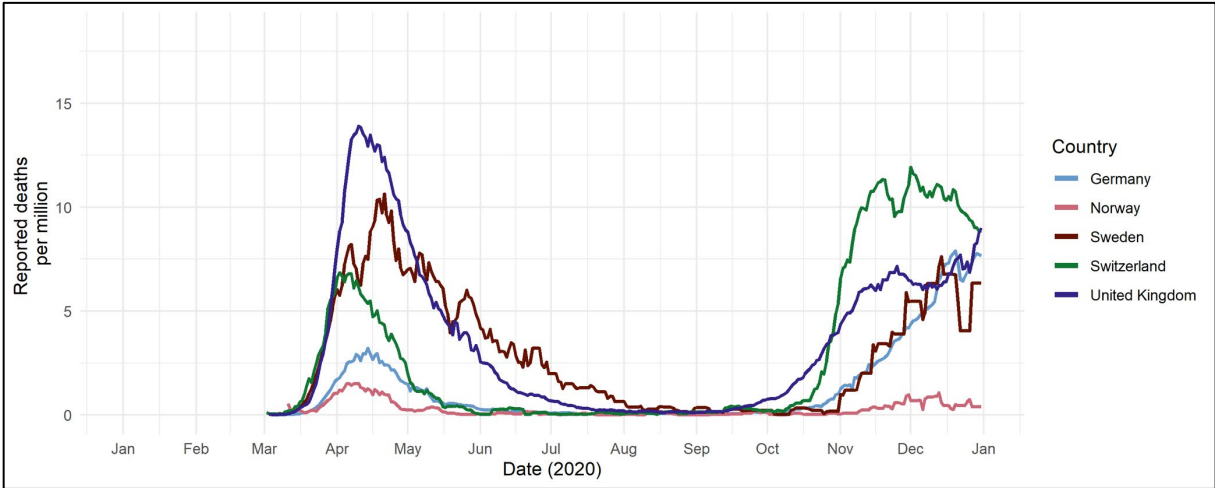

Figure 6: 7-day rolling average of daily deaths per 1,000,000 persons in Germany, Norway, Sweden, Switzerland and the United Kingdom. Source: Our World in Data (Ritchie et al., 2020).

5. Comparison of measures to mitigate the spread of the virus

Prior to 2020, it was established that non-pharmaceutical interventions (NPIs) would have a critical role in the spread of future pandemics, with the WHO advising in relation to an influenza pandemic:

> "Being universally and immediately available, they are the first line of defence in influenza pandemics and a critical element of pandemic preparedness. Implementing these measures effectively during a pandemic requires broad public awareness and acceptance, and intersectoral collaboration in settings that may be targeted by community-level interventions (e.g. schools, workplaces and public gatherings). Some non-pharmaceutical interventions may affect personal movement and freedoms (e.g. voluntary or enforced quarantine) and should be supported by transparent decision-making as well as robust legal and ethical frameworks." (WHO, 2018, p. 25)

NPIs include a broad range of measures, which can be classed as either personal NPIs (e.g. physical distancing, cough etiquette, hand hygiene) or community NPIs (e.g. school closures, work-from-home, reduction of mass gatherings) (WHO, 2018). During 2020, NPIs were the main tools available to manage the spread of COVID-19.

Using data from the Oxford Covid-19 Government Response Tracker (OxCGRT)(Hale et al., 2021), supplemented by reviews conducted as part of the country report development for the PAN-FIGHT project and reviews of documentation available through governmental websites, grey literature, and online sources, timelines of the implementation of NPIs and one pharmaceutical intervention (vaccination) in the five countries are compared in Figures 7-13**.** Among these NPIs, we discuss: (1) handwashing and respiratory hygiene, (2) stay at home measures, (3) restrictions on social gatherings, (4) border closures and quarantines upon crossing borders, (5) school closures, (6) workplace closures, (7) physical and social distancing, (8) face coverings in the community, (9) testing and contact tracing, and (10) vaccination.

It is important to note that within a country, measures may have been introduced in a sub-region, for example by a canton in Switzerland, or a state in Germany, which would constitute the category start date for the whole country but there could have been significant variation between the first region and the last region to introduce these measures, if at all. It is also important to consider that measures may have been implemented proactively (e.g. to prevent a large increase in transmission) or reactively (e.g. in response to a large increase in transmission) on their influence in managing the spread of the virus. Each of the NPIs will be discussed in turn, and in comparison, to the advice issued by the WHO. We cover these NPI measures below and finish with vaccination, which is a pharmaceutical intervention.

5.1 Hand washing and respiratory hygiene: nothing new

Early on, respiratory and hand hygiene, such as coughing into an elbow and frequent hand washing were promoted by all five countries to slow the spread of the virus. These measures are used widely in prevention of the spread of influenza. These recommendations remained in place throughout 2020 in the context of COVID-19.

5.2 Stay at home measures: complete novelty

Stay at home measures and strict lockdowns had never been part of the arsenal to fight a pandemic in the 5 countries. As part of overall "lockdown" measures, stay at home measures were used by some

countries where the public was either recommended not to leave their home or were only allowed to leave their home for certain reasons (examples include grocery shopping, exercising, going to work, going to the doctor). A summary is shown in Figure 7.

Some Länder in Germany (Armbruster & Klotzbücher, 2020a, 2020b) and the United Kingdom implemented requirements not to leave the house from late March until the beginning/middle of May 2020 and again later in the year. In Germany after a period of a requirement not to leave the home, no measures were in place between the beginning of May 2020 until the end of October 2020. Germany then oscillated between requirements not to leave the house and recommendations not to leave the house until the end of 2020. In the UK, the four nations lifted the lockdown restrictions at different speeds. Stay at home requirements were reintroduced later in 2020, but these were not for the entire UK, instead, the individual nations imposed 'lockdowns' as required. The only nation not to use a second lockdown was Scotland. These further lockdowns were also named differently. England implemented a second lockdown between 5 November 2020 until 2 December 2020 (BBC, 2020c); Northern Ireland implemented a "Circuit breaker" from 27 November 2020 until 10 December 2020 (Department of Health, 2020); and Wales implemented a "Fire break" between 23 October 2020 and 9 November 2020 (Welsh Government, 2020). In Sweden, from late March 2020 until the end of 2020, it was recommended not to leave the home. In Switzerland, recommendations not to leave the home were in place during the first and second waves of infections in 2020 and no measures were in place over the summer. Finally, in Norway there were no restrictions until the beginning of November 2020, when it was recommended not leaving the home. When countries recommend to stay at home, it is mostly to support work from home policies and avoiding spreading the virus when ill or in close-contact.
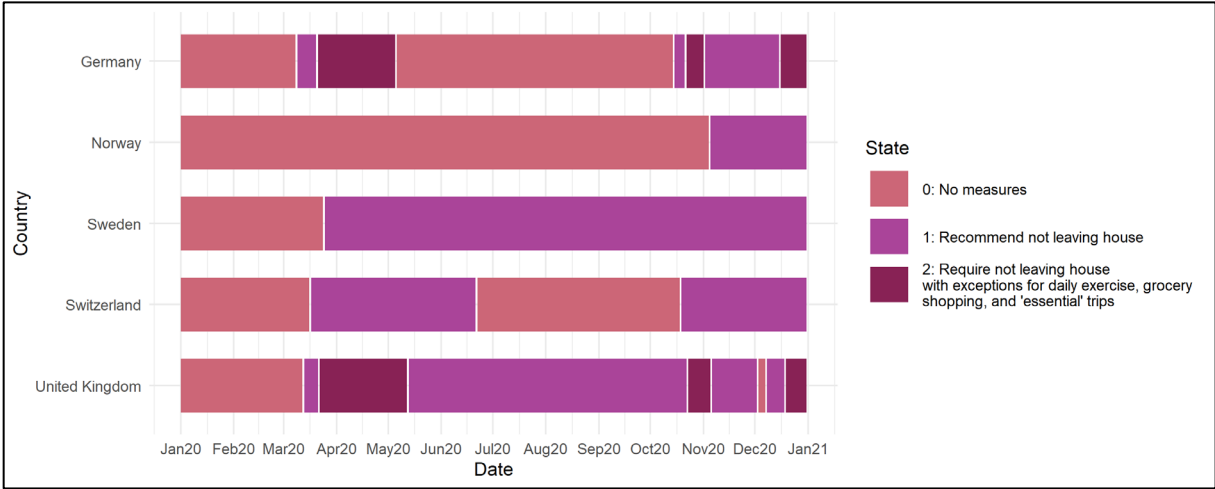
Figure 7: Stay at home measures in the five countries during 2020, showing how the countries used different levels of restrictions related to stay at home requirements. Source of data for graphic generation: *Oxford Covid-19 Government Response Tracker* (OxCGRT)(Hale et al., 2021)

5.3   Restrictions on social gatherings

Reducing the number of contacts was used in various forms in the different countries, with restrictions imposed on social gatherings. Like other aspects, restrictions on gatherings varied over 2020 and within countries. As shown in Figure 8, all 5 countries had restrictions on social gatherings in place April 2020 at the latest. Germany, Norway, Sweden, and Switzerland loosened up the restrictions on social gatherings at different periods throughout 2020, with Sweden loosening restrictions for the longest period of time. All five countries finished 2020 with restrictions on gatherings of less than 10 people.

Figure 8: Gathering restrictions. Source of data for graphic generation: Oxford Covid-19 Government Response Tracker (OxCGRT)(Hale et al., 2021)

5.4   Border closures and quarantines in a Schengen environment
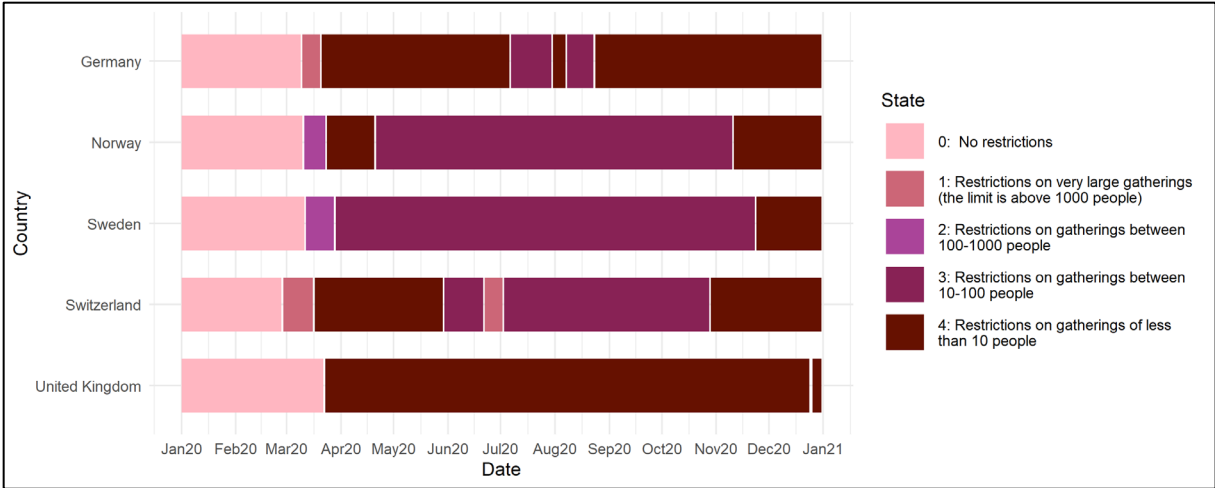
In 2019, guidance on NPIs issued by the WHO, for epidemic and pandemic influenza, did not recommend border closures at any level of pandemic severity. Such guidance states:

> "Border closure is generally not recommended unless required by national law in extraordinary circumstances during a severe pandemic, and countries implementing this measure should notify WHO as required by the IHR (2005)." (WHO, 2019b, p. 18)

On 29 February 2020, the WHO issued the following statement on border closures as part of a broader statement about travel advice:

> "In general, evidence shows that restricting the movement of people and goods during public health emergencies is ineffective in most situations and may divert resources from other interventions. Furthermore, restrictions may interrupt needed aid and technical support, may disrupt businesses, and may have negative social and economic effects on the affected countries. However, in certain circumstances, measures that restrict the movement of people may prove temporarily useful, such as in settings with few international connections and limited response capacities.
>
> Travel measures that significantly interfere with international traffic may only be justified at the beginning of an outbreak, as they may allow countries to gain time, even if only a few days, to rapidly implement effective preparedness measures. Such restrictions must be based on a careful risk assessment, be proportionate to the public health risk, be short in duration, and be reconsidered regularly as the situation evolves" (WHO, 2020h)

Despite WHO recommendations, Norway, Germany, Switzerland, and Sweden experienced bans, border closures or some kind of triage depending on areas where travellers were arriving from. UK remained open, with quarantines upon arrival, until the very end of 2020.

