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Opinion

Considerations for improving future pandemic responses

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Abstract

The COVID-19 pandemic of 2020 shook the world with its unprecedented scale, affecting over 700 million people and causing nearly 7 million deaths globally. In response, rapid and extraordinary measures were taken, including the development and distribution of COVID-19 vaccines at an unprecedented pace. However, the speed and magnitude of the response have raised questions about the efficacy and ethics of certain measures. To address these concerns, we present a non-comprehensive list of contentious issues that merit discussion and investigation by the scientific and medical communities. These issues encompass public education, ethical considerations, legal implications, policy decisions, regulatory oversight, gaps in scientific knowledge, and concerns related to mass vaccination efforts. By examining these topics, we aim to improve future crisis responses and maintain public trust and participation in vaccination programs. It is essential to learn from the successes and shortcomings of the COVID-19 response to better prepare for future health crises and ensure the safety and well-being of communities worldwide.

The eruption of the COVID-19 viral pandemic in 2020 was of unprecedented proportions, encompassing nearly the entire world, with over 700 million documented infections and almost 7 million deaths attributed to SARS-CoV-2 [1]. With such a scale of health crisis that has not been seen in multiple generations, a rapid and extraordinary response was needed to curb the pandemic. Prior to available pharmacological intervention measures, various transmission mitigating procedures were employed including previously incomparable lock-downs and social interaction mandates. In a remarkable triumph of scientific ingenuity, various COVID-19 vaccines were developed in record time as never witnessed before, including the emergence of novel technology employed in humans on a mass scale for the first time: mRNA-based gene therapy vaccines. In an equally unprecedented scale, in a span of under two years, the bulk of the global population has been COVID-19 vaccinated with 67% of the total population immunized with complete primary series, and 32% also vaccinated with at least one booster dose [2]. Only the African continent stands in stark contrast with population mass vaccination. Although it constitutes 17% of the world's population, the continent's vaccination rate by November 2022 was just 25% of all those fully vaccinated against COVID-19 [3].

However, the rapid scale of the response and the sheer size of the global population being impacted meant that not all measures employed were met with acceptance, had proper due diligence, scientific investigation or simply mistaken approaches could have been employed under the pressure of public demand to have solutions to the crisis. The scientific and medical community must analyze possible mistakes in pandemic response to ensure that future actions are improved in pandemic handling. While the stakeholders need to achieve their aims, the public trust in authorities is required for ideal mitigation steps [4]. It will not serve the invested parties any good if the public decides to turn against recommendations on

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account of such endorsements possibly not being accurate, be it true, or not in reality.

The reduced uptake of all forms of vaccinations might be a sign of such public wavering in accepting the dictates of medical authorities [5]. Loss of public participation can result in profound and undesirable outcomes beyond direct impact on the invested stakeholders, as reduced vaccination rates can negatively affect the population immunity required for keeping numerous pathogens at bay.

In consequence, we aim to provide a non-comprehensive list of potential topics of contention that we call for the scientific and medical community to discuss and investigate in a bid to improve future health crisis response and mitigate the potential negative consequences of loss of public trust. Proper prophylactic use of vaccination programs needs to be maintained for the best health population outcomes. Public trust and participation need to be preserved. Many of the voiced concerns have been collected from the public domain, thus reflecting how public opinion could represent the unwanted seeds of mistrust. We divide the potential issues of contention into seven sections: concerning public education, ethics of enacted measures, the legal framework surrounding the measures, policies enacted by the authorities, potential regulatory inadequacies, scientific knowledge gaps, and potential issues with the mass vaccination process itself.

Education

The medical authorities have not provided proper education on any at-home immune system support methods to complement either the anti-viral treatment or vaccine immunization. Examples of this include even the simplest practices such as boosting vitamin D levels [6], nutritional and healthy lifestyle recommendations [7], or simple natural solutions such as fasting for those who could safely undertake such approaches [8]. Another important example would be informing the public about the potential value of quarantine immediately post-vaccination to protect from the possible harm of infection soon post-immunization [9,10]. This is an easy example of how medical intervention value is unnecessarily undermined.

Ethics

Health sciences and medicine prides itself on pushing the boundaries of ethical thinking from the point of view of protecting patient's well-being. Here are potential points of discussion needing deeper exploration by ethics scholars to determine if the highest standard of ethics has been met: risk-benefit analysis of used countermeasures [11], delivery of appropriate informed consent [12], merits of injecting everyone with experimental gene therapies [13], appropriate reporting of adverse events [14], people's rights to be with dying relatives or to attend their funerals; healthcare separation from the government/state dictates and ensuring no conflicts of interest by hospitals; prevention of silencing of experts with opposing views [15], regulatory bodies not having ties to the pharmaceutical industry; examining the impact of media focus on peddling fear [16], limiting abusive use of the sense of morality (not punish people under moral medical pretexts); limiting abuse of such terms as "safe and effective"; not exploiting public gullibility in advertised solutions; doctors adequately receiving patient information over possible medical intervention injuries.

Legal

Sound legal process is the cornerstone of a free society and establishing public trust in the governing system. Legal scholars should investigate and justify the following items: appropriate independent control present over the pharmaceutical industry [17], accountability for potential gross negligence [18] and no corruption taking place due to financial incentives. If these items cannot be fully satisfied, appropriate steps need to take place to change laws that fulfill such demands of public safety.

