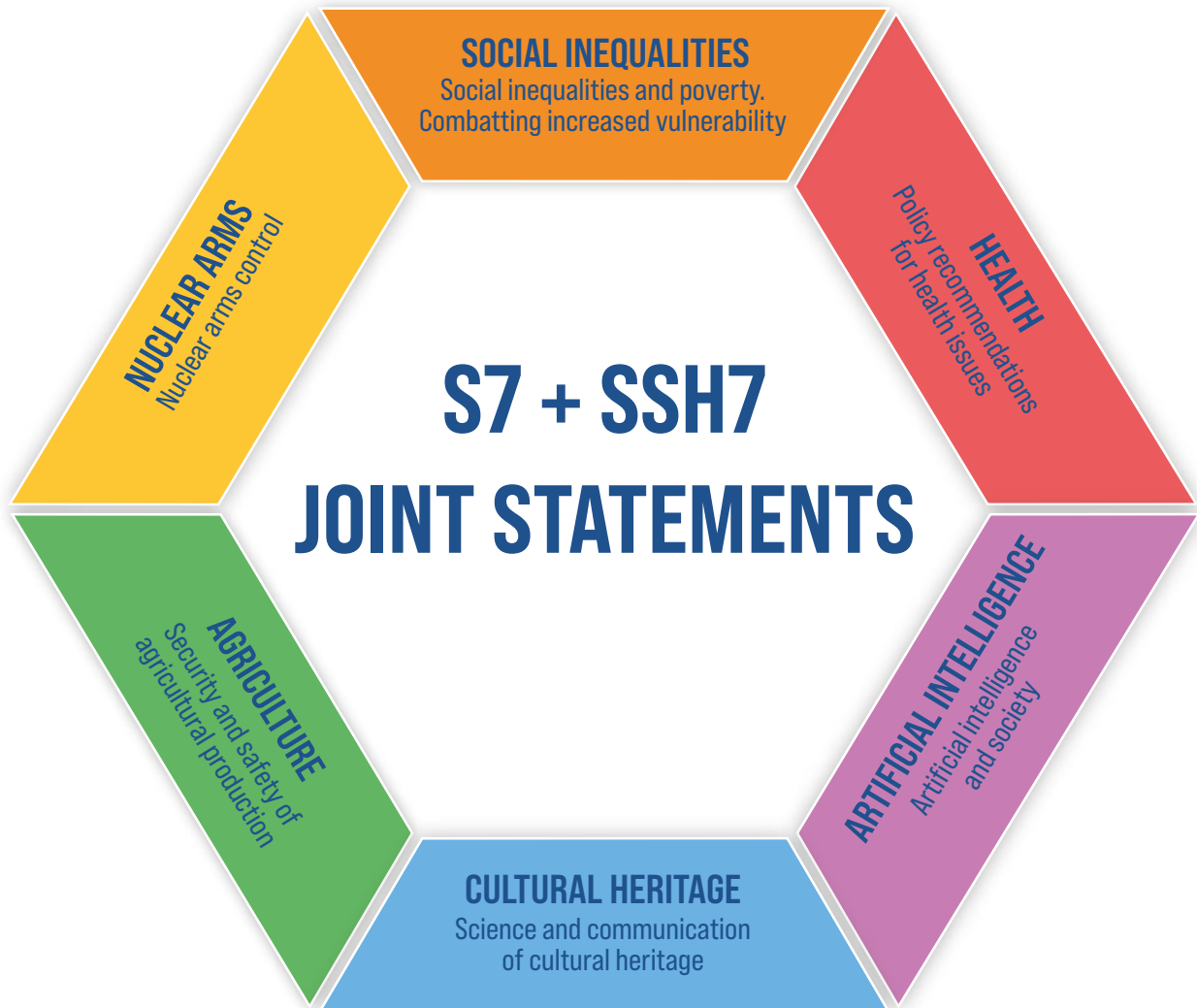




# SCIENCE FOR THE FUTURE

CHALLENGES,  
RESPONSIBILITIES  
AND OPPORTUNITIES

SCIENCE 7 +  
SOCIAL SCIENCES  
& HUMANITIES 7  
2024



**POLICY  
RECOMMENDATIONS  
FOR HEALTH ISSUES**

# POLICY RECOMMENDATIONS FOR HEALTH ISSUES

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A common denominator to a number of the policy recommendations in this document is Public Health. There is strong evidence, reinforced by the COVID-19 pandemic, that there is an increasing imbalance between investment in treating disease and investment in maintaining health.

