After-Action review of the public health response of Slovenia to the COVID-19 pandemic

ECDC TECHNICAL REPORT

After-Action review of the public health response of Slovenia to the COVID-19 pandemic

19–21 September 2023

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Abbreviations

AAR	After-Action Review
ECDC	European Centre for Disease Prevention and Control
PHSM	Public health and social measures (analogous with NPI)
NIJZ	Slovenian Institute of Public Health
RCCE	Risk Communication and Community Engagement
WHO	World Health Organization

Executive summary

At the request of the Slovenian National Institute of Public Health (NIJZ), ECDC designed and facilitated an After-Action review (AAR) for the NIJZ, focusing on the response to the COVID-19 pandemic between October 2020 to March 2021. ECDC managed the methodological approach and were the principal AAR facilitators, with support from a colleague from the World Health Organization (WHO) EURO. The AAR provided an opportunity for the participating bodies to share experiences and collectively analyse the public health response to COVID-19 in the country. The main objectives were to identify issues, challenges and best practice and propose actions to improve coordination and communication, address key preparedness gaps and support national pandemic preparedness and response planning.

This AAR workshop took place in Ljubljana, Slovenia, on 19-21 September 2023, and focused on three response areas: public health and social measures (PHSM) implemented in community settings, vaccine deployment, and risk communication and community engagement (RCCE). The selection of these topics and the AAR timeframe (October 2020 through March 2021) represents a transitional moment when the key role previously played by PHSMs began to be complemented by the availability of COVID-19 vaccines.

The findings of this review provide the basis for improving and strengthening preparedness and response in Slovenia. Overarching and specific findings per area and related recommendations discussed at the workshop are presented below. These recommendations are applicable on system levels and across all organizational levels, ranging from governmental and ministerial levels to other agencies within the healthcare system, as well as NIJZ.

Cross-cutting findings and overarching recommendations

- ECDC recommends that Slovenia updates its pandemic preparedness plans considering the findings from this AAR. Pandemic preparedness plans, or components of them, should be regularly tested through stress tests and simulation exercises. Similarly, national crisis management plans could be reviewed to clarify institutional roles and responsibilities during events.
- A concerted and probably longer-term activity should focus on reestablishing recognition of the leading role of NIJZ through revising and formalising a communication and community outreach strategy.
- The lack of availability of trained staff was highlighted as a key limitation facing the ability of NIJZ to mount an effective response to the pandemic. A plan for the mobilisation of surge capacities for future large-scale crises may assist during major events, while longer-term work to map and prioritise the staffing needs of NIJZ should be undertaken.

Public health and social measures

- Outbreak-related operational research protocols should be established to gather evidence on the effectiveness of public health and social measures (PHSMs) in Slovenia, as well as considering active engagement in pan-European projects on this subject.
- Relevant stakeholders should also be included in decision-making processes, bridging the gap between public health and, for example, schools in Slovenia (as a good practice example this was achieved with the second advisory group which was coordinated at the NIJZ and active between July 2022 and February 2023 (after the period that we reviewed)).
- Institutional roles for NIJZ in evidence-based decision-making processes should be better defined and integrated into national pandemic preparedness plans, including a mechanism for timely provision of technical guidance documents on PHSM.
- Integrated digitisation of infectious disease surveillance at NIJZ across all diseases is recommended and hospital capacity data should be readily available to inform PHSM decisions. Clarity on situations and contexts where contact tracing should be emphasised is also recommended and reflected in pandemic preparedness plans.
- It is recommended to address chronic understaffing and improvements in workforce capacity to be more resilient to public health emergencies, reduce pressure on individual staff members and identify tasks and responsibilities that can be delegated.

Vaccine deployment

- Ensuring that vaccine deployment strategies with defined roles, tasks and procedures for mass vaccination are clearly addressed in national pandemic preparedness plans.
- The reported lack of human resources, both regular workforce and surge capacity, can be addressed in the preparedness plan, and also with more long-term actions such as attracting more students to the healthcare field and defining ways of repurposing staff during health emergencies.
- By increasing the independence of and trust in the NIJZ, the involvement of political entities in future vaccination strategies and implementation processes can be minimised. This can be done by strengthening the leadership integrity and the autonomy of the NIJZ, and by increasing the visibility and credibility of their important work to the public.

Risk Communication and Community Engagement

- The RCCE plan should be placed within the national general preparedness plan, as per the EU Regulation (EU) 2022/2371 on Serious Cross-Border Threats to Health.
- Consider embedding crisis communication activities within the developing NIJZ Emergency Operations Centre.
- Public health and medical experts can use existing channels between NIJZ and other relevant institutions and media outlets to enhance communication around science with the public while also increasing public scientific literacy.
- Certified training could be provided in a wide range of topics, both on-the-job for those currently working in RCCE and for students who would like to join the profession. Topics where training is needed include infodemic management, the running of social listening/social media monitoring systems, health promotion, and risk communication and community engagement. Basic epidemiology and other key areas of public health should also be covered in order to ensure that RCCE experts are able to embed their work within a broader understanding of outbreaks. Such efforts would require commitment by the management of NIJZ, the Ministry of Health, the Ministry of Education, and Universities.

Next steps

ECDC suggests that the recommendations and actions proposed in this AAR be assessed, prioritised, and converted into an action plan to update the national preparedness and response plan as specified in Article 6 of EU Regulation (EU) 2022/2371 on Serious Cross-Border Threats to Health, along with any actions resulting from other relevant evaluations.

1. Introduction: context, objectives and methodology

1.1 Scope and objectives of the AAR

This AAR focused on three key response areas: vaccine deployment, Risk Communication and Community Engagement, and public health and social measures (which for the purposes of this review may be considered as an analogous term to non-pharmaceutical interventions (NPI)) implemented in community settings. The timeframe for this review was October 2020 through March 2021.

The general objectives of this AAR were to:

- provide an opportunity to share experiences and collectively analyse the response to COVID-19 in Slovenia by identifying issues, challenges and best practice;
- Propose short, mid- and long-term actions to be implemented to improve coordination and communication issues, address key preparedness gaps and strengthen Slovenia's preparedness and response.

1.2 Context: COVID-19 in Slovenia during the review period

This AAR focuses on a period of time (October 2020-March 2021), where there was documented 'pandemic fatigue' with PHSM, a fairly strict period of 'lockdown' including school closures, high case numbers, hospitalisations, and fatalities, and eventually approval and subsequent rollout of the first COVID-19 vaccines (Figures 1 and 2). During this period, availability of vaccines was very limited, and there was a need to develop priority groups for vaccination. In addition, the Alpha SARS-CoV-2 variant also emerged during this period.

