

TECHNICAL REPORT



Evidence-based advice processes for long-term care facilities in the COVID-19 pandemic

Report from the after-action review (AAR) in Norway
during the emergence of the Omicron variant of concern
of SARS-CoV-2

ECDC TECHNICAL REPORT

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This report was commissioned by the European Centre for Disease Prevention and Control (ECDC), coordinated by Agoritsa Baka, Anne Ingenbleek, Favelle Lamb and Svetla Tsolova. The report was produced by Olivier Rubin, Daniel de Vries, and Luisa Toro-Alzate and reviewed by Agoritsa Baka and Favelle Lamb and colleagues in Norway.

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Abbreviations

AAR	After-Action Review
AIGHD	Amsterdam Institute for Global Health and Development
EC	European Commission
LTCF	Long-term care facilities
NIPH	Norwegian Institute of Public Health (Folkehelseinstituttet, FHI)
NDH	Norwegian Directorate of Health (Helsedirektoratet)
NPI	Non-Pharmaceutical Intervention
VOC	Variant of Concern
WHO	World Health Organization

Executive summary

This focused After-Action Review (AAR) investigates the use of evidence in the Norwegian advice-making process for long-term care facilities (LTCFs) during the emergence of the Omicron variant of concern (VOC) between November 2021 and April 2022. The Omicron variant wave initially led to a renewed sense of scientific uncertainty and general anxiety in Norway. However, as new evidence emerged suggesting that the new variant was not only highly transmissible but also caused less severe clinical disease, these concerns were replaced with more lenient recommendations for the LTCFs and society in general. The purpose of this AAR is to shed light on the advice-making process underlying these decisions. How was evidence used to inform advice for LTCFs during the initial Omicron period?

The focused AAR's core methodology is a process-driven learning exercise that builds on a qualitative review of a delimited situation, in this case the advice-making process for LTCFs during the emergence of Omicron VOC. The case study approach allows for in-depth explorations of how key advice is produced across relevant organisations as well as how it changes over time considering new evidence. This involves identifying and making explicit any external pressures, informal practices, and networks (both within and across agencies) that affect the advice-making process. Data gathering consisted of a two-day consultation with key stakeholders (identified by the Norwegian Institute of Public Health (NIPH)) together with semi-structured interviews.

The advice-making process in Norway was influenced by international evidence (primarily from Denmark and Public Health Scotland), experience-based evidence from the doctors and leaders of the LTCFs, and, most importantly, the availability of daily epidemiological data across all Norwegian municipalities. NIPH and the Norwegian Directorate of Health (NDH) were also able to draw on many other types of relevant evidence and practices, allowing them to make the necessary evidence-informed changes to their advice: international evidence, peer-reviewed evidence, multidisciplinary practices, communication inputs upstream and experience-based evidence from LTCFs and the municipal authorities. The staff from the health agencies would have liked to include more strongly the voice of the LTCF residents and family members and behavioural science in the advice-making process.

The NIPH relied on a layered advice system where they would provide context-specific guidance. The municipalities had the flexibility to reflect on the proportionality of the advice, thus taking active part in the advice-making process. The advice-making process with regards to LTCFs appears not to have been subject to much pressure from the media or public opinion. However, freedom of information requests as well as Ministry of Health assignments in general strained the resources in both agencies.

An effective advice-making process during Omicron was made possible by:

- the availability of relevant epidemiological data disaggregated to the level of LTCF, allowing for quite robust inferences with regards to the implications of the Omicron wave;
- strong existing procedures and channels for exchanging information and advice down the system from the health agencies to the municipal authorities, and finally to the LTCFs;
- a high level of trust in the advice given by the NIPH and NDH among LTCF leaders and staff; and
- a high implementing capacity in the LTCFs, which is both the result of having highly qualified staff and adequate resources and of an updated and resilient preparedness system at the local level (with a digital monitoring system in place in many municipalities).

Procedures and guidelines were in place and had in many cases been stress-tested in practice during the previous wave of the pandemic. There are several good practices to learn from the Norwegian experience with LTCF advice during Omicron, some of which were implemented while others were only highlighted in the discussions:

- the importance of maintaining trust-based relationship down the advice-making chain to the municipal authorities and LTCFs (maintained through webinars, online meetings, formal reference groups and an 24/7 telephone hotline for staff);
- the need for concentrating data and information to a few online outlets/platforms to allow easy access and avoid conflicting advice;
- the importance of having updated national action plans and practices that have been integrated into the institution and incorporated into daily routines during peacetime;
- the need for clearly defined responsibilities and divisions of labour between the two health agencies (NIPH and NDH);
- the advantage of digitalisation and standardisation of epidemiological data to allow for daily updates on a disaggregated level that can be integrated into the advice-making process.

Further, the workshop emphasised the need for retaining adequate preparedness and response functions going forward and cautioned against retrenching staff and expenses in a post-pandemic phase. Effective procedures, collaborations, know-how, interdisciplinary workings, and learnings that have been built and refined during the years of pandemic crisis need to be retained within the institution, so that the knowledge is not lost when staff members leave their current positions. An important lesson learned is that it is very difficult to dial the pandemic preparedness capacity up and down quickly according to short-term needs. Effective pandemic preparedness and response, therefore, demands long-term investments that include continued training, updating of pandemic plans, surveillance, and conducting interdisciplinary evaluations of both crisis management processes and interventions to prepare for future health crises.

Background

The purpose of After-Action Reviews

An AAR is a country-led and country-owned initiative to conduct a qualitative review of actions taken to respond to an emergency with the purpose of identifying best practices, gaps and lessons learned [1,2] for improvement of future health emergencies. Following an emergency response to a public health event, an AAR would identify what worked well or not and how these practices can be maintained, improved, institutionalised, and shared with relevant stakeholders. AARs typically encompass a broad number of response dimensions which are investigated in a series of facilitated meetings with key stakeholders involved. Importantly, AARs are not evaluations and they do not seek to assign blame for suboptimal responses. Neither are they intended to assess individual performance or competence. Instead, they seek to identify learning opportunities and to contribute to the cycle of continuous quality improvement in emergency preparedness and response planning.

The World Health Organization (WHO) and the European Centre for Disease Prevention and Control (ECDC) have developed guidance and methods for AARs across many different aspects of health emergencies [2-4]. Teasing out learning opportunities and lessons learned in the context of the COVID-19 responses are particularly important. As COVID-19 has developed into a prolonged health emergency, ECDC and WHO have developed Intra-Action Reviews [5] and In-Action Review guidance [6] to ensure that important learnings and reflections can be undertaken while the emergency is still ongoing. An alternative approach to these interim AARs is to conduct an AAR on a particular aspect of the pandemic that is delimited both temporally and thematically. ECDC has referred to such an AAR as a focused AAR.[6]

Purpose of a focused After-Action Review on evidence-based decision-making

One important avenue for self-reflection and lessons learned during COVID-19 is regarding the role of evidence in the advice-making process[7,8]. The advice-making process encountered challenges with the interpretation and integration of evidence into the advice-making process, primarily due to uncertainty, time-pressure, and suboptimal guidelines and/or organisational structures [8,9]. Scientific evidence pertaining to the pandemic also went from being almost non-existent in the initial phase to becoming so abundant that a year later it risked overburdening agencies with contradictory, non-contextual evidence of varying scientific quality [10,11]. An investigation into the intricacies involved in the advice-making process, during such a complex and prolonged pandemic, demands a focused approach. Thus in 2021, ECDC commissioned and published a protocol for focused AARs with the sole purpose of understanding the advice-making process during the COVID-19 outbreak [4].

This focused AAR can shed light on the advice-making process underlying a particular decision or decisions. The decision should ideally concern the use of non-pharmaceutical interventions (NPIs) such as the use of protective gear, physical distancing, quarantine, and visiting restrictions. The advice-making should be both delimited temporally (e.g. during a particular phase of the pandemic, in this case the Omicron phase) and along sectoral lines (e.g. pertaining to schools, hospitals, businesses, or in this case LTCFs). Such a delimited case-study approach allows for in-depth explorations of the advice-making process and provides lessons learned for future health emergencies both in-country and cross-country. Importantly, the specific case functions as an entry-point into the review process and as an anchor for the subsequent discussions rather than a constraining factor in the conversations with the stakeholders. Often, participants in the AAR will reflect on processes leading up to the specific decision that go back many months. The core methodology is to trace how key advice(s) travels through and across relevant organisations as well as how it changes over time due to new evidence. This involves identifying and making explicit any external pressures (e.g. media, public, political, international and so forth) on the advice-making process and gaining insight into any informal practices and networks (both within and across agencies) that affect the advice-making process.

The central question of the focused AAR is to determine the role of scientific evidence in the deliberations and decisions made by public health authorities in the process of informing policy. What type of evidence were available to public health experts when advising policymakers? What value and weight did public health experts place on different pieces of evidence? How did they adapt evidence to be applied to their own context? And, what happened when there was no conclusive scientific evidence available? Inspired by the ECDC best practice for AARs, the findings of this focused AAR on evidence-based decision making (EBDM) will be structured around three main sections:

- What happened and who was involved?
- What influenced the advice-making process? And why did the advice-making process turn out as it did?
- What should change and how can it be implemented?

To facilitate the use of AARs in European Union and European Economic Area (EU/EEA) countries, ECDC conducted focused AARs on the LTCF interventions in Norway and Georgia (this work is complemented by similarly oriented focused AARs on school closures in Sweden, Finland, and the Netherlands). Both Norway and Georgia focused on the advice-making process for LTCFs during the Omicron phase. Initially, the Omicron variant induced a renewed sense of scientific uncertainty and general anxiety, which seemed to indicate the need for new and more restrictive measures in the operation of LTCFs. In less than a month's time, however, as new evidence emerged suggesting that although the new variant was highly transmissible is also caused less severe disease, these concerns were replaced with more lenient recommendations and finally an almost complete retraction of most NPIs associated with the operation of LTCFs.

The Norwegian focused After-Action Review

In consultation with the Norwegian Institute of Public Health (NIPH, Folkehelseinstituttet), it was decided that the AAR should focus on the use of scientific evidence in the advice-making process for LTCFs during the Omicron phase (November 2021 to April 2022). Several arguments were raised in the consultation phase that pointed to the merits of focusing on this phase: (i) the advice-making process would still be relatively fresh in people's mind and there would be a high likelihood that key actors would still be accessible and in the same positions as during the Omicron phase; (ii) it showcases how lessons learned from earlier waves in the pandemic led to more mature and institutionalised preparedness and response systems and how these dealt with new uncertainties and translated emerging evidence into advice; and (iii) the interpretation of evidence appears to have played a key role in a very compressed time-period from the initial recommendation of stricter NPIs in December 2021 to substantially loosening measures during January 2022.

Norway's health emergency management structure

The Norwegian Ministry of Health and Care Services was the central crisis management ministry for handling the pandemic. Norway, like most other Nordic countries, followed the responsibility principle where the same agencies that are responsible in normal times retain their authority during times of crises. Concretely, this meant that the two expert agencies, the Norwegian Directorate of Health (NDH) (Helsedirektoratet) and the Norwegian Institute of Public Health (NIPH) (Folkehelseinstituttet), were highly involved in the decision-making processes. The NIPH served mainly as a scientific epidemiological advice body while the NDH was the governmental health authority. Responsibility for coordinating the COVID-19 response had been delegated to the NDH in the beginning of 2020 with the authority to impose regulatory measures during the pandemic, while the NIPH monitored the epidemic situation and supervised and advised state and local authorities on infection control. However, several studies point to substantial overlapping roles of authority between the two agencies in practice [12,13]. In the context of healthcare facilities, the distinction between advice and regulation is less relevant.

Norway's healthcare system is to a large extent decentralised to more than 350 municipalities. Norway's Infection Control Act explicitly places infectious disease expertise at the municipality level, alongside the operation of LTCF services. Municipalities, therefore, have the authority to respond to a health crisis by implementing a range of local NPIs. Municipal doctors (kommuneoverlege) are responsible for the local pandemic preparedness systems in terms of monitoring, documenting, and reporting rates and cases. Municipalities have a large degree of freedom to implement measures, however, they were by and large bound by national advice and regulations. In some cases, they implemented stricter advice than those recommended at the national level.

Definitions

This focused AAR makes use of two key concepts that require some clarification from the offset (i) the advice-making process and (ii) the extent to which the advice is evidence-based.

Advice-making process

Providing advice entails taking decisions on the best course of action and communicating them to the right stakeholders. Advice can be guided by individual experience and intuition, or it can be the result of a deliberative decision-making process among a team of people with the purpose of gathering and analysing information about different potential responses and then recommending and communicating a subset of those responses to policy decision makers. The advice-making process referred to in this AAR concerns the latter. Formalised advice-making processes builds on organisational structures and practices that shape deliberations and influence what advice is considered and how it is addressed [14-16]. Advice-making also encompasses decisions relating to internal resource allocations, staff management, communication, implementation considerations and so forth. During the COVID-19 pandemic, experts from national and international public health agencies have typically been highly involved in the deliberative advice-making processes that inform policy. However, advice-making is different from policymaking in that it only constitutes the first stage of the decision-making process that ultimately results in policy.

Evidence-based

One of the key properties of advice-making is that it is evidence-based or -informed [17]. Evidence in this context refers to scientific evidence that adheres to a set of academic standards. These standards might vary according to the field of inquiry but will usually encompass the collection and testing of empirical data according to scientific methods and models that have been validated by peers [18]. The body of scientific evidence, therefore, will mostly consist of systematically gathered data, reports produced and validated by expert-agencies and peer-reviewed scholarly publications both nationally and internationally. There is always an elusive element to scientific evidence because it is constantly evolving and being reinterpreted, as scientists continuously work to affirm or expound existing evidence, which could be observed clearly during COVID-19 [19,20].