## Preparedness and response to pandemics

### *Statement of the problem*

The COVID-19 pandemic revealed weaknesses of health systems and institutional responses, and inadequate international cooperation. Control of an epidemic relies heavily on the pro-social actions of individuals: getting tested, wearing a mask, isolating oneself in the event of infection. This depends largely on public policies, the dissemination of reliable information, access to screening sites, an economic framework (such as paid sick leave) and the commitment of citizens. So far, there has been insufficient engagement with existing associations to set up a process that ensures that the public's voice is included.

### *Recommendations*

Initiatives need to be put in place and coor-

ordinated on a world scale to identify potential novel pathogens and their natural reservoirs in other (wild and domesticated) species. Research should be supported by pathogen biomonitoring and genome sequencing facilities that are equitably distributed throughout the world. This implies the generalization of "one health" approaches. Real-time integration of genomic sequence data with complementary microbiological, clinical and epidemiological data should be strengthened. Inter-operability of information systems and legal aspects of data acquisition and perusal need to be addressed at a transnational level. Wastewater surveillance programs and rapid molecular surveillance of contagious bioaerosols (based on microbial DNA or RNA) should be established and standardized. Research in technologies and platforms that allow rapid development of vaccines, monoclonal antibodies and other tools to rapidly address emerging infections should be prioritized.

There is a need for clinical trial networks to be formed well in advance of the threat, ready to make use of adaptive platform designs and master protocols where possible; clinical trial networks generated very useful information on the (in)effectiveness of drugs and on the effectiveness of vaccines during the COVID-19

pandemic. In COVID-19 we observed the broad impact of the infectious agent on people with predisposing conditions such as mental health, non-communicable diseases, sexually transmitted diseases, and social inequalities. This requires much more attention, in terms of monitoring for broader impacts, fighting poverty and preventing non-communicable and other communicable diseases. Given the reliance on a collective approach requiring governments to engage with civil society and local stakeholders, a critical element of all actions is to enhance public trust and health literacy.

It is vital to strengthen multilateralism for pandemic management in all its essential dimensions - political, cultural, institutional and financial. This commitment to readiness inevitably requires additional financial resources. While infrastructural and professional flexibility may be helpful, there should not be a trade-off between pandemic safety and ordinary service levels.

## **Antimicrobial Resistance (AMR)**

### *Statement of the problem*

Antimicrobial resistance (AMR) is based on a natural biological phenomenon of adaptation whereby microorganisms acquire the ability to survive or grow even in the presence of sufficient concentrations of an antimicrobial agent. The World Health Organization has declared AMR one of the top ten global public health and development threats. In 2019, annual deaths associated with bacterial AMR were 4.95 million, of which 1.27 million were directly attributable to bacterial AMR (Murray et al <https://pubmed.ncbi.nlm.nih.gov/35065702/>). At particular risk of mortality are the most vulnerable individuals, such

as the elderly and children in the early stages of life. In the absence of effective antimicrobial treatments, some of the most important achievements of modern medicine, including major surgeries and new cancer therapies, are also at risk. Furthermore, the Research & Development of new antibiotics has been severely insufficient during the last decades, mostly because innovative products are kept in reserve as last resort options only for the most threatening infections, which limits their profitability.

### *Recommendations*

One effective way to address this emergency is Antimicrobial Stewardship, which includes a set of procedures aimed at preserving the future efficacy of antibiotics by reducing their inappropriate use and therefore limiting selective pressure on the microbial population.