Figure 1. **Slovenia: 14-day COVID-19 case and death notification rates. AAR review period is circled in red**
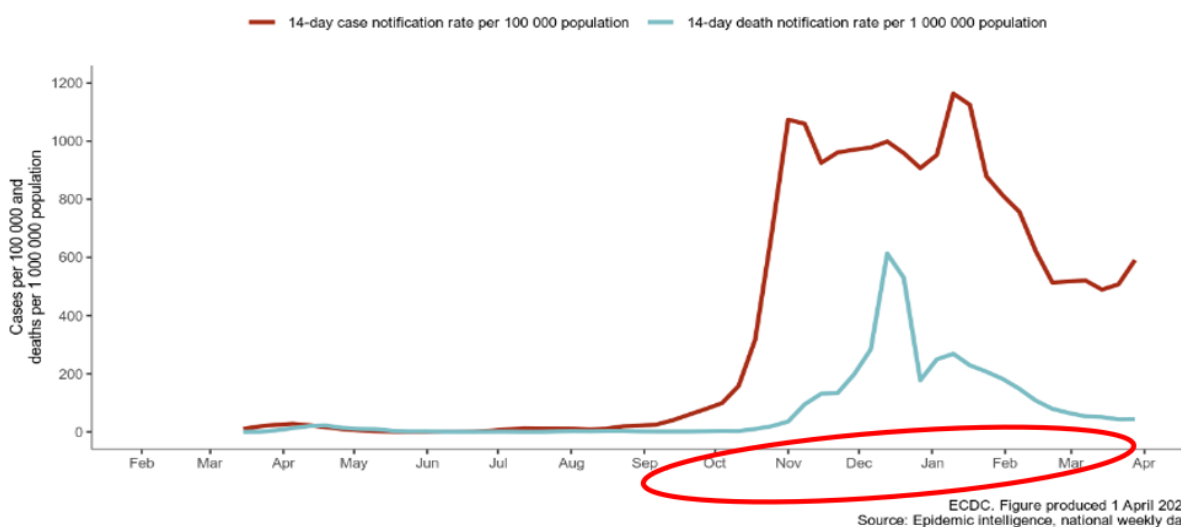
National totals as of 29 March 2021: 212 965 cases (earliest 2020-W10, latest 2021-W12), 4 311 deaths (2020-W12, 2021-W12)
Source: https://covid19-surveillance-report.ecdc.europa.eu/archive-COVID19-reports/

Figure 2. Selected Slovenian public health and social measures implemented during the AAR review period. Stay-at-home order, recommendations and social circles
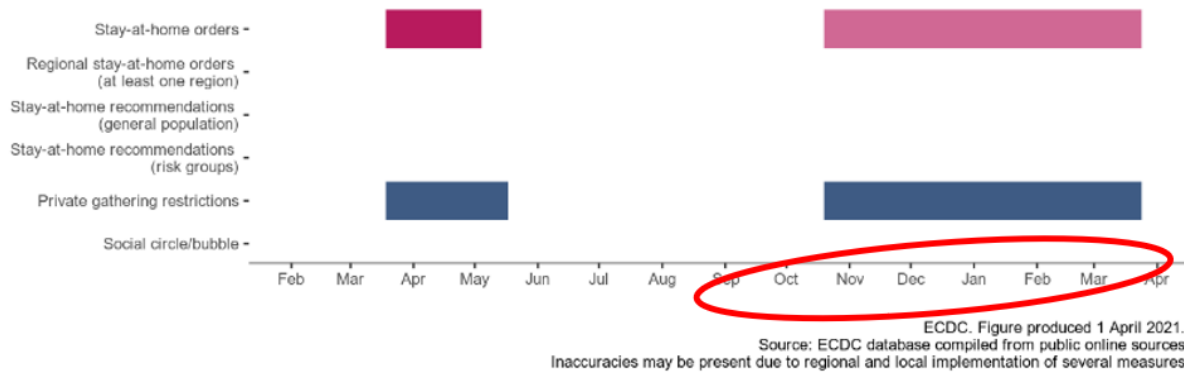
Source : https://covid19-surveillance-report.ecdc.europa.eu/archive-COVID19-reports/ as of 24 March, 2021. Lighter shade: partially-implemented measure.

Figure 3. Selected Slovenian public health and social measures implemented during the AAR review period: schools and workplaces
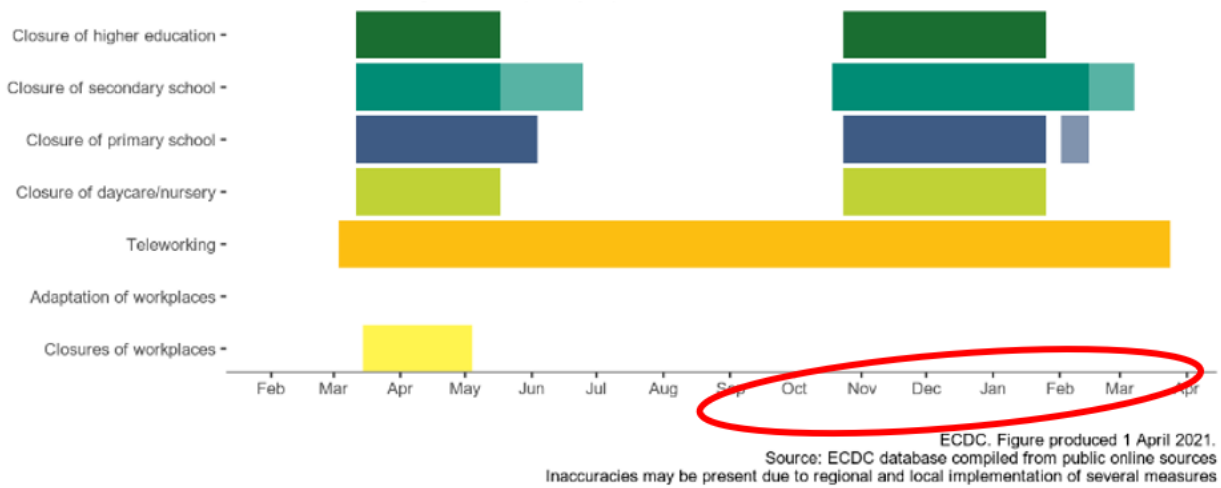
Source : https://covid19-surveillance-report.ecdc.europa.eu/archive-COVID19-reports/ as of 24 March, 2021. Lighter shade: partially implemented measure

Figure 4. Selected Slovenian public health and social measures implemented during the AAR review period: mass gathering restrictions
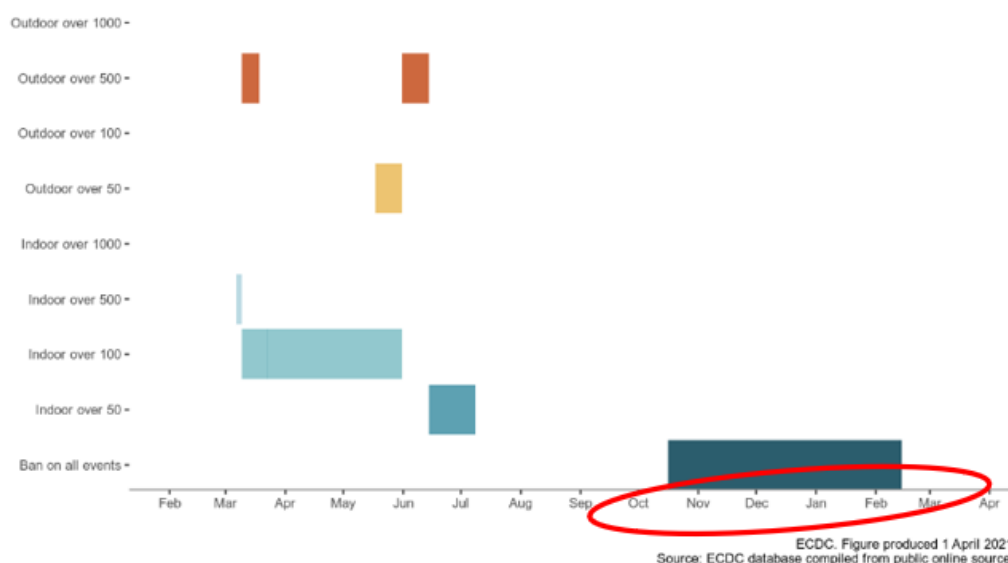
Source : https://covid19-surveillance-report.ecdc.europa.eu/archive-COVID19-reports/ as of 24 March, 2021. Lighter shade: partially implemented measure

1.3 AAR Methodology

This AAR workshop was participatory in design, involving the active input from all AAR participants (Table 1). The methodology was based upon prior ECDC and WHO guidance, and primarily the ECDC report on conducting AAR of the public health response to COVID-19. A first phase of the workshop was conducted in plenary, where all participants collectively re-constructed the timeline of key events during the review period. Thereafter, working groups, each covering one of the three highlighted response areas, plotted, sequentially, actions that happened in response to key events, followed by challenges ("pain points") and good practices that emerged in connection to specific actions. Thereafter, participants worked to identify and prioritise actions that could be undertaken to address specific pain points.

