



COVID-19 Lessons learned – Preparing for future pandemics

Executive Summary

This paper has been drafted by a group of twelve mandated scientists from six large multidisciplinary Research Performing Organisations located in Europe, the Consiglio Nazionale delle Ricerche, the Centre National de la Recherche Scientifique, the Consejo Superior de Investigaciones Científicas, the Helmholtz-Gemeinschaft Deutscher Forschungszentren, the Leibniz-Gemeinschaft and the Max-Planck-Gesellschaft.

The COVID-19 pandemic has shown that much more needs to be done to improve our preparedness and resilience, and that these challenges cannot be met by individual regions or member states. This concerns in particular decision-making structures, the provision of expertise, the legal basis for a rapid response and, last but not least, the expansion of scientific knowledge. Written under the impression of the current SARS-CoV-2 pandemic, this paper focuses on future pandemics similar in magnitude, the risk of spreading, and impact from a scientific perspective, and summarizes some of the still preliminary lessons that can be drawn from the recent experience of the COVID-19 pandemic:

- In case a global spread cannot be avoided, a low incidence strategy should be aimed at taking economic and societal costs in the different parts of the world into account.
- To raise public awareness and ensure compliance, the response strategy, current state of knowledge, rationale for each action, and potential uncertainties need to be clearly communicated.
- Legal provisions at the regional, national and European levels need to be adopted in the run-up to crises to avoid legal loopholes and enable rapid implementation of measures.
- European and global coordination actions for prevention, detection and mitigation need to be defined upfront, using ECDC, HERA and WHO as communication and support structures.
- A multidisciplinary permanent European expert committee on pandemics should be established under the authority of HERA.
- Data sharing and exchange have been instrumental in rapidly understanding the pathophysiology of SARS-CoV-2 infection. To be prepared for future pandemics, the further development and support of open science is necessary.
- Transdisciplinary research in economics, ecology, social and human sciences needs to be supported at national and European levels to develop sustainable, resilient and environmentally friendly agriculture and to better understand socio-anthropological behavior related to the emergence and spread of infectious diseases.

- The COVID-19 pandemic highlights the need for coordination of clinical trials at the European level, based on common guidelines.
- Rapid and efficient surveillance systems, including early detection assays, genomic sequencing of pathogens, and representative pandemic surveillance, need to be integrated into European and global surveillance systems.
- New diagnostic tools as well as technologies for aerosol monitoring are needed and should be developed and funded at the European level.
- To be better prepared for future pandemics, an EU competence framework should be developed involving policy makers, scientists and relevant stakeholders at regional, national and European levels.
- Scientists from many areas of basic research have contributed essential knowledge to pandemic response by aligning their research focus with current knowledge needs. Strong basic research is necessary to quickly fill knowledge gaps and to be prepared for future, as yet unknown crises.
- European/international research infrastructures such as EVA, InfraVec or INFRAFRONTIER have been crucial in past virus-related health crises and are of great importance for the research community in this field. Equally important are data infrastructures (e.g. for biomarker identification). This will continue to require political commitment and sustained investment efforts at national and European level.
- Side effects of the pandemic and mitigation measures on areas other than health need to be monitored and considered in the long term. For example, a thorough cost-benefit analysis is needed before deciding on pandemic-related closures of educational facilities such as schools and kindergartens, as such closures can have long-term negative consequences that cannot be predicted, especially for children and adolescents.
- A pandemic exposes financial stability to major risks in the long term. Economic and fiscal policy can make an important contribution to containing such risks.
- In the short term, there is no alternative to a massive response to the pandemic. In the long term, however, we should not rely on overly specific measures to prevent risks such as SARS-CoV-2. It might be more valuable to strengthen a non-specific crisis response capability on a global scale with regard to a whole spectrum of known and unknown risks.

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