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Strategies used to combat with Covid 19 pandemic

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ABSTRACT

The World Health Organization declared a COVID-19 pandemic on March 11, 2020, when there were 4,293 confirmed cumulative deaths. By May 17, 2020 this number increased to 315,005. The risk of death is higher above the age of 60, but there are many deaths below 60 (for example, in Sao Paulo, 25%). Due to the lack of a vaccine or specific treatment, there are at least three types of interventions used in the first wave of this pandemic:increased alertness and hygiene (e.g. Sweden); identification and isolation of infected people and their contacts (e.g. South Korea); lockdown (e.g. Italy). Choices of the right mix of interventions will vary from society to society and in the same society at different times. The search for a miracle drug is going on along with search for appropriate vaccine. In order to implement any strategy aimed to control the pandemic and preserve the economy, the country needs leadership that centralizes and coordinates actions. WHO is issuing the COVID-19 Strategic Preparedness and Response Plan (SPRP) for 2021 and accompanying documents as a package aimed at guiding the coordinated action that we must take at national, regional, and global levels to overcome the ongoing challenges in the response to COVID-19, address inequities, and plot a course out of the pandemic.Our review aims to evaluate strategies of the most affected countries from different continents all over the for confronting the epidemic as it explains the best practices that could help other countries to overcome current or any upcoming pandemic.

KEY WORDS : Coordination, planning, financing, monitoring and vaccination

INTRODUCTION

Coronaviruses (CoVs) are serious pathogens to humans and vertebrates affecting the hepatic, gastrointestinal, respiratory, and central nervous systems [1]. Coronaviruses belong to the Coronaviridae subfamily of the Nidovirales family. This subfamily is comprised of four genera: α-coronaviruses, β-coronaviruses, γ-coronaviruses, and δ-coronaviruses [2]. Various CoVs exhibit broad host ranges and tropism of tissue. Mammals typically get infected by α- and β-coronaviruses, whereas γ- and δ-coronaviruses typically affect birds and fish but only occasionally mammals [3]. The world has witnessed a series of coronavirus waves during the past two decades, triggering pandemics that have their perturbations on global health. The first one, named severe acute respiratory syndrome (SARS-CoV), had its last outbreak reported in

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September 2003 after infecting more than 8000 persons and causing 774 deaths with a fatality rate of 9.5 percent [4]. Nine years later, Middle East Respiratory Syndrome (MERS-CoV) triggered a respiratory disease in the Middle East. Even so; MERS-CoV is still ongoing compared to SARS-CoV, and the fatality rate was much higher (about 35%). Since December 2019 a third one called COVID-19 has emerged in Wuhan, Hubei province in China. COVID-19 is widely dispersed in humans and its genome is detached from SARS-CoV and MERS-CoV. China classified COVID-19 as a B-infectious disease according to the surveillance system of infectious diseases, which was updated in 2004, and categorized infectious diseases into classes A, B, and C [5]. Class A is highly infectious and causes massive epidemics within very short timespans, and includes plaque and cholera only. B-infectious diseases might cause epidemics and include acute respiratory syndrome (SARS), acquired immune deficiency syndrome (AIDS), viral hepatitis, poliomyelitis, highly pathogenic avian influenza, epidemic hemorrhagic fever, measles, epidemic encephalitis B, rabies, anthrax, bacillary and amebic dysentery, dengue fever, epidemic cerebrospinal meningitis, pertussis, diphtheria, neonatal tetanus, scarlet fever, brucellosis, gonorrhea, syphilis, leptospirosis, schistosomiasis, malaria, influenza A (H1N1), and typhoid fever. Class C involves less serious and fewer infectious diseases such as rubella, leprosy, mumps, leishmaniasis, and acute hemorrhagic conjunctivitis [6]. The new COVID-19 pandemic caused by SARS-CoV-2 has prevailed rapidly and infected around 17 million individuals worldwide (July 31, 2020) [7]. The basic reproduction or transmission number (R0 value) was estimated to be between 2 and 3.5, meaning that one patient can transfer the disease to 2 or 3 other individuals with a fatality rate of about 2 to 3%. SARS-CoV-2 caused many more deaths than its coronaviral relatives, while the mortality rates are considerably lower than MERS-CoV infections. The largest contributing factor towards enabling the control of MERS-CoV is the low basic reproduction number (R0 around 1), indicating that each person transmits it to just one other individual (SARS-CoV R0 was around 4) [8]. The COVID-19 pandemic has posed an eminent threat to many countries. Despite the measures taken up by different countries, this epidemic caused health [9] and economic losses and led to isolation among the countries of the world and between peoples inside the same state. In response to that crisis, there is an urgent requirement to figure out different impacts of COVID-19 to public health.