The findings from working groups were discussed in plenary format on multiple occasions, to ensure that cross-cutting issues were identified and addressed.

Annex 1 (AAR agenda) and Annex 2 (Results) present further details on the AAR workshop design and on how the timeline, actions, good practices, and challenges were identified.

Table 1. Summary of the AAR format

Date(s) of the AAR activity	19-21 September 2023
Location(s)	Ljubljana, Slovenia
Set-up	☒ Onsite
Participating institutions and entities	- NIJZ - Association of Principals and Assistant Principals of Slovenia - Ministry of Solidarity-based Future - Agency for Medicinal Products and Medical Devices of Slovenia - Community Health Centre Ljubljana - University Medical Centre Ljubljana - Government Communication Office - ECDC (facilitator) - WHO Euro (facilitator)
Total number of participants, facilitators and notetakers	30
Period covered by the review	October 2020 – March 2021
Response areas reviewed	☒ Risk communication, community engagement, and infodemic management ☒ COVID-19 vaccination ☒ Public health and social measures

2. Findings

2.1 Public health and social measures

The COVID-19 pandemic led to incredibly wide-ranging and costly implementation of PHSMs globally. Until vaccines became more widely available, PHSMs were the primary public health response measure. However, at the time of their implementation, there was little available evidence on their effectiveness at reducing transmission of SARS-CoV-2, nor their longer-term effects on the general wellbeing of the population. During the time frame of the AAR, there were several PHSM implemented, including a strict period of 'lockdown' which included school closures. This was in a period of high case notification rates, hospitalisations and deaths.

Key challenges

Key challenges that were identified relating to PHSM in Slovenia included:

- Due to a lack of established outbreak related operational research protocols it was not possible to adequately assess the effectiveness of NPI/PHSMs leading to challenges in evidence-based decision making.
- Negative effects for staff and students as a result of school closures for a prolonged time.
- Decisions sometimes made with limited evidence and at times without the input from scientific and social science experts, which compromised public acceptance of PHSMs.
- Due to lack of workforce capacity and clearly defined roles and responsibilities, individuals were placed under pressure during the pandemic for their roles in decision making,
- it was not always clear in what context/situations contact tracing should be performed (or not) and by whom, and how data should be optimally collected. The digitisation of contact tracing/linkage with epidemiological data from hospitals was also an issue.
- Existing legislation for pandemics did not provide enough clarity on roles and responsibilities, and no formal court procedures were in place making it harder to make decisions that have an impact/effect.
- Understaffing and insufficient workforce capacity led to high pressure placed on specific functions to handle the tasks at hand, and to overburdening of some staff functions.

Best practice

During the COVID-19 pandemic, many best practices were identified in Slovenia that stemmed from the ever-changing situation. These included: rapid changes in legislation to allow for response; implementation of a contact tracing monitoring system that adapted the tracing approach and supported prioritisation of risk groups; establishment of a taskforce that despite the added workload brought about positive changes; good intersectoral communication regarding measures (including in schools etc); use of a monitoring system within kindergarten/school settings and staff testing; recommendations on learning, masks, evaluation, mental health and pedagogical guidelines; more organised workload; less unnecessary transfers of patients to hospital; safer working conditions for staff and; a more precautionary approach adopted for the reopening of society to minimise any negative consequences.

Proposed actions to address issues

To address the challenges raised above, several actions were proposed.

- For challenges in evidence-based decision making, outbreak related operational research protocols should be established and active participation in pan-European projects that are focused on assessing the effectiveness of PHSMs should be considered; such evidence would increase governmental support for implementation of PHSM in future public health emergencies.
- For coordination of schools, relevant stakeholders should be included in the decision-making process and bridge the gap between public health and schools. There should also be a risk assessment method established so risk to staff and students can be determined and, for example, allow schools to remain open for as long as possible during public health emergencies.
- For guidance to the public on PHSM particularly when there is not a readily available and robust published evidence-base, a mechanism could be generated for the timely provision of technical guidance by NIJZ and include evidence-based decision-making processes with clearly defined roles for NIJZ and decision makers.
- , Ensuring that there is clarity of institutional roles in evidence-based decision making to mitigate for individuals who were placed under pressure during the pandemic for their personal roles in decision making. Pan governmental support for the role of NIJZ to ensure better integration of public health evidence into national crisis response.

- For digitisation of contact tracing/linkage with epidemiological data from hospitals and role of contact tracing, integrated digitalisation of infectious disease surveillance at NIJZ across all diseases, hospital capacity data should be readily available to inform PHSM decisions in future public health emergencies, clarity on situations and contexts where contact tracing should be emphasised, attention to data should be reflected in pandemic preparedness plans, and there should be EU technical guidance on implementation of contact tracing during pandemics.
- For legislation ready for pandemics, there should be formal revision for national pandemic preparedness plans, superior court procedures linked to revise pandemic preparedness plans, communication with the ombudsman and an Information Act. Such legislation will ensure decisions made will be effective/impactful and provide clarity on decision-making roles and responsibilities,
- there is need to improve workforce capacity (human resources, digital contact tracing and surge capacity) to address the issue of understaffing which leads to high pressure on specific functions. This is necessary to be more resilient to public health emergencies and reduce pressure on individual staff members, as well as identify appropriate tasks and responsibilities for delegation.

Public health and social measures is a wide-ranging and complicated topic with more than one PHSM often being implemented concurrently during the pandemic. This provided its own challenge during the AAR in Slovenia as it is difficult to delve deep into specific measures and their relative impact during a short time frame. Nevertheless, the challenges, best practices and proposed actions discussed are of relevance as were brought out during the discussions.

2.2 Vaccine deployment

The autumn of 2020 was characterised by intense planning for the coming authorisation of COVID-19 vaccines. The first COVID-19 vaccine received conditional market authorisation by the European Commission on 21 December 2020 (Comirnaty by BioNTech/Pfizer), followed shortly by Spikevax by Moderna on 6 January 2021. The first vaccine doses were delivered to EU countries within days after authorisation, for a vaccine rollout starting at the end of 2020. The initial limited number of doses forced countries to develop strategies for priority groups for vaccination. This was also a period of intense planning for mass vaccination once vaccines became increasingly available.

Key challenges

Key challenges in terms of vaccine deployment in Slovenia include a lack of previous planning for such vaccine rollout, especially in terms of national storage facilities, mass vaccination centres and of information flow. In the early phases of vaccine rollout, there was no harmonised national IT-system for booking appointments to get vaccinated. Workshop participants reported that there was some political interference in the vaccination strategy work and subsequent implementation, especially in terms of deciding on priority groups. The role of health inspectors was also mentioned as a challenge in the initial phases of vaccine rollout. The frequent changes in the national vaccination strategy created additional administrative burden and confusion for health practitioners and the presence of health inspectors added to this burden and the feeling of being constantly audited. The lack of flexibility in the role of health inspectors also caused vaccine doses to go to waste, since there was no official system or plan in place for how to deal with vaccine doses left at the end of the day. In Slovenia, as in many other countries, there was also a lack of human resources in the medical field, and in some cases difficulties in repurposing medical staff to other positions where they would be more needed.