In 2020 (see Figure 9) Norway, Germany, and Switzerland introduced border closures soon after the declaration of the pandemic, while the Public Health Agency of Sweden issued a travel advisory against non-essential international travel and introduced a ban on travellers from high-risk regions. Norway and Switzerland kept their borders closed until mid-May 2020 and mid-June 2020. Since March 2020

until the end of the year Germany and Sweden closed their borders to non-EU travellers. Norway first implemented a ban of travellers from high-risk regions and then changed to quarantining travellers from high-risk regions from mid-August until the end of 2020. Sweden, Switzerland and Germany continued to have a ban on travellers from high-risk regions for almost the rest of 2020 with the exceptions for commuters and the transit of goods (Federal Ministry of Interior, 2020). In contrast, in the UK, there was no border closure and only in late December 2020, the UK imposed a ban on travellers from high-risk regions, in this case South Africa, who were not UK residents (BBC, 2020d). See Figure 9 for an overview of the dates in the five countries. Residents in Germany, Switzerland and the United Kingdom could return to these countries throughout 2020 (with some requirements for quarantines or testing).
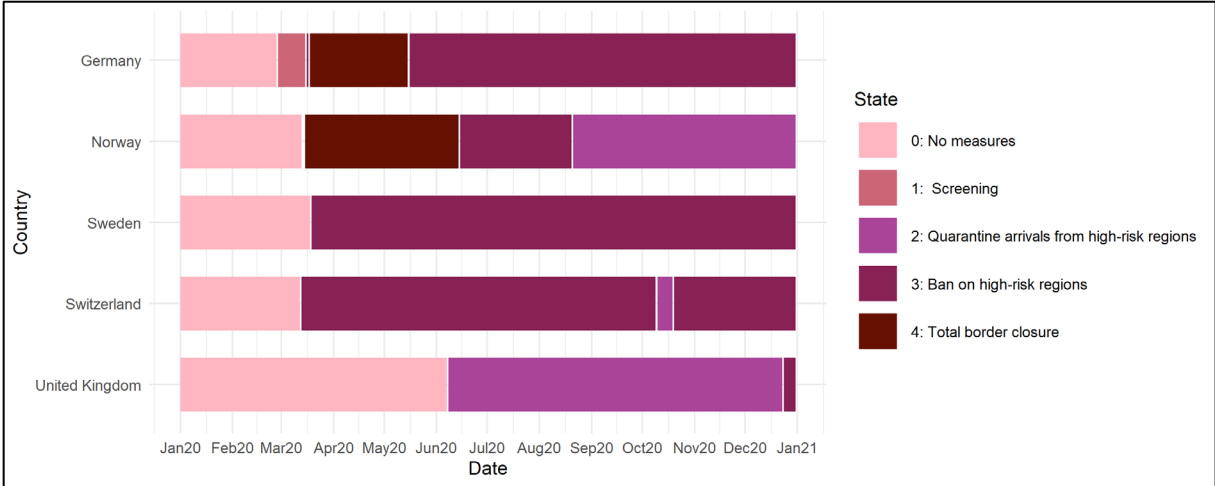

Figure 9: International travel measures to the country. Source of data for graphic generation: Oxford Covid-19 Government Response Tracker (OxCGRT)(Hale et al., 2021)

On quarantining arrivals into a country, the WHO issued the following in July 2020:

> "If countries choose to implement quarantine measures for all travellers on arrival, they should do so based on a risk assessment and consideration of local circumstances. They should also follow WHO guidance on quarantine of contacts in the context of COVID-19. (…) Countries must follow the special considerations for travellers under the IHR (2005), including by treating travellers with respect for their dignity, human rights and fundamental freedoms and minimizing any discomfort or distress associated with any health measures applied to them. (…) Countries shall not charge travellers for measures required for the protection of health, including (a) examinations to ascertain their health status; (b) vaccination or prophylaxis on arrival (not published 10 days earlier); (c) appropriate isolation or quarantine; (d) certificates specifying the measures applied; or (e) applied to baggage accompanying them." (WHO, 2020g)

Shown in Figure 9 is a summary of the measures related to international travel generally, but not shown are the dates when quarantine measures were introduced. Norway introduced a quarantine on travellers who arrived in Norway after 27 February 2020 (G.S.S.O, 2020); Germany introduced quarantine on 7 April 2020 and quarantine regulations were issued by the federal states (BCRT); the United Kingdom on 8 June 2020; in Switzerland, on 1 July 2020; in Sweden no quarantine was imposed, and people were urged to follow the recommendations of the National Health Agency of Sweden (PHAS). **.** In 2020, lists were used to manage countries or regions of origin from where travellers were required to quarantine. These lists changed at short notice as the international situation changed and could list countries or even regions within countries. In Germany, Norway, Sweden and Switzerland, all lists were managed centrally, but in the UK these lists were managed at the nation level as opposed to centrally.

The quarantine process for arriving passengers also varied, with some countries requiring hotel quarantine for at least some travellers, others home quarantine. The quarantine period for the five countries also varied, most were between 10 and 14 days.

5.5   School closures: The big long-term risk

School closures had been experienced during H1N1 pandemic. This was not a new measure for the control of infectious disease. However, the literature on school closures' efficacy is rather ambivalent (Cauchemez et al., 2014). School closures are preferable to class closures, but it all depends on the timing (the earlier the better) and on the social acceptance of measures that disrupt not only children but working parents.

In 2019, the WHO's guidance related to school measures and closures were recommended during influenza pandemics categorised as high or extraordinary (WHO, 2019b). UNICEF, WHO and IFRC issued interim guidance related to schools in March 2020 (UNICEF, 2020b) and UNESCO, WHO and UNICEF issued updated guidance on 14 September 2020 (UNICEF, 2020a). The considerations for school-related public health measures in the context of COVID-19 stated:

> "From a public health perspective, deciding to close or re-open schools should be guided by a risk-based approach, taking into consideration the epidemiology of COVID-19 at the local level, the capacity of educational institutions to adapt their system to operate safely; the impact of school closures on educational loss, equity, general health and wellbeing of children; and the range of other public health measures being implemented outside school. Decisions on full or partial closure or reopening should be taken at a local administrative level, based on the local level of transmission of SARS-CoV-2 and the local risk assessment, as well as how much the reopening of educational settings might increase transmission in the community. The shutting down educational facilities should only be considered when there are no other alternatives." (p. 1)

In Figure 10, school closure dates are shown. Again, as education decisions are not made by the central government in all countries, closures varied within a country and regional differences in school closures within a country are not shown in the figure. Nationally, both the UK and Germany experienced several periods of time where all levels of schools were required to close, whereas Switzerland and Norway only experienced this once. Sweden had a period requiring closing of only some levels or categories, followed by recommended closures, and then requirements for some closures at the end of 2020.
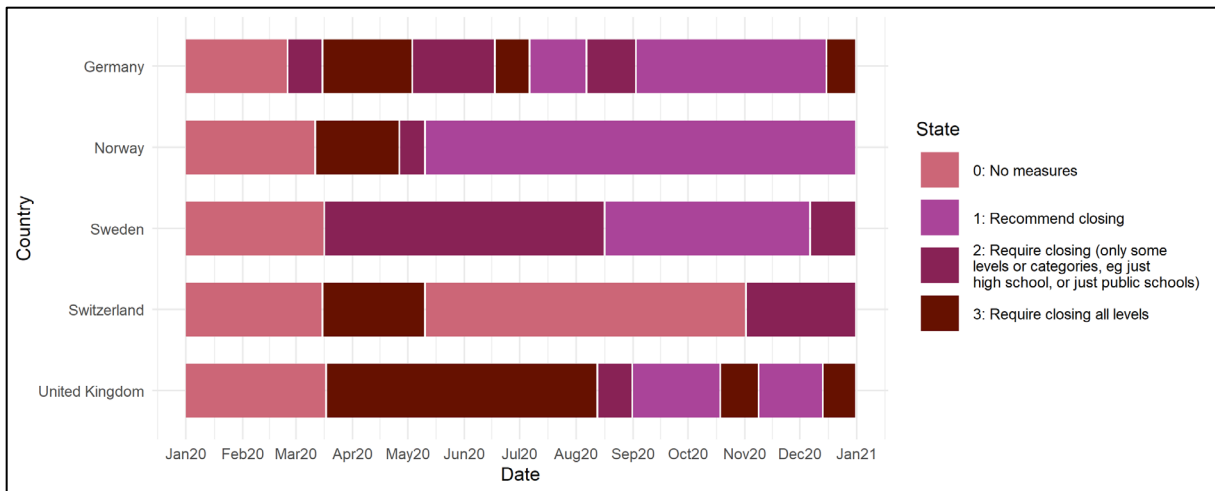
Figure 10: School closures. Source of data for graphic generation: Oxford Covid-19 Government Response Tracker (OxCGRT)(Hale et al., 2021)