Policy decisions

Many decisions undertaken by the authorities in the course of pandemic management have been met with disapproval due to the excessive impact on the everyday subsistence of individuals and organizations. The merit of such decisions required deeper conversation: no medical mandates should be imposed without any realistic exceptions being allowed [19], use of medical history "passports" leading to societal segregation is to be discouraged [20], problems of chosen policies are promptly reviewed to prevent continuation with same problematic policies instead of correcting the mistake; no large impact decisions are made based on very limited supporting evidence; the message delivered to the public should not be oversimplified [21], individuals performing routine health system tasks (vaccination clinics, health services, elder care, child care) are to be expected to have either natural or acquired immunity or undergo routine testing [22], comprehensive surveillance program implemented to track side effects caused by proposed interventions [14], adequate communication from doctors of potential side effects [23,24], transparency for public scrutiny allowed in a timely manner over chosen policies; true experts involved in decision-making processes to minimize incompetent or corrupt personnel in charge of decisions affecting the public; not ignoring the precautionary principle when alarming scientific information becomes available.

Regulatory

The regulatory bodies are invested with enormous responsibility in protecting public safety from iatrogenic harm. The public trust in these institutions is paramount for the continued workflow of translating clinical research to public health benefits and such reputation of invested public trust in the regulatory bodies needs to remain intact. The following considerations require further analysis for potential improvements that cannot be justified under the need for fast-tracking solutions: revisiting the discussion of the merits of allowing the gain of function experiments [25], oversight of adequate experimental data before the approval process (for example reviewed data should be up to date with appropriate

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time for data review allowed before approval [17]), adequate quality controls employed in research and manufacture [26], delivery of Clinical Report Files to expected standards [17], independent Data Safety Monitoring Boards always used [17], to not use different vaccine manufacturing processes for clinical trials to those used for public mass-immunization without having supporting safety data.

Science

With the explosion of published science, we might be facing a paradox of misuse of scientific knowledge when facing timely pressure in a crisis. Proper operating processes need to be considered when dealing with difficult circumstances such as pandemic response. The following points might require further scrutiny to improve future employed scientific data management: natural immunity is never ignored [27], appropriate focus is taken on prior science to guide medical decisions [28]; interventions are not pressed on healthy populations experiencing low mortality; non-pharmaceutical interventions such as lockdowns or masking are not to be used without adequate safety science [29,30], no censorship of scientific debate [31], published science contrary to chosen narratives is appropriately analyzed; partially vaccinated individuals are not to be considered as non-vaccinated to prevent confounding data interpretation; never assuming the vaccinated are unable to transmit a pathogen without adequate supporting data [32,33], long term vaccination data should be carefully assessed [34-36], ensuring adequate review process prior to clinical data publication [17], appropriate use of the Polymerase Chain Reaction (PCR) cycle threshold to arrive at COVID-19 diagnosis [37,38], proper and prompt investigation of excess deaths [39].

Vaccination

Mass vaccination is considered the best standard in protecting the public against emerging pathogens. It is vital that the public view of the value of vaccination must not be swayed due to seemingly inappropriate decisions in the past, potentially marring pertinent use of this extremely important medical intervention. For this reason, we call for deeper commentary on the following topics: validity of using non-sterilizing vaccines in the midst of a pandemic [41,42], merits of choice of novel untested technology [42,43], consideration of the use of anti-virals to support vaccination program effectiveness [44,45], not vaccinating at infection wave peaks (and thus risking unnecessary complications due to infection); adequate training of healthcare staff on the vaccination process (for example: to avoid risking injection into bloodstream and preventing vaccine products remaining at the site of injection) [46], adequately investigating potential harms of selected antigens or the antigen concentration to achieve highest safety [47], adequate analysis before selection of narrowly focused antigen rather than vaccinating against additional pathogen targets [47], assessing the risk of vaccination induced immunological imprinting [48], not vaccinating target groups without adequate supporting data (especially pregnant women, babies and children) while prioritising most vulnerable groups [49], not allowing alternative variant booster vaccination without adequate evidence of human safety; focusing on various types of immune response rather than responses that lead to the fastest approval process; already existing vaccines against different pathogens are considered for inducing immunological protection [50], appropriate reporting of absolute risk reduction and numbers needed to vaccinate statistics rather than mere focusing on relative risk reduction to avoid misinterpreting vaccine efficacy [51-53], adequate risk analysis of the role of artificial intelligence in fast-track drug discovery [54].

Conclusion

Nations demonstrate pandemic preparedness through the development and implementation of comprehensive plans that encompass strategies for early detection, rapid response, healthcare system resilience, and public communication - aimed at mitigating the impact of infectious disease outbreaks on public health and society [55-59]. In addition, nations can investigate the effectiveness of pandemic response through various means, including data analysis, expert evaluations, public feedback, and comparative studies with other countries. This assessment involves examining factors such as infection rates, vaccination coverage, healthcare system capacity, economic impact, and adherence to preventive measures. Additionally, governments may also commission independent reviews or inquiries to evaluate their pandemic response strategies and to identify areas for improvement [60-62].

The COVID-19 pandemic has been the greatest global public health crisis faced in recent times and humanity will more than likely need to contend with such future emergencies again. It is imperative that responses to the current situation are examined carefully to gain the greatest insights towards improving such reactions in future crises. These might not lie in the distant future. It is also a great opportunity for scientific and medical communities to carefully analyze the outcomes of such responses. This is especially so with the introduction of exciting and highly promising new gene therapy technology, in the form of mRNA injections.

Decisions have been made, selected strategies implemented, and now it is time to learn how to enhance the process for even better future outcomes. In conclusion, the COVID-19 pandemic serves as a critical lesson in crisis management, highlighting the need for thorough evaluation and improvement of response strategies. We call for honest and open discussion of raised points above to achieve these important aims and to enhance future preparedness for similar emergencies, whilst ensuring that public trust in proposed policies is maintained.

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