Best practice

Vaccine promotion started before the COVID-19 vaccines became authorised and available, in order to create a strong base for the coming vaccine rollout. In addition to regular information meetings organised by the Medical Chamber for healthcare workers and the medical society, there was a regularly updated website on Q&As on vaccination and spokespersons for vaccines on several levels, such as media appearances and media campaigns. This left very little room for the anti-vaccination movement in the beginning of the rollout. The use of the existing national vaccination registry, eRCO, was increased and improved during the pandemic and there was also a website on current vaccine coverage to highlight the progress of the rollout.

Proposed actions to address issues

The main proposed action is to draft a pandemic preparedness plan for vaccine deployment. This should include planning for human resources (how to involve healthcare and medical students, how to repurpose staff during need for surge capacity etc) and defined roles, tasks, and procedures for mass vaccine deployment. This preparedness plan should thereafter be regularly tested, through simulation exercises. Another proposed action is to update and upgrade the functionality of already existing applications for both booking and registration of vaccinations. The role of health inspectors can be improved by reassessing their role in case of a pandemic and have regular meetings between these and the health care providers, to harmonize working plans and expectations of their respective roles. Another important action is to strengthen and define more explicitly the public health leadership role and the independency of the NIJZ, in order to increase the public trust in the agency, and for reducing the opportunity for future political interference in the vaccination strategy and implementation process.

2.3 Risk communication and community engagement

The timeframe for the AAR covered a critical period of transition in Slovenia as elsewhere in the world. RCCE efforts were required to shift from supporting the implementation of PHSMs at a time when widespread pandemic fatigue was emerging to, additionally, preparing the population for the rollout of the national vaccination programme, and trying to manage expectations about the potential impact of the vaccine.

Key challenges

One of the main challenges for the RCCE team was the continuously changing epidemiological and social landscape, which meant that activities had to be constantly amended to address new circumstances. Further, it was difficult for RCCE colleagues to stay up to date with the ever-expanding scientific knowledge base of all aspects of COVID-19 – what was 'known' one month was not always so clear the following month – and to ensure that relevant new areas of knowledge, along with any accompanying uncertainty, were communicated effectively to the public. This issue was further complicated by the infodemic, with widespread dissemination of mis- and disinformation about both the PHSMs and the vaccine.

Internally, it was reported that the number of staff assigned to work on RCCE at the national level was too small to deal with the very high workload during this uniquely challenging period, and this took a toll on the people involved, both professionally and personally. There was reportedly also an unclear chain of command which meant that instructions were not always clear or easy to follow.

Best practice

RCCE staff were commendably committed to their difficult task during this time, and people reportedly worked over and above what might have been reasonably expected. However, this is not sustainable 'best practice', and questions could be asked about the extent to which staff might be able to rise to the occasion once again in the event of another comparable public health emergency. This points to a staffing challenge that requires attention.

Proposed actions to address issues

The following actions were proposed as a way of addressing some of the issues raised:

- In order to ensure clear and defined ways of structuring the RCCE response to future public health emergencies, it is suggested that the RCCE plan be placed within the national general preparedness plan, as per the EU Regulation (EU) 2022/2371 on Serious Cross-Border Threats.
- As a means of ensuring the efficient production of RCCE materials, and thereby optimising communication with the public, crisis communication activities should be embedded within the developing NIJZ Emergency Operations Centre. This is already an ongoing process, but additional support and leadership from NIJZ and the Ministry of Health may be needed to move it forward effectively.
- Enhancing the capacity of public health and medical experts in communicating on scientific topics to the general public, while also increasing public scientific literacy, could be accomplished through using existing networks and Memoranda of Understanding between NIJZ and other relevant institutions (such as Jožef Štefan Institute and the Chemical Institute). Experts could be supported and trained in the technical production of materials that could be used in social media. It would also be important for RCCE colleagues to engage with known and trusted journalists in the media to produce TV and radio shows that are scientifically educational and accessible to the public, but that do not use too much scientific jargon.
- Risk communicators require training in infodemic management and the running of social listening/social media monitoring systems. Such on-the-job training should be seen as an essential element in the professional development of these experts, and it should receive the explicit support of management. This could be given by including it in individual annual work plans. Financial support should also be provided to facilitate the acquisition and use of relevant software for social listening/social media monitoring.

- With limited human resources in the field of RCCE in Slovenia, certified training could be provided by NIJZ, in collaboration with other experts and faculties, on the topic of health promotion, risk communication and community engagement. RCCE experts should also be given the opportunity to take courses in basic epidemiology and other key areas of public health, while similar opportunities should be provided for public health trainees and professionals to learn about RCCE. Such efforts would require commitment by the management of NIJZ, the Ministry of Health, the Ministry of Education and Universities, but it was suggested that such an initiative should be led by NIJZ, who would produce a roadmap and engage all the relevant stakeholders.

3. Conclusions and next steps

The findings of this review (see Section 2 for more detailed information) offer a tangible basis for improving and strengthening preparedness and response in relation to the three response areas reviewed: PHSM, vaccine deployment and RCCE. Aside from the specific findings per response area, certain cross-cutting issues were highlighted during the AAR which also deserve attention.

The first issue relates to the overall governance of preparedness and response for pandemics and major infectious disease outbreaks. Many participants noted that further work to clarify roles and responsibilities across different institutes as well as ensure the scientific independence of NIJZ could support the agency in the response to future health crises. One tangible way that this could happen would be to ensure that the crisis management structures within the country are clearly delineated in updated pandemic preparedness plans.

A second issue that was repeated consistently throughout the workshop concerned the public trust in science and in the work of NIJZ. A concerted and probably longer-term activity should focus on reestablishing the perceived credibility of NIJZ through revising and formalising a communication and community outreach strategy.

Finally, the third issue related to the overall workforce capacity in Slovenia. In all areas assessed in this AAR, the lack of availability of trained staff was highlighted as a key limitation facing the ability of NIJZ to mount an effective response to COVID-19. Planning to ensure that surge capacities are optimised for future large-scale crises may assist during major events, while work to map and prioritise the staffing needs of NIJZ should be undertaken as a matter of some urgency.

ECDC suggests that the recommendations and actions proposed in this AAR be assessed, prioritised, and converted into an action plan to update the national preparedness and response plan as specified in Article 6 of EU Regulation (EU) 2022/2371 on Serious Cross-Border Threats to Health along with any actions resulting from other relevant evaluations.

Annex 1. After-action review agenda.