5.6   Workplace closures: Keeping "essential" workplaces open

One of the striking features of the COVID-19 response was widespread scale and extent to which many work sectors closed or encouraged "work from home" policies, whereas only services deemed to be "essential" remained open. Workplace closures of this scale were not foreseen in any of the WHO guidelines nor in any of the pandemic plans. On 03 March 2020, the WHO issued the 8-page document "Getting your workplace ready for COVID-19" in which is it is recommended that anyone with a mild cough, low-grade fever, or who has taken simple medications, such as paracetamol/acetaminophen, ibuprofen or aspirin (which may mask symptoms of infection), to stay at home or work from home (WHO, 2021). We can see in Figure 11 that in all countries, besides Sweden, there was an initial period involving some form of workplace closure requirements, with essential workplaces remaining open. Germany remained quite consistent in its workplace closure requirement policies throughout 2020. Norway had recommendations for workplace closures throughout the summer of 2020 and then returned to some closure requirements at the end of 2020. Switzerland and the United Kingdom both oscillated between requirements for some closures and requirements for all workplace closures except for essential services. Contrary to the UK, Switzerland had a period in the summer of 2020 where workplace closures were only recommended.
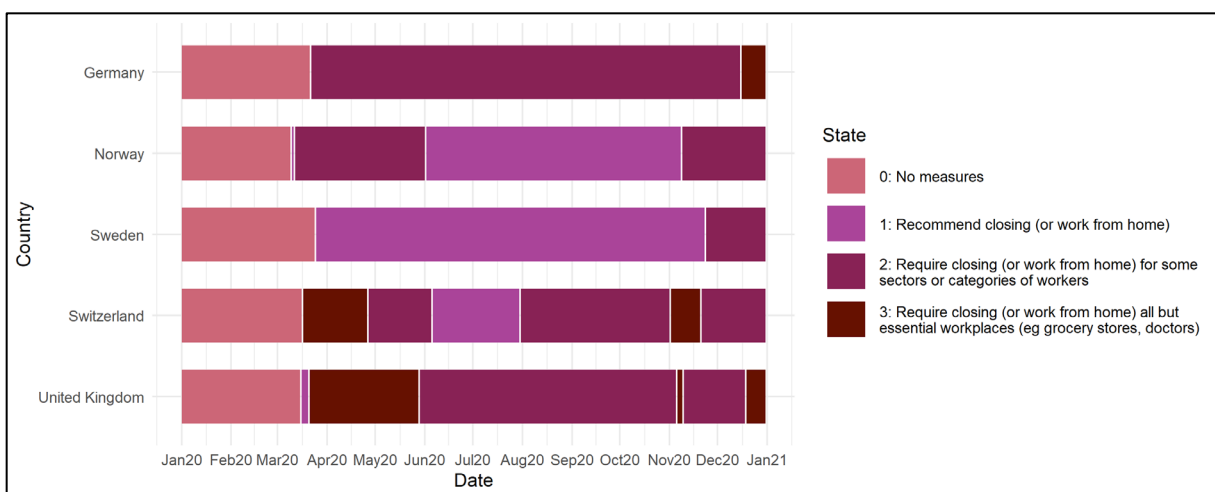

Figure 11: Workplace closures. Source of data for graphic generation: Oxford Covid-19 Government Response Tracker (OxCGRT)(Hale et al., 2021)

5.7   Physical and social distancing: The Unfortunate Term "Social"

Physical distancing was widely promoted as a behaviour to prevent the spread of the virus by the WHO. The WHO originally used 'social distancing' but quickly replaced 'social' with 'physical' to better capture that it was the need for spatial distancing and that it was still important to have social interactions. On 20 March 2020, at a WHO Coronavirus press conference, the following was said:

> "If I can just add, you may have heard us use the phrase physical distancing instead of social distancing and one of the things to highlight in what Mike was saying about keeping the physical distance from people so that we can prevent the virus from transferring to one another; that's absolutely essential. But it doesn't mean that socially we have to disconnect from our loved ones, from our family. (…) Technology right now has advanced so greatly that we can keep connected in many ways without actually physically being in the same room or physically being in the same space with people so as the DG highlighted in his speech a lot about this is - we say social distancing. We're changing to say physical distance and that's on purpose because we want people to still remain connected. (…) So find ways to do that, find ways through the internet and through different social media to remain connected because your mental health going through this is just as important as your physical health" (WHO, 2020k)

Following this change, from "social" to "physical", some regions adopted the use of the term physical distancing (for example, Scotland) but others continued to use social distancing. The recommended distances to retain ranged between 1.5 and 2 meters in the 5 countries throughout 2020. In the UK, physical distancing was in place for all of 2020 for those not sharing a household or extended household. This meant that physical contact, in a personal setting, between members of different households was not allowed at any point in 2020. The exception to this was that children were not required to physically distance from other children and adults from other households (at certain points of the year).

5.8   Face coverings in the community: A remarkable *about-face*

On 29 January 2020, the WHO released interim advice on the use of masks in the community, during home care and in health care settings in the context of the novel coronavirus outbreak (WHO, 2020a). According to this document, medical masks were only recommended for those who were already sick and had developed symptoms in order to prevent transmission to others. At this point, masks were not recommended a self-protection measure, since at the time, "no evidence [was] available on its usefulness to protect non-sick persons". The document also noted that wearing masks "may cause unnecessary cost, procurement burden and create a false sense of security", and that incorrect use "may hamper its effectiveness to reduce the risk of transmission" (WHO, 2020a, p. 1). On 27 February 2020, after the first COVID-19 case was confirmed in Geneva, questions about mask recommendations for healthy people in communities were raised during a WHO news conference in Geneva. Experts' replies were in line with WHO's 29 January 2020 guidance document, which indicates that "masks might be worn in some countries according to local cultural habits". As for the threat of transmission by asymptomatic people, Executive director Dr. Michael J. Ryan explained that this was not the driving force behind the epidemic and that emphasis should be put on what to do (e.g. to wash hands frequently) and how to do properly (e.g. the right method to wear and put off a mask) (WHO, 2020c).

The WHO updated its guidance on masks on 05 June 2020, recommending their use in the community, including non-surgical cloth face coverings (WHO, 2020b). This was followed by campaigns to encourage their use in communities (see WHO timeline). The WHO again updated guidance on 01

December 2020 with a document designed for policy makers, public health and infection prevention and control professionals, health care managers and health workers (WHO, 2020f)

The types of public spaces where masks were recommended or mandatory varied throughout 2020. For example, wearing a mask on public transport was introduced prior to shops in the four UK nations and the types of public spaces where masks were required changed. In Figure 12, the dates of mandatory and recommended use of masks in community settings are shown, highlighting the variation between the countries and compared to the recommendation by the WHO. Of the five countries, Germany was the first to recommend the use of masks as well as make these mandatory in some public spaces. Almost one month later the first recommendations were made in Switzerland and the UK. At the end of June and beginning of July, masks became compulsory in certain settings and areas in Switzerland and the UK. In August, Norway first implemented recommendations to wear a mask and made mandatory at the end of October. Sweden neither recommended nor made masks mandatory during 2020.

While Figure 12 shows a high-level overview of the five countries, it conceals variation within the countries as these recommendations and mandatory usage were not necessarily introduced at a national level, but instead a sub-national level. It is important to note that if a small region in a country introduced masks this would identify the whole country as a higher level in the code.
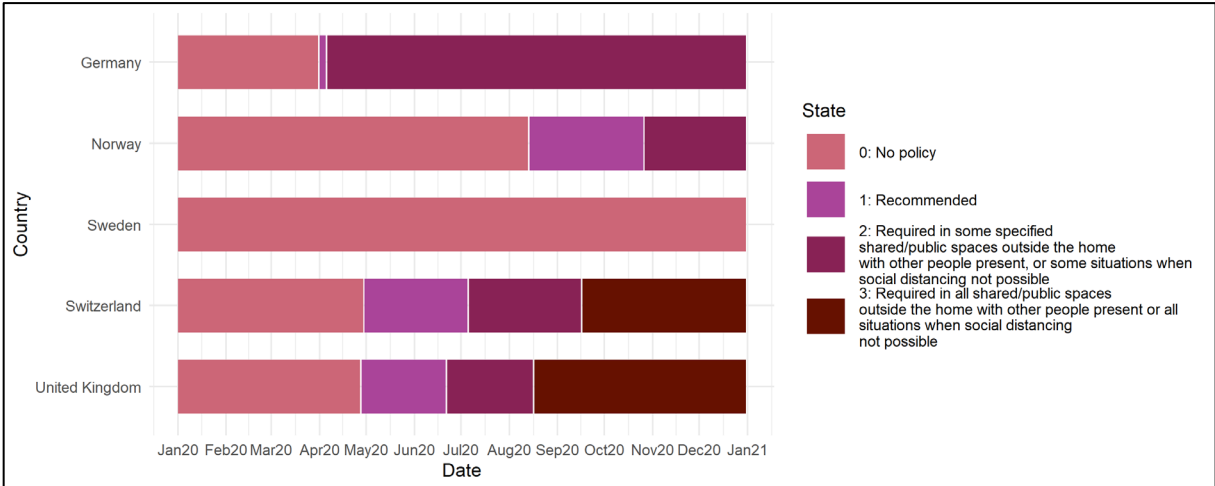
Figure 12: Facial covering policies. Source of data for graphic generation: Oxford Covid-19 Government Response Tracker (OxCGRT)(Hale et al., 2021)

5.9   Testing and contact tracing: Integral to the response

In 2019, guidance on NPIs issued by the WHO, for epidemic and pandemic influenza, did not recommend contact tracing in any level of an influenza pandemic:

> "Active contact tracing is not recommended in general because there is no obvious rationale for it in most Member States. This intervention could be considered in some locations and circumstances to collect information on the characteristics of the disease and to identify cases, or to delay widespread transmission in the very early stages of a pandemic in isolated communities" (WHO, 2019b, p. 38)

However, since January 2020, countries were advised to prepare themselves, including their testing capacities[18]. Testing, tracing and the isolation of contacts was quickly recommended by the WHO to identify and slow the spread of COVID-19. On 24 February, following a WHO mission to China:

> "The Mission stressed that "to reduce COVID-19 illness and death, near-term readiness planning must embrace the large-scale implementation of high-quality, non-pharmaceutical public health measures", such as case detection and isolation, contact tracing and monitoring/quarantining and community engagement." (WHO, 2020e)

On 11 March 2020, the WHO declared a pandemic and WHO Director General stated:

> "We cannot say this loudly enough, or clearly enough, or often enough: all countries can still change the course of this pandemic.(…)If countries detect, test, treat, isolate, trace, and mobilize their people in the response, those with a handful of cases can prevent those cases becoming clusters, and those clusters becoming community transmission.(…) I remind all countries that we are calling on you to activate and scale up your emergency response mechanisms. Communicate with your people about the risks and how they can protect themselves – this is everybody's business. Find, isolate, test and treat every case and trace every contact" (WHO, 2020i)

On 16 March 2020, the WHO statement was repeated and reinforced:

> "You cannot fight a fire blindfolded. And we cannot stop this pandemic if we don't know who is infected. We have a simple message for all countries: test, test, test. Test every suspected case. If they test positive, isolate them and find out who they have been in close contact with up to 2 days before they developed symptoms, and test those people too." (WHO, 2020j)

In contrast to the use of face masks, the WHO was clear regarding the need for countries to proactively manage cases from early in 2020.

5.9.1 Testing

In the early stages of the pandemic, countries had limited testing capacities, which were expanded throughout 2020. Germany developed the first novel corona test in January 2020 to detect the virus in suspected cases, and on 28 February 2020, the government mandated all insurance companies to pay for COVID-19 tests for symptomatic people. Norway and Sweden started testing for corona in February (FOHM, 2020), in Switzerland people exhibiting influenza like symptoms could be tested from 24 February 2020 (FederalCouncil, 2020). In the UK, community testing was available until 12 March 2020, and testing was then limited to hospitals (BBC, 2020a). The UK scaled up its testing capacities and community testing was reintroduced later in 2020. Tests offered by the NHS were free.

