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Health Systems' Challenges and Responses for Recovery in the Pre and Post COVID-19 Era

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Abstract

COVID-19 has been an unprecedented global crisis and health systems have put tremendous efforts to withstand the pandemic. It has brought new challenges by deeply impacting both the economies and the healthcare systems. This paper aims to provide an overview of the challenges and responses COVID-19 brought to the EU health systems and grasp investment opportunities which intend to improve their resilience, accessibility, effectiveness and sustainability. A review of policies and actions related to health systems' challenges and responses considered as opportunities are presented and discussed. The key challenges are boosting the way towards optimising health systems' capacity, ensuring access to healthcare, promoting R&D focused on the accelerated development of diagnostics, treatments and vaccines, improving health data digitalization as well as monitoring individual behaviour along with the socioeconomic impact. Numerous health policy recommendations, synergies and funding initiatives have been launched as responses to these challenges. EU is constantly obtaining lessons from the pandemic with coordination being the key component for response and for building in opportunities that will strengthen health systems' preparedness and management of cross-border health threats. Governments need to ensure that the health systems are equipped with the critical capacities to promptly respond to future health crises.

Keywords

Public Health, Health Systems, Pandemic, COVID-19, Recovery

1. Introduction

COVID-19 is on the top of health-related issues at the global level and it seems to remain a public health threat for months or even years. The pandemic has created a profound anxiety for millions of people around the world who are

concerned about their own and their families' health and consequently, about their trust in international and national bodies as well as in healthcare systems (Ornell et al., 2020; Koçak et al., 2021). The recent global economic crisis, initiated in 2008, strongly affected most of the European Union (EU) health systems challenging their sustainability with continuous budgetary constraints, personnel deficits and restrictions in health services provision (Mladovsky et al., 2012; Palasca & Jaba, 2015; Baumbach & Gulis, 2014). For example, in the European Union the unmet need for medical examination and care increased from 3% of population in 2008 to 3.7% in 2014 (Eurostat, 2020). Moreover, the pandemic has created and further revealed gabs on health systems' effectiveness, resilience, preparedness and sustainability in many EU countries (European Commission, 2019; Palasca & Jaba 2015; Drake et al., 2012).

Nowadays, the demand for healthcare due to COVID-19 is increasing rapidly, governments and health policy decisions makers are overwhelmed and more than ever the pandemic laid bare the strains on the healthcare systems (Aristodemou et al., 2021; Moynihan et al., 2021; European Commission, 2020a). Globally, there have been more than 170 million confirmed cases of COVID-19, including more than 3.7 million deaths until June 2021 (WHO, 2021). In the same period more than 32 million cases and more than 700 thousand deaths have been reported in 2021 in the EU (ECDC, 2021).

Moreover, early projections of the International Monetary Fund (IMF) implied a cumulative loss to the global economy over two years (2020-21) of over US$12 trillion from COVID-19 crisis (Gopinath, 2020). It is expected that the United States (US) and European economies will contract between 6% and 8%, with a major impact on global job losses estimated to be over 200 million (ILO, 2020; IMF, 2020). The degree of economic contraction related to the pandemic depends on the effectiveness of the measures applied, the structure of national economies, the fiscal capacity of governments to counter the collapse in economic activity and many more (Sapir, 2020). There should be no doubt that the overall cost-benefit ratio of a forthcoming lockdown is prohibitively difficult for all EU member states at all levels, economic, social, political and ultimately human. Like any financial and health crisis, recovery attempts are usually slow, temporary, incomplete, uncoordinated and partial due to differences in each country's economy as well as in the structure and performance of the healthcare sector (Verikios et al., 2016; WHO, 2017; Pujol, 2020; Susskind & Vines, 2020).