Date	Activities
Monday Sep 18 – Arrival	
15:30 Hotel Union Ljubljana	ECDC AAR team meets with the Slovenian team and views the venue in advance of the workshop.
Tuesday Sep 19 – Workshop "AAR: NPIs, vaccination deployment, risk communication and community engagement"	
8:30 – 9:00	Arrival and registration of participants
9:00 – 10:00 Hotel Union Plenary English	**Session 1: Introduction of project, presentation, and briefing** Presentation of the teams and organisational structure Welcome (10 min.) – Slovenian team Brief round of introduction: participants introduce themselves and which organisation/department they represent, and main activities performed during the timeframe (20 min.) Background to AARs. Introduction of project with scope of the AAR, the response areas being covered and the chosen timeframe. Brief discussion of the rationale behind the timeframe selection and the comprehensive perspective it offers in the continuum of the areas. (15 min.) – ECDC and WHO Europe An overview of the methodology and explanation of the expected outputs from the AAR. Information about the use of native language and the role of note takers (15 min.) – ECDC
10:00 – 10:30	**Coffee break**
10:30 – 12:30 Plenary English (small group discussions in Slovenian if necessary)	**Session 2: "What happened?"** In this session we plan to discuss a preliminary timeline of key events and actions related to technical decisions regarding the use of NPIs, vaccination strategies and the risk communication related to both. The chosen period represents a transitory phase of the pandemic, thus allowing to focus on the connections between the different areas in terms of communication and mutual influence. The aim is to the recognise, through interaction and exchange in plenary format, significant events and activities from the COVID-19 response. Best practices, gaps, and lessons learned can be identified. Participants will freely express opinions and discuss relevant events that happened, adding them to an unstructured timeline before gradually coming to a consensus. This interactive approach also allows participants to understand each other's roles and responsibilities.
12:30 – 13:30	Lunch break
13:30 – 15.30 Working groups English (discussions in Slovenian if necessary)	**Session 3: "What actions were taken in response?"** Following the same approach, participants will map activities that were put in place in response to an event or that triggered an event on the timeline. The purpose of the session is not to identify 'mistakes' or 'positive decisions', but rather to comprehend the factors that shaped the course of the COVID-19 response.
15:30-16:00 Plenary English	**Summary of Day 1**
Wednesday Sep 20 – workshop "learnings"	
8:30 – 9:00	Arrival and registration of participants
9:00 – 9:15 Plenary English	**Recap of Day 1 and overview of Day 2**
9:15 – 11:00 Working groups (with coffee) English/Slovenian (internal discussions)	**Session 4: "What went well and what was challenging?"** In this session, participants will focus upon challenges during the COVID-19 response, as well as aspects that went well. The identified issues will be placed in relation to the events and/or activities that had been mapped and then will be scored. Participants will map each issue on a 'pain point' matrix, focusing on feasibility and potential benefits of the intervention. The main issues to address are the ones that, once resolved, would significantly enhance the effectiveness of public health emergency preparedness and response, rather than leaving them as persistent challenges.
11:00 – 12:00 Working groups English	**Session 5: Prioritisation and corrective actions. "What can be done to change?"** In this session, areas that require immediate attention as well as those necessitating longer-term strategic implementations should also be identified. The criteria should include: - actions that would pose challenges in implementing a timely and effective COVID-19 response in the country - actions that would have a high impact in enhancing preparedness and response capacities generating sustainable results - activities that would be feasible in the current context at increasing capacities and capabilities The aim is to collect useful information and data to consolidate successful solutions and planning actions.
12:00 – 13:00	**Lunch break**

Date	Activities
13:00 − 14:00 Working groups English (small group discussions in Slovenian)	**Session 5: Continued** Finalisation of one-page reporting templates
14:00-16:00 Plenary English	**Session 6: Plenary feedback of working groups on corrective actions** Groups share their findings to the other groups and have the opportunity to discuss together at length, also exploring cross-referencing and commonalities across the response areas reviewed.
16:00 − 16:30 Plenary English	**Session 7: Towards an action plan** The aim is to summarise the findings on the best practices/success factors, main issues identified, and lessons learnt. Moreover, this is also an opportunity to reflect on the workshop itself. Agreement on the next steps and proposal of a one-page reporting and roadmap, including issues, possible actions, objectives and strategies to increase feasibility and implementation time, will be discussed.
Thursday Sep 21 – debrief and follow-up interviews	
09:00-10:00	If needed: potential follow-up interviews with specific personnel/teams
10.00 − 10.30	**Coffee break**
10:30 − 12:00 Plenary English	**Session 8: Plenary Debriefing** AAR facilitators to review preliminary findings to all interested parties, verify and validate the findings, and review agreements for next steps, including the writing process for the final report.
12.00 − 13.00	Lunch and departures

List of participants

GROUP	FACILITATORS	PARTICIPANTS
PHSM/NPIs	Jonathan Suk Favelle Lamb	Polonca Truden Dobrin Gregor Pečan Klavdija Kobal Štraus Nina Pirnat Nuška Čakš Jager*
Vaccination deployment	Kim Brolin Jussi Sane	Staša Javornik Sabina Zalar Alenka Trop Skaza Zoran Simonović Simona Repar Bornšek Mateja Logar*
Risk communication and community engagement	John Kinsman	Nadja Cirar Katja Turk Samo Belavič Pušnik Urška Štorman Mario Fafangel*

Milen Krek and Marta Grgič Vitek were interviewed separately but did not participate in the group discussions.

Tjaša Bertole, Tara Ledinek, Mihaela Tornar, Urška Rojko and Matic Hribernik were note-takers.

Klemen Petek joined as an observer.

Sanja Vuzem coordinated the AAR from the Slovenian side.

Annex 2. Results

During the AAR workshop, participants collectively re-constructed the timeline of key events during the review period. Thereafter, working groups, each covering one of the three highlighted response areas, plotted, sequentially, actions that happened in response to key events, followed by challenges ('pain points') and good practice that emerged in connection to specific actions. Thereafter, participants worked to identify and prioritise actions that could be undertaken to address specific pain points. This Annex presents examples of how the process led to the findings presented in Section 2.

Timeline of events and actions that responded to these events

Establishing a commonly understood timeline of key events, with an emphasis on the significance of the event, was the first stage of the AAR process. Here, in plenary format, all participants filled in the light yellow 'sticky pads' based upon their own recollections. After all participants had the opportunity to post their key events, plenary discussion grouped together common themes and organised the events according to an approximate timeline.

Thereafter, three parallel working groups, one for PHSM, one for vaccine deployment, and one for risk communication and community engagement, plotted out the actions that were implemented in response to selected key events. An amalgamated timeline is presented in Figures A1, A2, and A3, where light yellow squares represent the main set of key events presented in plenary, and then dark yellow (PHSM), green (RCCE) and blue (vaccine deployment) squares represent response actions related to these response pillars.