The WHO COVID-19 Strategic preparedness and response plan (SPRP) 2021 invites national authorities to update COVID-19 national plans to incorporate lessons learned throughout 2020, and to anticipate and prepare for the challenges of 2021, including the need to prepare all health systems to safely and equitably implement new COVID-19 tools such as vaccines. It is also intended for use by UN Country Teams and key partners to develop or update their 2021 COVID-19 multiagency plans with and in support of national authorities. The SPRP 2021 also describes the regional and global technical and operational platforms that will continue to support countries throughout 2021 to implement national action plans, to accelerate equitable access to new COVID-19 tools, and to undertake research and to innovate.

This Operational planning guideline was developed to accompany the SPRP 2021, to provide countries with practical, high-level actions under each of ten preparedness and response pillars

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that can be adapted as appropriate and implemented at national and subnational levels in order to achieve the SPRP 2021 six strategic objectives: • suppress transmission; • reduce exposure; • counter misinformation and disinformation; • protect the vulnerable; • reduce death and illness; • accelerate equitable access to new tools, including vaccines, diagnostics and therapeutics.The Operational planning guideline includes action checklists with new recommended activities under ten response pillars, aligned with the most recent technical guidance.

Epidemiological situation

COVID-19 has spread around the world, affecting every country directly or indirectly (figure 1). Its capacity for rapid spread means COVID-19 has sometimes overwhelmed even the most resilient health systems. As of 7thFebruary 2021, more than 105 million cases had been reported worldwide, and more than 2.2 million people were reported to have died (figure 2). In addition, increasing indirect mortality has been documented worldwide as health systems disruptions associated with the pandemic and response measures have impacted care for other health conditions. The pandemic continues to evolve. The number of cases and deaths globally continue to increase. In the most recent week for which data are complete (the week commencing 1st February 2021), almost 90, 000 deaths were reported globally, and more than 3 million new cases (figure 2). However, these headline figures obscure marked variation amongst WHO regions (figure 3), amongst countries, and within countries. Trends in incidence and mortality are downwards or stable in many countries, but these trends may not reflect the real evolution of the epidemic in countries where testing capacity is limited. In countries experiencing rapid rises in incidence, capacities for case investigation, contact tracing, and quarantine are often put under additional pressure.

Figure 1 Geographical distribution of reported COVID19 cases as at 13 February 2021

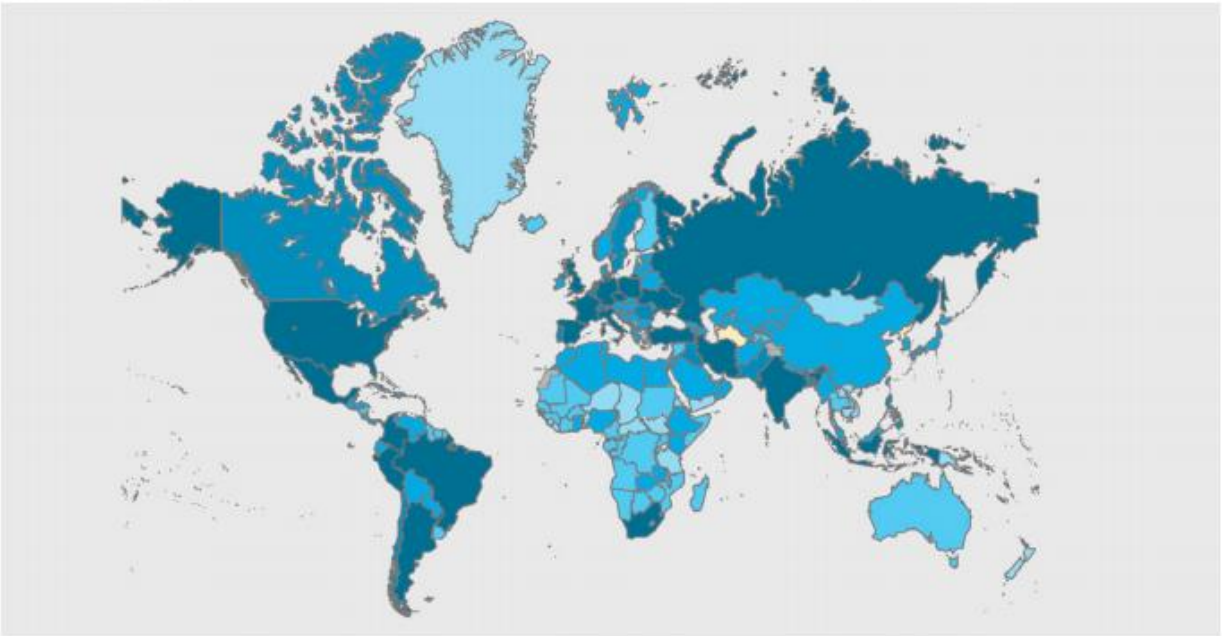

Figure 1: Spread of Covid 19 throughout world

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Males account for a higher proportion of deaths than females (57% of deaths but only 51% of cases), for reasons that are not completely understood, highlighting the need for sex-sensitive and gender-sensitive approaches to response. Women are at an increased risk of SARS-CoV-2 infection, and are often disproportionately affected by the social and economic implications of response measures. These impacts include, but are not limited to, a loss of sexual and reproductive health services, increased expectations to deliver unpaid care at home and in the community, and a steep rise in the incidence of gender-based violence. These periods of peak demand for social protection and refuge services coincide with periods that these services have been significantly curtailed due to COVID-19. In countries that report data disaggregated by social determinant of health such as ethnicity, occupation, education, living conditions, and income, there notable disparities in terms of exposure, vulnerability, access to health services, and health outcomes in the context of COVID-19.