Among other options, the pharmaceutical industry should be incentivized through public funding to develop new antimicrobials, vaccines and diagnostics for the most burdensome syndromes and the most dangerous pathogens. One goal is establishing a market that will encourage the development of new antibiotics - for example through advance purchase agreements. A second goal is how and when to use novel antibiotics, in order to minimize the chances of the early emergence of antimicrobial resistance. Global push incentives that de-risk R&D activities and pull incentives that reward the approval of much-needed products can create sustainable business models that support innovation and facilitate access. Also important is the promotion of research for alternative solutions including vaccines, monoclonal antibodies, phage treatments, treatments using CRISPR-Cas technology and other emerging/evolving methodo-

logies [see also “Infectious Diseases and Antimicrobial Resistance”, S7 2015].

## **The crisis of the universal health systems**

### *Statement of the problem*

Most National Health Systems are in crisis and primary prevention is still largely underfunded. The crisis derives from a range of factors, including aging societies, shortage of personnel (particularly nurses), lack of clear clinical guidelines, lack of an explicit agreement on the amount and quality of healthcare that citizens require, and organizational issues. There are several deeper drivers of the crisis including the “technological imperative”, i.e., the adoption of new technologies available on the market in spite of increasing marginal cost-effectiveness; large variability, even at small area level, in the delivery of healthcare; lack of harmonized information systems, so that little is known on the gap between needs, demand, and healthcare offerings. These aspects imply large health inequalities and shift financial demands from primary prevention to healthcare treatment.

The urgent need to activate and practice medicine inclusive of women has been confirmed by numerous studies in recent decades and by findings showing different susceptibility of men and women to different therapeutic strategies, and unequal access to services. There are persisting gender inequalities in diagnostic and treatment pathways. Clinical trials (specially phase 1 and 2), are still undertaken with men in the majority. There is also strong evidence that children are often under-represented in clinical research.

### *Recommendations*

There is an urgent need to address the underlying social determinants of health, including behavioural and environmental risk factors across the lifespan. Systematic national monitoring systems about healthcare access inequalities are needed.

The health system alone cannot tackle health inequalities and rising levels of comorbidities. Additional support is required for other sectors of public intervention to address these broad problems. Much greater transparency is needed to better define collective priorities, including better integration of the public and the private sectors and a social pact that specifies what citizens are entitled to and within which time frame, to make universalism a reality. There are also opportunities related to technology and the use of AI that can provide productivity improvements and more equitable access to services.

It is high time to promote medical research performed among women and children. Recognition of gender by medicine implies the need for urgent innovation in pharmacology. It is important that pre-clinical and clinical protocols of medical research be equally developed for men and women and that Ethics Committees ensure that protocols respect the right of women to health and access to inclusive healthcare. Children are also an underserved population, particularly in terms of research.

## **The health impacts of climate and environmental change**

### *Statement of the problem*

An overarching global problem that affects he-

alth is climate and environmental change. The health of humans and other species is seriously threatened by the rapidly changing climate. The health impacts are only partially known and include deaths from heat waves, spread of infectious diseases, especially those which are vector-borne, salinization of coastal areas, the deadly (direct and indirect) effects of floods, wildfires, drought and their implications for agricultural productivity and food safety. There are marked social inequalities in these health impacts. Government responses to global warming and wild species extinction have been so far insufficient and inconsistent.

### *Recommendations*

A first step of public action needs to be a rapid transition from fossil fuels to non-carbon solutions, including renewables, followed by other evidence-based and equity-sensitive interventions to mitigate climate change and adapt to it. International coordination of actions concerning deforestation, extensive animal breeding (particularly ruminants), wild animal harvesting, sanitation of food markets, and planetary health oriented dietary changes are urgently needed. Serious action against chemical pollution is also essential. Concurrently, the impact on climate change needs to be considered in healthcare services and delivery (e.g. choice of anaesthesia, drones for delivery of medications) as well as in the context of biomedical research.

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