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[18] See: https://www.euro.who.int/en/media-centre/sections/statements/2020/statement-novel-coronavirus-outbreak-preparing-now-as-one

5.9.2   Contact tracing: Manual, limited, and comprehensive approaches

Manual contact tracing[19] was the first type of tracing used in all five countries (see Figure 13). This type of tracing is extremely time intensive, requiring a lot of hours for contact tracers to identify and follow up with contacts. Germany, Sweden and the UK began comprehensive contact tracing at the end of January 2020, with Germany the first to introduce this. Comprehensive contact tracing refers to tracing being done for all cases. Switzerland began limited contact tracing mid-February and Norway began limited contact tracing at the beginning of April 2020. From June in Norway and from May in Switzerland, both countries moved from limited to comprehensive contact tracing for the remainder of 2020. While Germany and Sweden moved to limited tracing after an initial period of comprehensive contact tracing, the UK stopped active contact tracing on 12 March 2020 and had a period where no contact tracing occurred. Germany reintroduced comprehensive contact tracing mid-June 2020 until the end of 2020. Contact tracing was reintroduced in the UK (with a different tracing system in each nation) in each of the four nations at different times. Still, in the UK, comprehensive contact tracing was changed to limited contact tracing at the end of August 2020.
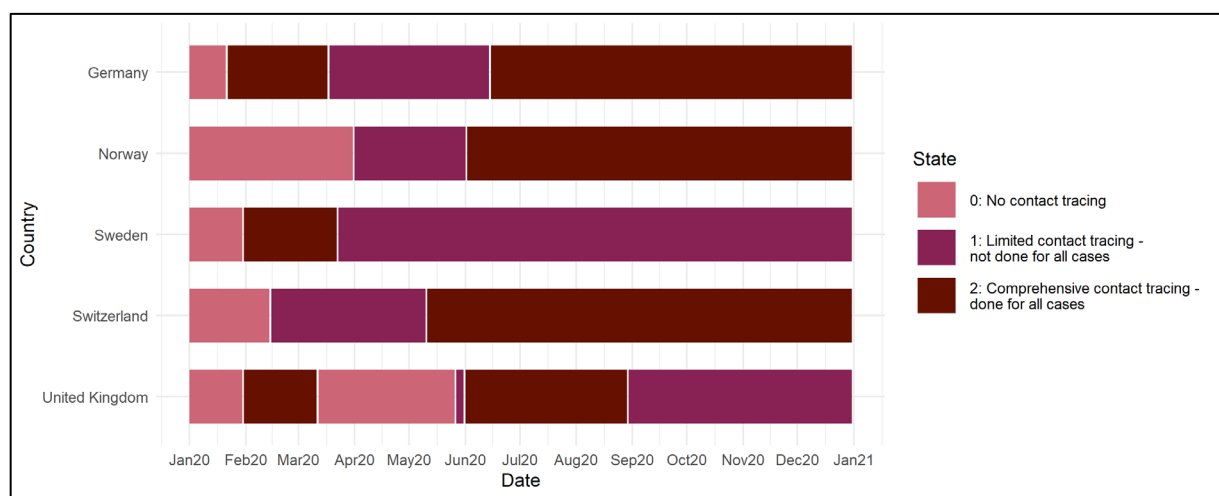
Figure 13: Contact tracing in each of the countries. Source of data for graphic generation: Oxford Covid-19 Government Response Tracker (OxCGRT)(Hale et al., 2021)

5.9.3   Track and trace applications: Success story or not?

Germany, Norway, Switzerland and the United Kingdom introduced contact tracing apps to assist contact tracing. The use of these applications was voluntary and depended upon users downloading them to their mobile devices. Apps were available to download onto certain smartphones. In Norway the "Smittestopp" app was launched 16 April 2020, withdrawn 15 June 2020 due to privacy issues (Ursin et al., 2020), with a new app launched 21 December 2020 (Folkehelseinstituttet, 2020); in Germany, the "Corona-Warn-App" was launched 16 June 2020; in Switzerland, the "SwissCovid"app was launched on 25 June 2020. In the UK, in contrast to the other countries, three separate apps were launched: "StopCOVID NI" app in Northern Ireland on 30 July 2020, "Protect Scotland" app in Scotland on 10 September 2020, and "NHS Covid-19" app in England and Wales on 24 September 2020. In Sweden no tracking phone app was launched due to privacy concerns and only introduced COVID Symptom Tracker app in April 2020 to help individual people check their symptoms (Lund University, 2020).

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[19] Contact tracing in this case involves identification of persons who may have been exposed to COVID-19. Contact tracers identified potential persons exposed and contacted these persons, usually by phone to inform them of their exposure and needs to quarantine.

While some apps were available quickly for download and use, such as Norway's app, others took more than six months following the declaration of the pandemic to be available for use. In addition to developing the apps, an additional need of the apps was for the ability to work across borders and even in the case of the UK to work across nations as different apps were developed.

5.10 Vaccination: Early beginnings

In 2020, more than 150 vaccinations were in development, and the first to be approved by the WHO was the Pfizer/BioNTech vaccine on 31 December 2020. In comparison to this, the MHRA in the UK approved the Pfizer/BioNTech vaccine on 2 December 2020 for use in the UK, in Switzerland SwissMedic approved for use on 19 December 2020 and the European Medicines Agency (EMA) approved the BioNTech/Pfizer vaccine for use by EU Member States on 21 December 2020. The UK started vaccination on 8 December 2020, Switzerland started on 23 December 2020, Germany started on 26 December 2020, and Sweden (Anadolu Agency, 2020) and Norway (The Local, 2020) started on 27 December 2020. Evidence on the impact of vaccines on the spread of the virus was not fully known at the end of 2020.

6. Summative comparison of national measures

In comparison to the WHO, the countries introduced measures both before and after the WHO proposed the guidance.

- Based on the review of the five countries, we observe that in 2020 there was significant variation in the implementation and withdrawal of measures. It is important to recognise that due to the laws in the countries, making certain things mandatory was not possible.
- WHO was not always consistent in its guidance throughout 2020. The change in recommendations regarding the use of facemasks is a striking example.
- Throughout the five countries, restrictions and measures were implemented, then removed and then reimplemented. In general, the measures in the five countries were eased over summer 2020. In retrospect, that was not such a good idea.
- A key feature of the COVID-19 pandemic response was the scale and extent to which people were asked or required to stay at home and/or work from home, with periods of time when only services or sectors deemed to be "essential" remained open.
- Another key feature of this pandemic has been travel restrictions, border closures, quarantine measures related to international travel, and reduced circulation between countries as wide-scale mitigation measures.
- All countries, except Sweden, developed tracing apps. Norway was the first country of the five to release its app. However, there were issues meaning it was withdrawn and then a new app was launched later in the year, issues included privacy concerns, concerns which were seen in the development of other apps and whether to use a centralised or decentralised system. The United Kingdom created several tracing apps in contrast to the other countries where one was developed. With cross border travel, there was a need for apps to work across borders, which was not possible at first.
- The UK stopped community testing and contact tracing for a period, which contrasted with the other countries and with the guidance issued by the WHO.

- The United Kingdom was the first to begin its vaccination campaign, with the MHRA approving the first vaccine on 2 December 2020 and vaccination campaign beginning on 8 December 2020. By the end of 2020, all countries had started their campaigns.

7. Risk communication: Who, how, what

In this section, we compare who the communication sources were (organisations, departments, individuals), how they communicated (which channels) and what they communicated (key messages).

7.1   Risk communicators

Table 5 presents a summary of who (organisations, departments, and individuals) provided information on different aspects.

In Germany, the main communicators at the national level were The Federal Government, The Federal Ministry of Health, and the Robert Koch Institute. Mayors and health ministers of Federal States also formed part of the main communicators at state level.

In Norway, the main communicators at the national level were the Ministry of Justice, the Ministry of Health and Care Services, the Norwegian Directorate of Health, and the Norwegian Institute of Public Health. In addition, the municipalities in Norway were responsible for regional communication to provide information tailored to the situation in that region.

In Sweden, the main communicators were the Public Health Agency of Sweden, the National Board of Health and Welfare, and the Swedish Civil Contingencies Agency.

In Switzerland, the FOPH, the Federal Council and the Cantons were the key communicators. The FOPH, which is Switzerland's public health body, was responsible for communicating about COVID-19-related information. The Federal Council, communicated about Switzerland's COVID-19 status and mitigation measures to the public. Additional information to that released at the federal level, such as regional specific information (e.g. quarantine period after contact with a known positive case), was communicated by the 26 Medical officers (26 Offices du médecin cantonal).

In the UK, the main communicators were the governments in each nation, the NHS and the public health bodies. The governments communicated high level updates about the COVID-19 status and the mitigation measures to the public. The UK Government communicated on reserved matters, for example on furlough. The NHS provided more information about COVID-19 and health. More detailed statistical information related to health was predominantly provided by the public health bodies.

Table 2: Some of the most important communication sources

	Germany	Norway	Sweden	Switzerland	United Kingdom
Some of the key "Faces" of the pandemic: professional roles (press briefings, health campaigns, speaking on shows etc.)	German Chancellor Federal Minister of Health Head of Administrative Office for Global Health and Director Institute of Virology at Charité President and Head of the Robert Koch Institute Director of the Institute of Virology at Charité The chairman of the German Ethics Council	Prime Minister of Norway Minister of Health and Care Assistant Director of the Norwegian Directorate for Health and Social Affairs Leader of the Norwegian Directorate of Health and the leader of the pandemic committee Leader of the Norwegian Institute of Public Health Attending physician at the Norwegian Institute of Public Health Department Director of the Norwegian Institute of Public Health Director of Infection Control at the	State Epidemiologist at the Public Health Agency Deputy state epidemiologist at the Public Health Agency Anders Tegnell personifying the top level civil servant/scientist in charge	Alain Berset, Swiss Health Minister and Federal Councillor Daniel Koch, Head of the Division of Infectious/Transmissible Diseases at the Federal Office of Public Health Virginie Masserey, Head of the Section for the Control of Infectious Diseases at the Federal Office of Public Health	Prime Minister First Ministers Health Minister, Minister for Health and Social Services, Secretary of State for Health and Social Care, Cabinet Secretary for Health and Sport Chief Medical Officers, Deputy Chief Medical Officers, Clinical Director, Healthcare Quality and Strategy Chief Scientific Advisors

		Norwegian Institute of Public Health Medical Director at the Norwegian Medicines Agency			
Public health body (including infectious diseases)	Robert Koch Institute (RKI)	Norwegian Institute of Public Health (NIPH)	Public Health Agency of Sweden	Federal Office of Public Health (FOPH)	Public Health England Public Health Agency Public Health Scotland Public Health Wales
Vaccine regulatory body	Paul-Ehrlich-Institute (PEI)	Norwegian Medicines Agency	The Swedish Medical Products Agency	SwissMedic	Medicines & Healthcare products Regulatory Agency (MHRA)
Media briefings (lead or equal lead organisation(s))	Federal Government Federal States Robert Koch Institute	The Norwegian Government including the Ministry of Justice, the Ministry of Health and Care Services, the Norwegian Directorate of Health, and the Norwegian Institute of Public Health Municipalities	The Public Health Agency, the National Board of Health and Welfare and the Swedish Civil Contingencies Agency	Conseil federal	UK Government NI Executive Scottish Government Welsh Government
Official statistics bodies for COVID-19	Robert Koch Institute	Statistics Norway	Statistics Sweden	Federal Statistical Office	Office for National Statistics, Northern Ireland Statistics and Research Agency, National Records of Scotland

Official COVID-19 statistics dashboard	Robert Koch Institute	FHI	The Public Health Agency of Sweden	Federal Office of Public Health	Public Health England, Department of Health/Information Analysis Directorate, Public Health Scotland, Public Health Wales
Website (COVID-19 & health)	Federal Ministry of Health https://www.zusammengegencorona.de/	Norwegian Institute of Public Health https://www.fhi.no/en/	Swedish Civil Contingencies Agency https://www.krisinformation.se/en Sweden's gathering place for information and services in health and care www.1177.se	Federal Office of Public Health https://www.bag.admin.ch/	NHS NHS Inform https://www.nhs.uk/
Website (COVID-19 & measures)	https://www.bundesgesundheitsministerium.de/coronavirus/chronik-coronavirus.html Additionally each state has its own website for informing their measures and regulations	https://www.fhi.no/en/op/novel-coronavirus-facts-advice/ https://lovdata.no/dokument/LTI/forskrift/2020-03-27-470	Krisinformation.se	Federal Office of Public Health	GOV.UK nidirect Scottish Government Welsh Government
Helpline (corona health)	Federal Ministry of Health corona hotline 0800 0000837. The non-emergency medical on-call service 116 117	Corona information hotline 815 55 015 For inhabitants of Oslo: 21 80 21 82	1177 Vårdguiden	Federal Office of Public Health's Infoline Corona 41 58 463 00 00 (every day, 6–23 h)	NHS 111 NHS 24

	The independent patient advice service 0800 011 77 22 All 16 federal states had their own corona hotlines additionally	ER on telephone number: 116117			

7.2   Risk messaging channels: Polyphony

In all countries, a range of messaging channels were used. In this section, we summarise some of the similarities, differences and unique aspects of the messaging channels. Overall, we observe the countries used many digital channels, for example the use of websites, dashboards, social media, text messaging, online advertising as well as artificial intelligence in the form of chatbots and decision support systems in the communication task in addition to traditional channels of communication, such as press conferences, billboards, posters, leaflets, letters, TV advertising, radio advertising, and key individuals appearing on television programmes. In the following, we provide short summaries and comparisons on selected communication channels.