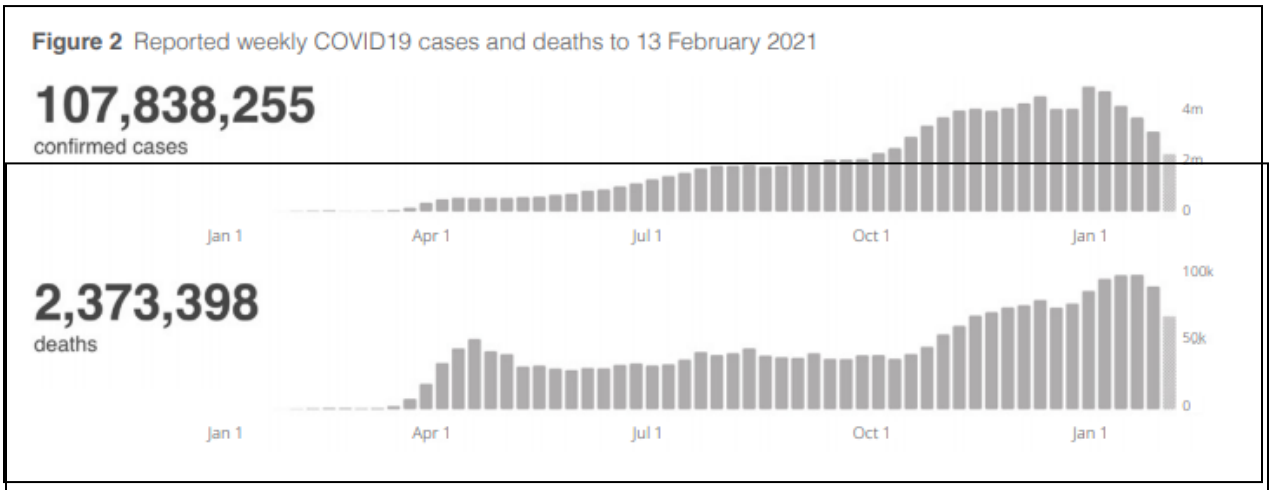

Figure 2: Death reports upto February, 2021 globally

Most COVID-19 cases are in younger adults, but the risk of death from COVID-19 increases steeply with age. Over 80% of deaths occur in individuals over the age of 65 years old, with a case fatality ratio of more than 10% in that age group. However, 16% of all deaths occur in individuals aged between 15 and 64 years old. Comorbidities including non-communicable diseases (NCDs) also significantly increase the risk of death, and there may be other factors that influence the outcomes of COVID-19 that are yet to be understood, especially in low-resource and humanitarian settings for which there is a lack of comparative data. At the population level, the mortality rate increases with increasing COVID-19 incidence. The best way to reduce mortality is therefore to suppress incidence. There is now growing evidence that a postCOVID-19 condition characterized by fatigue and cognitive impairments is not only affecting patients that have been hospitalized, but also a proportion of patients from every age cohort that had mild or moderate disease. In some cases this condition prevents patients from returning to their previous activities. The underlying mechanism of persistent or relapsing symptoms remains to be understood.SARS-CoV-2 transmission is highly clustered, with the majority of transmission

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events estimated to come from a relatively small number of cases. Transmission mainly occurs among close contacts of infected persons in indoor spaces, and can be amplified in enclosed settings with poor ventilation. Secondary attack rates are higher in household settings (recent estimates from two meta-analyses suggest household secondary attack rate is approximately 17–21%), and outbreaks have been reported from a number of settings, including long-term living facilities, prisons, religions or social events, and food processing plants. Health workers have been hit hard by COVID-19. Data from WHO's case database of 33 million records shows that health workers account for 7.7% of cases worldwide, although that figure masks wide variation amongst countries, and changes over time. Based on WHO data, in the first three months of the pandemic, health worker infections slightly exceeded 10% of reported cases, declining to less than 5% by early June 2020 and to approximately 2.5% by September 2020. In addition, the heavy burden placed on health workers involved in the response and within the wider health system has had a negative impact on their health and wellbeing.