Living in a pandemic era and experiencing the impact it caused to individuals, societies and economies globally, this paper aims to provide an overview of the challenges and responses COVID-19 brought to the EU health systems and grasp investment opportunities which intent to improve their resilience, accessibility, effectiveness and sustainability. Thus, the paper is structured in three sections. The first section highlights the challenges faced by the EU healthcare systems while managing the COVID-19 outbreak, in terms of capacity, health care delivery, surveillance—public health, innovation, social and economic consequences. The abovementioned challenges have put tremendous pressure to the

health systems to rapidly respond and adapt to the crisis needs as well as deliver the suitable healthcare services under excess demand conditions for care, as presented in the second section. Specifically, supranational and international entities' coordination and involvement in policy recommendations, funding initiatives and strategic planning for recovery are reported. In the third section, potential investment opportunities and recovery recommendations concerning the reinforcement of health systems, the protection of the EU citizens' health and the support of the economies are proposed.

This article provides an evidence synthesis capturing the challenges that emerged due to COVID-19 outbreak, tying them to the international institutions' responses to overcome the public health crisis and leading to the conception of potential investment opportunities for a sustainable future in the post COVID-19 era. To our knowledge, this is a first attempt structuring an evidence synthesis in the international literature that may be used as guidance for decision making in public health.

2. Methods

A critical review was performed to explore the challenges and responses for recovery in the pre and post COVID-19 era. International and European organizations such as the Organisation for Economic Co-operation and Development (OECD), World Health Organisation (WHO), Center for Disease Control and Prevention (CDC), European Commission (EC) and European Centre for Disease Prevention and Control (ECDC) etc. have been the predominant source of information. The search was also conducted in electronic databases such as PubMed, CINAHL, Scopus and SCImago (SJR) and additional publications were manually found from reference lists of relevant articles.

The keywords used were COVID-19, pandemic, health care systems, health crisis and recovery. Key search items for the challenges included: public health, socio-economic effect, access to healthcare, innovation and for the responses: health strategies, policy recommendations, funding initiatives and recovery plans. The research was confined to English language and relevant data was extracted from March 2020 to June 2021. Papers and data were excluded if they focused on COVID-19 pathophysiology, clinical management and cost of treatment, vaccine brands as well as cross-countries comparisons.

After an in-depth review, a broad qualitative overview of the data was formulated and an evidence synthesis conceived three pillars (Figure 1). More specifically, in the first pillar the major challenges were identified and grouped in five categories: health systems' capacity, access to healthcare, health technology innovation, public health and socio-economic impact. Thereafter, in the second pillar policies, actions, synergies and funding initiatives were categorized as responses to COVID-19 challenges. Finally, authors' discussions led to the conceptualization of the third pillar, identifying potential opportunities related to EU health systems' recovery, responsiveness and sustainability, coordinated investments' actions in innovation, public awareness as well as humanitarian values.

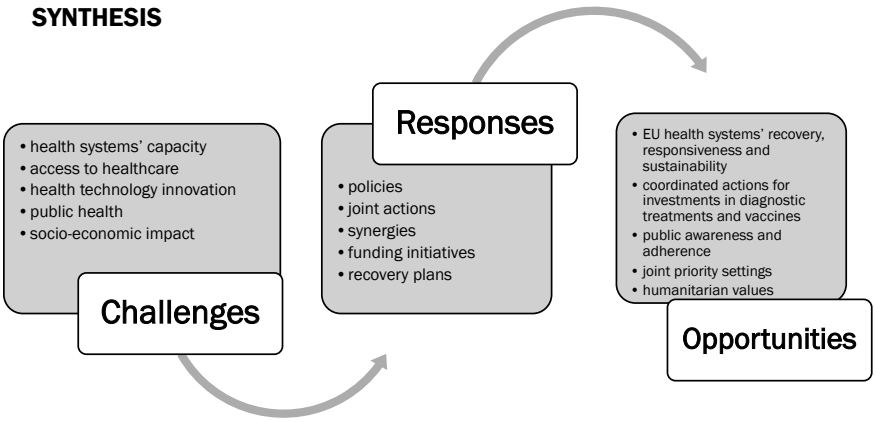

Figure 1. Methodology evidence synthesis.