7.2.1   Press conferences: Focal points

Authorities in all five countries held press conferences. Their composition (i.e. who led and who was present) and frequency varied over time, as well as between and within countries. In addition to being televised, some press conferences were streamed live on YouTube or apps such as Periscope. In all countries, there was a need to communicate national- and local-level messages.

In Germany, press briefings were held regularly at both the national and municipal level. The German Chancellor, Federal Minister of Health, Head of Administrative Office for Global Health and Director Institute of Virology at Charité, and President and Head of the Robert Koch Institute were among the members of national press briefings in 2020. Between March 2020 and January 2021, there were 1,362 press releases from the German federal government and the federal ministries (Brettschneider & Keller, 2021).

In Norway, the most common people to brief were Erna Solberg, Prime Minister; Bent Høie, Minister of Health And Care Services; Bjørn Gulvåg, Director of Directorate of Health; Espen Nakstad, Directorate of Health (Ass. Director); Camilla Stoltenberg, Director of Norwegian Institute of Public Health and Line Vold Department Director Norwegian Institute of Public Health.

In Sweden, joint press conferences were held by the Public Health Agency, the National Board of Health and Welfare, the Swedish Civil Contingencies Agency and other relevant agencies when needed. Conferences were broadcasted several times per week in 2020. Anders Tegnell, who personified the top-level civil servant/scientist in charge, was the main person who featured in the press (print and TV).

In Switzerland, the Federal Council led weekly press briefings, especially during the second quarter of 2020. The press briefings were key for communicating the current situation in Switzerland. Federal Council members were sometimes accompanied by health authorities, such as those working on infectious disease control at the FOPH. There were fewer press briefings during the summer and fall seasons compared to the previous months, as if the momentum had vanished.

In the UK, each nation held its own press conferences. In England, the UK Government led press conferences that typically involved three persons. The most common people to lead the briefings were the Prime Minister, Secretary of State for Foreign, Commonwealth and Development Affairs and First Secretary of State, and Secretary of State for Health and Social, though this changed but can be classified as a senior member of government. They were joined by other figures, which often included those with a medical or scientific background. Two key persons who regularly joined the UK Government press briefings were the Chief Medical Officer for England and the Chief Scientific Adviser. The composition of the press briefing changed over the course of 2020, with different people leading

and joining different briefings, while some included just one person. In Scotland, like England, there were typically three persons, with the First Minister leading almost every briefing. The First Minister was most often joined by people with a medical background (Chief Medical Officer or National Clinical Director of Healthcare Quality) and Cabinet Secretary for Health and Sport, and, just like England, different people attended different press briefings. In Northern Ireland, press conferences were led by either members of the Northern Ireland Executive or the Department of Health. In Wales, press conferences usually consisted of one person, for example the First Minister, Minister for Health, Chief Medical Officer, or NHS Wales Chief Executive. The frequency of the press briefings changed throughout the year and varied between the nations. (The individual country report contains more details.)

As England does not have a devolved government, its measures were set and communicated by the UK Government. Therefore, as the UK Government also communicated on matters relevant to all four nations (such as furlough), it was important that it was clear whether what was being said related to England or the whole of the UK.

For some press conferences, sign language interpreters were present, for others, the sign language interpreters were shown in small screens during the broadcast, and some did not have sign language interpreters during their live broadcasts.

7.2.2   Official Websites

Websites were a key source of information in all five countries. In Germany, a new, dedicated website[20] provided information about COVID-19 to the public, while the Robert Koch institute[21] offered daily reports (in German and English) on the COVID-19 situation for the national and international public health sectors. The Ministry of Health created a page about the Coronavirus pandemic (SARS-CoV-2) on their website where they frequently posted (almost daily) bulletins[22]. Moreover, each state had its own website with the latest update in coronavirus measures and local coronavirus statistics.

Norway used several websites that were a mix of health, public health and government sites[23][24][25].
In Sweden, a pre-existing website[26] was the main source of COVID-19 information. This website is used during crisis and emergency events in general, not restricted to COVID-19 or health emergencies.

In Switzerland, a dedicated COVID-19 website was created by the FOPH[27].

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[20] https://www.zusammengegencorona.de
[21] https://www.rki.de/EN/Home/homepage_node.html
[22] https://www.bundesgesundheitsministerium.de/coronavirus/chronik-coronavirus.html
[23] https://www.helsenorge.no/en/coronavirus/
[24] https://www.regjeringen.no/no/tema/Koronasituasjonen/id2692388/
[25] https://www.fhi.no/en/
[26] www.krisinformation.se
[27] https://www.bag.admin.ch/bag/en/home/krankheiten/ausbrueche-epidemien-pandemien/aktuelle-ausbrueche-epidemien/novel-cov.html

In the UK, multiple websites were used to communicate information related to COVID-19, the main set of websites were a combination of government websites[28][29][30][31], health service (NHS) websites[32][33], and public health bodies and statistics bodies in each nation.

7.2.3 Communicating data: The widespread use of dashboards

Communicating data was a significant part of the risk messaging, and dashboards[34] were a prominent means of presenting and providing access to data for a range of users, including the public. The content and functionality of the dashboards varied between organisations and over time. Some of the factors, features and functionality that were commonly reported included the number of cases, cases per 100,000, number of deaths, deaths per 100,000, interactive maps (i.e. ability to select regions to provide more detailed information), test positivity rate, hospital admissions, ICU admissions, hospital capacity, vaccinations administered, ability to download data, ability to make choices on what data to show (e.g. time periods, locations). The dashboards included visualisations, data tables and written summaries. Table 6 provides a list of the dashboards used in each nation, we have also identified some additional features included in the dashboards that are not mentioned above.

Table 3: List of dashboards in each country. Dashboards were reviewed in April 2021 and some features may have been added in 2021.

Location	Organisation	Link
Germany	Robert Koch Institute	https://experience.arcgis.com/experience/478220a4c454480e823b17327b2bf1d4
Northern Ireland, UK	Department of Health/Information Analysis Directorate	https://app.powerbi.com/view?r=eyJrIjoiZGYxNjYzNmUtOTlmZS00ODAxLWE1YTEtMjA0NjZhMzlmN2JmIiwidCI6IjljOWEzMGRlLWQ4ZDctNGFhNC05NjAwLTRiZTc2MjVmZjZjNSIsImMiOjh9
Norway	Norwegian Institute of Public Health	https://www.fhi.no/sv/smittsomme-sykdommer/corona/dags--og-ukerapporter/dags--og-ukerapporter-om-koronavirus/
Scotland, UK	Public Health Scotland	https://public.tableau.com/profile/phs.covid.19#!/vizhome/COVID-19DailyDashboard_15960160643010/Overview
Sweden	Public Health Agency	https://www.folkhalsomyndigheten.se/the-public-health-agency-of-sweden/communicable-disease-control/covid-19/statistics/
Switzerland	Federal Office of Public Health	https://www.covid19.admin.ch/en/overview

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[28] https://www.gov.uk/coronavirus

[29] https://www.gov.scot/coronavirus-covid-19/

[30] https://www.nidirect.gov.uk/campaigns/coronavirus-covid-19

[31] https://gov.wales/coronavirus

[32] https://www.nhs.uk/conditions/coronavirus-covid-19/

[33] https://www.nhsinform.scot/illnesses-and-conditions/infections-and-poisoning/coronavirus-covid-19

[34] Typically, a dashboard provides a summary of key measures which may be shown visually or in a written format. The dashboards can also be interactive, allowing a user to make selections to tailor the data to their interest. The dashboard is usually linked to data sets and as these data sets are updated so are the outputs within the dashboard. In the context of COVID-19, many aspects of the data were updated daily.

United Kingdom	Public Health England	https://coronavirus.data.gov.uk/
Wales, UK	Public Health Wales	https://public.tableau.com/profile/public.health.wales.health.protection#!/vizhome/RapidCOVID-19virology-Public/Headlinesummary

7.2.4   Chatbots and decision support systems: A novelty

Chatbots, a form of artificial intelligence, were available to use on certain websites and through apps[35]. The purpose of these were to help users find information rather than speaking with a person. For example, the UK Government launched the Coronavirus information service on WhatsApp[36] and NHS Inform in Scotland (Scotland's provider of online medical information) launched a service to help users of the website find information related to COVID-19[37]. In neither of these situations would a user speak to a person but instead, the chatbot would help retrieve information for the user to their questions. In addition, there were also tools to help guide individuals to information faster. For example, in the UK, there was a system in which users were asked a series of questions, and based on their responses, they were given information about where they could, for instance, access financial help. The WHO saw value in similar tools, with WHO/Europe, UNICEF, and the Central Asia Regional Office (ECARO) working together to develop HealthBuddy, which was described by WHO in May 2020 as a multilingual interactive chatbot designed to "help countries in the region to access accurate information, and counter misinformation surrounding the virus" (WHO, 2020d).

7.2.5   Social Media and New Media: A massive surge

The current, most popular social media platforms — such as Facebook — have been around for less than two decades and only mobilised during a limited number of epidemics (Guidry et al. 2017; Lwin et al. 2018). However, during the ongoing COVID-19 pandemic, their use has developed quite extensively. Social media channels (such as YouTube, Instagram, Twitter, Facebook, TikTok…) were used to disseminate information during the COVID-19 pandemic by official communication sources in each of the five countries, as well by the WHO. Their messages often directed users to information sources such as websites. They were also platforms that users could take an active role in sharing information with their friends/followers, comment on posts, and react to content, for example, by liking content. Globally, Facebook had the greatest number of active users (2.4 billion) in 2019. It was followed by YouTube (1.9 billion), while Instagram had 1 billion active users, and TikTok and Twitter had 500 million and 326 million active users, respectively[38]. It is important to note that individuals without an account can also view posts on these platforms but may be limited in different ways (i.e. how much they can view, how easy it is to navigate the site).

The WHO reviewed their social media accounts in December 2020 and provided data summarising the growth in followers/subscribers and sharing of posts, revealing without a surprise that both followers/subscribers and sharing of posts grew significantly (WHO, 2020l). At the beginning of 2020, the WHO's Facebook, Instagram and Twitter accounts all had less than 5 million followers and by 1 December 2020 they had grown to 35.8 million on Facebook; 9.6 million on Instagram; and 8.6 million on Twitter (WHO, 2020l). Shares on Facebook rose from 1.2 million in 2019 to 12 million in 2020; shares on Instagram rose from 0.3 million in 2019 to 2.6 million in 2020; and retweets on Twitter increased

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[35] As mentioned earlier, the WHO also launched a WhatsApp service.