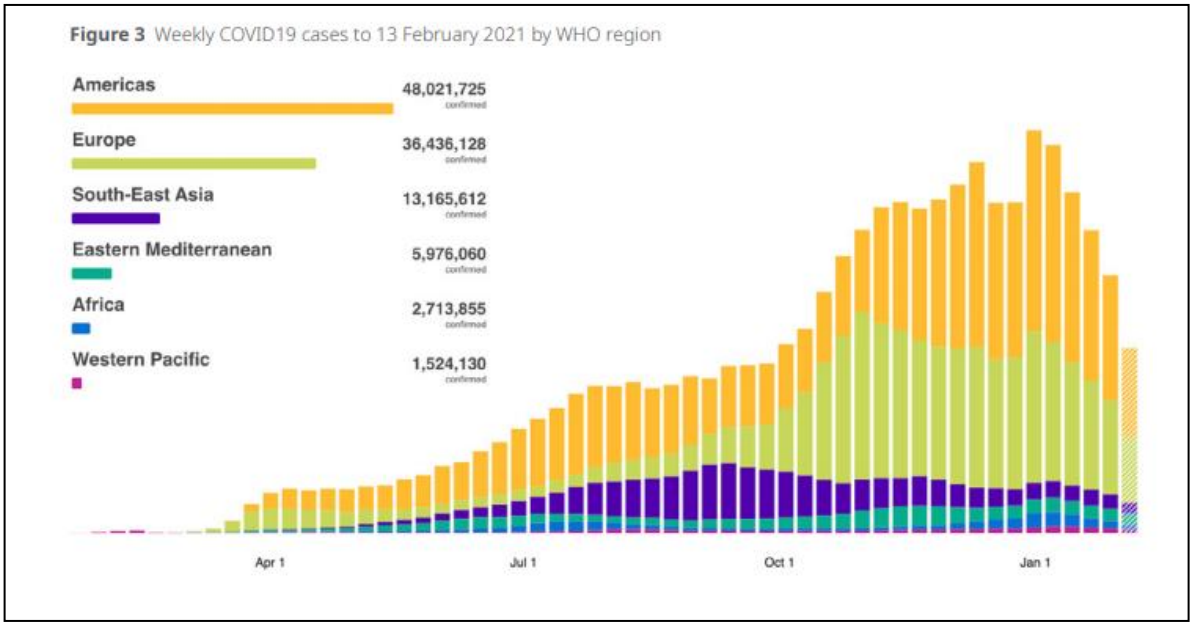

Figure 3: Weekly Covid cases up to February, 2021 globally

Emergence of SARS-CoV-2 variants

Viruses constantly change through mutation, and so the continual emergence of new variants of SARS-CoV-2 has been expected. The vast majorities of mutations is neutral, and have no measurable effect on transmission, or on the type and severity of clinical disease caused by infection. However, some mutations can arise that confer an adaptive advantage to the virus, giving rise to variants of concern. Such changes may enable the virus to spread more easily in certain conditions, may alter some of the clinical characteristics of the disease, and/or reduce the effectiveness of medical countermeasures including vaccines, therapeutics and diagnostics. Throughout 2020 and during the first quarter of 2021, WHO has tracked and assessed the risk

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associated with the emergence of a number of specific mutations and variants of concern identified around the world. Research and modeling is ongoing to determine the impact of specific mutations and variants of concern on transmission; disease presentation and severity; and the potential impact on diagnostics, vaccines, and therapeutics. WHO is working with partners and through the SARS-CoV-2 Virus Evolution Working Group to track and assess the level of risk associated with mutations based on potential impacts on public health. It is clear that the longer and more widely SARS-CoV-2 circulates, the more opportunities it has to adapt, and the greater the threat to our ability to test, treat and vaccinate for COVID-19. In addition, mechanisms for the surveillance of mutations in susceptible animals and associated risks for people in contact with these animals have been promoted jointly by the WHO, the Food and Agriculture Organization, and the World Organisation for Animal Health.

Accelerated research and innovations

The Global research roadmap, launched in February 2020 and regularly updated since, provided the platform to launch what, in under a year, has become a global biomedical research effort unparalleled in history. Pre-empting the need to simultaneously stimulate large-scale production and put in place the capacity to ensure the global implementation of these tools, WHO and partners launched the Access to COVID-19 Tools (ACT) Accelerator in April 2020. In the final quarter of 2020 the world saw the first evidence that these efforts had borne fruit in the form of new vaccines and diagnostics with the potential to turn the tide of the pandemic. A growing number of vaccines have now announced and published safety and efficacy results from phase 3 placebo-controlled trials. The efficacy of these products has far exceeded the minimum efficacy of 50% established by WHO in early 2020. WHO, through its Strategic Advisory Group of Experts on Immunization (SAGE), has issued recommendations for the use of several vaccines, and will continue to evaluate candidates on the basis of its population prioritization recommendations and ethical values framework for COVID-19 vaccines. For therapeutics, the WHO-coordinated Solidarity Trial collects and analyses the results of clinical trials to provide evidence-based recommendations for the clinical management of patients. Interim results published in October 2020 that showed all four of the treatments evaluated (remdesivir, hydroxychloroquine, lopinavir/ ritonavir and interferon) had little or no effect on overall mortality, initiation of ventilation, nor duration of hospital stay in hospitalized patients. Corticosteroids are the one treatment so far found to have a significant clinical benefit among patients with severe or critical disease in terms of reduced mortality. The Solidarity Trial continues to evaluate other treatments for inclusion, including newer antivirals, immunomodulators, and anti-SARS CoV-2 monoclonal antibodies. PCR tests remain the gold standard of SARS-CoV-2 diagnostic testing for accuracy, but other types of tests have also been developed, including rapid antigen detection tests, which are faster, easier to administer (especially in remote locations) and considerably cheaper than laboratory-based molecular assays. Although they are not a replacement for PCR tests, they can be used in a variety of