Other than using scientific evidence, the advice-making process can also draw on experience-based evidence [21], sometimes referred to as 'implementation-based evidence' [22] or 'ecological evidence' [23]. Experience-based evidence can be subject to scientific inquiries and interpretations but is not necessarily subject to the scientific process of setting up a specific research design and submitting to peer review. Experience-based evidence could come from implementing agencies, in this case the LTCFs, that would be able to provide an assessment of the current situation and feedback on how the given advice works in practice. The advantage of making decisions using experience-based evidence during health emergencies is the pace by which the evidence can be collected and interpreted.

What constitutes pertinent scientific evidence changes and shifts over time and is shaped by relationships between experts and their social, economic, organisational, and political environments. Experts are faced with a host of cognitive and institutional factors that influence interpretations of scientific evidence [9,15,24,25]. The interpretation of evidence is not only inherent to the scientific process, but also to the advice-making process, wherein identical pieces of scientific evidence in similar contexts can result in very different advice [14,15,26]. The underlying ideational and governmental differences can create variations in how health experts produce advice during COVID-19 [14,27-29]. Importantly, therefore, even the best evidence can produce suboptimal advice under flawed advice-making processes.

Methods

The primary component of the AAR was a two-day consultative in-country workshop with key participants from NIPH and NDH on the advice-giving process regarding LTCFs during the Omicron phase. Complementary interviews with other key stakeholders such as municipal authorities, LTCF leaders, LTCF doctors and representatives from the Ministry of Health were conducted in-country just prior to and after the workshop. One interview with a communication specialist from the NIPH had to be conducted online a week after the country-visit. All participants were informed of the purpose of the AAR, and they all signed informed consent forms (see ethical considerations).

In preparation for the workshop, key representatives from NIPH, ECDC staff and consultants had online meetings on April 27, May 2, May 16 and May 30 to discuss the purpose and focus of the AAR; to schedule the country visit; to agree on the format and scope of the workshop; and to exchange key documents of relevance to advice-giving process concerning LTCF guidelines during the Omicron phase.

The following documents were consulted in preparation for the country-visit:

A total of seventy six primary documents were downloaded from the NIPH website (<https://www.fhi.no/>):

- NIPH Key guidance documents to LTCF (råd til kommunale helse- og omsorgsinstitusjoner and råd til sykehjem under covid-19-pandemien).
- NIPH Risk assessments (Risiko, prognose og respons i Norge)
- NIPH News pertaining to COVID-19.

Secondary documents included the two national inquiries into the COVID-19 response [30,31] and in addition, six published articles on the response of the Norwegian government to the pandemic. [12,13,29,32,33]

These documents were also used in this report, primarily to triangulate some of the qualitative evidence gathered through the consultative process and interviews.

Consultative workshop

The participatory consultation is the core activity of the AAR. It is a two-day workshop aimed at discussing the use of evidence in the advice-making process with key staff of the agencies who were involved in the recommendations relevant for the continued operation of LTCF during the Omicron phase. NIPH was the prime actor providing advice for the LTCF, in cooperation with the NDH. The NIPH was also the main driver behind this AAR, handling all the logistics such as sending out invitations and hosting the workshop at the agency. The two-day consultative workshop took place June 8-9, 2022, with participation from key NIPH staff (three participants) and key NDH staff (two participants). The workshop was facilitated by two consultants from Amsterdam Institute for Global Health and Development (AIGHD) and attended by two ECDC staff. A third consultant from the AIGHD took notes. Henceforth, the consultants and the ECDC staff is referred to as the 'research team.'

The agenda for the consultative workshop is attached in the appendix. The first day of the workshop focused on agreeing on a timeline of events; mapping out who was involved in the advice-making process and in what capacity; as well as discussing why the advice-making processes unfolded as it did with a focus on the use of evidence. The purpose was to reflect on how evidence influenced the advice-giving decision-making process as well as what evidence was available and how it was used (or not used). The second day focused on reflecting on how people made sense of the situation and identifying and discussing major lessons learned about the use of evidence during key advice-making processes relevant for LTCFs.

- What were the challenges in the advice-making process?
- What worked well and what didn't?
- And what can be done to improve the process going forward?

The consultative workshop was guided by specific theoretical tools and methods, most notably the Evidence-Based Public Health (EBPH) framework and the bounded rationality/sense-making literature (see analytical approach). On June 10, 2022, the consultants presented a hot debrief with broad-based participation from all relevant stakeholders including municipal authorities, LTCF leaders, doctors, NDH, NIPH and ECDC staff.

Additional interviews and field visits

On the 7 June 2022, the delegation visited the LTCF authorities (Sykehjemsetaten) in Oslo municipality to conduct a two-hour interview with key personnel involved in the decision-making process of guidelines during the Omicron phase. Present at the interview were: the Chief Medical Officer for LTCF; two officers from the LTCF authorities; and two directors of LTCFs in Oslo. On 10 June, the research team visited a LTCF in Oslo municipality and conducted interviews with the on-site medical doctor and the Director of the LTCF. Furthermore, the research team conducted an interview with a representative from the Ministry of Health and care services involved in the decision-making process of the LTCF guidelines. Finally, on June 17, the team conducted an online interview with the Assistant Communications Director at NIPH.

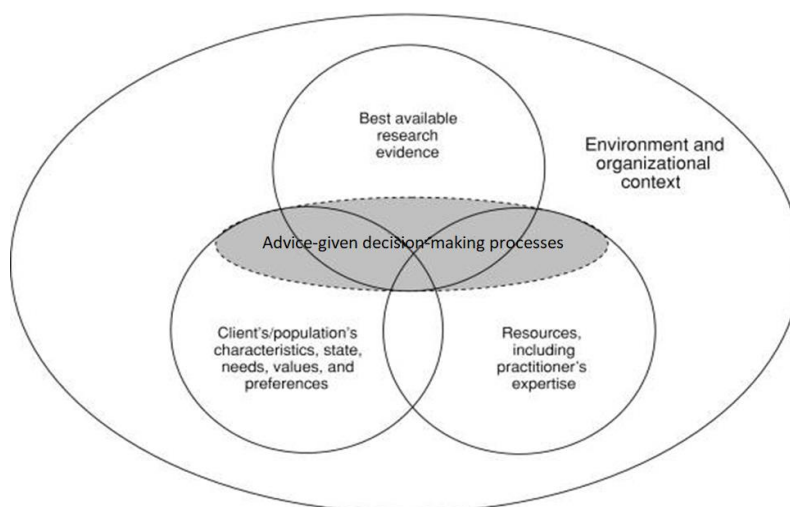
Analytical approach

The data collected through the consultative workshop and interviews seeks to inform the advice-making process surrounding LTCF interventions during the Omicron phase and derive lessons learned. Some key theoretical and methodological tools and techniques were used when gathering and interpreting the data. The interviews were semi-structured and relied on an interview guide (Annex 2). The consultative workshop made use of a combination of written questions as well as select statements from academic papers, guidelines, or risk assessments that were used to facilitate the discussions. The research team presented a tentative timeline that was subsequently discussed and augmented. This established a common understanding of key events, but it also exposed slightly different views of how key events had been experienced. Participants were also asked to draw ego-centric

stakeholder maps illustrating the most important actors in the advice-given process on LTCF. This included reflecting on actors that they thought had been missing in the process. This exercise both helped to visualise important interrelationships on the spot but was also used for a more thorough aggregate mapping exercise presented in this report (see Stakeholder Mapping).

The discussion of evidence was structured according to the EBPH framework illustrated in figure 1 [34]. The framework is used to encourage participants to think of the advice-given process as dependent not only on evidence but also on other important external factors. The resources category addresses the adequacy of the available financial and organisational resources as well as the expertise and experience of stakeholders. Was there sufficient capacity, for example, to effectively translate and communicate evidence to the municipalities? The population characteristics category contains the needs, values, and preferences of the next of kin, visitors, LTCF staff and residents that are most likely to be affected by the recommended measures. Participants could reflect on the extent to which the advice-making process was impacted by these factors. The external frame contains environmental and organisational factors that shape the overarching cultural context in which the advice is given. In short, the framework embeds the advice-making process in a larger socio-political environment.

Figure 1. Evidence-based public health framework.



Adapted from Satterfield et al. [34]

Furthermore, the consultative workshop relied on bounded rational theory and sense-making framing to facilitate discussions of why people might react differently to the same evidence. Bounded rationality means there are limits to our cognitive ability, available information, and processing time. One consequence is that decision-makers might filter evidence through distinct (and sometime contradictory) interpretive prisms. The AAR relied on the Cynefin framework that introduced different sense-making frames to facilitate a discussion of their own perspective and how that might differ from that of other stakeholders [35]. Asking participants to self-reflect on their own interpretive prisms allowed us to consider counterfactuals and to identify distinct points of divergence in the advice-given process during Omicron that could have resulted in different advice. For example: could the evidence have been interpreted in a different way? And what type of evidence would have caused participants to reconsider the advice given?

Reporting on key preliminary findings was done on a continuous basis during the visit, but especially through the hot debriefing on June 10. The present report has been subject to feedback and approval internally from the ECDC, NDH, and NIPH. Stakeholders participating in the AAR have been given the opportunity to read the report and provide feedback.

Ethical considerations

Written informed consent was obtained from all respondents. The consent form is included in Annex 1. The objective of the AAR was explained to the interviewees and workshop participants, and they were assured of their right to withdraw from the interview/workshop discussion at any time. Unless respondents explicitly confirmed in writing that they were willing to go on record, they remained anonymous in the reporting. Anonymity was pursued for all interviewees, and where it was not possible (due to easily identifying traits) the interviewees were explicitly made aware of this. All interview and field note materials were stored securely in AIGHD in compliance with Regulation (EC) No 45/2001 on the storage of personal data and ensuring citizens' privacy. Only the research team had access to it and any recording were deleted prior to the publication of this report.

Results

The section will contain an account of the timeline of what happened as well as a stakeholder mapping based of the advice-making process based on information provided by the participants.

Timeline of events

From an advice-making perspective, the most interesting periods of the Omicron phase in Norway is the period of stricter measures unfolding during December 2021 and then a period of relaxing measures from January 2022 onwards.

The period of stricter measures (December 2021)

The SARS-CoV-2 variant B.1.1.529 emerged globally at the end of November 2021. It was first reported in South Africa and was designated as variant of concern (VOC) by the WHO's Technical Advisory Group on 26 November 2021 and named "Omicron." Initially, there was very limited information about the variant, although data from South Africa suggested that it was much more transmissible than the Delta variant. The NIPH followed up with a risk assessment on the same day (November 26) where they predicted that Omicron would eventually spread to Norway and that it could become the dominant variant due to its apparent higher transmissibility. Already then, the NIPH suggested that the "omicron variant is unlikely to cause more serious illness" but that it was too early to tell how well vaccination would protect against the variant. The agency did expect continued protection against serious illness, however.

On 30 November 2021, the NIPH was notified by a local laboratory in Oslo of the first possible Omicron variant cases in Norway. This followed a superspreader event in the form of a company Christmas party with 117 attendees on 26 November (some attendees had just returned from South Africa). Although almost all attendees were fully vaccinated, three-quarters got infected and most developed mild symptoms. This was indicative that vaccination did not appear to provide optimal protection against infection [36].

On 1 December, municipal guidelines to the LTCFs were updated. Omicron was explicitly mentioned as a concern and the guidelines included some more restrictive measures such as self-testing among employees and a demand for visitors to wear a mask in all common areas.

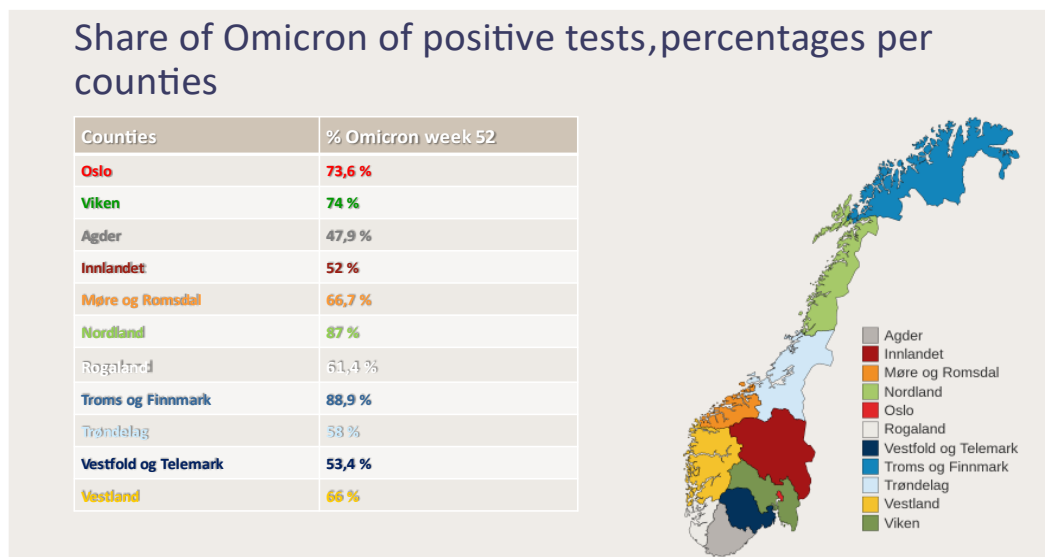
During December, the NIPH put out three risk assessments (December 7, 13 and 22). The situation was characterised as 'serious' (Risk Assessment, December 7) and 'increasingly serious' (Risk Assessment, December 13). While it was recognised that Omicron was unlikely to cause more serious disease (especially in vaccinated people), the initial concern was that the much more rapid spread of infection would increase the chances of the virus reaching the elderly and especially the unvaccinated elderly (Risk Assessment, December 7). NIPH was concerned that more outbreaks in LTCFs and hospitals would affect the most vulnerable. The assessment was that even if the Omicron variant was to cause less serious illness in the individual, the large spread would still lead to significantly more hospitalisations than was currently seen at that time (Risk Assessment, December 13). The NIPH worked with different scenarios where the worst-case would overwhelm the health sector in January or February 2022. Thus, the main reason behind a new wave of more restrictive measures implemented by the government on 8 December was focused on avoiding a breakdown in the health sector. These restrictive measures were a consequence of the advice from both NIPH and NDH. As noted in the press release: "the danger of an overloaded health service and the spread of the more contagious omicron virus necessitate new, strict measures to reduce social contact in society."ⁱ

For LTCF guidelines, this meant reintroducing physical distancing measures (distance of at least one meter) and recommending the use of face masks for both employees and visitors when in contact with residents. All staff and residents regardless of vaccination status had to be tested immediately except those who had been exposed to COVID-19 in the past three months. Employees who had not used the recommended protective gear or were defined as a close contact had to be quarantined and subsequently tested. The same applied to residents who had not received a booster dose. Employees who had used the recommended protective gear, and who were therefore not defined as other close contact, should be tested again after three to five days. Residents who had received a booster dose at least one week previously and who were defined as close contacts were to be tested on day three and seven. Residents who had received a booster dose at least one week ago, and who were defined as close contacts were tested daily with an antigen rapid test or every other day with a PCR test for seven days after exposure.