There are some limitations that merit consideration. First, our study did not capture the global perspective regarding the challenges, responses and opportunities given the ongoing unpredictable course of the pandemic. Second, a systematic review was not able to be performed due to the fact that the responses are based on data extracted from international and European bodies.

3. Challenges Faced by the European Health Systems in Relation to COVID-19

Extraordinary strains on the provision of healthcare and medical personnel, repeated national or local lockdowns and economic fallouts—unseen since the Great Depression of the 1930s—are the prime challenges of the pandemic globally (Baldwin & Weder di Mauro, 2020a; 2020b). It should be noted that EU countries are at different stages of national and subnational outbreaks. Everyday thousands of cases are recorded, however no country knows the exact figure of people infected with COVID-19, as the lab-confirmed infections counted are linked to those that have been tested (WHO, 2020a; Ritchie et al., 2020). Thus, there is not enough data on cases infected by the virus and its variants to facilitate a real understanding of how to manage the pandemic, therefore future challenges and responses may appear (OECD, 2020a; ECDC, 2020a; CDC, 2021).

The more it is realised how much COVID-19 pandemic has changed the world, the suitability of prevention, healthcare and technology management strategies are urged (Vechreshild et al., 2021; ECDC, 2020b). As far as the technological challenges, diagnostic tests provide accurate data which not only identify infected individuals, but they support guidance for the appropriate medical treatment that they should receive, isolate those infected as well as trace and quarantine their contacts (Hellewell et al., 2020). Testing strengthens the understanding of the pandemic and the risks it poses in different populations as well as age groups, and it also contributes to more efficiently medical, human and economic resources' allocation (Ritchie et al., 2020). Universal testing, isolation policies and vaccination appear to be the most viable ways to vanquish the pandemic. However, the market for diagnostic tests and vaccination in the context

of a raging pandemic is laden with market failures stemming from uncertainty, capacity constraints and coordination failures (Cherif & Hasanov, 2019, 2020a, 2020b).

Availability and access to COVID-19 diagnostics and treatment, regulatory barriers and health system's capacity are among the major challenges that international bodies, national governments as well as regional health authorities have to cope with. Even among countries with universal coverage, health inequalities and unmet needs for healthcare persist (Mackenbach, 2006). Tackling health inequalities has added an enormous pressure to healthcare systems along with the necessity to ensure healthcare provision to vulnerable groups (Moynihan et al., 2021). In many countries, the high levels of out-of-pocket payments deter people from seeking early diagnosis and treatment, resulting in the acceleration in the rate of transmission (OECD, 2020c). It is worth mentioning, that screenings for melanoma, breast and colon cancer were decreased by 65% - 95% in early May 2020 and reductions of 30% - 35% remained in mid-June in the US (Greenup et al., 2020a). Also, similar studies conducted in the UK by Miles (2020) and Galeotti et al. (2020) report that cancer testing, screening and diagnosis have declined sharply and treatment for patients with newly diagnosed cancer was delayed impacting cancer mortality (Blay et al., 2021). Therefore, the impact of financial toxicity on treatment choice and health outcomes has been raised and revealed as among the most negative effects impacting access to healthcare (Sagan et al., 2020; Greenup et al., 2019).

Moreover, challenging with individuals' socioeconomic, demographic and behavioural characteristics, epidemiological models that predict the spread of COVID-19 infection show that income is strongly associated with individuals' self-protective behaviour. Poorer individuals are less able to practice social distancing and to protect themselves, as well as less able to telework (Papageorge et al., 2020; Stabile et al., 2020; Palomino et al., 2020). Therefore, individuals with low income face a steeper trade-off between their health and economic status, due to the threats posed by the coronavirus (Brown & Martin, 2020). A major consequence of the COVID-19 projected by Ahmad et al. (2021), is that the unemployment rate will be higher in the forthcoming years, and last for more than 5 years, resulting in a decrease of the household income and the luxury consumption commodities (Celik et al., 2020; Martin et al., 2020). COVID-19 pandemic has also contributed to the increase in the prevalence of social interaction, isolation, loneliness, boredom, domestic inter-personal violence and mental health disorders in the population (Banerjee & Rai, 2020; Mukhtar, 2020). In addition, higher health risks, especially in regards to the ageing population with multiple chronic diseases as well as the increased "pandemic fatigue" are associated with significant behavioural challenges (Mofijur et al., 2020; WHO 2020b). Moreover, health professionals' heavy workload, pressure and shortages are negatively impacting health systems' performance (Torales et al., 2020). Despite the commonly reported health professionals' shortages in many European countries, it should be noted that the healthcare sector in the EU employs about