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different settings, and provide an importantboost to testing capacity.The urgency and commitment with which the scientific community, supported by the global industry, rose to the challenge of developing vaccines, diagnostics and therapeutics in 2020 must now be matched by equally strong commitment from the global community to ensure these new technologies are distributed fairly and equitably to where they are needed most.

Investments are also critical so that communities are adequately informed and engaged in a gender-sensitive, equity-oriented and inclusive manner. With communities fully engaged and actively participating through the full cycle of planning, delivery, and assessment for new biomedical tools, demand for these tools can be increased, leading to widespread and effective uptake and use. Research and innovations in diagnostics, therapeutics, and vaccines will continue to be critically important for reducing transmission, morbidity, and mortality in 2021, and their continued development must be accelerated.

STRATEGIC PREPAREDNESS AND RESPONSE PLAN

The goal of this strategy is end the COVID-19 pandemic, and build resilience and readiness for the future. Though all the countries know much more now than did know one year ago and have developed operational and scientific solutions but the majority of countries have not yet applied that knowledge and those solutions comprehensively or consistently. In 2021 they must redouble their efforts and adapt strategies to achieve six key strategic public health objectives (Figure 4):

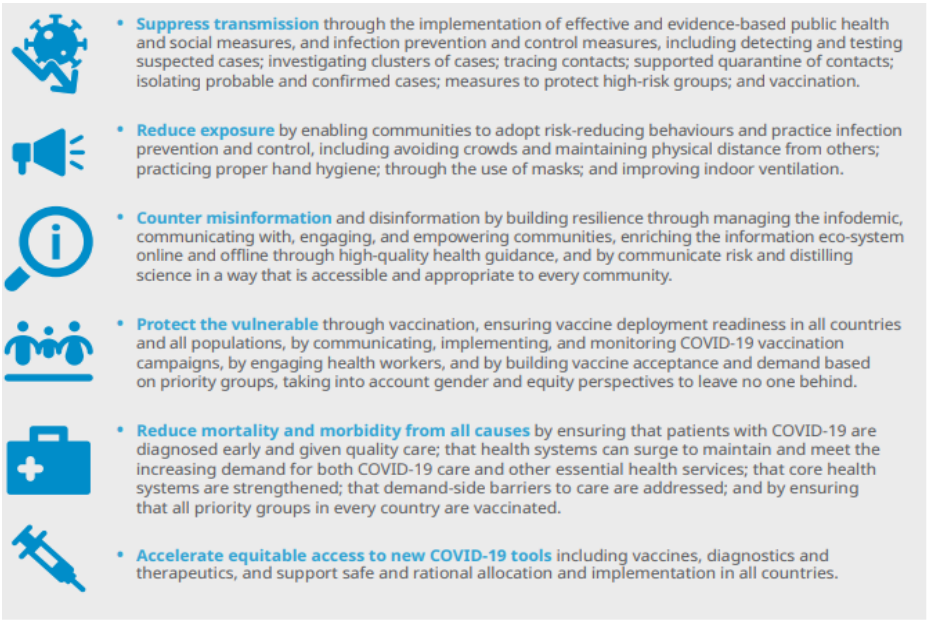

Figure 4 : Six key strategic public health objectives:

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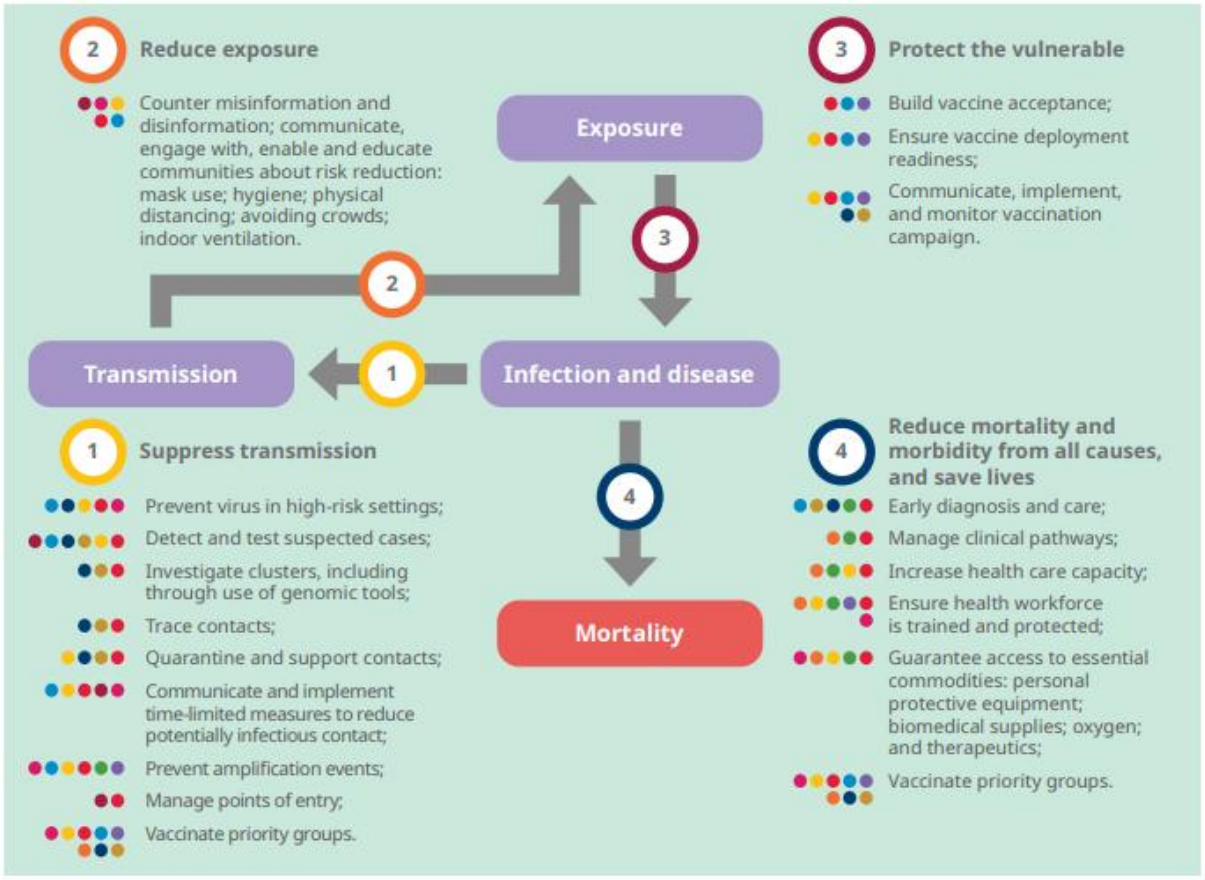
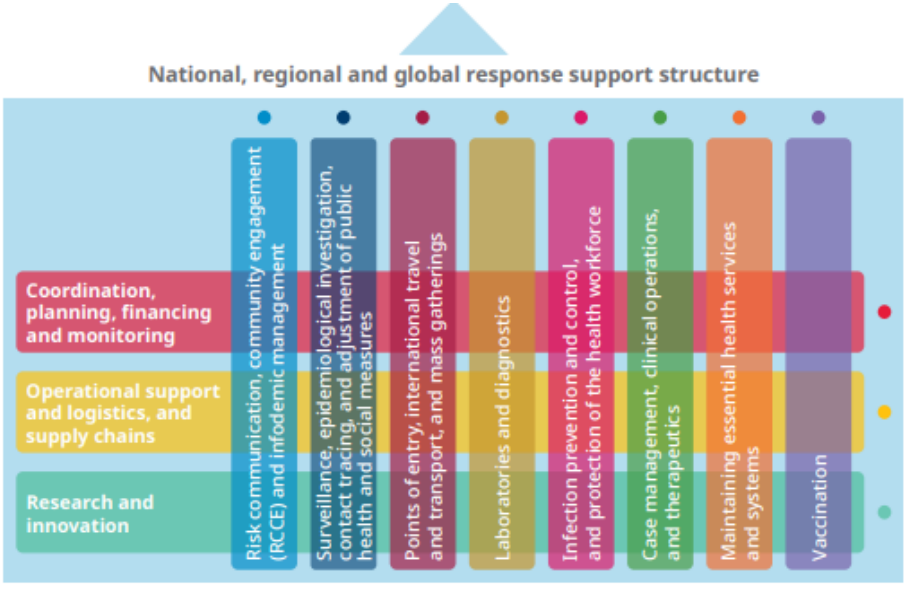
Figure 5 Public health and social measures are supported by multiple response pillars





To achieve our collective strategic objectives we must intervene to break the cycle of transmission-exposure-infection-transmission/mortality. The key interventions and capacities to weaken and break each of the links in this chain are shown above under headings 1–4. The precise nature and form that these public health and social measures take will and should differ between countries, and between subnational areas within countries, according to context and capacities. However, all of these interventions and capacities must be underpinned and facilitated by a multi-disciplinary national and/or subnational response structure. The success of every intervention is supported and enabled by multiple pillars of the response. These national response structures are supported in turn by global operational and technical support platforms, including a cross-cutting research and innovation pillar at the global and regional level.

