

ECDC expert consultation on the implementation and evaluation of non-pharmaceutical interventions

December 2022

Background

In order to explore how insights from the implementation of non-pharmaceutical interventions (NPIs) during the COVID-19 pandemic may guide further preparedness for COVID-19 – as well as pandemic preparedness and response work in the EU more generally, ECDC organised an expert consultation in June 2022 on the implementation and evaluation of NPIs. This report summarises the findings from that consultation.

It has been well documented that while NPIs implemented during the pandemic demonstrated effectiveness against containing SARS-CoV-2 transmission, they also had many adverse socio-economic impacts.¹ The near-term future for COVID-19 is uncertain, with several plausible scenarios, some of which could require, periodically, consideration of reimplementing certain NPIs.² Over the longer-term, pandemic preparedness plans will need to incorporate lessons and insights learned from the COVID-19 pandemic.

Consultation scope, purpose and structure

The meeting brought together 49 external participants – experts from various countries in Europe, Canada and the US, representing a wide range of relevant expertise, partners and stakeholders alongside ECDC staff. The meeting was also attended by representatives of the European Commission, Directorate-General for Health and Food Safety – Public Health, as well as WHO Health emergency programme and WHO Regional Office for Europe (see Annex 4 for the full participant list). All participants completed Declarations of Interests forms.

The main purpose of the consultation was to share knowledge and expertise between ECDC stakeholders who were responsible for implementing NPIs in country settings during the COVID-19 pandemic, with a selected multi-disciplinary expert group.

For this consultation, discussions were designed to be **open-ended** in order to capture a broad range of issues that international and national public health organisations, research communities, and governmental organisations in other sectors might take forward in their activities related to the COVID-19 pandemic and to pandemic preparedness planning.

¹ <https://www.nature.com/articles/d41586-022-02823-4#:~:text=But%20these%20analyses%20are%20out,collapse%20of%20health%2Dcare%20systems> .

² <https://www.ecdc.europa.eu/en/publications-data/long-term-qualitative-scenarios-and-considerations-their-implications>

The consultation was designed to hear from participants about their experience, insights and expert opinion on the many different aspects of NPIs, not just the medical but also the wider perspectives. For this, the format of the meeting included plenary panel discussions and parallel working groups, organised in three workstreams:

- **Stream A:** NPI Effectiveness
- **Stream B:** NPI Cost effectiveness and social impact
- **Stream C:** Behavioural insights and adherence

Each workstream was asked to discuss five specific topics, and then to report upon the findings in the final plenary session (see **Table 1**).

Table 1. Workstream discussion topics.

	Discussion Topic 1	Discussion Topic 2	Discussion Topic 3	Discussion Topic 4	Discussion Topic 5
Stream A: NPI effectiveness	Data collection and sources	Assessing the effectiveness of NPIs in controlling SARS-CoV-2	Assessing the timing of implementing and relaxing NPI measures	Evidence to policy	Ways forward
Stream B: NPI cost-effectiveness and social impact	Accounting for societal impact in NPI decision-making	Assessing the cost-effectiveness of NPIs	Data collection and sources	Evidence to policy	Ways forward
Stream C: Behavioural insights and adherence	Role of behavioural and social sciences during the pandemic and decision-making on NPIs	Integration of behavioural and social sciences into the preparedness & response process	What is needed for the future (ECDC and beyond)	Risk communication and community engagement	Ways forward

Conclusions

Overarching conclusions from the consultation are presented here. Detailed summaries of the key discussion points from the consultation can be found in the Annexes.

The COVID-19 pandemic led to necessary introduction of a wide-range of NPIs. While these have been shown to be effective in mitigating population health impacts from COVID-19, their implementation and even effectiveness appears to have varied substantially across time and across national and sub-national contexts. It is also noteworthy that the importance of various NPIs will vary depending on the availability of vaccines and medical countermeasures.