8.5% of the workforce, accounting for almost 10% of the EU Gross Domestic Product (GDP) (European Commission, 2016).

In brief, the key challenges outlined in this section are boosting the way towards optimising health system capacity, ensuring access to healthcare, promoting Research and Development (R&D) focused on the accelerated development of diagnostics, treatments and vaccines, improving health data digitalization for surveillance purposes as well as monitoring individual behaviour along with the socioeconomic impact.

4. Responses to the COVID-19 Challenges

A globalized world makes health policies interdependent and interconnected. The enduring challenges of addressing health conditions that have their roots in the pandemic became of added urgency worldwide. At global and European level, there has been an enhancement of common goals and objectives on how to deal with the COVID-19 pandemic in order to keep the societies healthy. It is obviously acknowledged that the pandemic needs to be handled with consciousness and responsibility. Many initiatives have been put in place in order to rediscover the values of what health systems hold in common. The goal to minimize deaths and the spread of the disease remains health systems' top priority.

An overview of health policy recommendations, actions, synergies and funding initiatives are presented in this section, outlined as major key responses to the challenges that occurred due to the coronavirus pandemic.

WHO, having a leading role in health policy making and coordination, in 2020 developed a framework of policy recommendations to guide governments in the planning and implementation of national and subnational strategies to bolster public support for COVID-19 prevention measures. This initiative consists of 4 strategies focusing on 1) the collection and use of evidence for targeted and tailored effective policies, 2) the engagement of people, 3) risk reduction and 4) the hardship people experience and the negative impact of the pandemic on their lives (WHO, 2020c).

In a sense of solidarity and unity, WHO/Europe and the European Commission shared a common ambition to achieve the highest level of health and health protection. Focusing on cooperation, they aim to exchange information and best practices, consult with each other, coordinate activities, seek synergies and consider joint actions and initiatives. Key areas were prioritised and they are: 1) strengthening health security against health emergencies and other threats, 2) strengthening effective, accessible, resilient and innovative health systems, 3) reducing the impact of non-communicable diseases with a focus on cancer, 4) promoting sustainable food systems and health, 5) promoting health cooperation with non-EU-countries (European Commission, 2020b).

Moreover, in a spirit of collaboration, a joint undertaking of the WHO/Europe, the EC and the European Observatory on Health Systems and Policies has created the tool "The Health System Response Monitor (HSRM)" designed in response to the COVID-19 outbreak to collect and organise up-to-date informa-

tion on how countries are responding to the crisis. It focuses primarily on the responses of health systems but also captures wider public health initiatives (HSRM, 2020).

As policy making involves a range of actors, the engagement for all EU member-states generated a pool of joint and sustained efforts for dynamic policy makings to tackle the pandemic by creating the European Health Union. Its vision is to better prevent and address future pandemics and reinforce the EU health systems resilience and sustainability. Also, the establishment of another body entitled the Health Emergency Preparedness and Response Authority (HERA) aimed to strengthen the EU's capacity to respond to cross-border health threats and emergencies and support unmet medical needs (European Commission, 2020c).