ⁱ Government press release – 8 December 2021

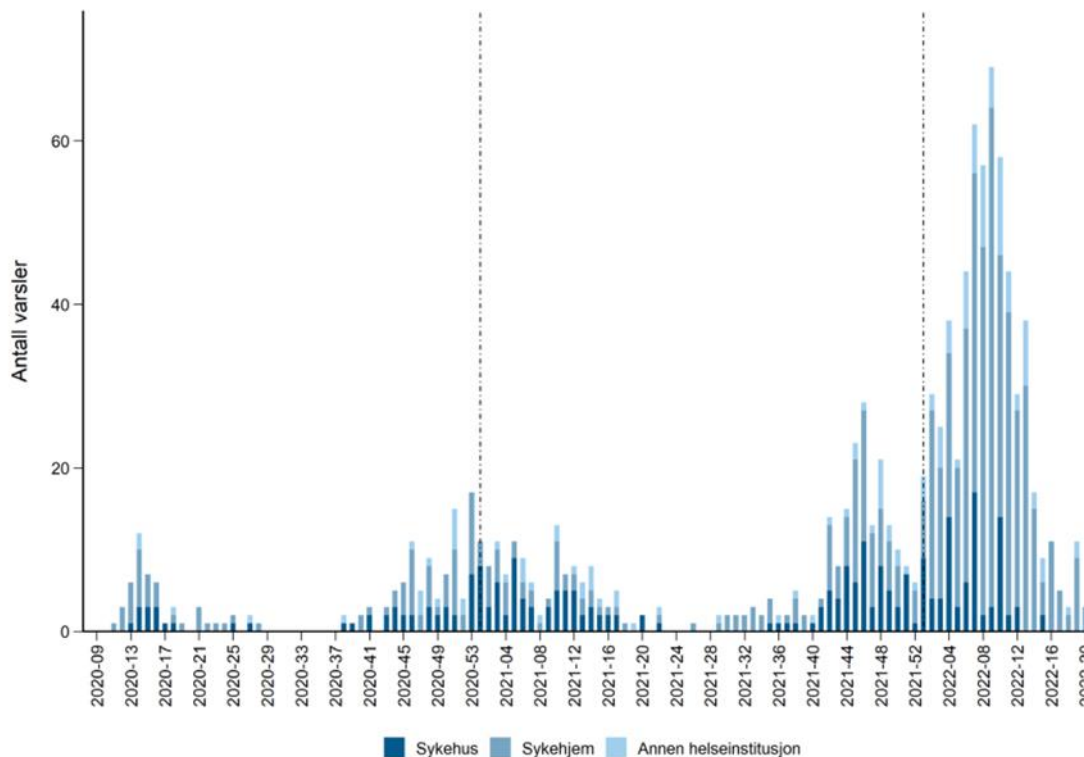
The Omicron variant quickly dominated the circulation in Norway in week 52, when it accounted for 65.4% of all infections that were screened or sequenced. It had even spread to all corners of Norway including remote rural areas up North that had previously not had any (or very few) COVID-19 cases. Figure 2 breaks down the percentage of Omicron positive tests for different parts of Norway while Figure 3 can be used to illustrate the substantial size of the Omicron outbreaks (vis-à-vis previous COVID-19 waves) that hit the LTCFs (Sykehjem) in the beginning of 2022 in both hospital and LTCFs.

Figure 2. Share of Omicron cases of positive tests by Norwegian region, week 52, 2021.



Source: provided by NIPH at consultative workshop, June 8-9, 2022.

Figure 3. Registered COVID-19 outbreaks in health institutions from beginning of 2020 to mid-2022.



Legend: dark blue: hospitals (Sykehus); blue: LTCF (Sykehjem); light blue: other health institutions (Annen helseinstitusjon).
 Horizontal axis: weeks; vertical axes: number of registered outbreaks
 Source: provided by NIPH at consultative workshop, June 8-9, 2022.

The period of easing measures (January and February 2022)

In the first risk assessment in 2022, NIPH concluded with much greater certainty that the Omicron variant offered significantly less risk than the Delta variant for serious illness [37]. This certainty was rooted in international studies and evidence from ECDC and the WHO, but even more in the daily monitoring of data coming in from the LTCFs (see evidence section) and information coming from nearby countries, particularly Denmark which was slightly earlier in the viral spread. Rather, the main advice from NIPH was now to slow down the pandemic “with the least possible intervention measures - so that the simultaneous burden of disease and the burden on the health service and society does not become intolerable” (risk assessment January 12, 2022)[37]. On 14 January, the government explicitly stated that “stopping an Omicron-driven winter wave is not possible, nor is this desirable.” Referring to the NDH and NIPH advice, the government found it beneficial to start easing some measures while keeping others.

For LTCFs, this meant that NIPH guidelines no longer called for quarantines. The guidelines still recommended upholding some testing-regiment for employees and residents except for those who have been exposed to COVID-19 in the past three months. Employees who had used the recommended protective gear should only be tested if experiencing symptoms. Employees who had not used protective gear but had been in close contact with an infected person did not need to quarantine but should instead test on day three and five. Residents should test if exhibiting symptoms or if they had been in close contact with an infected person on days three and five.

On January 26, the NIPH risk assessment cautioned that the Omicron variant had only reached the elderly population to a lesser extent, so the full severity of the disease was still uncertain. However, the main challenge was identified as ensuring that the infection pressure towards the health sector was minimised [38].

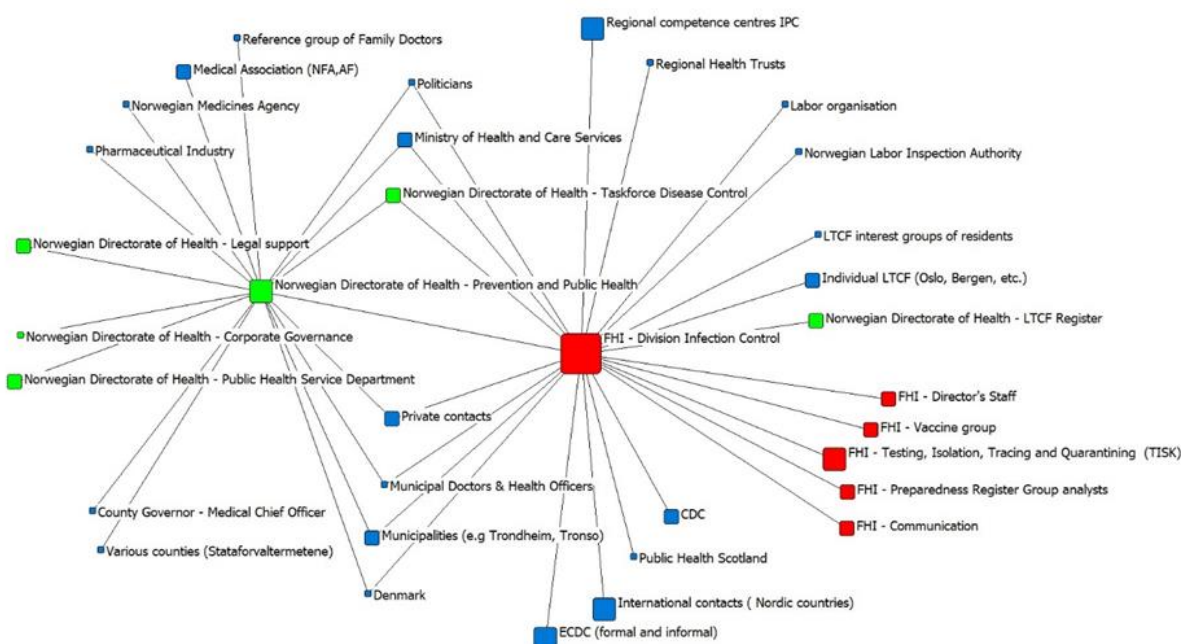
On February 12, the comprehensive testing regiment was further reduced. The guidelines for LTCF dictated that testing should now only be conducted for those exhibiting symptoms. Employees who had symptoms should test themselves with a self-test (quick test) before going to work. Employees were encouraged to be vigilant for typical and atypical symptoms in residents and apply a low threshold for testing. However, the mandatory (regulatory) for isolation was removed, although it was still recommended for employees or residents with symptoms that test positive [39].

In the following months, measures were eased even more both in society as a whole and within LTCFs. The LTCF guidelines on 15 March, for example, recommended that LTCFs established plans for return to a normal operation in accordance with local infection control programs [40].

Stakeholder mapping

Using UCINET social network analysis, a combined stakeholder social network was created based on all the individually drawn (ego) networks of the five participating members of the workshop, shown in Figure 4.

Figure 4. Combined expressed stakeholder network based on Ego-network of workshop participants (n=5).



Source: AIGHD, Size of node reflects suggested importance in process. Green = NDH (n=2), Red = NIPH (n=3), Blue = others (n=0). Network is a rough approximation of the linkages.

We asked participants with what institutions they had had personal contact with regarding the advice-making process during the omicron phase and merged their resulting ego networks. The resulting social network is a very rough approximation of the complexity of real interactions only based on a limited number of informants, all working in only two institutions. As a result of this process, in the social network these two institutions are the central nodes in this overall network (shown in red and green). The size of the node suggests its relative importance in the advice-making process, based on input by the participants. Note that the visualisation was clustered manually.

The primary purpose of the map is to provide a summary of the formal and informal interactions during (and before) omicron. A few institutional nodes are mentioned by participants from both participating institutions, such as politicians and staff at the Ministry of Health, staff at the taskforce disease control at the NDH, private contacts in the field, municipal doctors and health officers, various municipalities, and contacts with professionals especially (but not only) in Denmark. Interestingly, these shared connections are not necessarily the same as the contacts which were most important to the participants. The latter are indicated by larger node sizes. Outside of the 'shared' institutional contacts, we see a few clusters that appear institute specific. For the NDH there are linkages to pharmaceutical and medical associations as well as county level political institutes. For NIPH there are linkages to LTCF staff and registry data analysts, regional centres and trusts, labour authorities and organisations, and international resources (e.g. ECDC).

Importantly, the network represents what a small number of participants who were key in the advice-making process highlighted as important interactions; it does not necessary imply that the NDH did not interact at all with ECDC or labour organisations or that the FHI did not have any contact with medical associations. In summary, the mapping shows that there are somewhat distinct foci of the two institutes during the advice making process, with overlap mostly at the ministerial and municipal levels.

The advice-making process

This section discusses the major factors that shaped the advice-making processes, and it is structured around three main categories. The first category relates to the gathering and interpretation of evidence; here, focus is on what evidence was used (and what was lacking) and how the evidence was integrated into the advice-making process. The second category focuses on communication: how was the advice communicated to the practitioners at the local level, internally and between agencies, to the public at large and the relevant ministries. The third category examines the capacity and the resources available at all levels of the advice-making process and the consequences for the implementation of the advice.

Evidence in the advice-making process

As indicated in the timeline, the emergence of the Omicron variant generated new uncertainties and stresses in the advice-making process during a rather condensed period. Particularly at the initial phase of the variant's appearance, advice and risk assessments had to be produced within hours. Still, it appears that both NIPH and NDH were able to draw on many different types of relevant evidence, which allowed them to make several evidence-informed changes to their advice, most notably the shift towards easing restrictions less than a month after having recommended stricter measures for LTCF and in society in general. From the discussion with stakeholders at both agency-levels as well as at the municipal level (Oslo's health authorities), it has been possible to identify five distinct types of evidence or practices related to evidence that were included in the advice-making process together with three practices or types of evidence that were thought to be missing in the process, shown in Figure 5.