There have been and remain significant gaps in global 'research preparedness': public health agencies, often working in 'advice-making' functions, have generally struggled to monitor and assess the implementation of NPIs within their jurisdictions, let alone account for the myriad socio-economic, legal and ethical considerations associated with NPIs when they are widely implemented. While challenges around data availability and merging methodologies from different disciplines may always exist, participants across the three workstreams consistently highlighted a series of activities that international and national public health agencies, research funders and organisations, and governmental organisations in other relevant sectors, such as social welfare, labour and/or trade economics, should consider. These include:

- Invest in conducting structured **lessons learned exercises** and after-action reviews focused on identifying good practice, challenges, and priority issues related to the COVID-19 pandemic.
- Ensure that **pandemic preparedness plans** and crisis management **structures are revised** based upon **lessons learned** and that they account for the implementation of NPIs based upon factors such as the phase of the pandemic, the expected effectiveness and efficiency of the NPI in a given socio-economic and political context, behavioural insights, socio-economic impact, and levels of uncertainty.
- **Strengthen** international, national and sub-national **capacity** for evaluating and monitoring the implementation of NPIs through the development of guidance, training, improved methodologies, and the identification and collection of appropriate datasets.
- Foster a greater range of **collaboration and knowledge exchange** across public health and other disciplines, notably economics, policy sciences, and social sciences including behavioural insights.
- Develop better awareness and understanding of the complexity of policy-making among public health actors, **strengthen linkages to decision-makers** (e.g. policy-makers in public health and healthcare sectors, funding bodies, politicians, etc.), and invest in improving the timeliness, salience, and credibility of evidence delivered to policy-makers during health crises.
- Advance the state-of-the-art in the field of **risk communication and community engagement** through developing longer-term work aimed at building **trust**, ensuring **transparency**, and deploying **behavioural insights**.
- Continue to conduct studies on the **long-term impacts**, both direct and indirect, **of the COVID-19 pandemic** through multi-disciplinary research coordinated at national and international levels.

Next steps

The priorities listed above are likely relevant to public health and infectious disease prevention and control agencies globally, depending on their operational contexts, mandates, and available resources. At the EU and national levels, governmental agencies, research funders, and research organisations should seek to build bridges across sectors and disciplines and to coordinate activities relevant to the implementation of NPIs so that, collectively, as many of these items are addressed as thoroughly as possible. Discussions around operationalising the insights from this consultation will be the focus of subsequent meetings with ECDC National Focal Points for Preparedness, Response, and Threat Detection, while the findings presented here will also inform ECDC annual work planning in the context of a revised ECDC mandate³.

Acknowledgements

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³ <https://www.ecdc.europa.eu/en/news-events/ecdc-extended-mandate-endorsed-today-european-parliament>

Annex 1. summary of key discussion points for workstream A: NPI effectiveness

Data collection and sources

It is well known that assessing the effectiveness of NPIs during the pandemic has been a key challenge. This has partly been related to the simultaneous introduction of multiple measures, but it has also been related to a lack of 'research preparedness' for quickly establishing and integrating data sources, which would enable the development of more timely analyses as well as of indicators of NPI effectiveness.

Participants noted that a wide range of quantitative, qualitative, and e.g. virological data are required to conduct integrated analyses of NPI effectiveness. A further challenge has been varying testing rates through the pandemic, making comparisons across different geographical regions and/or time-frames difficult. In some instances, there are good examples where countries linked population registries with epidemiological data. Transparent and publicly available dashboards and archives of response measures implemented have emerged as another good practice.

There would be gains to be made from 'research preparedness': developing pre-established and standardised protocols for the monitoring and assessment of NPIs when implemented; establishing research partnerships and collaborations across disciplines; and collecting and maintaining a range of baseline datasets (e.g. on social mobility, public trust in public health institutions, viral circulation).

Assessing the effectiveness of NPIs in controlling SARS-CoV-2

Through 2020 and 2021, assessments on the effectiveness of NPIs in controlling SARS-CoV-2 were highly challenging. As noted earlier, this partly relates to factors such as: the simultaneous introduction of multiple measures; gaps in data and a lack of baseline data; changing testing strategies and capacities. Participants generally felt that there was a lack of high-quality data, available at the right time, to inform decision-making on NPIs – both for the introduction and de-escalation of such measures.

Aside from the data collection issues mentioned above, achieving ethical approvals under tight timeframes for such studies may also have been challenging; one solution would be to work to design prospective studies that are compliant with the standards required from ethical review boards.

Participants also felt that there could be a role for international organisations, such as WHO or ECDC, to support countries to organise priority areas for research and to facilitate the design and implementation of NPI effectiveness studies. Involvement of international governmental organisations (IGOs) could also help to ensure there is minimal duplication of studies across countries, while also helping to facilitate the exchange of research findings and best practices.