Immediate policy responses were developed across sectors with an emphasis on effective policy interventions, processes, decisions, trends and proposals. As an immediate response, at EU level, the Civil Protection Mechanism, focused on the mobilisation of medical teams and supplies to the member states in need, as well as the motivation of the European industry to respond to the pandemic by increasing the production of masks, gloves, diagnostic tests, ventilators and critical medical goods. In addition, the EC in July 2020 published the Communication report, which outlined key measures on testing, contact tracing and public health surveillance, medical and non-pharmaceutical countermeasures, access to personal protective equipment, medicines and medical devices, etc. (European Commission, 2020d).

There are also several additional immediate responses and policy recommendations targeting at the behavioural changes and public health risks reductions. ECDC regularly publishes its updated risk assessment regarding the COVID-19 pandemic alongside with a set of guidelines for non-pharmaceutical interventions (NPI), such as hand hygiene, physical distancing, cleaning and ventilation. Emphasis is given on testing and contact tracing, improving surveillance, ensuring better access to personal protective equipment and medicines and sufficient health capacity (ECDC, 2020c, 2020d).

Another major response to the pandemic is the European Vaccine Strategy, "the birthplace" of a structured new approach on vaccines policies and procedures, which empowers a diversified vaccines preparation portfolio. The EC entered into agreements with individual companies on behalf of the member states aiming at supporting vaccines' development and production, given that it has been considered as one of the most crucial investments worldwide (European Commission, 2020e).

Several vaccines have been approved and are available in the market and national vaccinations campaigns to raise awareness have been launched. Furthermore, as the COVID-19 crisis has revealed not only a need for vaccines but also a demand for other pharmaceuticals, the EC has adopted the Pharmaceutical Strategy for Europe in order to facilitate medicines' accessibility, availability and affordability and most importantly to boost a patient centered health care (Eu-

ropean Commission, 2020f). New challenges concerning the transportation, storage and administration of the vaccines, seem to be handled overtime (European Council, 2020).

It can be argued that global mobilisation to fight the health consequences of COVID-19 has been impressive. The immediate international response from multilateral and bilateral co-operations focusing on both health-related measures and broader support to economic activity, is estimated at around US$250 billion (OECD, 2020b). Funding led by the United Nations (UN) for the Global Humanitarian Response Plan aimed to raise more than US$2 billion for immediate needs. Multilateral development banks readied large amounts of resources with about US$120 billion in loans and grants. The World Bank mobilised 2 billion dollars in early April 2020 specifically directed to health and committed to additional US$160 billion over the next 15 months (OECD, 2020c, 2020d).

Also, the action "Global Coronavirus Response", committed by G20 leaders aimed to ensure equitable access to vaccines, diagnostics and therapeutics by supporting with a pledge of €9.8 billion collected by donors (OECD, 2020c). An example is the "Access to COVID-19 Tools Accelerator" (ACT-Accelerator) forming a collaborative framework by mobilising resources through international pledging, launched by WHO, the EC and France. The vaccine pillar of ACT-Accelerator is COVAX, a global facility of €850 million targeting at vaccines' research, development and manufacturing (WHO, 2020d).

Apart from the aforementioned joint global solidarity efforts, recovery plans were announced in the US and EU. The US policy package—the "Biden plan"—of $1.9 trillion was adopted in March 2021 as an economic response to the pandemic (The White House, 2021). In the EU, a total recovery package of €1.8 trillion was secured and is available to all member-states, accounting for 5% of the EU27 GDP, to help rebuild a sustainable, fair post COVID-19 Europe. This recovery package refers to a combination of the EU Budget and the Next Generation EU. More precisely, the Next Generation fund of €750 billion is a common response to the coronavirus outbreak, aiming to boost public and private investments and support reforms by disseminating best practices (European Commission, 2020g).

Moreover, in order to address the human and economic consequences of the pandemic, EC via the Emergency Support Instrument (ESI) pledged €2.7 billion (European Commission, 2020h). ESI is used for the European vaccine strategy, aiming to secure the production of vaccines and sufficient supplies for the member—states through Advanced Purchase Agreements (APAs) with vaccines' producers (European Commission, 2020i, 2020j). Nearly €100 million for the procurement of quality health-related products with emphasis on the prevention and treatment of COVID-19 are assured as part of the upfront costs financed by ESI (European Commission, 2020h). As a result, safe and effective vaccines have been produced by several pharmaceutical companies, securing the purchase of a specified number of vaccine doses in a given timeframe and price.

