Letter to the Editor

Pfizer: The miracle vaccine for COVID-19?

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The recent news of Pfizer and BioNTech’s COVID-19 vaccine gave the world a sense of light at the end of a tunnel [12]. Although over 40 vaccine candidates now exist [3], Pfizer and BioNTech’s vaccine generated the most excitement as it was the first to reveal promising efficacy data [2]. According to interim results published on November 9, 2020, the vaccine appeared 90% effective [2]. However, the confidence rose further with new data, published on November 18, 2020, revealing their vaccine now appears to be 95% effective [1]. In response, stock markets rallied and hope spread worldwide, as the prospect of a return to normality became a tantalising possibility. Yet, are such thoughts premature? Is it naïve to think that an effective vaccine is the solution to the pandemic? Despite the optimism surrounding a vaccine, many challenges exist, from guaranteeing its safety and efficacy, to mass production and distribution, to challenges with public messaging, particularly with rising vaccine hesitancy in high-income nations [4].

1. What the vaccine promises

Although distancing, masks, and lockdowns have slowed the spread of COVID-19, a vaccine can protect individuals and create lasting change. The COVID-19 vaccine will enable individuals to develop immunity to the SARS-CoV 2 pathogen [5] and if taken up by a large proportion of the population, it may provide a degree of herd immunity. This will reduce the spread of COVID-19, protecting vulnerable populations, preventing the healthcare system from becoming overwhelmed and enabling focus and funding to return to managing ongoing chronic diseases. Also, the reduced risk of developing COVID-19 will enable individuals to return to a degree of normality, allowing economic activity to increase and preventing further economic damage.

2. Risks of the vaccine

As safety and efficacy data continues being released about this new mRNA vaccine, there is limited information about the known risks of the vaccine. Understandably, with the duration of the clinical trials as they are, long-term side effects and whether the vaccine will provide lasting immunity are unknown. Also, the vaccine is not 100% effective and has reduced efficacy if not stored at precise temperatures [6] – vaccinated subjects may become emboldened to discard their precautions and take greater risks, shedding their social responsibility in curtailing respiratory transmission, presenting an increased risk for those with inadequate immunity. As the full research findings about the vaccine are not yet publicly available, we have only press releases from Pfizer to look to for our information at this time – which state that there are no significant risks to the vaccine.

3. Issues with the data of the vaccine trial

Phase III trials of the vaccine involving 43,538 participants produced 170 confirmed cases of COVID-19 in the first 28 days, with the vaccine found to be 95% effective in preventing COVID-19 (162 cases observed in the control group versus eight in the vaccinated group) [1]. Whilst this is a significant breakthrough, it remains a relatively small sample and a short time horizon. Furthermore, although Pfizer reported no significant safety concerns to date, the medium- and long-term safety of the vaccine remain unknown. Public concerns about the longer-term safety of the vaccine remain valid, considering that it may take months or years for these effects to become evident. The vaccine’s efficacy may still change following further studies, or its effectiveness may wane over time. The duration that the vaccine provides immunity is unknown, thus complicating decision-makers’ abilities to gauge vaccine dosing, timing, budgeting, and possibly increasing the risk of an inequitable distribution. The most recent data suggests that the vaccine effectively protects the elderly – a particularly vulnerable and high-priority group – with 94% efficacy in people aged over 65 years old [1]. It also appears unlikely that a single dose will provide lifelong immunity, with data suggesting that immunity lasts only 12–18 months [7].

However, critical to the eradication of the disease is the mass vaccination of a large percentage of the population, which will require quelling public concerns regarding this vaccine. First, there are fears that the vaccine is being granted expedited approval and that this will compromise quality and safety standards. Second, there is distrust of Pfizer, a private pharmaceutical company, its intentions, and whether they will place the interests and needs of the public above their desire for...
commercial gain, especially regarding product safety and quality. Third, anti-vaccination movements have increased the spread of misinformation and undermined public trust in established authorities [8]. These issues have all been amplified by mass communication, which has enabled a vocal minority to receive a disproportionately large following to disseminate conspiracy theories and fake news. Overcoming these attitudes will require empathy and listening to these people’s concerns, as well as consistent and effective public health messaging [9].

4. Issues with administering the vaccine

Notwithstanding safety concerns, mass-production and delivery of the vaccine remains a difficult task. First, storage and transportation of the vaccine requires a −70 °C environment to maintain its efficacy [6]. This will be especially challenging as the equipment required to achieve such cold temperatures is not readily available in typical medical settings (as no common commercial vaccine needs storage at such extreme temperatures) [6]. Second, administration of the vaccine will be challenging considering that recipients require a booster 21 days later [10], and tracking these people down and administering the vaccine within a specific timeframe (to maximise its effectiveness), will require additional coordination and effort. Third, distribution will require identifying and agreeing upon strategic priority groups who will be offered the vaccine first. It appears likely that amongst the priority populations, frontline healthcare workers and the elderly would first receive the vaccine [11].

5. Future challenges for the vaccine

Since it first emerged in humans, SARS-CoV-2 has mutated and has been able to cross between human and animal populations [12,13]. For example, 12 Danish people developed COVID-19 from a specific mink-associated variant strain of the virus [13]. If the SARS CoV-2 virus continues to replicate and transmit, new strains could develop which may become resistant to a vaccine. If SARS-CoV-2 cannot be eradicated with an effective vaccine, this will lead to the disease becoming endemic within the human population, like influenza and AIDS remain – this could be due to an ineffective vaccine product, poor production, distribution or population vaccine uptake.

6. Conclusion

This is not the first pandemic in the history of humankind. Nor will it be the last. Previously, pandemics have caused untold death and suffering, destabilised economies and altered civilisations. Yet, now more than ever, humanity has the scientific knowhow to attempt to challenge these great scourges. This pandemic has shed a painful spotlight on the political, sociocultural and commercial determinants of health. Pfizer and BioNTech’s vaccine cannot deliver an immediate return to the normality of the pre-COVID world. Nor does it claim it will. However, it is a step. It is a significant step in defining a new normal in a world where COVID-19 has left its mark.

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