Assessing the timing of implementing and relaxing NPI measures

It was frequently noted that the timing for implementing and relaxing NPIs has been highly challenging; many participants also noted that it has been particularly difficult to withdraw measures once implemented. The composition of, and timing of, NPI measures should be clearly linked to the overall objectives of the public health response.

In the EU, participants pointed to a wide range of different approaches to NPIs across countries; this may be explained by a wide range of factors, including varying risk tolerance and healthcare system capacities, epidemiological context, crisis governance structures, and legal frameworks for implementing NPIs.

Importantly, COVID-19 response priorities have been constantly changing, due to changing epidemiological situations, the emergence of variants of concern, vaccination programmes, and fluctuating healthcare system capacities. These dynamics must be understood when assessing the effectiveness of NPIs.

Participants in this session agreed that decisions on the timing of implementing and relaxation of NPIs should be based upon clear public health objectives and the availability of quality evidence (e.g. reliable surveillance data, virological data, and healthcare capacity data), alongside assessments of the negative societal impacts that may accompany NPIs. There is scope to improve the ways in which models are used to inform pandemic management, whilst the use of indicators, also important, needs to account for lags in data – reported data may not always represent the current or upcoming situation during rapidly evolving crises.

Evidence to policy

Participants in this workstream noted that public health evidence was only one input among many during complex and time-sensitive periods of decision-making. There continues to be a lack of precision in the ways in which wide ranges of NPIs may be decided upon; this could reflect a paucity of actionable data on the effectiveness of various NPIs.

Participants made it clear that a **multi-disciplinary** composition of governmental advisory groups is critical. It is also important to distinguish between the roles of e.g. public health agencies, where often the role is rather more one of advice-making than decision-making.

In order to ensure that the evidence from public health agencies is well received in decision-making circles, it is crucial that there is **transparency** around the quality and uncertainties pertaining to evidence. Weaknesses and knowledge gaps need to be clearly communicated, both to decision-makers as well as to the general population.

Ways forward

Improving '**research preparedness**' was a prominent discussion point from this workstream. Although the term is somewhat vague, participants referred to it as enhancing preparedness to be able to conduct and implement studies that ensure data collection and analysis to support the monitoring and evaluation of NPIs when implemented. For example, in pre-emergency phases, 'sleeping protocols' could be established that would enable the rapid launch of targeted research as required. Similarly, **guidance and training** can also be developed to improve national and sub-national monitoring and collection of information around the implementation of NPIs.

Participants also emphasised the continued need to conduct **detailed evaluations** of NPIs implemented thus far during the COVID-19 pandemic, and to ensure that lessons on their implementation are both identified and learned. Thus, further work on promoting the exchange of experiences and best practices from the pandemic should be pursued. Similarly, as the **longer-term effects** of the pandemic are mostly likely not yet fully understood, participants also highlighted the need to continue to assess the long-term impacts due to the pandemic (i.e. direct impacts due to COVID-19, and indirect impacts due to the implementation of NPIs).

Annex 2. Summary of key discussion points for workstream B: NPI cost-effectiveness and social impact

Accounting for societal impact in NPI decision-making

Participants highlighted that although attention was, at least initially, predominantly focused on the health impacts of the pandemic, there were in effect three crises at the same time: a health, economic, and social crisis. The pandemic affected social and health inequalities. While the impact on health may have been felt more by older individuals, the economic and social impact may have been harder on younger individuals, potentially causing lifelong effects (e.g., on lifetime earnings of young individuals if they were impacted in their educational attainment and employment outcomes).

Data on the indirect effects of COVID-19 NPIs and restrictions were not available initially. However, participants underlined that **previous evidence** on social determinants of health as well as of health inequalities could have been better accounted for in decision making on NPIs and other pandemic-related restrictions – preferably accompanied by a consequence analysis across socioeconomic strata or key populations. During the discussion, data on the social stratification of medical, economic and social vulnerabilities as well as, for example, internet access and digital literacy were mentioned as relevant variables in avoiding to further aggravate existing inequalities.

Legal aspects including human rights issues were mentioned as a tool to assess the potential consequences to different groups, in particular to groups protected by discrimination laws such as people with disabilities and individuals with legal barriers to healthcare access. The convention of the rights of the child was mentioned as a tool in highlighting children's right to health and education in relation to pandemic school closures.