[36] Details: https://www.gov.uk/government/news/government-launches-coronavirus-information-service-on-whatsapp

[37] Details: https://www.nhsinform.scot/illnesses-and-conditions/infections-and-poisoning/coronavirus-covid-19/coronavirus-covid-19-ask-nhs-inform-a-question

[38] Details: https://ourworldindata.org/internet and https://innerarchitect.com/top-20-social-networks-by-active-users-2019/2021)

from 0.5 million in 2019 to 1.8 million in 2020 (based on data collected until 1 December 2020) (WHO, 2020l). The WHO also used podcasts and YouTube videos including their Science in 5[39] series COVID-19 Q&As[40] series to disseminate information and answer questions from the public.

Similarly to the WHO, health authorities in each of the five countries also shared information about COVID-19 on social media and saw their accounts grow significantly in terms of followers in 2020. For example, the German Federal Ministry of Health's Facebook page grew from 87,000 to 593,000 followers between 1 March and 2 May 2020[41]. During the same period, the Norwegian Institute of Public Health's Facebook account went from 29,000 to 103,000 followers, while Public Health Agency Sweden's Facebook page grew from 11,000 to 199,000 followers. Similarly, in Switzerland, the FOPH's number of Facebook followers increased from 4,000 to 104,000. Meanwhile, in the UK, NHS UK's Facebook page grew from 270,000 to 809,000 followers, while Public Health England's Facebook account went from 58,000 to 437,000 followers[42]. Readers interested in learning more about what health authorities in each of the five countries communicated on social media during the first year of the pandemic can consult Kompani et al.'s (2022)[43] forthcoming paper, "Five-country Comparison of European Health Organisations' COVID-19 Social Media Communication", which includes findings on how frequently health authorities posted about COVID-19 on Facebook, Instagram and Twitter, as well as the themes that they communicated.

It should be noted that health organisations were not the only public authorities to communicate about COVID-19 on social media. For example, since the start of the pandemic, the UK Government has been posting about COVID-19 on its own Facebook page, while Alain Berset, the Swiss Health Minister and Federal Councillor, has been tweeting about the pandemic on his own personal Twitter account.

Facebook
Facebook is a social media platform that was launched in 2004. Its parent company, Facebook, Inc., which changed its name Metaverse in 2021, also owns Instagram and WhatsApp. Facebook users create an account and choose who to become friends with (friendships are reciprocal) and pages to follow (not necessarily reciprocal). Users are able to post status updates, which can contain text, images and videos. A user's Facebook homepage shows a selection of posts from accounts that the user is friends with or follows. Posts can be commented on, liked and shared. Some observations of the use of Facebook are listed below.
- Facebook was used to direct to and create awareness of other information and services. For example, Public Health England promoted their blog through Facebook[44]; NHS UK account promoted the contact tracing app[45].
- Some accounts shared the results of surveys they had carried out[46].
- Facebook was used to share short Q&A videos on different topics[47]

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[39] Science in 5 videos: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/media-resources/science-in-5
[40] COVID-19 Q&A #AskWHO live series:
https://www.youtube.com/playlist?list=PL9S6xGsoqIBWoRPNDwI_qFOb-j3xcNOXR
[41] Data obtained with CrowdTangle
[42] Data obtained with CrowdTangle
[43] Kompani, K., Aroro, S., Broqvist, H., Koval, O., Mahdavian, F. (2022). Five-country Comparison of European Health Organisations' COVID-19 Social Media Communication.
[44] Example post: https://www.facebook.com/366592640044758/posts/2837048566332474
[45] Example post: https://www.facebook.com/NHSwebsite/posts/10158855572991543
[46] Example post :
https://www.facebook.com/PublicHealthWales/photos/a.416561841773060/3384401598322388/?type=3
[47] Example post: https://www.facebook.com/NHSwebsite/posts/10158180709226543

- Profile pictures and cover photos were updated to contain a COVID-19-related image.
- Comment sections of posts were often very active.

Instagram

Instagram is a photo- and video-sharing social media platform launched in 2010. Instagram users can post an image or video (caption optional) on their page or share an Instagram story (a photo or video that disappears 24 hours after being posted) that their followers can then see on their post or story feed. Users can like, share, comment, and save posts. Some examples of how Instagram was used are listed below.

- Instagram was used to share personal stories, which were a photo with a caption which provided their story. For example, England's NHS account, NHS England and Improvement, focused almost exclusively on personal stories of patients[48] and medical staff[49].
- The Swiss health authorities (FOPH) shared videos of famous Swiss athletes and other personalities encouraging people to follow Covid-19 guidelines[50].
- The Swiss health authorities (FOPH) also posted short clips from the Federal Council's COVID-19 press conferences[51].
- The comment sections were also active. Some health authorities engaged with users, responding to some questions and comments. The FOPH in Switzerland is one example of an account doing so.

Twitter

Twitter, which was launched in 2006, is a microblogging platform where users can post short updates, known as tweets, which are shown to their followers on their homepage with the most recent tweet appearing at the top of their Twitter feed. A user selects who to follow, with those tweets shown to them in their timeline. Some observations on the use of Twitter are listed below.

- Verified accounts have a small verification icon next to the account name. Many organisational accounts have been verified, which helps provide legitimacy of the online account.
- Tweets can be pinned to the top of a user's page, meaning that when a person goes to a specific account, that is the first tweet that is shown. This allows a key message to stay prominent as opposed to moving down the page as new tweets are posted as tweets are shown chronologically.
- The banner picture, profile picture and name (but not Twitter handle) can be changed. For example, the Welsh Government changed its name to: "Welsh Government #KeepWalesSafe", incorporating a hashtag in their name and changed their banner picture to a COVID-19 related message.
- Some countries, such as Switzerland posted in multiple languages (French, German, Italian) for all posts.
- Accounts can retweet tweets from other users that may be of interest to their followers. With multiple organisations involved in the pandemic response, this enables the same messages to be disseminated through different accounts and allowing for consistent messaging.
- Some Twitter accounts would reply to questions asked by users, whereas other would not, highlighting differences in social media policies. Examples of this include the Welsh Government Twitter account and the Clinical Director, Healthcare Quality and Strategy who was a key figure communicating to the public in Scotland both responded to tweets on Twitter through their accounts.

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[48] Example post: https://www.instagram.com/p/CEwm-a8FoNr/
[49] Example post: https://www.instagram.com/p/CCENLkegY2F/
[50] Example post: https://www.instagram.com/p/B9-AllQhpfv/
[51] Example post: https://www.instagram.com/p/B_HUS7yHQG5/

- The Welsh Government used the Periscope app to live stream press conferences on Twitter.
- Twitter was used to promote other sources of information, for example Public Health Scotland tweeted updates of their COVID-19 dashboard[52] as well as release of reports[53].

YouTube

YouTube, which was launched in 2005, is a video-sharing platform that allows users to view and upload videos. Users can also subscribe to accounts and ask to be notified when they upload new content. Some observations on the use of YouTube:

- Some YouTube accounts were verified, such as "10 Downing Street".
- YouTube was used to store videos from the press conferences, allowing them to be viewed live or following the briefing.
- The Scottish Government created sections on their home page and classified the video uploads according to these. The sections were aimed at different needs of a user related to the pandemic, for example sections included: "Coronavirus: Support and guidance"; "Coronavirus: First Minister's updates"; and "Coronavirus: Self-isolation and testing". In contrast, some other YouTube accounts either did not have sections or had sections that were more relevant to pre-pandemic issues.
- YouTube videos were embedded into website pages of some communications sources. For example, on the Scottish Government website, the press briefings had a YouTube video embedded on the website page accompanied by a transcript[54].
- Comments were turned off for many organisations' videos.

Podcasts

- One example of the use of podcasts during the pandemic is 'Das Coronavirus-Update mit Christian Drosten' which translates to 'The coronavirus update with Christian Drosten'. This podcast by Drosten, who has been a key figure in the pandemic in Germany podcasted weekly since the last week of February 2020 and discussed various coronavirus research including virus study, mutations, vaccine progress, role of children and the latest coronavirus updates (NDR, 2021).

7.2.6 Engaging with the public/two-way engagement

Engagement is considered a central part of risk communication in the risk communication literature (Bourrier & Bieder, 2018). While the above addressed the channels used to communicate to the public, we are also interested in how the publics were able to ask questions, provide suggestions and engage in a dialogue with the communication sources through the communication channels listed above as well as others. It was challenging to systematically review opportunities for engagement in the five countries, therefore presented below is a selection of what we have identified. This list is not exhaustive but shows some examples of how it was done during the COVID-19 pandemic and provides some options of how this can be done in future. The examples are mostly drawn from the country reports that are part of PAN-FIGHT's publications.

- In Germany, live discussion panels were held on different topics where key persons (at the national level) would answer questions from the public. For example, on 5 December 2020, a live discussion was held with a focus on vaccines and the Federal Minister of Health, the President of the Robert Koch Institute and the President of the Paul Ehrlich Institute answered

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[52] Example tweet: https://twitter.com/P_H_S_Official/status/1341724275422670848
[53] Example tweet: https://twitter.com/p_h_s_official/status/1334111938964549632
[54] Example of this: https://www.gov.scot/publications/coronavirus-covid-19-update-first-ministers-statement-11-2021/

questions from the public. Over 2000 questions were submitted prior to the event beginning with questions submitted through the website (Federal Ministry of Health, 2021).

- In Norway, the Prime Minister of Norway answered questions from the public in a "People's Question Time" session on 22 March 2020 on Facebook[55].
- In Wales, the Twitter account of the Welsh Government @WelshGovernment replied to questions directed to them on Twitter, not just for specific question and answer events.
- In Switzerland, the FOPH responded to some questions from the public on Instagram.
- In Norway, the public could contact the Norwegian Institute of Public Health by phone if they had a question to which the answer was not available elsewhere[56].
- In the German state of Baden-Wurttemberg, a "Bürgerforum", akin to town hall meeting, was used[57]. These meetings were organised by the government of Baden-Wuttemberg. At these meetings, citizen representatives informed the government on the current state of public opinion and the needs of the population.
- In Scotland, the Scottish Government launched an online public discussion on how to ease lockdown restrictions between 5 May 2020 and 11 May 2020, with the purpose of informing the route map for Scotland. The online discussion generated more than 4,000 ideas and almost 18,000 comments[58].
- In Scotland, a member of the public who wanted to share an idea related to the pandemic could email the government using a specific email address.
- On the Scottish Government website, at the bottom of every webpage is the question: "Was this helpful?" with three options for a user to select (if they choose to engage): "Yes", "No" and "Yes, but". On selecting any of these options, the respondent is able to provide a comment and then send their feedback. This includes providing feedback on the pages specifically related to COVID-19. A blog by the Scottish Government stated that 56,000 users had left feedback[59] since 23 March 2020 (blog was posted on 29 June 2020).
- While in 2021, the First Minister of Scotland stated that if a person living in Scotland had not received their vaccination letter and they believed they had been missed, as a final option (following them contacting their GP as well as helplines), they could email her directly and she provided her email address[60].
- At some of the UK Government press conferences, members of the public could ask questions.
- In the United Kingdom, feedback was sought on the Coronavirus dashboard via a survey. The survey collected 17,000 responses in 48 hours[61].
- On vaccines, side effects could be reported through the Yellow Card scheme[62] in the United Kingdom.