Figure A1. Timeline of events and responses, October – November 2020. Light yellow= main events relevant to the prioritised areas;
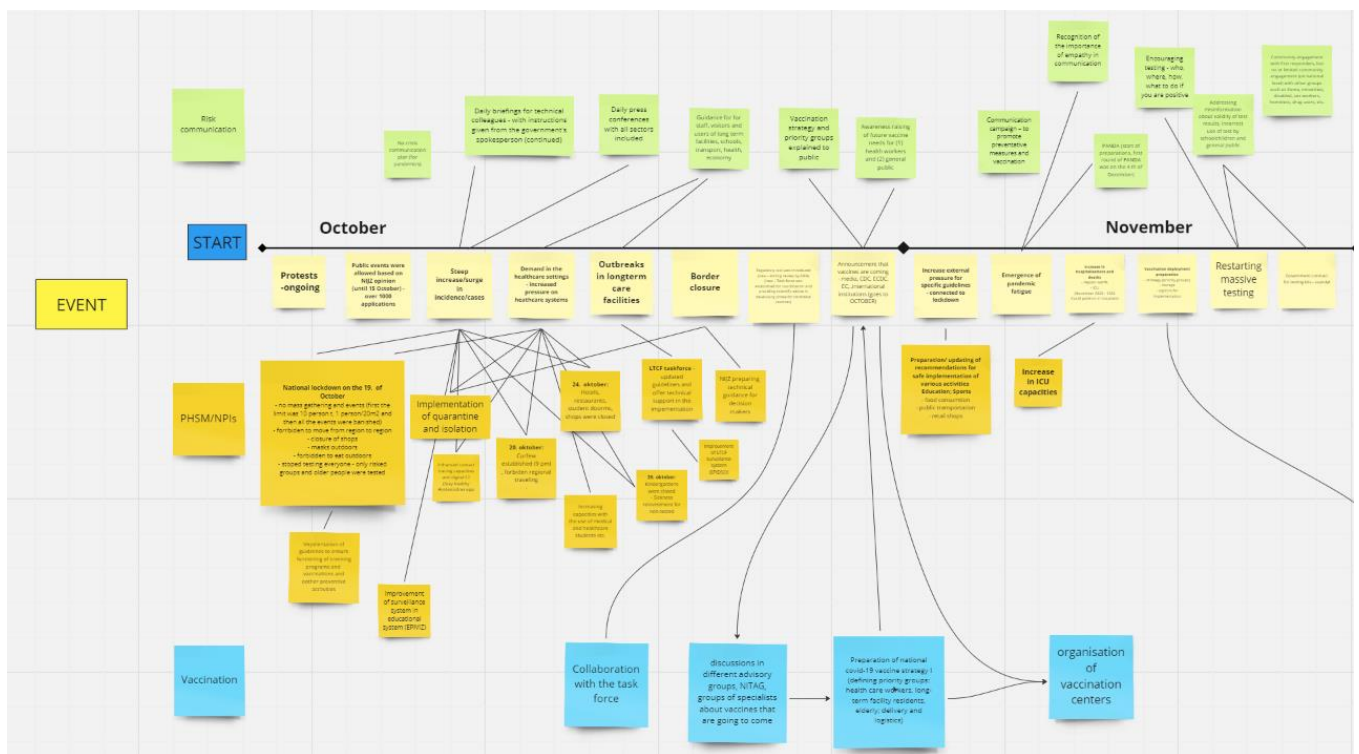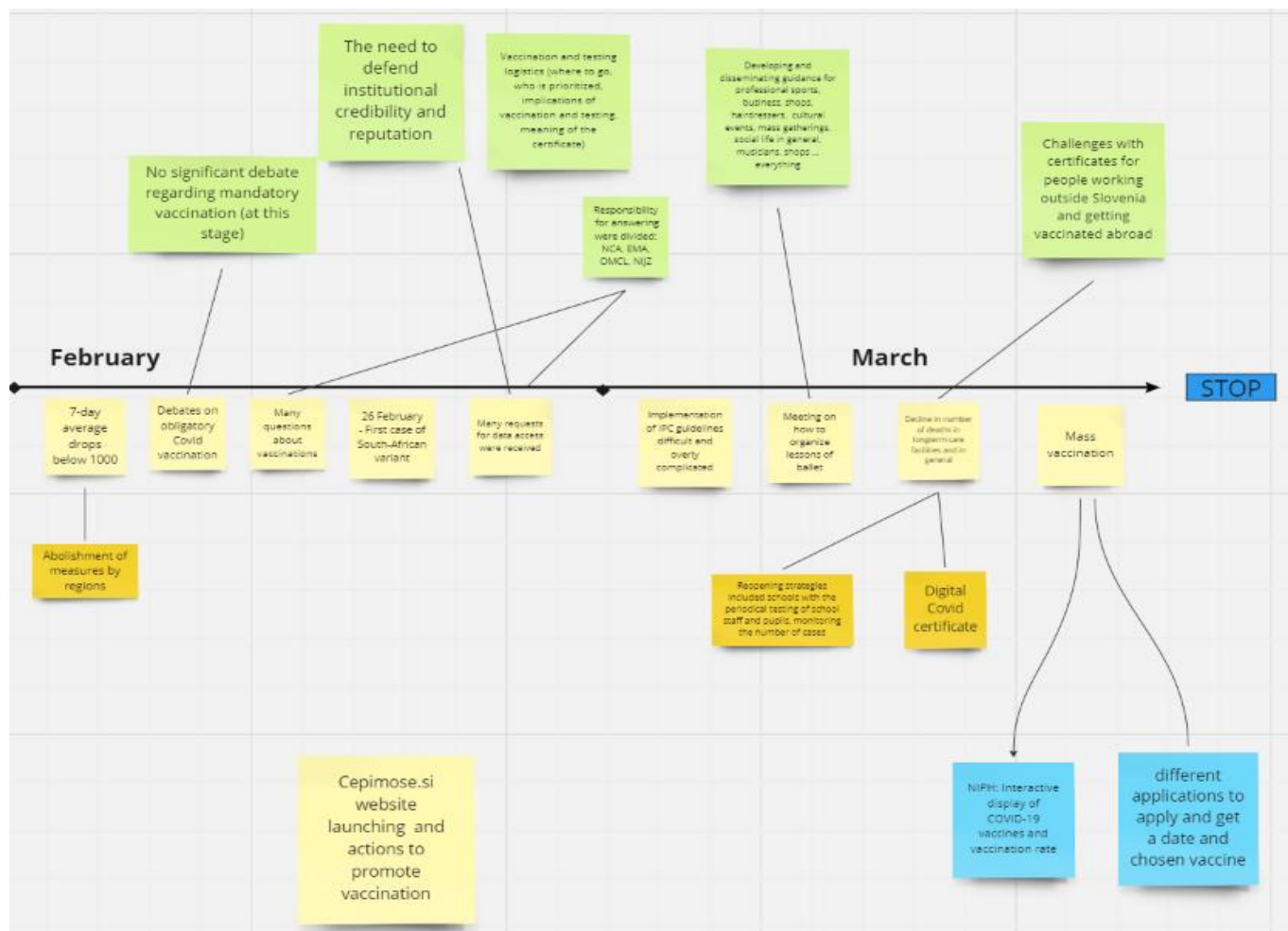

Dark yellow= actions that were put in place in response to an event related to PHSM; Green= actions that were put in place in response to an event related to risk communication; Blue= actions that were put in place in response to an event related to vaccine deployment

Figure A2. Timeline of events and responses, December 2020-January 2021.
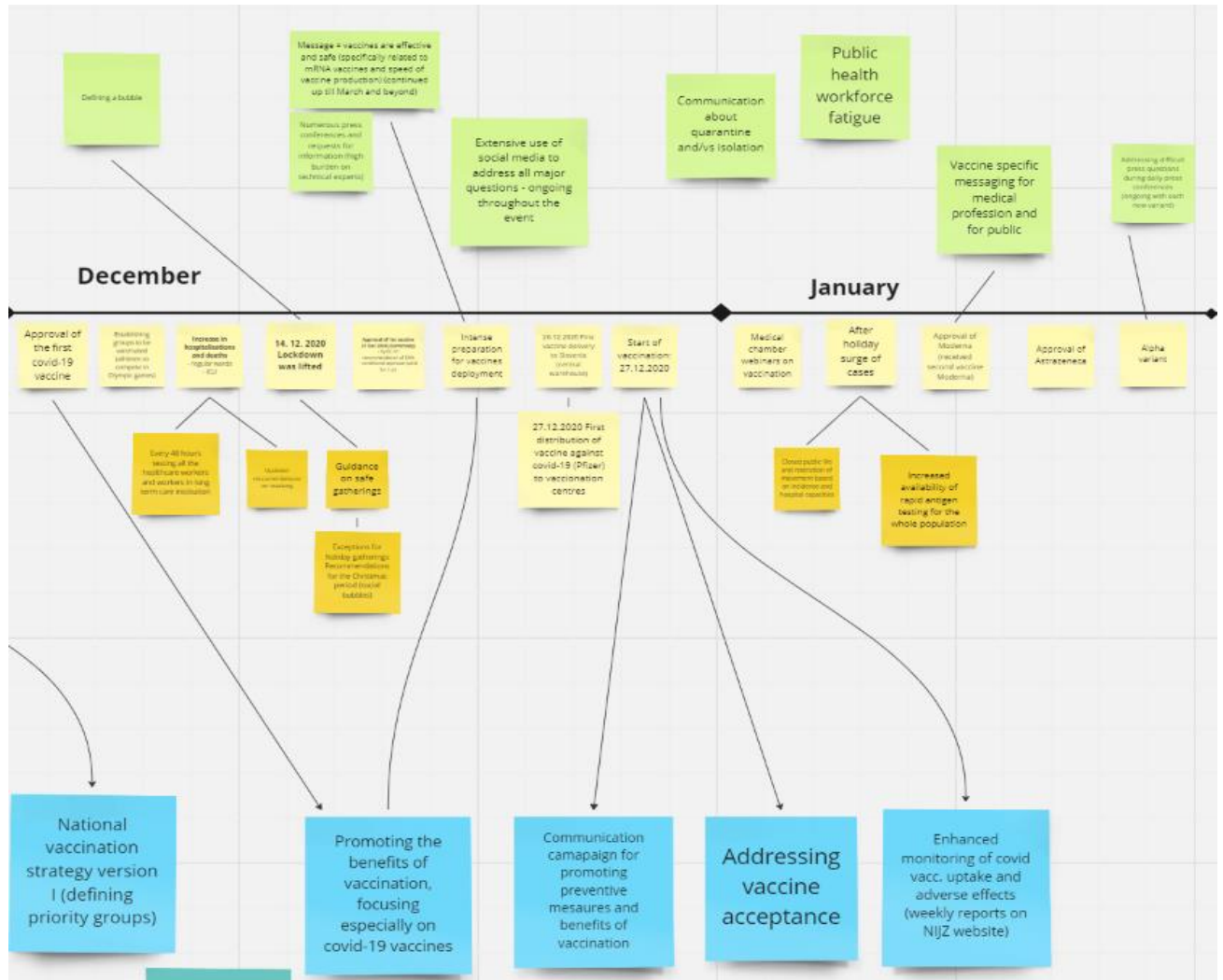
Light yellow= main events relevant to the prioritised areas; Dark yellow= actions that were put in place in response to an event related to PHSM; Green= actions that were put in place in response to an event related to risk communication; Blue= actions that were put in place in response to an event related to vaccine deployment