Significant grants dedicated to health of €5.1 billion and €4.8 billion are

funded by EC via the EU4Health and Horizon Europe respectively (European Commission, 2021). These two research programmes aim to make a substantial contribution to the post-COVID-19 recovery by making the EU population healthier, strengthening the resilience of health systems and promoting health-care innovation. In addition, strategic investments aiming to protect the EU citizens and mitigate the severely negative socio-economic consequences of the pandemic with a budget of €100 billion to member-states, were initiated by the "Support to mitigate Unemployment Risks in an Emergency", the SURE financial programme.

5. Opportunities for Investing in Public Health

An outline of the challenges and responses due to the COVID-19 pandemic has been presented and discussed in the previous sections, mainly at European level but touching upon a global perspective. This section focuses on whether these challenges and responses taken on board are considered to be opportunities for recovery and for investing in public health in the post COVID-19 era.

As time, knowledge and experience are progressing, the "facts" appear to change continuously in terms of the coronavirus awareness. In this context, the pandemic has created an opportunity to make changes in the health care systems with inputs supporting health services' delivery as well as introducing several strategies and joint initiatives. As shown in **Figure 2**, supranational and international entities, governments, institutions as well as the private sector have made numerous efforts and launched recovery plans in order to respond to the most important challenges, such as health systems' capacity, access to healthcare, innovation technology, public health and socioeconomic consequences focusing mainly on governance, financing, human resources and services delivery.

EU member states have already started sharing best practices for managing the pandemic and transition policies towards knowledge-based healthcare reforms (Goniewicz et al., 2020). Numerous challenges and opportunities for recovery occur on how to build and shape stronger health systems, strengthen the crisis preparedness and the management of cross-border health threats, develop strategies to use the new technology and in particular, artificial intelligence (Islam et al., 2021).

It is undoubtful that the pandemic brought forward investments in public health and that healthcare delivery requires hard and constant work and remains a top responsibility for the EU member-states. The current health policy environment dealing with the pandemic has been "recharged" with new funding mechanisms to support health systems. Health systems are still continuously trying to build on the lessons learned, such as to interpret and analyse big epidemiological data, to establish innovative research networks and reach easily accessible funding programmes. Thus, the implementation of funding programmes linked to better co-ordinated actions, horizon scanning and pooling of resources have been revealed as major effective investment opportunities.