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[55] See: https://www.regjeringen.no/no/aktuelt/folkets-sporretime-med-statsministeren/id2694469/
[56] See: https://www.fhi.no/sv/smittsomme-sykdommer/corona/
[57] See: https://beteiligungsportal.baden-wuerttemberg.de/de/mitmachen/lp-16/buergerforum-corona/
[58] Report on the outcomes of the online engagement can be found https://www.gov.scot/publications/coronavirus-covid-19-framework-decision-making-overview-public-engagement/pages/1/ and ideas and comments can be viewed https://www.ideas.gov.scot/covid-19-a-framework-for-decision-making/home?sort_order=rated
[59] Source: https://blogs.gov.scot/digital/2020/06/29/online-behaviour-during-lockdown/
[60] For example see transcript: https://www.gov.scot/publications/coronavirus-covid-19-update-first-ministers-statement-monday-15-february-2021/
[61] See: https://publichealthmatters.blog.gov.uk/2020/09/04/the-covid-19-dashboard-bringing-together-data-and-statistics-in-one-place/
[62] More: https://www.gov.uk/guidance/the-yellow-card-scheme-guidance-for-healthcare-professionals#reporting-during-the-coronavirus-covid-19-outbreak

- The Clinical Director, Healthcare Quality and Strategy in Scotland appeared on a football podcast and listeners submitted their questions and he answered a selection of these.
- Many countries conducted research involving members of the public.

7.3   Risk messaging

The research team identified a selection of key messages in each of the countries in the individual country reports and these are reproduced below. Messages from Germany in Table 7; Norway in Table 8; Sweden in Table 9; Switzerland in Table 10; the United Kingdom in Table 11. Note that as the United Kingdom did not have a UK-wide campaign, the key messages for each nation are shown. A range of methods were used to identify messages, including reviewing press conference videos, social media accounts, websites, posters and more. We acknowledge that these are only a selection of the key messages and some may have been missed due to the search strategy. In the following tables, details related to when the messages were used are included when possible. Dates provided are, in most cases, estimates as it is challenging to identify the start and end dates of messaging campaigns.

Table 4: Key messages in Germany

Message	Translation	Details
Die AHA+A+L-Formel: Abstand wahren, auf Hygiene achten und – da, wo es im Alltag eng wird – eine Maske tragen. Zusätzlich sollten wir im Alltag die Corona-Warn-App nutzen und in Innenräumen regelmäßig lüften.	the AHA + A + L formula: keep your distance, pay attention to hygiene and - where things get tight in everyday life - wear a mask. In addition, we should use the Corona warning app in everyday life and ventilate the rooms regularly.	The original acronym "AHA" stands for Abstand, Hygiene, Alltagsmaske. The acronym was extended to "AHA + A + L" with A standing for the COVID-19 tracing app and L standing for air (Lüften) .
"Zusammen gegen Corona"	"Together against Corona"	
"Wir bleiben zuhause!"	"We're staying home"	
"Wir halten zusammen"	"We stay together"	
"Applaus für die Helden"	"Applause For The Heroes"	
"Vermeiden Sie öffentliche Verkehrsmittel und unnötige Reisen"	"Avoid public transport and unnecessary travel"	
"Reduzieren Sie persönliche Kontakte"	"Reduce personal contacts"	
"Home-Office-Möglichkeiten nutzen"	"Use home office options"	Encouragement to work from home if it is possible

Table 5: Key messages in Norway

Message	Translation	Details
"Hold deg hjemme. Redd liv."	"Stay home. Save lives."	
"Last ned smittestopp"	"Download the infection stop app."	Recommendation to download the contact tracing app.
"Covid-19 dugnad"	"Covid-19 voluntary work"	Encouragement to engage in collective effort during the COVID-19 pandemic.

"Du kan bære smitte uten at du vet det selv. Takk for at du tar hensyn!"	"You can carry the infection without knowing it. Thank you for your kind consideration!"	
HOLD AVSTAND	Hold the distance	Constant, but has varied during the pandemic regarding the distance in m (ranging between 1 m and 2m >) and the number of allowed social contacts at a time.
UNNGÅ ANSIKT TIL ANSIKT KONTAKT	Avoid face to face contact	Constant
VASK HENDENE	Wash your hands	Constant
BRUK DESINFISERENDE MIDLER	Use antibacterial products	Constant
BRUK MUNNBIND DER DET ER ANBEFALT	Wear a face mask where it is recommended	Changed from "not recommended" in March 2020 to "obligatory" by the end of 2020. The messages regarding the usage of a face mask vary across the country (municipalities), depending on the severity of the outbreak and the ability to keep 1 m distance, and type of social interaction (face musk in public transport and taxis).
HOLD DEG HJEMME OM DU ER SYK	Stay home if you are sick	Constant
TEST DEG SELV OM DU ER SYK	Test yourself if you are sick	Constant
UNNGÅ OFFENTLIG TRANSPORT	Avoid using public transport	Constant
UNNGÅ UNØDVENDIGE REISER	Avoid unnecessary travel	Constant
FØLG RÅDENE I KOMMUNEN DIN	Follow advices from your municipality	Constant

Table 6: Key messaging in Sweden

Message	Translation	Details
Where is the original message? "Tvätta händerna - i 30 sekunder"	"Wash your hands—for 30 seconds"	Launched in March 2020
"Stanna hemma om du är sjuk"	"Stay at home if you are sick".	Launched in March 2020

"2 meter regeln. Så ofta du kan"	"The 2 meters rule. As often as you can"	??
"Sommarregler"	"Summer rules"	Launched in June 2020
"För dem du älskar"	"For those you love"	Launched autumn 2020
"Fortsätt skydda dig själv och andra"	"Keep protecting yourself and others"	Launched autumn 2020
"Ingen som du älskar ska hamna på en intensivvårdsavdelning"	"Nobody that you love should end up in an ICU"	
Träffa få. Umgås bara med dina närmaste.	*Meet as few people as possible.* Spend time only with those closest to you.	5 important rules campaign launched by 1177 Vårdgivarguiden
Håll avstånd Undvik platser med risk för trängsel.	*Keep a safe distance.* Avoid crowded areas. Try to spread out instead.	
Stanna hemma Har någon i ditt hushåll covid-19? Stanna hemma allihop.	*Stay at home* Does anyone in your household have COVID-19? If so, you must all stay at home.	
Testa dig vid symptom Beställ hemtest kostnadsfritt.	*Get tested if you have any symptoms* Order a free home-testing kit.	
Res säkert Undvik att träffa nya personer på resmålet.	*Travel safely* Avoid meeting new people at your destination.	

Table 7: Key messages in Switzerland in 2020

Message	Translation	Details
"Stop Corona."		This overarching coronavirus campaign message was featured from the onset of the pandemic.
"Voici comment nous protéger"	"Protect yourself and others"	This slogan was also a cornerstone of the FOPH's coronavirus communication. It is featured on the top-right corner of most FOPH posters.
"Ensemble et solidaire" "Ensemble"	"Together in solidarity" "Together"	This campaign message was introduced around the time when the first nationwide lockdown was announced.
"Restez à la maison. Sauvez des vies." "Restez à la maison,"	"Stay at home. Save lives." "Stay at home."	This message also emerged around the time when the first nationwide lockdown was announced.

"Le coronavirus est encore là"	"Coronavirus is still here."	This message was introduced in spring/summer 2020 after the easing of the restrictions imposed by the first semi-lockdown.
"A vous d'agir"	"Take responsibility."	This message, which encouraged people to take responsibility by respecting the COVID-19-related hygiene and safety guidelines, emerged during the late summer/early autumn 2020.
"Rencontrez le moins de personnes possible"	"Get together with as few people as possible."	This message discourages people from meeting physically with too many people and emerged in late summer/early fall 2020.
"Plus important que jamais : stopper l'augmentation des cas."	"More important than ever: stop the rise in infection numbers."	This campaign slogan was also introduced late summer/early autumn 2020.

Table 8: UK messages at the nation level

Message	Details
"Stay home. Protect the NHS. Save Lives"	Stay at home guidance to population to protect the National Health Service (NHS) and to save lives. Used for different periods in each of the nations. Message first used from the end of March 2020 (GOV.UK, 2020a). Used in England during the first wave of the pandemic but England dropped this message in May 2020 when easing lockdown restrictions.
"Stay alert, control the virus, save lives"	Used from May 2020 in wave 1 in England only, replacing the stay home messaging. The other nations did not change from the general stay at home guidance (BBC, 2020b).
Hands. Face. Space.	Ran from September 2020 onwards (GOV.UK*, 2020e). This message was shown on the podiums during press briefings and featured in COVID-19 communication materials. Key mitigation actions: wash hands, cover face and maintain space between you and persons outside of your household.
"Rule of 6"	Used in England when the rule of 6 was implemented in September 2020 for meeting others with whom you do not live (GOV.UK, 2020b)
"We all must do it to get through it"	Used in Northern Ireland from March until end of 2020 (The Executive Office*, 2020). Slogan used throughout 2020. The slogan was also accompanied pictographs of either some of the key mitigation actions "stay home", "keep distance", "wash hands" or additional phrases "stay safe" "save lives".
"FACTS" "Living with FACTS helps keep us safe."	Used in Scotland. FACTS campaign was launched in June 2020 and used until end of 2020 (Gov.scot, 2020c). The campaign was to raise awareness of the key actions members of the public should continue to take.

"Remember FACTS" "Remember FACTS for a safer Scotland"	The acronym "FACTS" stands for: F – Face covering A – Avoid crowds C – Cleaning hands T – Two meter distance S – Self-isolate The acronym summarises the key things people should do to help minimise the spread.
"Stay safe. Protect others. Save lives"	Used in Scotland. First seen in a press conference in June 2020, aligning with the launch of the FACTS campaign and moving from the stay at home message (Gov.scot, 2020b).
"Stay home. Stop the spread. Save lives."	Used in Scotland. A variant on the stay home messaging.
"Stopping the spread starts with all of us."	Used in Scotland. Shown at press briefings from 2nd November 2020, coinciding with the launch of the Covid Protection Levels (Gov.scot, 2020a).
"Stick with it Scotland, for yourselves and each other" #WeAreScotland	Used in Scotland from July 2020.
"NHS is open"	Used in Scotland to encourage the use of the NHS during the pandemic and not to put off treatment due to the pandemic.
"Keep Wales safe" "Together we'll keep Wales safe"	Used in Wales.
"Three rules to keep Wales safe"	Used in Wales. Washing hands, wearing a face covering and keeping 2m apart.

Reflections on the messaging

In Norway, Switzerland, and the United Kingdom, messaging related to staying home to save lives was used. In Germany, the message "We're staying home" was used.

Some messaging focused on raising awareness about the virus. For example, in Switzerland the message "Coronavirus is still here" was used at the end of the first wave and in Norway, the message "You can carry the infection without knowing it. Thank you for your kind consideration!" highlighted that people can have the virus and not show symptoms. There were also examples of messages to encourage the public to continue with the protective measures, with the message "Stick with it Scotland, for yourselves and each other" used in Scotland beginning in the summer as case numbers dropped.

Featured in many of the countries' messages was the use of "we" in the sense of collective action or that the pandemic affects everyone. One example of this is the slogan used in Northern Ireland, "We all must do it to get through it". This slogan was used as a logo on materials and accompanied by small images, typically displaying recommended preventative measures. This message appears to be versatile and was consistently present in communication with the public, especially given the ability to change the measures being recommended and for it to fit on to other materials. Another example is "Together against Corona" and "We stay together" which were used in Germany.