**Figure A3. Timeline of events and responses, February 2021 – March 2021**

Light yellow= main events relevant to the prioritised areas; Dark yellow= actions that were put in place in response to an event related to PHSM; Green= actions that were put in place in response to an event related to risk communication; Blue= actions that were put in place in response to an event related to vaccine deployment

Pain points

In the next phase of the workshop, working groups, according to the three response areas, identified key challenges, or 'pain points' that were linked to specific response activities. These pain points were then voted on according to the overall impact they had on the COVID-19 response. Each participant received five votes (in the form of red circular stickers) they could allocate as they felt to be most appropriate (e.g. all votes on one pain point, or distributing votes across multiple pain points). Figure A4 visualises this process for the vaccination deployment working group.

Figure A4. Identification of pain points by the working group on vaccination deployment.
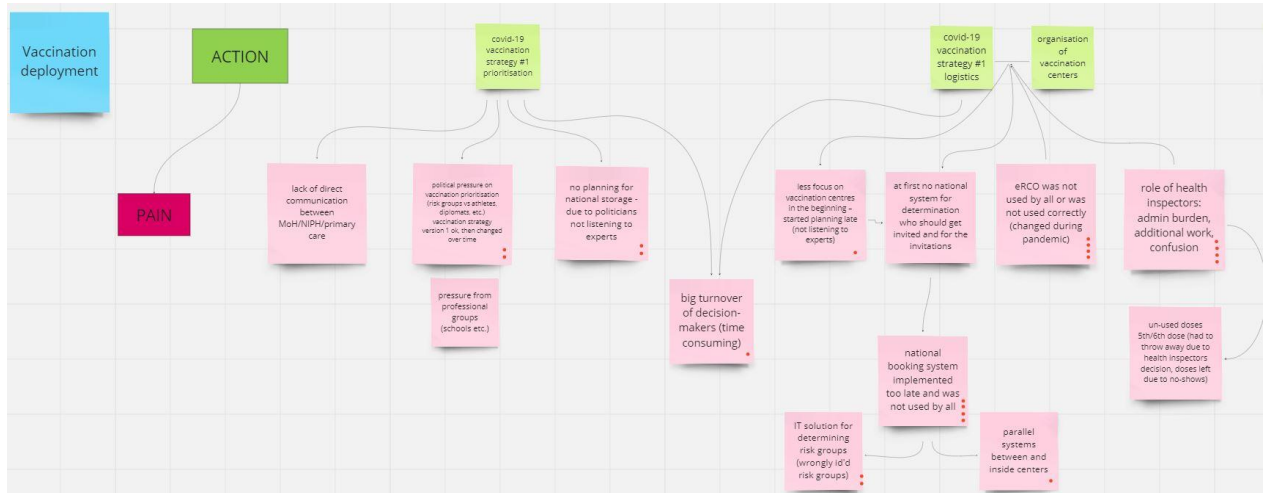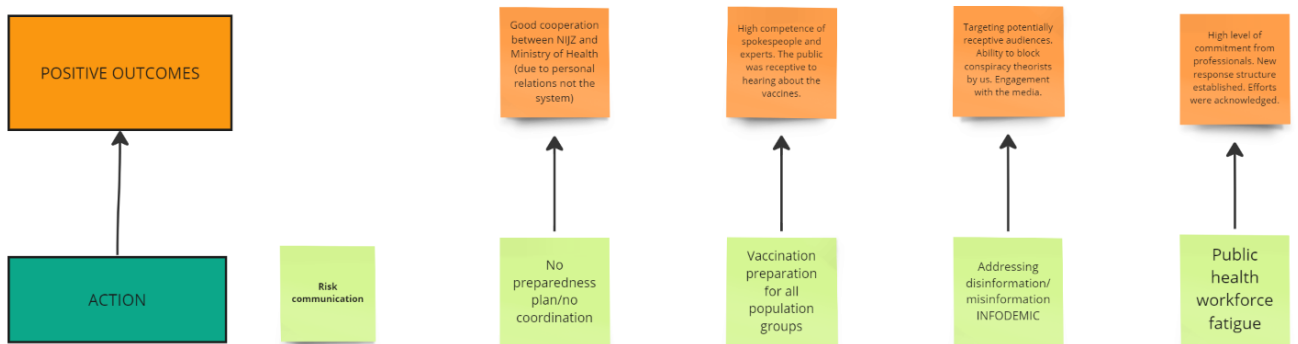

Green= actions that were put in place in response to an event related to vaccine deployment; Pink= pain points identified in relation to an activity that didn't go as planned; Red dots= scoring of the most relevant issues

Best practice

In addition to identifying pain points, participants were also asked in working groups to identify best practices that emerged during the public health response, in order to ensure that these can be documented and, where relevant, safeguarded or incorporated into regular response activities or processes. Figure A5 demonstrates this process from the RCCE working group.

Figure A5. Identification of best practice by the RCCE working group.