Figure 5. Evidence perceived to be used (green) and not used (red) during the advice-making process to LTCFs in Norway



Source: AIGHD

The following five types of evidence appears to have been prominent in the advice making process:

(i) Access to daily, high-quality Norwegian data

The existence of a central national preparedness database combining data from various registries in the country was essential in gathering context-specific information about how Omicron impacted the Norwegian LTCFs. It was uniformly agreed that access to this data was the most important type of evidence in the advice-making process. When Omicron hit, the NIPH had access to daily updated data on resident and employee infections and fatalities, close contacts, vaccination coverage, and the type and time of vaccination. The data in the national platform was drawn from different central registries, so their accuracy depended on these central registries. One example was that the LTCF resident registry was updated once a year, which meant that the denominator was somewhat inaccurate. Add to this, there was not an authoritative list of the complete number of LTCFs in Norway. Despite these challenges, the NIPH could track the Omicron impact in LTCFs with quite robust epidemiological data that showed high transmissibility in the LTCFs (interestingly primarily introduced by asymptomatic caregivers rather than from visitors or among the residents themselves) but very moderate severity symptoms among the residents. Residents even exhibited less severe symptoms than the general population. This was a very important piece of evidence in the advice to lift restrictions for LTCFs in January.

(ii) International evidence

The risk assessments produced by the NPIH explicitly drew on and referenced several Omicron studies from other countries, most notably South Africa in the initial phase of the outbreak. The most important international evidence, however, came from Denmark's experience with Omicron. The variant reached Denmark before Norway, and the two countries share many socio-economic traits. Thus, Denmark was ahead of the Omicron curve, and

their experience could relatively easily be translated into the Norwegian context. In addition, there were established fora for cooperation and information sharing between the Nordic countries that were used regularly throughout the Omicron outbreak. Some staff from NIPH reported speaking to their Danish colleagues daily during some periods, both through official channels but also through the occasional informal phone call. Due to linguistic similarities, NIPH could also directly consult risk assessments written in Danish.

Evidence and advice from international organisations (such as ECDC and WHO) were consulted by the NIPH as an important resource, but was not given the same extra authoritative input status at the NDH. One explanation is that ECDC and WHO produced general evidence and advice that needed to apply across multiple countries. The situation in Norway, e.g. with their high level of testing capacity and LTCF capacity to provide medical treatment, might not conform to the situation in other countries. In addition, Norway had data regularly updated on new infections among employees and residents in LTCFs. These data were used to continuously evaluate the infection prevention actions in place in LTCFs and was an important tool in evaluating different infection prevention actions. Another explanation was uncertainty related to the limited available evidence for the protection of facemasks in different settings. NIPH advocated for the use of facemasks based on a risk analysis of the situation (including background prevalence, type of activity and contact and suspicion of infection). ECDC's position on when to use face masks in public, for example, was seen by the NIPH to have a somehow weak scientific basis, so the agency took a more graded approach. Still, the evidence and guidelines produced by the ECDC were considered very important in that they were used as a 'second opinion' and to triangulate and question NIPH's own findings and interpretations. Staff from the NDH noted how they benefitted from ECDC and WHO advice as an extra authoritative input into the decision-making process particularly when the evidence base was still thin. NDH was, for example, more in line with those recommendations on face masks than the NIPH position and they could base their advice to healthcare settings on this international guidance.

(iii) Evidence from scientific studies

At the time of Omicron circulation, one of the main challenges of using other studies in the advice-making process was simply keeping up with the surge in publications as well as assessing their relevance and quality. This needed to be done in a situation where key staff were preoccupied with providing recommendations to municipalities, addressing government assignments, handling freedom of information requests from the public and producing and interpreting daily data from the Norwegian LTCFs. To solve this, the NIPH established a small working group that was tasked with daily identifying and categorising international studies. This resulted in an updated and detailed database of the relevant literature. This allowed NIPH staff quick access to the relevant studies for their fields of expertise together with a brief overview of the findings. There was general agreement that this database was instrumental in providing useful evidence to NIPH staff, and several international studies are explicitly cited in the risk assessment and guidelines. At the same time, this database was kept internally, and not shared with other institutions, such as the NDH, who had to undertake their own literature search.

(iv) Multi-sectoral and -disciplinary working groups

Both NIPH and NDH staff emphasised how the COVID-19 pandemic spurred the creation of multisectoral and multidisciplinary working groups. At the NDH, guidelines and government assignments were handled by various task forces with a multidisciplinary angle where they would often simultaneously work on the same advice from multiple perspectives. NDH is responsible for the legal perspective, and close cooperation with the legal department was important. Participants generally felt that it was beneficial to work in this multidisciplinary way and expressed an aspiration for these forms of cooperation to be sustained and institutionalised. At NIPH, laboratory teams would work with infectious disease modelling experts and the mental health specialists to produce advice. Lawyers and communication specialists at both agencies would work together with epidemiological experts on how to frame advice and regulations. More long-term research cooperation has also been established with other agencies and research institutions. The NIPH had ongoing research projects with the Defence Research Institute and aerosol biologists from the Environmental Health Division investigating the effect of facemasks on transmission.

(v) Experience-based evidence

One important source of evidence was the dialogue with the municipalities and their health authorities, and professionals at LTCFs. Based on their daily experience with LTCFs, for example, it quickly became clear that the residents experienced very mild symptoms; often they would exhibit fewer symptoms than the younger health workers. It was the staff that became sick and that would pose a different kind of challenge, i.e. understaffing. This type of evidence was very useful both in understanding major shifts in the epidemiology of the pandemic (as with Omicron) but also in modifying advice on a smaller scale to better align with the practical experiences of the LTCFs and municipal authorities.

Relevant evidence and practices lacking from the advice-making process

From the participatory consultations, key experts involved in the advice-making process pointed to three additional types of evidence and/or practices would have been beneficial to have in the advice-making process.

(i) Evidence based on lived experiences from residents and next of kin

The voices of the residents and next of kin were included in the advice-making process but somewhat indirectly through feedback from the municipal authorities and the individual LTCFs. Systematically collected evidence of the lived experiences of residents and next of kin, those primarily affected by the regulations, constitute evidence that NIPH and NDH would have liked to include. It appears that residents had problems understanding and hearing when staff wore protective equipment; it was difficult for them to see facial expressions; the need for isolation was difficult to understand for some residents; and the physical (and emotional) contact between residents and staff had to be scaled down significantly. However, these experiences were not gathered and communicated upwards systematically. The agencies did have access to data from an annual census survey of LTCF residents across Norway but having more quantitative or qualitative data on perceptions and lived experiences would have been beneficial. While the limited cognitive state of most residents makes collecting this evidence challenging, more efforts could have put into integrating the voices of these groups into the advice-making process (see Lessons Learned). Academic scholars did make some qualitative studies of a few LTCFs [41,42], but these studies were not commissioned by the two health agencies, and indeed they were never picked up by them.

(ii) Inclusion of ethical and social science concerns in evidence

Participants from both agencies frequently included ethical considerations in their advice. Indeed, one of the earliest LTCF guidelines from April 2020 explicitly addressed the ethical concerns of social distancing and isolation measures: "not being able to have contact with your loved ones for a long time is considered unfortunate with regard to psychosocial health, and is also ethically problematic" [43]. The same trade-off between reducing infections and providing a normal life for LTCF residents was explicitly emphasised during the Omicron phase. Ethical concerns for the participants would often be driven by social factors such as mental health issues, quality of life, loneliness, behavioural changes and so forth. Such concerns were also pivotal for the more than 600 ministerial assignments (mostly answers to questions pertaining to the pandemic) that were handed down by the Ministry of Health to the health agencies over the course of the pandemic, as they generally had to include a consideration of social consequences. Both agencies had in-house experts in economics, communication, and legal matters. NIPH conducted several focus-group interviews with broad-based participation from the different strata of society. In addition, the agencies specifically considered the specific socio-economic profile of immigrants and other vulnerable groups that were frequently overrepresented in the number of infected, fatalities and unvaccinated. This type of evidence, however, appears to have been used sparingly in the health sector. There are obvious resource limitations both with respect to time (advice had to be produced in a matter of hours in the initial phase of Omicron) as well as in-house capacity to produce behavioural evidence. One participant noted that there was too much work for too few people, so you had to cover everything yourself. Still, both agencies experienced an increase in interdisciplinary cooperation within their organisations, but better integration of social and behavioural science upstream in the generation of evidence (when feasible) was acknowledged as beneficial.

(iii) Better practices/procedures for sharing of evidence

The sharing of evidence was somewhat challenging. The decentralised structure of the health system means that advice needed to trickle down multiple levels without it being diluted or misunderstood. The advice developed by NIPH, for example, needed to be shared with more than 350 municipal health authorities; they, in turn, needed to share the advice with several LTCF leaders in each municipality who needed to make sure that it reached the large numbers of relevant staff. Participants pointed to some delays and misinterpretations in this process, but they were not prominent. More common was critique and scrutiny of the advice internally in the decentralised healthcare system pipeline by those receiving the advice. This is not necessarily suboptimal. Rather than just disregarding the advice, municipalities would provide feedback and critique within the system, making NIPH and the NDH aware of certain practical challenges and perhaps even causing them to revise guidelines. An example could be strict guidance for health practitioners regarding isolation that would just not be feasible in practice.

Another advantage is the fact that critique and scrutiny could be dealt with through internal channels. Participants noted how the media was almost never sought out as an outlet of frustration due to the perceived professional 'loyalty' within the health-oriented advice-making chain. The biggest hurdle for sharing of evidence, however, appears to be both between the two health agencies (NIPH and NDH) and within the individual agencies. Internally, the drawback of working in dedicated multidisciplinary teams on specific advice or government assignments is that it risks forming a 'satellite' organisational structure where it is exceedingly difficult to disseminate information internally in the organisations between different teams.

Participants pointed to the fact that although they would try to share information both within and between agencies, it would often not reach the right people. Information sharing between the two agencies also appeared to be suboptimal. A participant from the NDH remarked how she had to read newspapers from South Africa to get information about the new Omicron variant at the same time NIPH was working on a risk assessment. In general, NDH felt at times that they did not get the information quickly enough from the NPH. This is something the AAR will return to under the 'Lessons Learned' section.

Communication

One important dimension of the advice-making process is being able to effectively communicate advice to relevant stakeholders. Up to this point, the AAR discussed the importance of sharing evidence both horizontally (between the two health agencies) and vertically (with the municipalities and LTCFs). In this part, the AAR will focus more explicitly on communication in a context of declining public trust, pandemic fatigue, and public anxiety about this new contagious Omicron variant. The AAR focuses on four important dimensions of communication: (i) how communication concerns were integrated into the advice-making process; (ii) communication between the NIPH and municipalities; (iii) how advice-makers interacted with the media; and (iv) how the changing of advice quite substantially in a short period posed a significant communication challenge.

(i) Communication as part of the advice-making process

Both agencies had strong communication teams that were involved in much of the advice from the beginning. Communication was not restricted to the final phase where the epidemiological advice was to be announced to the public. Instead, it was seen more as an integral part of the advice-making process. It should be noted that the communications teams contained a broader expertise than communication in the narrow sense and encompassed behavioural science insights, social psychology, and social media management. The desire to communicate advice in a digestible and simple manner would at times clash with the epidemiological experts' demands to keep all the nuances, caveats and uncertainties of the science in their advice. It was considered an advantage to have communications as part of the technical teams that compiled advice, so that these trade-offs and other considerations could be addressed upstream. The communication expert interviewed found it would have been beneficial if they had an even more prominent role in the advice making process. The communications team was also active in disseminating and interacting on social media. For example, they countered a persistent rumour about the ineffectiveness of vaccination that circulated on social media with a very simple graph comparing the number and age of vaccinated and unvaccinated hospitalisations (see figure 6). It went viral and reached millions of views in just three days, underlining the importance of simple, effective communication that can present data visually and without too many caveats and uncertainties.

Figure 6. Tweet from NIPH containing a breakdown of the vaccinated and unvaccinated hospitalisation rates and median ages, November 15, 2021



(ii) Communicating to municipalities and LTCFs

One of the clear advantages in terms of communicating advice to LTCFs is that the primary recipients of that information are also from the health sector. This means that there is an immediate appreciation and understanding of the kind of advice and recommendations forwarded by the NIPH. The advice might also be subject to more scrutiny and critique, but it will mostly be rooted in professional disagreements rather than scepticism towards the scientific method itself. The NIPH participants jokingly stated that every time they would come out with new advice, half the doctors would think it was too strict and the other half that it was too lenient. Thus, when communicating with the municipal authorities, the NIPH tried to include nuances and details, be transparent and provide several procedural options and gradients of measures depending on the specific context of the municipalities. This allowed the municipalities to reflect on the proportionality of the advice. It also provided an opportunity for dialogue rather than one-way communication of uniform regulations. However, it also opened the opportunity for differences in interpretation of advice. During the Omicron period, the NIPH experienced that some municipalities interpreted advice in a much stricter way than intended. At times advice had to be reframed to avoid these unintended interpretations. But communication and disagreements were almost always kept within the advice-making process.

(iii) Interacting with the media

Both agencies generally had a good relationship with the media. In the initial phase of the pandemic, different public health experts would be interviewed with limited organisational coordination. For some, it took time away from more pressing tasks and many found it stressful to suddenly figure in the media (named) as the expert behind some contested advice. By the time of the Omicron outbreak, however, there were more established procedures in place. Often it would be the director or other dedicated spokespersons who would explain and defend new advice in the media. They effectively functioned as lightning rods for media critique and public debate, allowing the key health experts to focus on their key tasks such as producing and interpreting evidence.