Some messages, such Switzerland's "It's up to you to act", highlighted the responsibility of the person as an individual. Other messages highlighted the duality of a person's actions, that by acting it protects themselves and others, which touches upon both the benefits to a person and to contacts of a person. For example, "Keep protecting yourself and others" in Sweden and "Stick with it Scotland, for yourselves and each other" in Scotland.

Only in Germany fresh air/ventilation became part of the main message in the country when "AHA" was extended to "AHA-A-L". The word 'safe' was used in several messages.

One message which received negative comments in the UK, was "Stay alert, control the virus, save lives", where it was considered ambiguous on what actions were to be taken[63]. Wales and Scotland chose not to adopt this message.

Campaign messages changed throughout the year and reflected the situation at the time.

Not or very little in the messages
We also considered messages that were communicated less frequently. For example, on Facebook, Instagram and Twitter, it appears that some of the messages that were communicated about the least include long COVID (or just recovering from COVID-19); messages targeting pregnant women; messages targeting university students and younger people who were finishing high school; exercising during COVID; and teleworking (Kompani et al., 2022)[64]. None of the campaign messages focused on feedback from the population on matters; the messages focussed on collective actions, or responsibility of the public but did not focus on the responsibility or actions of the governments/health authorities. Messages of support were also rare in 2020.

8. Concluding summary

Pre-pandemic
- The five countries in the study are all high-income countries, with health systems that aim to provide universal coverage to their populations.
- Germany notably had the highest number of beds per 1,000 people and a high number of physicians and 4.2 per 1,000 (The World Bank, 2017).
- Health emergency simulation exercises were conducted in UK and Germany.
- Pandemic plans were available for each country, and all were designed for an influenza pandemic. In addition to a national plan, Germany had pandemic plans for each of its 16 states. Sweden had the most comprehensive approach towards social threats.
- All five countries had experience with previous pandemics and communicable diseases as well as recurring health threats, such as seasonal flu.

Response measures
- The countries implemented and loosened restrictions at different paces and even within a country, it varied. It was not uncommon for several strategies to be operating in parallel in a country. There were often several strategies in place running in parallel in several countries and this was in part due to the organisation of responsibility/power related to health, with some being centralised and others decentralised. Some also moved especially for the first

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[63] See: https://www.bbc.co.uk/news/uk-52605819
[64] Kompani, K., Aroro, S., Broqvist, H., Koval, O., Mahdavian, F. (2022). Five-country Comparison of European Health Organisations' COVID-19 Social Media Communication.

wave and lockdowns measures from a decentralised to a centralised decision making (Switzerland, Germany).

- The pandemic and the publicity of the pandemic meant the measures in place by different countries were known and could be compared between the domestic and international situation. Additionally, the case numbers and deaths were also able to be compared as these were reported daily. Some countries, like Switzerland, provided an international perspective in its dashboard and website.

- Lockdown decisions, border closures, travel bans, forced quarantines have however been taken mostly without concerted action across countries or in line with WHO guidance.

- International benchmarking and exchanges of experience have predominantly happened at the clinical level.

Risk messaging

- UK had an interesting situation as there is not a devolved government for England, meaning the UK Government communicated measures for England, and the Devolved Governments communicated for the devolved nations. However, the UK Government decisions on some measures related to the pandemic, such as furlough decisions, which were relevant to all four nations.

- Different levels of communication were active: national and local. Local levels allows for additional tailored information.

- The mobility of people across borders meant there was a need for contact tracing and apps to work beyond borders, requiring international coordination and systems joining up to provide data. Northern Ireland and the Republic of Ireland quickly identified this as an issue and made an agreement to ensure the apps worked together. There were privacy concerns related to the app and decentralised approaches were taken to the apps.

- Many communication channels were used to disseminate information: websites, Facebook, Twitter, Instagram, YouTube, press briefings, text, letters, billboards, TV advertising, social media advertising, radio advertising, Q&As, appearances on TV shows, radio shows, and press briefings, newspapers, and more. This highlights the complexity of how many channels are being used to disseminate information.

- Examples of how the public could inform and communicate with the organisations were available but limited, however this might be due to difficulties finding these examples. There are some examples of where the public were invited to provide responses (i.e. submit questions and feedback), which garnered thousands of responses.

- There was inconsistent use of case definitions across borders, which involved changing definitions. There were also challenges with different reporting and monitoring systems even within a country. Making links within countries and between countries also proved to be challenging.

- Contact tracing apps have had a mixed result. For the future, they need to work across borders and with different systems. They should also consider the public's willingness to use them on a wide scale.

- Reporting case numbers is important so that individuals get a sense of how prevalent the disease is. There is a need for good reporting practices and seamlessly integrating with international bodies using the data. Clear data presentation is crucial in this respect. While interactive dashboards were used to allow the communication and exploration of data, the functionality differed between countries and over time.

- Press briefings were a key communication source in all countries. Who was present varied but often involved only a handful of communicators. These have a great sway in what and how various issues are framed, for instance when answering questions.
- It's not just what is said and written. Risk messaging includes actions, such as closing a border, and all mitigation measures, as well as support. Some of these measures (i.e. travel bans, closing of borders, and quarantines at the expense of travellers) were not supported by WHO recommendations.

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Appendices

Appendix 1 - Communication related documents published, co-published or co-authored by WHO, available from https://www.who.int/

Risk communication and community engagement document name	Why is it important for risk communication
Risk communication and community engagement readiness and initial response for novel coronaviruses (nCoV), 10 Jan 2020 https://www.who.int/publications/i/item/risk-communication-and-community-engagement-readiness-and-initial-response-for-novel-coronaviruses-(ncov)	A series of checklists, including on risk communication aspects.
Home care for patients with suspected novel coronavirus (nCov) infection presenting with mild symptoms and management of contacts, 20 Jan 2020 https://www.who.int/publications/i/item/10665-330671	First dedicated publication for a fragile public
Risk communication and community engagement readiness and response to coronavirus disease (COVID-19): interim guidance, 1st established on 26 Jan 2020, revised and published on 19 March 2020 https://www.who.int/publications/i/item/risk-communication-and-community-engagement-readiness-and-initial-response-for-novel-coronaviruses	A series of checklists, including on risk communication aspects.
A guide to preventing and addressing social stigma associated with COVID-19, 24 February, 2020 https://www.who.int/publications/m/item/a-guide-to-preventing-and-addressing-social-stigma-associated-with-covid-19	This document addresses social stigma in the COVID-19 pandemic, with the target audience government, media and local organisations. The document identifies that social stigma may lead to adverse effects, such as (1) people concealing their illness, (2) delays in a person seeking medical attention, and (3) people not taking on suggested behaviours. Suggestions of how to address social stigma are provided, these are: (1) a focus on the use of language and provided in the document are a list of dos and don'ts with respect to language used; (2) recognising the different roles of stakeholders in communication and their effect on social stigma, along with suggestions of how to avoid or reduce stigma; and (3) general communication advice.
Risk Communication and Community Engagement (RCCE) Action Plan Guidance COVID-19 Preparedness and Response, 16 March 2020	A tool that can be used to develop a risk communication and community engagement plan.

https://www.who.int/publications/i/item/risk-communication-and-community-engagement-(rcce)-action-plan-guidance	
Mental health and psychosocial considerations during the COVID-19 outbreak, 18 March 2020 https://www.who.int/publications/i/item/WHO-2019-nCoV-MentalHealth-2020.1 https://www.who.int/publications/i/item/WHO-2019-nCoV-MentalHealth-2020.1	This document provides a series of messages, which aim to 'support mental and psychosocial well-being'. These messages are tailored to different groups (e.g. healthcare workers, carers of children, people in isolation) in the population.
Working with Community Advisory Boards for COVID-19 related clinical studies, 23 April 2020 https://www.who.int/publications/m/item/working-with-community-advisory-boards-for-covid-19-related-clinical-studies	Ethical considerations for clinical research with Community Advisory Board. Localizing the Response through Community Advisory Boards.
COVID-19 message library, 28 April 2020 https://www.who.int/publications/i/item/covid-19-message-library	WHO provided a series of messages which were, if required, to be tailored to the local situation in the country of use. This library of messages was to be used for SMS or voice messages to communicate to populations in countries, globally. The WHO encouraged Member States to adapt the messages to the local setting. Messages were required to be translated.
Gender and COVID-19: Advocacy Brief, 14 May 2020 https://www.who.int/publications/i/item/gender-and-covid-19	This advocacy brief, published in May 2020, focuses on the role of gender, highlighting that pandemics have different outcomes for men and women and that the measures implemented by countries should recognise and consider these. The WHO urged that the preparedness and response to the COVID-19 pandemic and that gender analysis to be central to these activities. The WHO recommends the inclusion of affected groups within the decision-making process. The WHO has six key asks: (1) recording of sex and age in COVID-19 cases and appropriate analysis and research based on gender; (2) to ensure access to services related to violence against women; (3) continuation of sexual and reproductive health services; (4) suitable training and provision of PPE and other services to front line care workers, with special attention to the fact that the majority of whom are women; (5) COVID-19 testing and care should be free, access to healthcare fair, and ensuring sick pay and unemployment benefits to mitigate economic and social costs and to help with slowing the spread of COVID-19; and (6) to promote that health is a basic right and for COVID-19 measures and inclusive and for emergency powers to only be used for as long as required but no more.

Addressing violence against children, women and older people during the covid-19 pandemic: Key actions, 18 June 2020 https://www.who.int/publications/i/item/WHO-2019-nCoV-Violence_actions-2020.1	The document focuses on why violence is likely to increase in the home; who are most at risk of this; and what can be done by (i) governments and policy makers; (ii) programme managers; (iii) facility managers; and (iv) health care providers about COVID-19 and violence in the home.
COVID-19 Global Risk Communication and Community Engagement Strategy – interim guidance, 23 December 2020 https://www.who.int/publications/i/item/covid-19-global-risk-communication-and-community-engagement-strategy	This was issued in December 2020, due its late issue, it is not likely to have affected what was done in 2020, so not reviewed.
Additional document	**Key points**
Communicating and Managing Uncertainty in the COVID-19 Pandemic: A quick guide, 27 May 2020 https://www.who.int/docs/default-source/searo/whe/coronavirus19/managing-uncertainty-in-covid-19-a-quick-guide.pdf?sfvrsn=270e4ac8_4	Uncertainty is recognised as a central theme of the COVID-19 pandemic, especially in the early stages and this document provides guidance on how manage this to avoid outcomes such as a loss of trust in the communication source, panic, or fear. The document provides five recommendations of how to manage uncertainty: (1) transparency – communicate policies and findings as soon as possible, even when uncertainty still exists and ensure that information is provided in a way that can be easily understood; (2) explicitly communicate uncertainty – identify what is known and what is not known, explain how decisions are made despite the uncertainty, and state what is being done to reduce these uncertainties; (3) consistency (over time) – from early on let populations know that there will be changes and these are to be expected and that information and decisions are based on what is known at present and this is subject to change and changes in knowledge can lead to changes in policies, when issuing information use words that show that these aspects are not final (e.g. provisional, interim), develop a process to replace old information with new, and ensure that all documents have time and date to allow easy identification of whether it is old or new; (4) consistency (across partners who are also communicating) – inconsistent information across partners may lead to a lack of trust in the information source and confusion, therefore partners should work together to ensure that messaging is consistent; and (5) communicate actions that individuals can take to reduce the risk to themselves and to those who are important to them, and to differentiate between actions to be taken by people who are in different at-risk groups.

	This document is emblematic of the conventional wisdom in the field prior to COVID: "What we already knew"