Best practices identified from the RCCE working group. Green= actions that were put in place in response to an event related to risk communication; Orange= good practices identified in relation to the main activities

Working group conclusions: RCCE

Timing	Issue (pain point)	Proposed action to address this issue	Objectives of the proposed action	How to assure implementation of this action, and/or to increase feasibility?
For short-term implementation (1-2 years)	Lack of clear instructions or chain of command.	Preparing the risk communication and community engagement (RCCE) plan within the national general preparedness plan according to the European law (regulation on Serious Cross Border Threats to Health).	To ensure clear and defined (SMART) ways of structuring the response to public health emergency by the end of 2024.	Intersectoral coordination under the umbrella of the Ministry of Health.
	Continuous need to produce updated materials for risk communication during a public health emergency.	To embed the crisis communication activities within the developing NIJZ emergency operations centre.	-To facilitate more efficient production of materials and therefore optimise communication with public. -To facilitate production of different types of materials for different types of channels.	Ongoing, but additional support and leadership from NIJZ and Ministry of Health may be needed.
	-Challenges in communicating scientific uncertainties to the public (applies to short-, mid- and long-term implementation).	-NIJZ with other institutions (Jožef Štefan Institute, Chemical institute) to support experts to engage with the social media through graphic materials, technical production training. Identifying key messages, target audiences, channels. -Engaging with the media (Ugriznimo v znanost - TV Show, radio show). To produce shows that are educational and accessible to the public (without too much jargon).	-To enhance the capacity of public health and medical experts learning to communicate about science with the public. -To increase public scientific literacy.	-Leveraging existing collaborations and MOUs between NIJZ and other relevant institutions. -Working with known and trusted journalists.
	-Infodemics, disinformation, misinformation and AI (applies to short-, mid- and long-term).	-Training for risk communicators in infodemic management. -Facilities for social listening and social media monitoring.	-To enhance the capacity to cope with infodemics, etc.	-Managers to understand the importance of this topic and support on-the-job training. -Include this training in individual annual work plans. -Financial support for accessing relevant software, etc.
For mid-term implementation (2 - 5 years)	24/7 action required, too few staff.	-Certified training by NIJZ in collaboration with other experts and faculties on the topic of health promotion, risk communication and community engagement (also to include basic epidemiology). -Periodical training in public health for risk communicators. Opportunities for public health trainees and professionals to learn about RCCE	To produce more people who are qualified to deal with risk communication and community engagement during a public health emergency.	Commitment by the management of NIJZ, Ministry of Health, Ministry of Higher Education and the Universities. NIJZ initiates the process, produces a plan and engages all relevant stakeholders. Each stakeholder needs to be committed to the plan.
For long-term implementation (5 - 10 years)		-	-	-

Working group conclusions: vaccine deployment

Timing	Issue (pain point)	Proposed action to address this issue	Objectives of the proposed action	How to assure implementation of this action, and/or to increase feasibility?
For short-term implementation	1. Lack of human resources (regular workforce and surge capacity)	- Draft and test preparedness plans on surge capacity (plan to involve healthcare and medical students, broader public health work force)	- Strong and agile workforce	- Political will - Advocacy, awareness - Wider dissemination of AAR report - Sustainable funding
	2. Role of health inspectors during initial implementation of pandemic vaccination	- Reassess their role in case of pandemic	- Make sure to reduce unnecessary burden of health care personnel -Harmonise yearly working plans	- Regular meetings - one per year - Providing information (both ways)
	3.	-	-	-
For mid-term implementation	1. Proper planning of epidemic vaccination strategy	- Pandemic preparedness vaccination plan and regular testing of this plan	- Defined roles, defined risk groups, faster response, faster implementation of vaccination	- Commitment, resources, internal motivation for developing and testing of plans
	2. IT solutions for booking, registration vaccination	- To update and upgrade functionality of already existing app	- More timely, efficient system	- Advocacy, high-level support - Sustainable funding - Promote benefits
	3. Importance of data visualisation on vaccine coverage	- **A**dding vaccine coverage of different vaccines on the dashboard	- To maintain the system -Increase digitalisation of routinely collected data	- Dedicated human resources (data scientists)
For long-term implementation	1. Lack of human resources (regular workforce and surge capacity)	- Attract more students in healthcare field - Review and revise legislation (repurposing of existing workforce in future pandemics)	- Strong and agile workforce	- Political will - Advocacy, awareness - Wider dissemination of AAR report - Sustainable funding
	2. Political interference in vaccination implementation and strategy process	-Strengthen the leadership integrity and independence of NIPH (legislation?)	- Increase independence, professionalism - Increase trust - Information campaigns on NIPH mandate in peaceful times - Governmental promotion of NIPH importance	- Political will - Advocacy, awareness - Wider dissemination of AAR report

Working group conclusions: PHSM

Timing	Issue (pain point)	Proposed action to address this issue	Objectives of the proposed action	How to assure implementation of this action, and/or to increase feasibility?
For short-term implementation	Challenges in evidence-based decision-making	• Establish outbreak related operational research protocols and join pan-European projects focused on assessing effectiveness of NPI/PHSMs implemented during the COVID-19 pandemic	• Increase the evidence base on NPI/PHSMs • Increase governmental support for implementation of NPI/PHSMs in future pandemics and major health crises	• Commit to continued learning from the COVID-19 pandemic • Enable staff time to participate in EU research networks and projects • Follow current and upcoming guidance from ECDC and WHO on NPI/PHSM
	Coordination of schools	• Inclusion of relevant stakeholders in coordination and decision-making processes bridging public health and schools • Establish risk assessment methods to address risks to staff and students	• Schools continue to be open as long as possible during respiratory outbreaks/pandemics • To lessen the burden of NPI/PHSMs for children according to the risk assessment	• Memorandum of understanding (MoU) or other mechanisms for enhanced coordination of Ministry of Health (MoH) and Ministry for Education • Pandemic preparedness plans consider school closures explicitly
For mid-term implementation	Guidance on wearing masks outdoors, even if alone, compromised public acceptance of NPI/PHSMs	• Generate mechanisms for the timely provision of technical guidance by NIJZ • Evidence based decision making processes with clarity of role for NIJZ	• Timely production of technical guidance in future crises to mitigate political debate • Stronger utilisation and impact of scientific and social science evidence in decision-making • Improved trust in recommended NPI/PHSM measures	• Streamlined processes for the timely production of technical guidance • Scientific and political debate of obligatory NPIs and appropriate legislation to clarify decision-making roles and responsibilities
	Individuals were placed under pressure during the pandemic for their personal roles in decision-making	• Clarity of institutional roles in decision making • Pan-governmental support for the role of NIJZ	• Staff empowered to advocate for evidence-based decisions • Better integration of public health evidence into national crisis response	• Cooperation with MoH • Inclusion of all stakeholders • Legal support for the independence of the agency
	Digitalisation of contact tracing/linkage EPI hospital data and role of contact tracing EPI.	• Integrated digitalisation of infectious disease surveillance at NIJZ across all diseases • Hospital capacity data readily available to inform NPI/PHSM decisions for future health crises • EU technical guidance on implementation of CT during pandemics	• Explicit attention to data in revised pandemic preparedness plans • Clarity on situations and contexts where CT should and should not be emphasised in response strategies • EU level exchange of data and best practices	• Political will: prioritisation of resources is possible if the perceived need is high • Identify role of CT in pandemic preparedness plans at different pandemic phases • Clarify plans in advance for scaling up CT if necessary across all relevant stakeholders

Timing	Issue (pain point)	Proposed action to address this issue	Objectives of the proposed action	How to assure implementation of this action, and/or to increase feasibility?
For long-term implementation	Laws ready for pandemics (superior court and legislation).	• Formal revision for national pandemic preparedness plans • Superior court procedures linked to revise pandemic plans • Communications with the ombudsman • Information act	• Better chance that decisions actually have an effect/impact • Clarify of decision-making roles and responsibilities	• Cooperation with MoH • Inclusion of all stakeholders • Routine simulation exercises to test specific aspect of revised national pandemic preparedness plan
	Understaffing led to high pressure on specific functions	• Improve human resources (HR) capacities in SLO epidemiology. • Digital CT/surge capacity plan for CT. • Identify appropriate tasks and opportunities for delegation during crises	• Improved workforce capacity and system resilience to crises • Reduced pressure on individual staff members during crises	• Political will • Incentives for residency • Financing • Identifying surge capacities and streamlining of task allocation • Improved coordination across governmental sectors

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