Although there was generally satisfaction with this arrangement, some expressed the view that the outsourcing could risk putting form (how the advice was framed and packaged) over substance (the actual epidemiological foundation of the advice) because the experts who might be most familiar with the advice would not be the ones communicating it out. With regards LTCFs, there had previously been some critical media coverage about the strict visiting rules (and the legality of those measures) but generally there had not been much negative media coverage, which some participants found somewhat surprising considering the vicious debate around LTCFs visiting rules in other countries. This is possibly due to the older age of LTCF residents in Norway compared to other countries. In the initial phase of Omicron, there were some media reports of unvaccinated healthcare workers causing an outbreak. A doctor went to the press to provide examples where unvaccinated health personnel had infected residents, some of whom had subsequently died. This led to what workshop participants described as a "media witch hunt" against unvaccinated healthcare workers that was not supported by epidemiological evidence, showing Omicron spreading as much in vaccinated as in non-vaccinated health workers.

Another important issue in the interaction with media and the public was the requests under the freedom of information legislation. These requests from both the press and private individuals strained the resources at NIPH and the NDH. Some staff would receive as many as 10–15 requests per day, which meant that significant resources to respond to these requests were diverted away from advice-making and evidence production. All participants acknowledged the importance of freedom of information, so the discussion was more practical than on the principle: however, these requests strained the already very limited human resources of both institutions (see lessons learned).

(iv) Changing the message

Prior to Omicron, one of the core objectives of public health measures had been protecting the elderly from getting the disease. However, with the Omicron variant that core objective shifted from first making sure that the healthcare sector would not be overwhelmed (as was the main objective in the initial phase of the pandemic back in 2020) to keeping LTCFs operational despite staff shortages due to illness and compulsory quarantine and isolation. In January 2022, this shift in emphasis and the lifting of some of the restrictions which had been implemented weeks before presented some communication challenges. NIPH had modelled the number of infected people and the number of potential hospitalisations during the Omicron wave [44].

Due to widespread uncertainties during the initial phase of spread of the Omicron variant in December 2021, these models applied a broad range of parameters and, as such, exhibited substantial variation in the different projections. There was a feeling at the NIPH that the uncertainty was communicated quite clearly but that the media, nevertheless, focused mostly on the worst-case scenarios such as hundreds of thousands infected and up to 2 500 hospitalisations simultaneously from COVID-19. In comparison, the peak of hospitalisations during the pandemic had so far been much lower at around 350 [44]. This made the change of advice in January 2022 look even more like a complete reversal. There was a sense that some people at the time were reluctant to follow the new more lenient advice because they were still stuck in the catastrophic scenarios and a deep ingrained fear of catching the virus.

Furthermore, it appeared that Omicron was infecting vaccinated and unvaccinated people at very similar rates. Although COVID-19 vaccinations still appeared to provide better protection against severe illness, the effect was not as pronounced due to the mildness of symptoms from Omicron in general. A cornerstone of communication had always been that vaccinations provided protection from COVID-19 infections. Acknowledging that this might no longer be the case to the same extent also appeared like a reversal of previous advice. Even health practitioners were somewhat baffled by the changing of advice, noting that they had learned to prevent and track infections by testing, but then NIPH suddenly changed the recommendations and deemed it unnecessary at that point. While new evidence might merit changing advice, from a communication perspective one needs to consider that changing advice frequently also carries a cost - not only in terms of the implementation of new procedures but also indirectly by potentially being seen as incoherent or inconsistent by the public thereby lowering trust and compliance with advice. The optimum balance between acknowledging uncertainty and following the science versus keeping advice simple, clear, and consistent is hard to pinpoint and may vary from audience to audience. It is a key issue for further social science research.

Capacity and implementation

Having a widespread and regular testing regime with the capacity for fast sequencing played an indispensable role in generating the evidence needed to provide timely and evidence-based advice. Here, the AAR will focus on four key aspects of capacity during Omicron that impacted the advice-making process: (i) a high level of institutional resilience among LTCF; (ii) increased staff vulnerability due to pandemic fatigue; (iii) opportunities for learning and building institutional memory; and (iv) the implementation capacity on the local level.

(i) High-level of institutional resilience among LTCFs

The fact that LTCFs had comparatively high capacity (in comparison with Sweden and Denmark, for example) has been highlighted in other studies [13,33] and was also emphasised in our discussions. Having a medical doctor affiliated with each LTCF was critical, especially because they had the capacity to provide a higher level of medical care in the facility. It is important to note that in Norway an institutional decision was made at the beginning of the COVID-19 pandemic, that SARS-CoV-2 positive LTCF residents would be cared for in the facilities rather than being transferred to a hospital. The staff/resident ratios were generally relatively high in the Norwegian LTCFs, many of the staff are full-time employees, and many of the staff had strong medical backgrounds, although there are also many part-time workers. They were advised to not have several workplaces in order to limit the risk of spread of COVID-19 between LTCF. An LTCF leader who was interviewed, for example, had 20 years of experience from an emergency department at a hospital. In one LTCF that was visited, the staff had the resources during the initial phase of the pandemic lockdown to call the next of kin every day on the phone to let them know how their family members were doing. LTCFs were able to purchase iPads, telephones, TVs, and other alternative recreational activities. They did not have to watch their spending because all COVID-19 related initiatives were not charged to their operational account but could be charged to an emergency COVID-19 account provided by the state.

The leaders of the LTCF also expressed a substantial degree of institutional resilience in the face of Omicron. They had already been through COVID-19 outbreaks before, they knew what they had to do, procedures and routines had already been established, and some had implemented a digital reporting and monitoring system of epidemiological data. As they noted, after two years of getting to know the role and the capacities of the staff involved in their LTCF, they felt ready to deal with the Omicron outbreak. Several COVID-19 procedures had already been adopted as the new normal. In urban areas, many LTCFs felt that they were ahead of the curve when it came to the Omicron phase due to their vast experience with previous outbreaks. This, of course, does not mean that Omicron did not scare the municipal authorities and staff at the individual LTCFs, but they felt that they had proven and established procedures for dealing with it. One of the key initiatives was the digitalised reporting and information platform. This had not been rolled out across all municipalities (see lessons learned) but in Oslo, where it had been implemented, the municipal health authorities noted how in previous outbreaks they would be swamped with calls from LTCFs from six in the morning to late at night. When Omicron hit, however, they did not hear from anyone. In fact, they had to call the LTCFs to get updates on how they were handling the outbreak. This was partly due to the digitalisation of information. This did not only aid in producing a useful database for evidence gathering, but it also freed up resources as cases no longer had to be reported manually to the municipal health authorities. It was also partly due to established procedures and experience with the pandemic. The municipalities knew that they had the technical expertise and resources necessary to adopt NIPH advice and apply it to their specific context. Thus, participants agreed that the capacity and the financial resources available to LTCFs appear to have contributed to an effective Omicron response.

(ii) Increased staff vulnerability due to pandemic fatigue

Having to deal with the COVID-19 outbreak for two years put significant strain on the staff at the advice-making agencies. Many employees had to both push advice and assessments upwards to the government/ministry-levels as well as downwards towards the municipality-level. Many ministerial assignments were handed to them for political reasons, and not necessarily in a coordinated way. A representative from Ministry of Health admitted that they should have coordinated their assignments to the two health agencies better, and that some assignments were more rooted in the need for politicians to show that they were invested and engaged in the COVID-19 response than an objective need to be informed about a specific COVID-19-related issue. The staff at both health agencies worked for very long hours with limited opportunity to 'pull the plug' on work-related matters, even during vacations. New employees were thrust into both the agencies in chaotic times and had to find their own footing.

Staff from both NIPH and NDH described how they were pushed to a point where they were constantly afraid of forgetting something or overlooking evidence. At times they felt they were drowning not so much in their core assignments of producing and interpreting evidence but in coordination meetings and telephone/zoom calls. In addition to the general exhaustion, the speed at which advice and assessments needed to be made during the Omicron outbreak made staff uncomfortable due to the high level of uncertainty. It left them with little time and opportunity to check and scrutinise evidence. One participant noted how she first heard about Omicron in South Africa on a Thursday and by Friday noon she had to deliver her advice. This, of course, is characteristic of crisis management. But with a prolonged crisis such as the COVID-19 pandemic, clearer organisational routines and practices would help to achieve some kind of 'normalcy' in the daily work of core personnel (see lessons learned).

A public health crisis does not need to translate into an organisational crisis. There was also a sense from core staff that many of the important routines and capacities that had been built up during the pandemic were in danger of being dismantled now that COVID-19 was no longer considered a societal emergency. The NIPH is now subject to cutbacks, which is demotivating for core staff after years of putting in the extra effort. The staff would describe but not complain about the stressful work environment they had been subject to for the last two years. However, they felt demotivated when seeing much of what they had built up (such as procedures, collaborations, knowhow,

interdisciplinary workings, and learnings) being slowly eroded as the government focus increasingly shifts elsewhere.

(iii) Capacity for learning and building institutional memory

The agencies also continuously became better at institutionalising and documenting knowledge and procedures. So even when people would leave, it would be possible to trace back decisions and draw lessons. However, more systematic and dedicated reviews of the advice-making process are in short supply. One participant noted that it was almost like cramming all the experience they had amassed into a small box, only to find that next time the box is opened, there is nothing useful there. "We simply don't learn enough" was a common viewpoint. Although there are two major assessments of the Norwegian response [30,31], there was a feeling that they were quite high level and did not deal adequately with the areas of infection prevention, control and preparedness in healthcare that are most relevant for the two agencies. Because these are the authoritative assessments of the Norwegian response, it matters that the importance of preparedness is not really emphasised enough in them. Having small in-house evaluations or AARs does not carry the same weight both with the public and the ministry. Still, the participants highlighted the importance of preserving knowledge gained from the pandemic response and sharing the lessons learned, but they felt like the window of opportunity to document and implement lessons learned was closing fast.

(iv) Implementation capacity at the local level

During the Omicron phase, the modus operandum was that much of the LTCF policies should be based on local decision-making and implementation. This was possible due to: (i) high local capacities for implementation at municipal and LTCF level; (ii) an already decentralised health system; and (iii) a high degree of trust in the relationship between LTCF, municipal authorities, the NIPH and the NDH. A vertical advice-making process such as this stays exclusively within the purview of health experts from the initial advice all the way down to the medical staff responsible for implementing it.

There was, therefore, less need for uniform and strict regulations that would be easily implementable by non-expert staff. Instead, NIPH relied on a layered advice system where they would provide context-specific guidance to account for the different situations in the municipalities. Participants from both the municipal authorities and the agencies noted that the different municipalities in Norway would often not be faced with the same levels of SARS-CoV-2 circulation so that implications would differ vastly according to geography, demography, and socio-economic composition. Hence, they would not need the same advice but should be given some flexibility to choose advice that aligned better with their situation. Some rural municipalities for example, in the north of Norway did not experience COVID-19 outbreaks until the Omicron phase and did not see the necessity of measures implemented in the months before. On the other hand, sometimes municipalities would interpret the LTCF guidelines more strictly than expected by NIPH. Initially, that would usually be in urban areas where the outbreaks would often be substantial compared to the rural areas. Oslo municipality, for example, decided that only full-time staff were allowed to work at LTCFs (thus no students or part-time employees) to minimise the risk of transmission.

When the initial phase of Omicron hit Norway, many municipalities in north Norway experienced outbreaks for the first time. They would distort guidelines or engage in advice shopping (see section Lessons Learned) to justify their stricter restrictions in terms of social distancing, isolation, and the use of protective gear. The NIPH felt that these more restrictive measures went too far and successfully engaged in a dialogue with these municipalities, which reinforces the high level of trust and respect between the NIPH and the municipalities. At other times, LTCFs would implement less strict guidelines - for example when it came to isolation of staff during Omicron. During the initial phase of the pandemic, several LTCF leaders also prioritised being on-site to remain aware of what was happening and respond accordingly rather than working from home, as had been advised. During the Omicron phase, when LTCFs were facing staff shortages, they informed the NIPH and the NDH that it would be beneficial to change the advice to allow asymptomatic staff to return to work, and this request was quickly accommodated. This latter example also illustrates how the NIPH, the NDH, and municipal health authorities were able to draw on the experiences of individual LTCFs in the advice-making process, due to institutionalised procedures allowing for feedback on what worked and what did not work to reach the NIPH. The LTCFs, thus, were not just implementing agencies, but at times played an active part in the advice-making process.

Discussion

Summing up the advice-making process – a paradigm shift?

The advice-making process during Omicron benefitted from the ability and capacity to gather and interpret much relevant evidence within a short time span. The production and interpretation of evidence were effective on all levels from the municipalities to the health agencies. The advice-making process also benefitted from the fact that the implementing agencies and the LTCFs were relatively well staffed, including medical personnel compared to relevant facilities in neighbouring countries. They were themselves part of the health sector and were active both in implementing advice as well as contributing to the advice-making process. The initial concern about the Omicron variant starting in December 2021 was quickly re-assessed considering both international evidence (primarily from Denmark and Scotland), experience-based evidence from the doctors and leaders at the LTCFs, and – most importantly – the availability of daily epidemiological data from across all Norwegian municipalities. This made NIPH and the NDH agile in the advice-making processes and capable of changing advice quickly as more evidence became available.