With the ambition of accounting for pre-existing social inequalities and inequalities in health, cross-societal impact assessment and stakeholder analyses are needed early. This would require multidisciplinary scientific advisory boards to be available for decision-makers before a crisis takes place. These assessments need to take into account uncertainty, timing and lengths of NPIs as well as transparent risk-benefit communication to the general public. In the future, pandemic preparedness plans could better integrate interdisciplinary perspectives from a range of stakeholders.

Assessing the cost-effectiveness of NPIs

Participants noted the importance of distinguishing the different phases of the pandemic. At the start, with high degrees of uncertainties on key epidemiological parameters like mortality, NPIs may reduce transmission and buy policy makers and societies valuable time for basic knowledge generation, to understand what they are dealing with, and then the time needed for any coordinated response, ideally with the prospect of containment. According to the 'rule of rescue', economic considerations may not be the top priority during the initial phase if the situation presents itself as a large-scale and imminent threat to population health. Without a (healthy) population, there cannot be a healthy economy. However, participants argued that such a view needs to change quickly after the initial phase of the pandemic, when consideration also needs to be given to the comprehensive benefits and costs of any implemented NPIs and other measures.

Ideally, participants argued, after the initial phase of 'flattening the curve' of the disease burden, there needs to be a second phase of 'flattening the economic burden' by implementing measures that prevent a long-lasting economic recession, or at least cushion the impact from recession. As the economy and public health cannot be separated, difficult decisions may need to be made before the risk materialises. These decisions can cause knock-on effects through society (i.e., positive and negative externalities); both within healthcare but also for the wider economy (e.g. on supply chains). Finally, in later stages of the pandemic, we should revisit the question of 'why do we implement NPIs?'. Any initial aims and objectives of minimising hospitalisations, deaths, and optimising healthcare capacity may need to change across different pandemic waves, different vaccination coverage rates, and so on, and measures may aim to become more targeted, e.g. by risk-profile.

Participants also noted the importance of bringing together the methodologies from different fields, e.g. macro-economics, public health, social and behavioural sciences. They commented that public health and disease control agencies benefit in their work from strengthening the role of health economists among their staff. Participants also suggested another meeting in a similar format consulting on pharmaceutical interventions that were outside the scope of this meeting, and with a broad range of attendees representing medical and clinical professions but also other disciplines like economics.

In addition, despite established guidelines and best-practices for micro-economic evaluations of healthcare interventions, we will need to understand better why known and conventionally used analysis values/indicators (like value-of-statistical-life, VSL, or disability-adjusted life years, DALYs, etc.) are not used by policymakers. While the ideas of the 'rule of rescue' and that of 'sunk costs' may be particularly relevant in the early phases of the pandemic, the opportunity cost of implementing certain NPIs rise over time if the pandemic situation improves. Similarly, a continued focus on saving lives as the main outcome may support the notion of societies being in a perpetual emergency. A more comprehensive focus may be needed that accounts for both mortality and morbidity, and any shift that may occur between the two over time (including the interdependency with any pharmaceutical interventions that may directly impact the benefit of NPIs on, for example, long COVID and productivity losses, and vice versa).

Data collection and sources

Just like adequate and robust data are needed to assess the epidemiological impact, relevant health-economic indicators to be used as universal metrics need to be quickly decided on upon at the start of a pandemic. For example, GDP, DALYs, well-being (including mental health and all-cause excess mortality), inequality or poverty indices, disruptions to uptake of medical interventions and healthcare seeking behaviour, etc. Public health agencies would have a role to help agree upon the selection of indicators as well as to identifying risk groups and coordinating data collection.

It was also noted that scientific tools are available to address these questions but that more clarity may be needed as to when cost-effectiveness analyses are useful. Research and policy questions need to be clearly defined as the framing of the questions has a direct impact on the research design and methods.

The issue of the availability of expertise was also raised by participants: such as whether sufficiently trained experts would be available to help with data collection and economic analyses during emergencies. In addition, economists are a diverse group with expertise from a range of sectors, with the most relevant ones being from the health sector. Some participants noted how health economists working primarily on micro-economic evaluations had to link up with macro-economists to estimate the impact of interventions from the healthcare sector on other economic sectors (the economy at large). To foster this exchange, it may prove useful if health and economic organisations talk with each other prior to and during the start of pandemics. A related aim should be to coordinate data collections among Member States in a timely fashion. The usefulness of dashboards was mentioned, and the need for quick access to data (e.g. by ECDC) to serve the EU and experts.