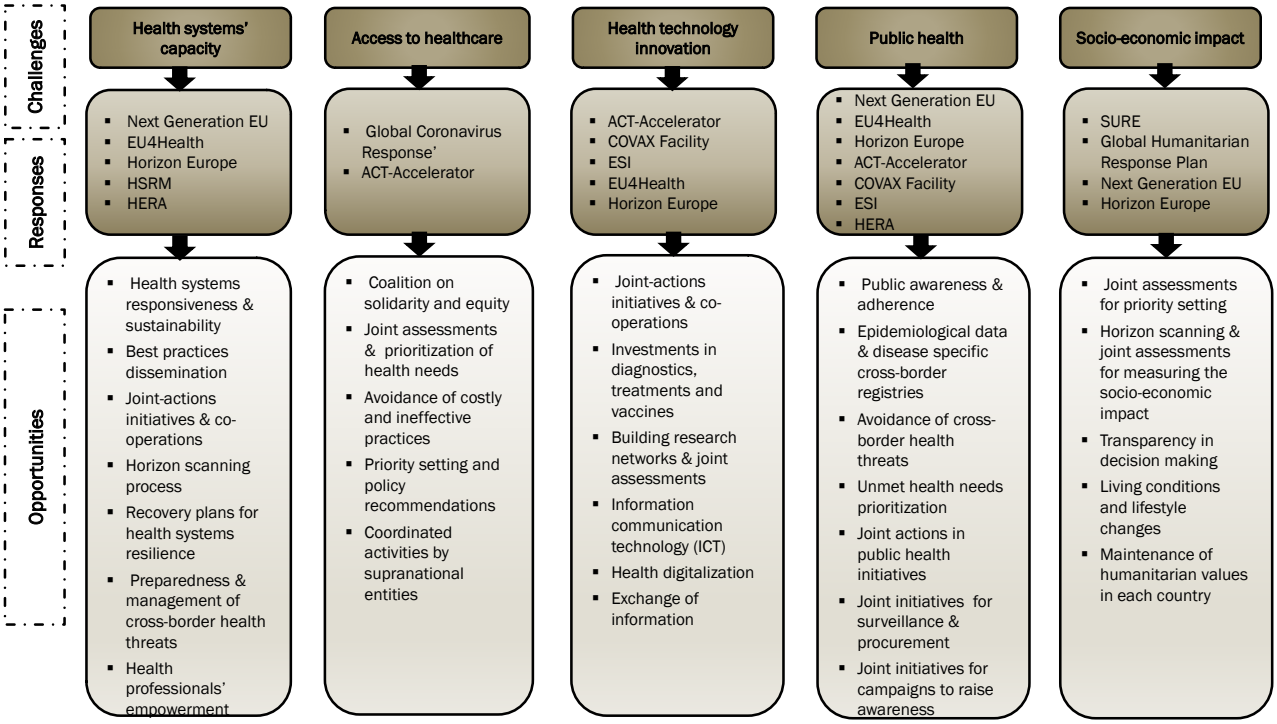

Figure 2. Challenges, responses and opportunities related to the COVID-19 pandemic.

The pandemic has opened new paths of research regarding many aspects in the field of health and partnerships among academia, market and international organisations with a focus on health systems resilience and sustainability (McGuire et al., 2020). Next steps on the implementation of effective recovery policies need to be continued. The EU has to be better prepared for future health crises, not only by investing in transforming the current health challenges into opportunities, but also by improving cohesion in its policy recommendations (Auener et al., 2020).

In addition, member-states have to enhance their efforts mitigating the transmission of the virus through the protection of the citizens by ensuring adherence to public health measures. Solidarity and equity principles are of significant importance to face this major world health crisis and its devastating socio-economic consequences. Continuous vigilance and coordinated actions are required to fight the pandemic globally. The need to plan effective and efficient programmes at national level by supporting health systems and ensuring that they are equipped with the critical capacities to react to future health crises rapidly is still present. Moreover, the major problems of the healthcare systems, such as the budgetary constraints, workforce shortages and the raising of public health expenditures still remain. Tailor made healthcare initiatives, such as adaptation of cost-effective strategies, continuous assessment of high-priority health needs and avoidance of costly and ineffective practices should be enabled (Chalkidou & Krubiner, 2020). Additionally, fostering the public vigilance and the patient-centered quality healthcare are societal investments of significant value.

6. Conclusion

COVID-19 has been and remains an unprecedented global crisis and health systems have put tremendous efforts to withstand the pandemic. This crisis transformed challenges and policy responses into numerous top priority opportunities that have already become a tangible reality. EU is constantly obtaining lessons from the pandemic with coordination being the key component to respond to challenges and build on opportunities that will strengthen health systems' preparedness and management of cross-border health threats. However, continuous vigilance and coordinated actions are required to fight the pandemic globally. Governments need to ensure that the health systems are "equipped" with the critical capacities to promptly respond to future health crises. The pandemic made humanity rethink what was given for granting and paving the way for more efficient economic measures and effective health care delivery. Learning the global lessons is essential.

Successful recovery actions should ensure that the pandemic will leave "permanent scars" neither to the health systems nor to the health status and the social behaviour of the humanity.

Disclaimer

The information and views set out in this article are those of the author and do not necessarily reflect the official opinion of the European Commission.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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