The change of advice during Omicron constituted a paradigm shift along at least two dimensions. It was a paradigm shift to recommend easing the NPIs at the LTCFs during a surge in COVID-19 infections. Preventing infections at the LTCF had previously been the overarching goal during the entire COVID-19 pandemic. Furthermore, the shift from protecting the elderly against infections to being primarily concerned about infection levels for the LTCF staff (and the health sector in general) also constituted a paradigm shift. These paradigm shifts in advice and implementation were made possible by (i) the availability of relevant epidemiological data disaggregated to the level of LTCF that allowed for quite robust evidence with regards the Omicron wave; (ii) strong existing procedures and channels for exchanging information and advice between the health agencies, the municipal authorities and the LTCFs; (iii) a high level of trust in the advice given by the NIPH and the NDH among the LTCF leaders and staff (one leader of a LTCF spoke about a default ‘acceptance mode’ of the advice coming from NIPH due to the agency’s consistent display of transparency and openness with regards to what it knows and does not yet know with certainty); and (iv) a high capacity in the LTCFs, both due to staffing issues (having a municipal doctor affiliated and full-time and often medically trained staff) but also through a readiness and confidence in the preparedness system at the municipal level when Omicron hit. The municipal authorities and the LTCFs were not only implementing entities, but they were also involved in amending the advice to fit the local circumstances and providing feedback on the advice given. Procedures and guidelines were in place and had in many cases been tested in practice during the previous wave of the pandemic. Many municipalities had also implemented digital systems for monitoring and collecting data by the time Omicron hit.

However, there were also some factors that impeded on the advice-making process. One was unclear responsibilities and a lack of clear coordination between the two health agencies (NIPH and NDH) when it came to the response to Omicron. Another one was the human factor. At this late stage in the pandemic and following immediately the surge of Delta infections, there was a general sense of fatigue among staff at all levels. One participant put it bluntly with regards his colleagues: “I can see it in the eyes that they are not the same people than before.” While one might expect people to put in an extra effort during a crisis, when a crisis becomes prolonged there needs to be institutional and organisational changes to support key staff in upholding an effective system of infection preparedness within the confines of an acceptable work/life-balance. Below, the AAR will formulate a few suggestions for such changes in the form of good practices.

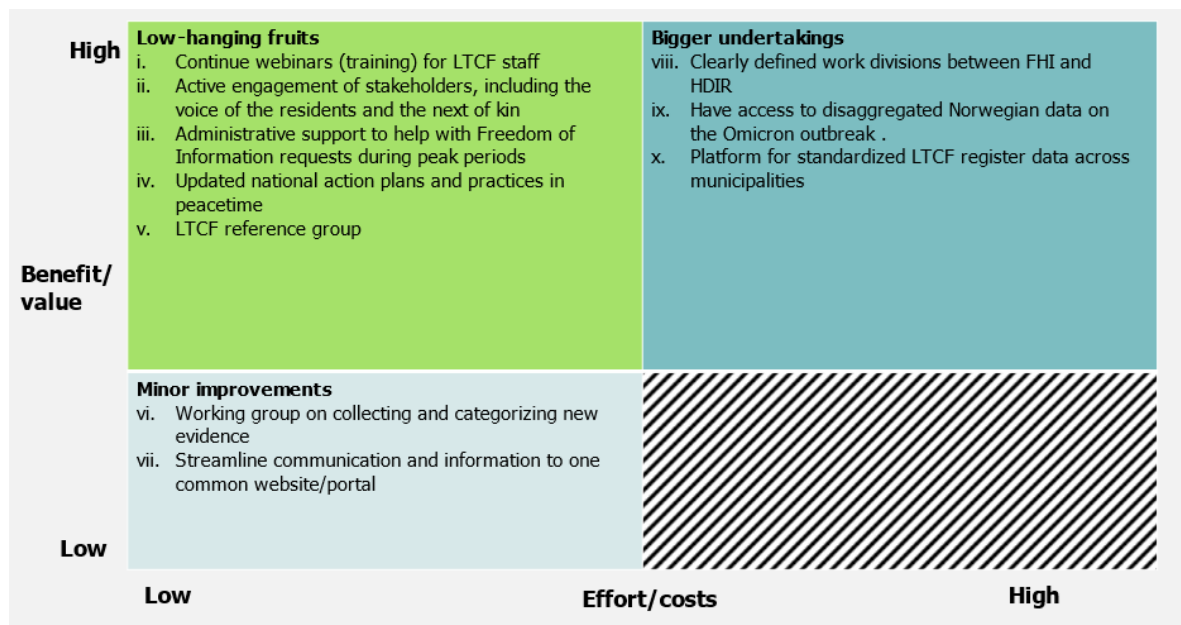
Conclusions and potential implications

Lessons learned and good practices

The following suggestions for good practices came up during the AAR process. These good practices were proposed by the participants themselves under the consultative processes. The research team gathered the different suggestions and categorised them according to the likely effort/reward-ratios, focusing on practices with:

- moderate effort and high reward;
- moderate effort and moderate rewards; and
- high effort and high reward.

Efforts refer to both financial costs and organisational resources, while rewards are focused primarily on ways to improve the advice-making process (that is, focused on process optimisation rather than outcome). Figure 7 provides an overview of the 10 lessons learned from this focused AAR, and this final section will go through each of them.

Figure 7. Overview of lessons identified during the AAR exercise in Norway, June 2022

Moderate effort and high reward

(i) Continue webinars (training) for LTCF staff

Every two weeks, key staff from different LTCFs across the country would receive insights and training through webinars run by NIPH. There was consensus among LTCF staff and the NIPH that the webinars have had a substantial influence in building institutional resilience and trust between the different levels of advice-making. The webinars reached the rural areas and provided LTCF staff both the opportunity for continued training but also for information sharing and networking among LTCFs themselves. During the Omicron outbreak, for example, these webinars provided important tools for sharing opinions and allowing participants to send questions and comments to the NIPH regarding how their advice should be implemented in practice. Webinars provided a forum for practitioners to share their experiences with the epidemiological and clinical consequences of Omicron as well as with implementing the NIPH guidelines in practice. It was highlighted as an important initiative during the pandemic that is important to continue in peacetime as an institutionalised practice.

(ii) Active engagement of stakeholders, including the voice of the residents and the next of kin

There was common agreement on the merits of including the voices of the residents or next of kin more meaningfully in the advice-making process. Importantly, NIPH had continuous communication with the municipal authorities and selected LTCFs around the well-being of the residents and the challenges facing next of kin. There was a general sentiment among NIPH staff, though, that the voices of these stakeholders could have been included more actively. Two specific challenges for inclusion were emphasised, however. One related to the modest cognitive abilities of many residents which makes it more difficult (but not less important) to include their voices in any systematic way. In one LTCF, for example, only 12 out of 85 residents were able to fill out the annual survey. One municipal doctor estimated that 80 percent of the residents had some form of dementia (and the remaining 20 percent had yet to be diagnosed).

The second challenge is that extracting voices from these stakeholders is resource intensive. It cannot be stressed enough how strained key staff felt during most of the pandemic, including the Omicron phase. It was difficult for key staff to devote time and resources to comprehensive qualitative studies across several LTCFs. Good practice would ensure that procedures are established in peacetime on how and when to include these voices. The AAR would recommend that these studies be commissioned at moderate costs to external actors (e.g. social scientist within academia and/or onsite practitioners) with experience in these kinds of qualitative bottom-up studies that allows for different voices to be included in the advice-making process.

(iii) Administrative support to help with Freedom of Information requests during peak periods

As already mentioned, NIPH staff – on top of other activities - were often heavily challenged by these requests during the Omicron phase (and during the COVID-19 pandemic in general), as was the staff at the NDH. On top of providing advice to both the government and the municipal authorities (often based on the NIPH's own research activities and interpretations of evidence), they also had to deal with multiple Freedom of Information requests. Some employees noted that they could get as many as 15 daily requests. The NIPH did not have the administrative capacity to handle the extraordinary number of requests in a good way. It appears suboptimal that highly specialised experts or managers in key positions should be the primary caseworkers on these administrative requests. A good practice to alleviate some of these administrative tasks would be hiring additional staff as temporary administrative support during an emergency to handle these requests. This workforce could be surged or downsized according to the need for it. Such administrative support might also alleviate some of the pressure on key personnel in general by providing support on keeping track of meetings and telephone calls.

(iv) Updated national action plans and practices in peacetime

While most staff had always been very aware of the risk of a pandemic, they felt that the organisational crisis procedures and systems could have been integrated more strongly into ongoing routines and practices. Hence, the recommendation to update national action plans, procedures, and practices in peacetime. One well-known example was the inadequate stockpile of personal protective equipment in the initial phase of the pandemic. However, the point raised by the participants also related to broader organisational issues. It pertained to having clear organisational systems and procedures in place and – not least – making sure that staff were familiar with these procedures (through training exercises and simulations). Concretely, one such important procedure could be regular evaluations of LTCF infection control practices. One participant felt that everything they had learned and their daily tasks/work routine changed when the pandemic struck, and they had to start from scratch carving out their own procedures and practices from trial and error.

The good practice, therefore, relates not only to having updated national action plans on paper, but also to making sure these are integrated into routines on different levels. This is particularly important in a decentralised health system such as the Norwegian one where municipalities play a key role in both advice-making and implementation. Updated action plans that are continuously communicated to relevant stakeholders by means of training and information dissemination would constitute good practice in preparation for an unknown future health emergency. This future emergency is unlikely to precisely mirror COVID-19. Nevertheless, as no plan can foresee all possible scenarios, building resilience and flexibility in the public health staff would be quite important.

(v) LTCF reference group

It would have been beneficial to work with a formal reference group of LTCFs. There was much interaction with the municipalities and certain LTCFs, on a mostly ad hoc basis. Systematising this interaction into a reference group would ensure broad representation rather than participation by those with the loudest voice, highest capacity, or strongest interest (often from urban areas). Populous urban municipalities have the advantage of being closer to the advice-making agencies, more contactable and being easily noticed.

This AAR is also based on consultations with one such municipality authority (Oslo). Experience-based evidence gathered from a larger and more inclusive municipal/LTCF reference group would be much more representative from an analytical perspective. From a capacity building perspective, such a reference group would also strengthen participation and cooperation with the many smaller rural municipalities (which account for most of the municipalities). While there surely is value in including the most populous municipalities in the advice-making process (as their decisions would affect a disproportionate amount of people), a more balanced reference-group would surely be good practice by strengthening country-wide engagement and facilitating a more robust and representative gathering of experienced-based evidence.

Moderate effort and moderate reward

(vi) Working group on collecting and categorising new evidence

One of the main challenges for the health agencies was simply keeping up with the incredible surge in relevant literature. This was especially true during an emergency where NIPH and NDH staff needed to give priority to other more pressing issues such as servicing the Ministry of Health, providing guidelines to municipalities and collecting and analysing epidemiological data. Establishing a small working group explicitly tasked with collecting and categorising new evidence in an easily digestible format would appear to be a good practice. Participants in the workshop found the database very useful in that it provided an easy overview of COVID-19 literature that might be relevant to particular fields of interest.

One important suggestion is to make the database accessible to other agencies and maybe even the public. The NDH, for example, did not know of the working group before this AAR, and as such they did not have access to the database. They indicated at the workshop that they would have benefitted from being able to access the database-evidence. Making the database publicly (and easily) available is a minor undertaking and something the AAR would recommend as good practice, and that could reap long term benefits in further reinforcing public trust in the health authorities/countering misinformation.

(vii) Coordinate communication and information to one common website/portal

Helsenorge.no has been the website targeting the public in Norway during the pandemic, with in-depth information and recommendations to the public from NIPH, and recommendations to healthcare practitioners from NIPH and the Directorate of Health. These webpages might word their recommendations slightly differently and change advice at slightly different times, which created some confusion among healthcare practitioners and the public, especially at the start of the pandemic and despite close coordination between the different organisations.

The ultimate organisation of communication channels amidst the different actors in Norway with responsibilities is continuously under discussion, and the number of relevant actors to cooperate and coordinate with by far exceeds the health authorities. Often, the need for fast and widespread information precedes the time needed for optimal coordination of wording. First and foremost, it is dependent on organisational and legal clarifications, for example, to clarify who is communicating what, in which channel or website. The consultative seminar also revealed a strong preference for information dissemination at fixed times. This will not always be feasible in chaotic settings such as in the initial phase of Omicron but in calmer periods it should be possible to coordinate advice and guidelines on specific days of the week. In the absence of this, health practitioners complained that they had to consult different website at different days and timeslots. Press conferences on Fridays with new advice also made it difficult for the healthcare practitioners to implement the changes as fast as possible. A mid-week press conference would provide better opportunities for implementing new practices and procedures.

High effort and high reward

(viii) Clearly defined work divisions between NDH and NIPH

As previously described, advice and regulations for the pandemic response were shared between two agencies, the NIPH and the NDH. Each agency should in principle have their own expertise and specified role during the pandemic. However, in the consultative process it quickly became clear that there was a substantial overlap of responsibilities. One of the main lessons, identified by all the participants, was the need for more clearly defined areas of responsibility between the two.

Even before the pandemic, staff were unclear about their different roles. While the NDH in principle should take the epidemiological advice produced by NIPH but then consider a broader set of factors (economic, social, legal and so forth) to strengthen the advice, this was often not the case in practice. From the NIPH side, the argument was that 'pure' advice does not exist, and this type of advice must necessarily also encompass a broader set of social and economic concerns. From the NDH side, they would often want to reinterpret the epidemiological evidence when producing advice and communicate it to the policy makers in the Ministry of Health. At times this meant starting from scratch rather than from the advice and evidence provided by NIPH.

