

A syndemic approach to tackling the complexities of mpox, COVID-19 resurgence and seasonal wildfires in Greece

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WHO declared the monkeypox (mpox) outbreak during the summer of 2024 a public health emergency of international concern (PHEIC) (1), encouraging countries to take measures to contain its transmission and to ensure fair and effective allocation of resources to control the disease. Setting the scene for Mpox control is pivotal, however, a pragmatic approach can only be achieved if the broader health challenges at the local and national levels are tackled.

To analyse the crisis and resources to address them, we searched peer-reviewed and gray literature on PubMed/Medline, Scopus and Google Scholar for information related to mpox, COVID-19, wildfire, healthcare infrastructure, and crisis response in Greece and the supranational institutions from which the country receives related resources and expertise. We included primary and secondary research reports, documents and press releases issued by health authorities in English or Greek. Preference was given to reports published from 2009 until the time of the search. A rapid search leading to a narrative presentation was chosen to highlight different threads, including the intertwined public health crises of Mpox, COVID-19 and natural disasters like wildfires in Greece; the continuous challenges faced by health systems, such as insufficient resources and staffing shortages, recommendations for improving crisis management with focus on prevention and implementation of good practices to build public trust.

News of the PHEIC reached health authorities in Greece at a critical time. As of 13 August 2024, wildfires had been reported close to Athens, damaging approximately 400 km² of forest and 100 homes, and forcing the evacuation of thousands of residents (2). Greece has experienced frequent wildfires recently, including one of the deadliest in 2018 (3). The situation has worsened due to climate change, leading to prolonged heatwaves and reduced rainfall.

Wildfires devastate the environment posing significant public health risks. Smoke and particulate matter exacerbate respiratory conditions, especially for those already made vulnerable by COVID-19 (4). Displacement due to the wild fires forces people into evacuation centres, where overcrowding can aggravate the spread of in-

fectious diseases. The stress and trauma associated with displacement further compromise immune systems, increasing susceptibility to illnesses such as mpox.

Tackling wildfires requires significant investment in human resources and equipment, ranging from firefighting to climate adaptation equipment. In any context, especially in Greece, where austerity measures due to the 2009 financial crisis have constrained public funds, allocating resources to climate adaptation depletes resources available for health care (5).

Investing in health care should include addressing (re) emerging crises, mpox and COVID-19, as well as tackling the deficits compromising access and quality of services. Since the first mpox case in Greece was reported in June 2022, more than 88 cases have been confirmed (6). Health workers who have been battling COVID-19 for over 3 years now face the additional challenge of managing mpox. Although COVID-19 has not been considered a public health emergency in recent months, there was a notable increase in COVID-19 cases and hospitalisations during the 2024 summer, with average admissions reaching 800 per 4 weeks (7).

Strengthening national health systems to address the impact of diseases and wildfires requires careful resource allocation and timely procurement of test kits, vaccines and personal protective equipment (PPE). However, investment is limited by the need to prepare for seasonal flu surge during fall and winter and the shortage of health workers compromises the capacity for testing, vaccination and patient support. Although Greece has the highest physician-to-inhabitant ratio in Europe, the current financial crisis has led to a shortage of physicians and health professionals within the national health system. It is estimated that up to 6000 doctor positions remain vacant in Greek public hospitals (8,9). Attempts to address the issue have caused conflicts between the government and medical societies. As a form of protest, members of these societies refuse to prescribe medications in primary care settings. Although no cases of health workers refusing to serve patients in acute settings, whether public or private, have been documented, this situation represents an additional

strain requiring resources and efforts, which would ideally have been used for mpox or COVID-19 (10).

In a broader context, the austerity measures imposed as a response to the 2009 financial crisis have deprived the national health systems and state agencies of resources or vital control over infrastructure and services that could accelerate a coordinated response to health care crises and natural disasters (5,11). These include a wide range of entities, from national energy and water providers to financial institutions and transportation and telecommunication networks (12,13). Recovering these assets can be challenging in the foreseeable future and extends beyond the scope of this paper, however, regulatory mechanisms that enable their coordinated and rapid deployment are pivotal within the preparedness context.

The case of Greece, a mediterranean country striving to tackle mpox and COVID-19 (re)surgence and a wave of seasonal wildfires, reminds us of the need for a syndemic approach (14,15). Three key elements are recommended (Table 1):

1. Integrated crisis management: It is crucial to move beyond single outbreak documentation of mpox, COVID-19 and wildfires. Briefings, reports and

response should focus on the interconnected evolution of health crises. It is essential to develop an integrated matrix that will reflect disease outbreaks as a function of the burden on the health system and the population.

2. Prevention beyond silos: Resources should be harnessed collectively for the prevention and early detection of diseases and disasters. In the same way that efforts to fight major wildfires are coordinated internationally, testing and vaccination should be well-coordinated among regions and countries to prevent cross-border transmission.
3. Transparent and compassionate communication to gain public trust: Health information and disease control measures must be implemented and communicated clearly and with empathy to assure of sincere support for the public.

Preparedness is very crucial as situations evolve, with pathogens emerging alongside natural disasters, civil unrest, armed conflicts, and population displacements (16,17). There is a need for continuous evaluation and re-evaluation of the challenges for better understanding and coordination of efforts, infrastructure, resources, and partnerships for timely and comprehensive response.

Table 1 Recommendations for a comprehensive response to mpox and associated health emergencies

Category	Recommendation	Population	Stakeholders and institutions
International aid	Address mpox and broader health issues that require a lot of resources for comprehensive response	The public High-risk individuals	WHO United Nations World Bank International Monetary Fund Nongovernment organizations Ministry of Health European Union Commission
Studies and assessments	Report comprehensively on mpox spread in relation to local and national challenges Initiate measures beyond incidence and prevalence	The public Different age groups (children to adolescents to elderly) Vulnerable populations (refugees, pregnant women, prisoners, individuals with disability)	National Institutes of Health European Centre for Disease Prevention and Control European Centre for Disease Control Academic institutions Public health departments
Health communication	Communicate health information transparently and empathetically, recognizing the complex challenges people face	General population The elderly Cultural and religious communities	International health agencies European Center for Disease Prevention and Control Ministry of Health, Public health agencies Media outlets Nongovernment organizations Community leaders Religious leaders
Cooperation	Enhance cooperation between government, medical societies and international organizations to ensure a unified response	Healthcare professionals Health promotion professionals Volunteers in health promotion and public health	National governments Nongovernment organizations WHO Medical societies (e.g. Hellenic Medical Society) European Union International Red Cross and Red Crescent
Healthcare Investment	Invest in test kits, vaccines, personal protective equipment and support for healthcare workers to address immediate and underlying health care deficits	Individuals and corporations Financial advisors Managers Entrepreneurs	National health systems Ministry of Finance Private sector Pharmaceutical companies WHO European Union Funding agencies
International collaboration	Foster global partnerships to share data, research and resources for coordinated response to mpox and other health emergencies	Researchers Health care professionals Health systems administrators Epidemiologic registry administrators	WHO Global Health Security Agenda Gavi, the Vaccine Alliance Global research institutions National governments International Red Cross and Red Crescent

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