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Figure 5: Public health and social measures are supported by multiple response pillars

National-level preparedness and response

For the purposes of national level planning and coordination, the high-level COVID-19 SPRP 2021 retains the same core structure and rationale as the SPRP for 2020 (figure 5), with a number of key additions and adaptations in response to lessons learned over the past 12 months, and to address new challenges in the year ahead. These adaptations include the addition of vaccination as a vital tool to reduce morbidity and mortality; an emphasis on ensuring the capacities are in place in all countries to equitably deploy COVID-19 vaccines, novel diagnostic and therapeutics; a risk-management framework for SARS-CoV-2 variants; and an increased recognition that mental health and psychosocial support is an integral component in public health emergency response that must be addressed across a range of response pillars, including case management, risk communication and community engagement, and the maintenance of safe and accessible essential health services.The Operational planning guideline includes action checklists with new recommended activities under ten response pillars, aligned with the most recent technical guidance [16].

Pillars

Pillar 1: Coordination, planning, financing, and monitoring

Pillar 2: Risk communication, community engagement, and infodemic management

Pillar 3: Surveillance, epidemiological investigation, contact tracing, and adjustment of public health and social measures

Pillar 4: Points of entry, international travel and transport, mass gatherings and population movement

Pillar 5: Laboratories and diagnostics

Pillar 6: Infection prevention and control, and protection of the health workforce

Pillar 7: Case management, clinical operations, and therapeutics

Pillar 8: Operational support and logistics, and supply chains

Pillar 9: Strengthening essential health services and systems

Pillar 10: Vaccination

Actions under each pillar are categorized into three groups (Figure 6) that together form the primary components of an iterative response cycle from planning, through implementation, to monitoring and evaluation to inform further planning and decision-making.

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Group 1: actions relate primarily to planning, including needs assessments and design, identification and engagement with key stakeholders, and situation and capacity assessments.

Group 2: actions are focused primarily on implementation.

Group 3: actions are those required to inform the constant adaptation and adjustment of the response, including action related to monitoring and evaluation, field data collection, and data analysis and review.

This Operational planning guideline is a living document and will be updated regularly to incorporate new technical guidance in response to the constantly evolving epidemiological situation. National plans should be implemented, in accordance with the principles of inclusiveness, respect for human rights, and equity.

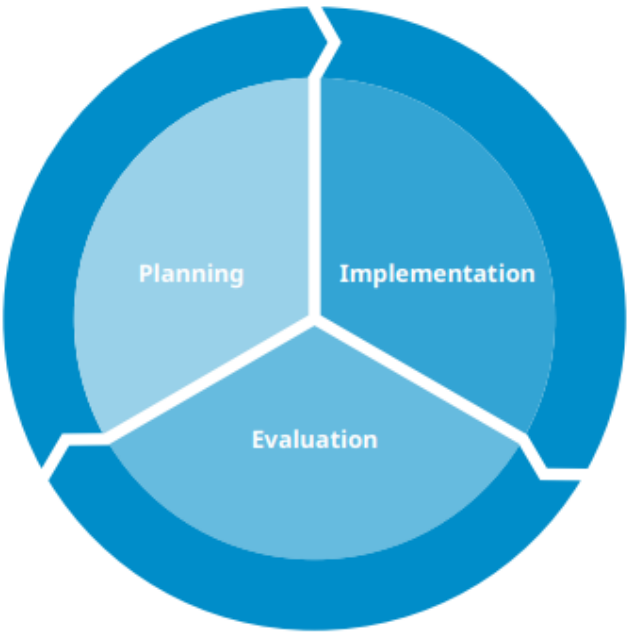

Figure 6: Three groups of each pillar

Public Health Responses to COVID-19

Most countries were forced to announce emergency measures to protect vulnerable people and block ways of transmission due to the continuous increase in confirmed cases by time as reported in [10, 11, 12, 13, 14, 15]. With regard to this escalating situation, governments have begun to develop strategies to resolve the pandemic cooperatively with international health agencies, i.e., Centers of Disease Control (CDC) and World Health Organization (WHO) that declared many precautions based on previous lessons from MERS and SARS diseases.