The poorly defined roles and miscommunication created some challenges. One relates to the effectiveness of using resources from two agencies to pursue very similar purposes. The two agencies would at times almost work in parallel during the pandemic. From the perspective of the NIPH, there was also a sense of unnecessary debate back and forth. When advice leaves the NIPH, it has often already been through several internal layers of quality control and feedback. NIPH then expected the NDH to contribute with economic and/or legal considerations and not question the fundamental epidemiological findings. This misalignment of expectations complicated the advice-making process during a time when resources (both time and capacity) were scarce. Participants noted that resources were instead used to come to agreements between the two agencies rather than on other more "productive" matters. One of the NIPH staff emphasised that challenging data and advice at every point is not an efficient way to use the limited resources that the agencies had at their disposal.

Another challenge relates to the confusion this generated among healthcare practitioners and the public. The most obvious risk is that disagreements between the agencies, most of which were publicly known, could lead to confusion for the public: if trusted expert-run agencies do not even agree, then it might become more legitimate for private citizens to also disagree with the official advice e.g. on social distancing. Healthcare practitioners might also not know whether to contact the NIPH or the NDH for advice. And as one of the practitioners noted, this is not ideal in an acute emergency. The NIPH and the NDH might also provide different answers to similar questions. This means that healthcare practitioners and municipal authorities would sometimes engage in 'advice shopping' – that is shop around between the two agencies to find advice that comes closest to what they want to do.

The unclear roles between the two agencies are culturally reinforced. Employees at both agencies might truly believe that certain functions are within their authority, and they naturally convey that to new employees, allowing for cultures of overlapping authority to reproduce. The disciplinary backgrounds of the staff across the two agencies are also very similar. One implication highlighted in the workshop was that staff in NDH with similar expertise to that of NIPH might find it difficult to just rely uncritically on the assessments from NIPH. Instead, they might want to make up their own mind based on the epidemiological evidence.

Disagreements on advice constituted a particular challenge when there was little opportunity to exchange information, viewpoints and to come to a common agreement. This was the situation in the initial Omicron phase where both agencies were forced to work on risk assessments independently due to extreme time-constraints. On the other hand, having two agencies with overlapping authority also appeared to have some advantages in the advice-making process. Participants emphasised how having more people looking into the way research is interpreted added robustness to the advice, trained staff in looking at evidence from multiple angles, and prepared them for engaging with opposing views. A 'devil's advocate'-mechanism is built into an advice-making making duopoly with two centres of authority, so to speak. Interestingly, there would often be a pattern in the advice of the two agencies with the NDH taking a more precautionary perspective. The fact that they represent two slightly different perspectives might only add to the advantage of having two agencies, as their advice does not differ largely or in a random way from each-other, which would mostly just create noise, but there is some consistency in the differences.

These historical differences in perspectives also meant that when the NIPH explicitly expressed that they were very concerned about the Omicron variant in mid-December, the NDH knew that the outbreak could in fact be very serious. In fact, during the Omicron phase, the differences in perspectives of what needed to be done were much smaller than previously, and participants agreed that the cooperation between the agencies had been better during the Omicron phase. The communication between the agencies had improved but mainly due to individual initiatives of reaching out and establishing weekly consultations across agencies and less due to organisation changes or any ministerial separation of authorities. Another strength in the advice-making process is that both agencies worked in a transparent manner, which made it easier for both agencies, municipalities, and the public to revisit the evidence and to trace the process from evidence to advice. Still, it appeared that communication between the agencies was not optimal in the initial more chaotic phase. From the perspective of the NDH, a substantial problem was there had been no time between when the NIPH delivered their advice, and when the NDH had to do the same.

In acknowledgement of these advantages, some raised the question of whether this overlap might have been bad for employees individually (taxing them with what felt like futile extra discussions and coordination efforts) but good for the advice-making process by making it more robust. However, there was a clear agreement that the Ministry of Health had to clearly define tasks and responsibilities between the two agencies, and that the benefits of the present duopoly often did not outweigh the drawbacks during COVID-19. One good practice would be for the Ministry of Health to ascribe clear lines of responsibility and potentially leadership responsibilities under clearly defined circumstances to either one of the agencies. Again, this would be most beneficial to do in peacetime as it demands quite substantial formal organisational changes as well as cultural and behavioural changes within the agencies.

(ix) Norwegian data (national and local) on the Omicron outbreak was essential

The importance of gathering and interpreting epidemiological data in real time is one more lesson. While international evidence and studies were used in the advice-making process, emphasis was clearly on gaining access to Norwegian data as the foundation for advice. This, of course, necessitates a substantial testing-regiment as well as sequencing capacity. But it also crucially depends on the advice-making agencies gaining easy access to this data and connecting it with relevant information from central registers. The NIPH had access to high-quality data during Omicron. While the national database could have been better (see section Access to daily, high-quality Norwegian data), the importance placed on being able to access context-specific data daily provides an important lesson for infection prevention and preparedness in general. There is little doubt that access to this data allowed the NIPH to change advice as quickly as it did, and for the implementing agencies to accept this advice with confidence.

(x) Platform for standardised LTCF register data across municipalities

While the NIPH had access to high quality epidemiological data from the LTCFs, the data was often compiled from central registers which were not updated frequently. Participants expressed a need for a platform/dashboard that would be easily available for advice-makers on all levels, allowing them to access information more easily and disseminate it faster. Such a system needs to be set-up in peacetime and for more scenarios than the SARS-CoV-2 pandemic. This activity is a somewhat complex undertaking as it would necessitate change in legal framework as well as the challenge to establish good technical solutions. From a purely epidemiological perspective, the data needs to be standardised across municipalities. Even smaller municipalities also need to have the resources

necessary to provide regular and reliable data updates. In addition, there are also technical and legal hurdles, such as the database needs to comply with the GDPR-rules. During Omicron, the NIPH would receive some data from the municipalities but would not be allowed to legally send some of the compiled information back to the municipalities due to these kinds of constraints. Technically, data is currently on different systems that in turn are supported by different data companies. Thus, a common dashboard would require sufficient funds, solutions to any legal matters, technical know-how, and an alignment of the different digital systems. This is no small feat and again should preferably be addressed in peacetime. If successful, the result would be real time access to disaggregated epidemiological evidence. NIPH would, for example, be able to identify the beginning of an outbreak in a given municipality that might have gone undetected otherwise because LTCF staff and doctors can only base outbreak identification on their individual experience and expertise and thus not recognise the specific patterns of transmission until too late in the outbreak. In other words, such a dashboard could have very concrete ramifications for successful infection control and prevention.

References

1. European Centre for Disease Prevention and Control (ECDC). Conducting after-action reviews of the public health response to COVID-19. Stockholm: ECDC; 2020. Available at: <https://www.ecdc.europa.eu/en/publications-data/conducting-after-action-reviews-public-health-response-covid-19-update-0>
2. World Health Organization (WHO). Guidance for after action review (AAR). Geneva: WHO; 2019. Available at: <https://www.who.int/publications/i/item/WHO-WHE-CPI-2019.4>
3. European Centre for Disease Prevention and Control (ECDC). Best practice recommendations for conducting after-action reviews to enhance public health preparedness. Stockholm: ECDC; 2018. Available at: <https://www.ecdc.europa.eu/en/publications-data/best-practice-recommendations-public-health-preparedness>
4. European Centre for Disease Prevention and Control (ECDC). Protocol for a focused after-action review on evidence-based decision-making for selected COVID-19 response measures. Stockholm: ECDC; 2021. Available at: <https://www.ecdc.europa.eu/en/publications-data/protocol-focused-after-action-review-evidence-based-decision-making-covid-19-response>
5. World Health Organization (WHO). Guidance for conducting a country COVID-19 intra-action review (IAR). Geneva: WHO; 2020. Available at: https://www.who.int/publications/i/item/WHO-2019-nCoV-Country_IAR-2020.1
6. European Centre for Disease Prevention and Control (ECDC). One-day in-action review (IAR) protocol in the context of COVID-19. Stockholm: ECDC; 2021. Available at: <https://www.ecdc.europa.eu/en/publications-data/one-day-action-review-iar-protocol-context-covid-19>
7. Salajan A, Tsoлова S, Ciotti M, Suk JE. To what extent does evidence support decision making during infectious disease outbreaks? A scoping literature review. *Evidence & Policy*. 2020;16(3):453-75. Available at: <https://bristoluniversitypressdigital.com/view/journals/evp/16/3/article-p453.xml>
8. Rutter H, Wolpert M, Greenhalgh T. Managing uncertainty in the COVID-19 era. *BMJ*. 2020;370:m3349. Available at: <https://www.bmj.com/content/bmj/370/bmj.m3349.full.pdf>
9. Rubin O, de Vries DH. Diverging sensemaking frames during the initial phases of the COVID-19 outbreak in Denmark. *Policy Design and Practice*. 2020;3(3):277-96. Available at: <https://www.tandfonline.com/doi/abs/10.1080/25741292.2020.1809809>
10. Colman E, Wanat M, Goossens H, Tonkin-Crine S, Anthierens S. Following the science? Views from scientists on government advisory boards during the COVID-19 pandemic: a qualitative interview study in five European countries. *BMJ Global Health*. 2021;6(9):e006928. Available at: <https://gh.bmj.com/content/6/9/e006928.abstract>
11. Vickery J, Atkinson P, Lin L, Rubin O, Upshur R, Yeoh E-K, et al. Challenges to evidence-informed decision-making in the context of pandemics: qualitative study of COVID-19 policy advisor perspectives. *BMJ Global Health*. 2022;7(4):e008268. Available at: <https://gh.bmj.com/content/7/4/e008268.abstract>
12. Askim J, Bergström T. Between lockdown and calm down. Comparing the COVID-19 responses of Norway and Sweden. *Local Government Studies*. 2022;48(2):291-311. Available at: <https://www.tandfonline.com/doi/abs/10.1080/03003930.2021.1964477>
13. Christensen T, Lægreid P. Balancing governance capacity and legitimacy: how the Norwegian government handled the COVID-19 crisis as a high performer. *Public Administration Review*. 2020;80(5):774-9. Available at: <https://onlinelibrary.wiley.com/doi/abs/10.1111/puar.13241>
14. Bækkeskov E. Same threat, different responses: Experts steering politicians and stakeholders in 2009 H1N1 vaccination policy-making. *Public Administration*. 2016;94(2):299-315. Available at: <https://onlinelibrary.wiley.com/doi/abs/10.1111/padm.12244>
15. Liverani M, Hawkins B, Parkhurst JO. Political and institutional influences on the use of evidence in public health policy. A systematic review. *PLoS One*. 2013;8(10):e77404. Available at: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0077404>
16. Jasanoff S. *The fifth branch: science advisers as policymakers*. Harvard: Harvard University Press; 1998.
17. World Health Organization (WHO). *Evidence, policy, impact: WHO guide for evidence-informed decision-making*. Geneva: WHO; 2021. Available at: <https://www.who.int/publications/i/item/9789240039872>
18. Brownson RC, Fielding JE, Mays LA. Evidence-based public health: a fundamental concept for public health practice. *Annual Review of Public Health*. 2009;30:175-201. Available at: <https://www.annualreviews.org/doi/abs/10.1146/annurev.publhealth.031308.100134>
19. Haghani M, Bliemer MC. COVID-19 pandemic and the unprecedented mobilisation of scholarly efforts prompted by a health crisis: Scientometric comparisons across SARS, MERS and 2019-nCoV literature. *Scientometrics*. 2020;125:2695-726. Available at: <https://link.springer.com/article/10.1007/s11192-020-03706-z>
20. Yeo-Teh NSL, Tang BL. An alarming retraction rate for scientific publications on Coronavirus Disease 2019 (COVID-19). *Accountability in Research*. 2021;28(1):47-53. Available at: <https://www.tandfonline.com/doi/abs/10.1080/08989621.2020.1782203>