Evidence to policy

Participants commented that economic analyses are famous for 'modelling insights, not numbers', but some of the uncertainties surrounding economic analyses are not communicated well with other disciplines that are used to see hard numbers with precision. Pre-established partnerships across the health and economic sectors might facilitate the timeliness and salience of information available for decision-making during crises.

Participants stressed that the ethical dimension related to policy assessment cannot be understated. Options for response communicated as a result of any health and economic analysis will be impacted by the perceived risk, severity and susceptibility of individuals (and policy makers on their behalf, with an eye on the public health). Complicating this matter is that the exponential growth of cases is not easily grasped in real-time and can lead to the mistiming of response measures when case numbers are low, despite exponential growth (as seen with COVID-19).

Ways forward

Participants suggested that health and societal impact assessments might be accounted for in pandemic preparedness plans, based upon precautionary and proportionality principles. Health organisations could seek to expand their networks of experts to include health economics expertise to be able to make complex assessments of the cost-effectiveness of various response measures. Similarly, better understanding of multi-factorial decision-making processes might better equip public health agencies to act as effective knowledge brokers. Ensuring that transparency and trust are key focal points when communicating epidemiologic evidence, irrespective of the audience, was also highlighted as an essential activity for public health agencies.

Annex 3. Summary of key discussion points for workstream C: Behavioural insights and adherence

Role of behavioural and social sciences during the pandemic on decision-making on NPIs

Participants highlighted the role that behavioural and social sciences can play in facilitating implementation and adherence to NPIs, while also contributing to understanding the negative social impact from such measures. There should be a clearly defined, formal role for social and behavioural sciences as part of the composition of advisory and decision-making bodies, as well as in contributing to vulnerability analyses (e.g. identifying the socially and medically vulnerable groups that might be adversely affected by NPIs if implemented).

A notable current gap relates to strategies for countering mis- and disinformation, and for addressing infodemics in a public health emergency; this was highlighted as a relatively urgent area of work that social and behavioural sciences could lead. A further area for important contribution related to work aimed at instilling and maintaining trust and in ensuring transparent communications between public health agencies and decision-makers and the general public.

Integration of behavioural and social sciences into the preparedness and response process

The integration of behavioural and social sciences in the public health preparedness and response processes has been a longstanding challenge. Clear frameworks and tools for formally incorporating these disciplines and their insights into public health emergency responses need to be developed, accompanied by training to ensure that epidemiologists better understand these disciplines, as well as vice-versa. Social and behavioural scientists should ideally also be fully integrated into teams responsible for risk communication and the production of communication materials designed to reach a range of communities.

Social and behavioural sciences, meanwhile, should seek to refine the ways that knowledge is produced so that it can generate actionable evidence. These disciplines may also help to expand thinking around the types of desirable outcomes from a public health point of view – for example, not only saving lives, but also protecting social, mental and financial well-being; maintaining and building trust in society; or addressing health inequalities.

What is needed for the future (ECDC and beyond)

Further work to integrate and institutionalise behavioural and social sciences in infectious disease prevention and control/public health was highlighted by participants as a priority area, thereby ensuring that these disciplines become a routine contributor to public health activities. One mechanism for doing this could be to establish expert networks linking behavioural and social scientists to public health agencies; ensuring that social and behavioural scientific expertise is formally incorporated into national emergency response teams is another. Guidance and training could be developed for integrating such expertise into multidisciplinary response teams and emergency advisory bodies. Previous work conducted at ECDC, such as on community engagement in preparedness and response, could be further developed, which could create additional opportunities for updating existing guidance.

Risk communication and community engagement

Risk communication and community engagement (RCCE) were frequently discussed as areas that require sustained input from behavioural and social scientists. Although ECDC and WHO and other organisations have produced training and guidance on RCCE, participants felt that further work on ensuring that public health professionals are trained and kept up to date with advances in the field are important. The tendency by some authorities to focus RCCE efforts on the 'RC' component at the expense of substantive and sustained community engagement was noted; the challenges inherent in community engagement activities were acknowledged, but additional efforts are required to ensure that its potential contribution to public health emergency preparedness and response is realised. Other ideas participants had related to further incorporating RCCE into field epidemiology training curricula, and ensuring that pandemic preparedness plans explicitly account for RCCE.

Annex 4. List of participants

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