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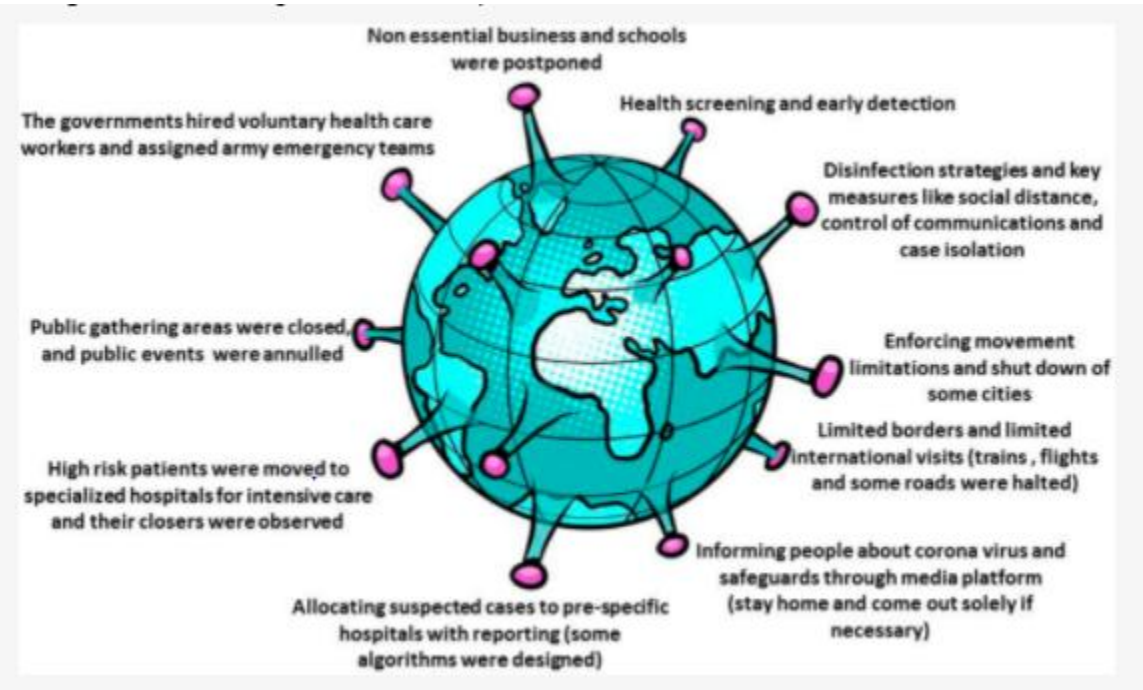

Figure 7: Common strategies followed by all the countries

Collectively, demographic diversity, standard of living of each country's citizens, political state and health systems in addition to other factors led to various strategies being implemented across the globe trying to cope with the crisis (Figure 7). However, the collaboration and sharing of responsibility for controlling the pandemic through exchange of information between countries was the most important step. Taken together, countries facing COVID-19 or any other pandemic should consider control or closure periods and whether required or compulsory closure of unneeded workplaces and public entities as a first line of social distance measures can reduce transmission rate. The closure times should be adapted to the unique characteristics of the novel disease, i.e., the incubation duration and transmission routes, and the nature of these outbreaks. The main purpose of the pandemic control closure phase is to avoid the spread of disease by people with asymptomatic infections. Governments should use closure times to optimize effect, promotions, group screening, active communication, monitoring, isolation, and quarantine. Some countries have promoted their people's consciousness across many channels, e.g., television, newspapers, and conferences. They have been resorting to the use of more modern health and education technologies i.e., E-learning and telemedicine to reduce the urge to go outside. Such a hybrid strategy is also backed up by analyses of responses to previous pandemics, which have shown that average attack rate reductions were more noticeable if social distance policies and other disease prevention steps were combined to prevent transmission. Now we are facing second wave of pandemic and we should be prepared for third wave and further coming in future.

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CONCLUSIONS

SARS-Cov-2 spreads at an astonishing speed across the globe. On 30 January 2020, WHO announced the outbreak of COVID-19 an international public health emergency which impacted 77 countries (status: 4 March 2020) [17**]**. The speed and extent of pandemic detection, particularly early diagnosis and notification of new cases, is an important measure to monitor this infectious disease. Countries that have previous experience with viral infectious diseases (most commonly SARS), powerful primary care systems with helpful infrastructures, guidance rules and instructions, and community awareness with social responsibilities prove to be more effective in controlling the spread of infection and reducing its deleterious impacts. Numerous countries endeavor to construct an info-structure of national digital health in order to improve disease surveillance and link public health and clinical intelligence programs. Clear and open contact between governments and healthcare staff would be pivotal. It was the time for hospitals or agencies that engage in healthcare delivery to audit its protocols and consumables for all selected patients. Heads of State, global health leaders, private sector partners, and other stakeholders have accelerated global partnership to speed up the production of COVID-19 diagnostic and preventive tools. All governments should prepare the public for a third wave or another outbreak. National policy discussions about the future of the respective society should be initiated. COVID-19 is a tragedy for us all collectively, but it is also an opportunity to ask ourselves what kind of society we want after the pandemic fades away.

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