21. Collins HM, Evans R. The third wave of science studies: Studies of expertise and experience. *Social Studies of Science*. 2002;32(2):235-96. Available at: <https://journals.sagepub.com/doi/abs/10.1177/0306312702032002003>
22. Rajan D, Koch K, Rohrer K, Bajnoczki C, Socha A, Voss M, et al. Governance of the Covid-19 response: a call for more inclusive and transparent decision-making. *BMJ Global Health*. 2020;5(5):e002655. Available at: <https://gh.bmj.com/content/5/5/e002655.abstract>
23. Van Damme W, Dahake R, Delamou A, Ingelbeen B, Wouters E, Vanham G, et al. The COVID-19 pandemic: diverse contexts; different epidemics—how and why? *BMJ Global Health*. 2020;5(7):e003098. Available at: <https://gh.bmj.com/content/5/7/e003098.abstract>
24. Lu X, Xue L. Managing the unexpected: Sense-making in the Chinese emergency management system. *Public Administration*. 2016;94(2):414-29. Available at: <https://onlinelibrary.wiley.com/doi/abs/10.1111/padm.12261>
25. Genuis SK. Constructing “sense” from evolving health information: A qualitative investigation of information seeking and sense making across sources. *Journal of the American Society for Information Science and Technology*. 2012;63(8):1553-66. Available at: <https://asistdl.onlinelibrary.wiley.com/doi/abs/10.1002/asi.22691>
26. Baekkeskov E. Explaining science-led policy-making: Pandemic deaths, epistemic deliberation and ideational trajectories. *Policy Sciences*. 2016;49(4):395-419. Available at: <https://link.springer.com/article/10.1007/s11077-016-9264-y>
27. Carstensen MB, Schmidt VA. Power through, over and in ideas: conceptualizing ideational power in discursive institutionalism. *Journal of European Public Policy*. 2016;23(3):318-37. Available at: <https://www.tandfonline.com/doi/abs/10.1080/13501763.2015.1115534>
28. Baekkeskov E, Rubin O. Why pandemic response is unique: powerful experts and hands-off political leaders. *Disaster Prevention and Management*. 2014;23(1):81-93. Available at: <https://www.emerald.com/insight/content/doi/10.1108/DPM-05-2012-0060/full/html>
29. Laage-Thomsen J, Frandsen SL. Pandemic preparedness systems and diverging COVID-19 responses within similar public health regimes: a comparative study of expert perceptions of pandemic response in Denmark, Norway, and Sweden. *Globalization and Health*. 2022;18(1):1-18. Available at: <https://globalizationandhealth.biomedcentral.com/articles/10.1186/s12992-022-00799-4>
30. Norwegian Corona Commission - Myndighetenes håndtering av koronapandemien. Myndighetenes håndtering av koronapandemien. Oslo: Government of Norway; 2021. Available at: https://files.nettsteder.regjeringen.no/wpuploads01/blogs.dir/421/files/2021/04/Koronakommisjonens_rapport_NOU.pdf
31. Norwegian Corona Commission. Myndighetenes håndtering av koronapandemien – del 2. Oslo: Government of Norway; 2022. Available at: <https://www.regjeringen.no/contentassets/d0b61f6e1d1b40d1bb92ff9d9b60793d/no/pdfs/nou202220220005000dddpdfs.pdf>
32. Christensen T, Lægveid P. Scientization under pressure - The problematic role of expert bodies during the handling of the COVID-19 pandemic. *Public Organization Review*. 2022;22(2):291-307. Available at: <https://link.springer.com/article/10.1007/s11115-022-00605-0>
33. Ursin G, Skjesol I, Tritter J. The COVID-19 pandemic in Norway: The dominance of social implications in framing the policy response. *Health Policy and Technology*. 2020;9(4):663-72. Available at: <https://www.sciencedirect.com/science/article/pii/S2211883720300769>
34. Satterfield JM, Spring B, Brownson RC, Mullen EJ, Newhouse RP, Walker BB, et al. Toward a transdisciplinary model of evidence-based practice. *The Milbank Quarterly*. 2009;87(2):368-90. Available at: <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1468-0009.2009.00561.x>
35. Snowden DJ, Boone ME. A leader's framework for decision making. *Harvard Business Review*. 2007;85(11):68. Available at: https://www.systemswisdom.com/sites/default/files/Snowdon-and-Boone-A-Leader's-Framework-for-Decision-Making_0.pdf
36. Brandal LT, MacDonald E, Veneti L, Ravlo T, Lange H, Naseer U, et al. Outbreak caused by the SARS-CoV-2 Omicron variant in Norway, November to December 2021. *Euro Surveill*. 2021;26(50):2101147. Available at: <https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2021.26.50.2101147>
37. Folkehelseinstituttet (FHI). Risiko ved covid-19epidemien og ved omikronvarianten i Norge- 12 Jan 2022. Oslo: FHI; 2022. Available at: <https://www.fhi.no/contentassets/c9e459cd7cc24991810a0d28d7803bd0/vedlegg/risikovurdering-12-01-2022.pdf>
38. Folkehelseinstituttet (FHI). Risiko ved COVID-19-epidemien og ved omikronvarianten i Norge. Oslo: FHI; 2022. Available at: <https://www.fhi.no/contentassets/c9e459cd7cc24991810a0d28d7803bd0/vedlegg/risikovurdering-260122.pdf>
39. Folkehelseinstituttet (FHI). Koronavirus (SARS-CoV-2) – fakta, råd og tiltak. Oslo: FHI; 2022. Available at: <https://www.fhi.no/ss/korona/koronavirus/koronavirus/?term=>
40. Folkehelseinstituttet (FHI). Kommunale helse- og omsorgsinstitusjoner- tiltak ved utbrudd av covid-19 - arkivert. Oslo: FHI; 2022. Available at: <https://www.fhi.no/historisk-arkiv/covid-19/koronavirusveilederen-arkiv/utbrudd-i-kommunale-helse--og-omsorgsinstitusjoner/>
41. Gautun H. Elderly care during the pandemic: Norway and Denmark stand out. Oslo: Norwegian Social Research (NOVA); 2022. Available at: <https://www.oslomet.no/en/research/featured-research/elderly-care-during-pandemic-norway-denmark-stand-out>

42. Jacobsen FF, Arntzen C, Devik SA, Førland O, Krane MS, Madsen L, et al. Erfaringer med COVID-19 i norske sykehjem. Oslo: Senter for omsorgsforskning; 2021. Available at: <https://omsorgsforskning.brage.unit.no/omsorgsforskning-xmlui/handle/11250/2737650>
43. Folkehelseinstituttet (FHI). Råd for helsevirksomheter med én-til-én-kontakt (first issued on 19 April 2020, updated on 14 February 2022). Oslo: FHI; 2020-2022. Available at: <https://www.fhi.no/historisk-arkiv/covid-19/koronavirusveilederen-arkiv/en-til-en-helsetjenester/>
44. Folkehelseinstituttet (FHI). Modelling scenarios for the SARS-CoV-2 Omicron VOC (B.1.1.529) in Norway, January-February 2022. Oslo: FHI; 2022. Available at: <https://www.fhi.no/contentassets/e6b5660fc35740c8bb2a32bfe0cc45d1/vedlegg/nasjonale-og-regionale-rapporter/modelling-scenarios-for-the-sars-cov-2-omicron-voc-b.1.1.529-in-norway-january-february-2022.pdf>

Annex 1. Informed consent form

After-Action Review of evidence-based decision making in long-term care facilities during COVID-19

The goal of this project is to conduct an After-Action Review (AARs) on evidence-based decision making (EBDM) for long-term care facilities during COVID-19. Evidence-based decision making is a process for making the best decisions possible using the evidence available. The project focuses on the EBDM process of public health experts when generating advice that informs policy. The AAR exercise looks at the advice-giving process for long-term care facilities (LTCF) during the omicron (B.1.1.529) phase of the outbreak in two countries: Norway and Georgia. The central question is how evidence has been used to inform decisions made during the omicron period. You have been identified as a stakeholder who was part of the advice-making process, and this is why you are asked to participate in this exercise.

- Your participation in the interview is entirely voluntary, and if you agree to take part, you are free to change your mind or withdraw at any time without consequences.
- If you agree to take part in an interview, any processing of your personal data will comply with Regulation 45/2001 and Swedish national law. ECDC is the data controller of this processing operation, and the data is collected and stored by the Amsterdam Institute for Global Health and Development on its behalf, in its role as processor of the data.
- With your agreement, we may want to quote some of what you say in a country and/or aggregated report, but we will do so in a way that ensures that it cannot be ascribed to you.
- With your agreement, we may want to include your name and institutional affiliation in an Annex that lists the informants who have contributed to this case study project.
- With your agreement, we may want to record the conversation which will only be used for our notes and be deleted after the project finishes.

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

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

Yes No

1. I agree for this conversation to be audio recorded and understand that the recording will be used for note-taking only and deleted after the project.
2. I agree to having my words used as quotes in the final report, and I understand that my words will be anonymized so that it will not be possible to ascribe any of my comments to me.
3. I agree to having my name and institution included in an Annex at the end of the final report that lists the informants who have contributed to this case study project.

Signature: _____

Name (in CAPITALS): _____

Place & Date: _____

Annex 2. Interview instrument

Part 1: What happened, who was involved and how did they make sense of the situation?

Involvement

1. What does your institution do? What is your role?
2. What was the role of your institution in the omicron advice giving process? How were you included?
 - a. If not included: Did you want to be? Why were you not involved in the advice making process?
3. *If role in advice making:* can you map out the various stakeholders or groups that you were involved in during the advice-making process?
 - a. If you were to rate each of these stakeholders by the amount of influence they had on the decision-making process, who would have had the most influence? (1=low, 2=medium, 3=high)
 - b. If you were to rate each of these stakeholders by the level of interest they had in the decision, who would have had the highest level of interest? (1=low, 2=medium, 3=high)

Sense-making analysis

4. When you first heard about the omicron variant, to what extent could you apply your previous experience with similar events?
5. Using the Cynefin framework, which of the following descriptions fits best with the way that you experienced the event: complex, complicated, chaotic or obvious/simple?

Part 2: Why did it happen? How did evidence contribute? Why did the decision develop the way it did?

For reference and probing: Major themes of the EBPH framework, by category

Research evidence	Resources	Population characteristics	Environment and organisational context
Objectivity	Human resources and institutional memory	Socio-political factors (populism, economic interests, etc.)	Intersectoral
Uncertainty	Capacity for knowledge translation	Cross-border issues	Economic
Time pressure	Situational awareness	Media influence and citizen participation	Institutional and legal

Evidence in advice-making

6. What struck you as most influential on the way that the advice-making process developed? Why?
 - a. Think beyond research evidence, also think about resources, population characteristics or environmental and organisational contexts.
7. To what extent do you feel that the advice made was 'evidence-based'? Why/why not?
 - a. What value and weight did experts and decision-makers place on different pieces of evidence?
 - b. What happened when there was no conclusive scientific evidence available?
 - c. What types of scientific evidence were looked at? How was this evidence gathered? How was it interpreted?

- d. What other factors were looked at alongside the evidence and how were these balanced against each other when decisions were made?
8. How has evidence been used to inform decisions made during this period? How did decision makers adapt evidence to apply it in their own context?
 - a. How does it compare to earlier waves?
 9. Could you give an example of when evidence was used well / not used well?
 - a. How did you determine if evidence was used well or not well?
 - b. What monitoring mechanisms do you use?
 10. Who assessed the impact of the advice and how did they do so?

Implementation

11. How did you understand and implement the advice? Were there unclarities?
12. Were you able to provide feedback about implementation?
13. How did the advice change the epidemiological situation?

Part 3: What can be learned? What should change? How can change be implemented and monitored?

14. What were the main lessons learned from this event, with respect to evidence-based decision-making?
15. What should change, with respect to the evidence-based decision-making process?
16. Have you seen any changes in the decision-making process since the event? To what extent have these changes benefitted the use of evidence in the process?

Closing

17. Is there anything else you would like to add?

Annex 3. Country visit overview

Date	Activities
Tuesday June 7	
12:00 – 12:45	<ul style="list-style-type: none"> Meet-up ECDC, consultants, Norwegian team. Location: near nursing home authority (TBD)
13:00 – 15:00	<ul style="list-style-type: none"> Visit with Nursing Home Authorities. Location: <u>Nedre Slottsgate 3</u>, 0157 Oslo
Wednesday June 8	
9:00 – 10:00	<p>Session 1: Introduction of project</p> <p>The goal of the AAR is to foster opportunities for discussion and dialogue on the role of evidence in decision-making regarding technical advice for long-term care facilities during the omicron outbreak. Participants are invited to reflect on the advice-giving decision-making process and help identify best practice suggestions for improvement.</p> <ul style="list-style-type: none"> Word of welcome (5 min.) – Hanne-M. Eriksen-Volle, Seksjonsleder Resistens- og infeksjonsforebygging. Folkehelseinstituttet Introduction of project (10 min.) - Agoritsa Baka, ECDC Principal Expert Emergency Preparedness and Response Brief round of introduction (15 min.) Review of AAR activities (30 min.) – Olivier Rubin, Professor Department of Social Sciences and Business, Roskilde University & Danny de Vries, Associate Professor, Department of Anthropology, University of Amsterdam
10:00 – 10:30	Break
10:30 – 12:30	<p>Session 2: What happened and who was involved</p> <p>In this session we plan to discuss a preliminary timeline of key decision/advice giving events and trace the processes (formal and informal) related to technical decisions regarding formal advice(s) relevant to omicron in long-term care facilities. This also entails mapping out the various stakeholders that participants had contact with during the response, including agency roles.</p>
12:30 – 14:00	Lunch
14:00 – 17:00	<p>Session 3: Why did the advice develop the way it did? How was evidence used?</p> <p>Here we will discuss how evidence influenced the advice-giving decision-making process as well as what evidence was available and how it was used (or not used). The purpose of the session is not to uncover 'mistakes' or 'good decisions' (with the benefit of hindsight), but to understand why the decision-making dynamics unfolded as they did and what role evidence played in these dynamics. Participants will be asked to identify how and when evidence was brought into the advice's decision-making process, and how it was responded to.</p>
Thursday June 9	
09:00 – 10:30	<p>Session 4: How did advice-makers make sense of the situation?</p> <p>In this session, participants' opinions will be collected to get a variety of perspectives on why the decision-making process of the formal advice unfolded as it did. Participants should also reflect on how various professional backgrounds and experiences; institutional practices and procedures, and the type and availability of evidence shaped and defined sensemaking.</p>
10:30-11:00	Break
11:00 – 12:00	<p>Session 5: What can be learned? What should change? How can change be implemented and monitored?</p> <p>Identify and discuss major lessons learned about the use of evidence during key decision-making processes regarding advice related to long-term care facilities. What can be done to improve gaps or challenges and to sustain best practice?</p>
12:00 – 13:00	Lunch
13:00 – 14:00	Session 5 (continued)
14:00 – 15:00	<p>Session 6: Wrap up, closing and evaluation</p> <p>Opportunity to reflect on the consultation process itself, but also on the outcomes. Agreement on the next steps, including the writing process for the final report. The session will be closed with a brief evaluation.</p>
Friday June 10	
	<ul style="list-style-type: none"> Possible follow-up interviews (e.g. involved communications officer) Possible visit to long-term care facility
13:00 – 14:00	<p>Session 7: Hot Debrief</p> <p>Consultants will review preliminary findings to all interested parties, verify and validate the findings, and review agreements for next steps.</p>

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