Dear Dr. Anthony Fauci,

As a student who is interested in learning about vaccines and the current pandemic, I decided to write a letter to share my perspective with you. First of all, I want to thank you and your NIAID colleagues for your efforts to educate and reassure millions of people worldwide about the Covid-19 vaccines and their reliable efficacy. I have observed the key role you have played as a leading public health official to influence and inspire average Americans toward making responsible choices for the common good. Many citizens in the U.S. have been motivated by you to become vaccinated and to comply with other Covid-19 protocols based on the scientific facts that you have consistently presented. Given your ability to lead and influence the nation, I am reaching out to you with proposals for potential solutions to help more people get accessible, comprehensive, and unbiased vaccine information and thus to help overcome vaccine hesitancy among the 42% of the U.S. population who are still not vaccinated. (usafacts.org)

Since March 2020, people around the world have not been able to go back to their everyday lives due to the Covid-19 variants ranging from the Alpha variant to the Omicron variant. Therefore, vaccination has been a crucial task undertaken by world leaders amid this pandemic because vaccines reduce the risk of infected people suffering severe side effects of Covid-19. However, vaccination rates are not increasing fast enough as some people mistakenly believe that medical experts present erroneous information and that the vaccines are in fact hazardous. Many factors feed this negative misperception; but, many experts claim that two main factors are hugely responsible: social media and rapid clinical trials.

First, misinformation in social media platforms triggers people to distrust the vaccines and even participate in anti-vaccine advocacy groups. Some people wrongly believe that vaccines induce infertility, trigger cancer, alter DNA structure in humans, and are tools used by the government to keep them under control. Political and social analysts attribute this phenomenon to polarizations and the omnipresence of misinformation within social media platforms. According to USA Today, "More than 500 websites have promoted misinformation about the coronavirus – including debunked claims about vaccines, according to a firm that rates the credibility of websites." (USA Today) Further, one article mentions that, "Vaccine hesitancy in the U.S. has been fueled by social media disinformation and rightwing media personalities, who have repeatedly questioned the efficacy and even safety of the vaccine." (The guardian) These sources clearly demonstrate that some groups of people who misuse social media inhibit many internet users from believing in medical experts and vaccines.

Second, although the Covid-19 vaccines are getting praise from many experts and scientists around the world, concerns regarding side effects of the vaccines, especially mRNA vaccines, are increasing because some believe that the distribution of the mRNA vaccines might similarly end up like the tragic Thalidomide scandal that happened during the 1950s. As you likely know, Thalidomide was a globally sensational drug that pregnant women consumed globally to relieve morning sickness. After a company called Grünenthal synthesized Thalidomide in 1954 and went through rapid clinical trials using animals as test subjects, they made a quick conclusion that there were no short or long-term severe side effects even though they had no credible evidence to support these claims. As a result, in the late 1950s, pregnant women worldwide claimed that consumption of Thalidomide resulted in fetal malformations, fetal impairments, and even the death of their infants. Notwithstanding the fact that there is clear difference between the Thalidomide scandal and the development of the Covid-19 vaccines, some people believe that rapid clinical trials involved in developing the Covid-19 vaccines resemble critical incidents involved in the Thalidomide scandal and therefore are dangerous. (thalidomide.ca)

Social media and the rapid clinical trials involved in making the Covid-19 vaccines are responsible for people's skeptical views about vaccines. But, from my standpoint, I firmly believe that the CDC and NIAID are also accountable for people's negative reaction to the vaccines because they failed to utilize their media presence in effective ways.

The CDC and NIAID offer much helpful and precise information about the vaccines through websites that include a compilation of medical terminologies translated into comprehensible jargon and contain direct medical research papers that back up scientists' arguments. Yet, some drawbacks within CDC and NIAID's websites can dissuade people from visiting and acquiring the information.

The first issue is that useful pages within the websites are generally difficult to access. It requires multiple steps for visitors to find pages containing a compilation of medical terminologies and medical articles. So, website visitors tend to ignore such pages.

Second, even if users reach usefully informative pages, most people cannot garner the information they want since many web pages are either too simplistic or else too extremely difficult to understand. Most of the time, people visit these websites to acquire descriptive yet understandable information about the vaccines. But, once people visit these websites, they cannot obtain what they want as webpages are either too superficial or else contain difficult medical papers that are based on unfamiliar scientific methods and trials.

Lastly, most of the articles on these websites mainly focus on the vaccines' efficacy; one cannot see any article highlighting the severity of the side effects concerning the vaccines. Some say it is unnecessary to include articles that underscore the vaccines' side effects. Yet, without articles that stress the severity of the side effects, some people may assume that some information may be intentionally dropped and is therefore biased. Consequently, some people consider these credible websites to be both inaccessible and incredible.

Hence, to persuade people to believe in medical experts and increase the vaccine rollouts, I think that the CDC and NIAID should actively modify their independent media, and utilize to ameliorate their shortcomings since millions of people nowadays use the internet daily. Therefore, I strongly recommend that you and your colleagues modify and update CDC and NIAID websites based on my suggestions because I believe that precise utilization of independent media to inform people about Covid-19 and the vaccines will not only result in an increase in vaccine rollouts, but also increase people's trust in both government and medical institutions.

My first proposal is that the website interfaces must change to make websites easier to navigate and keep organized. For instance, on the CDC's website, there are many informative sections called 'Possible Side Effects' and 'Safety & Monitoring' that address the side effects of the Covid-19 vaccines and show investigations into long-term side effects of the vaccines. Likewise, many pages delineate the manufacturing process of the vaccines and how the vaccines work. Yet, this practical and comprehensive information is somehow unreachable due to redundancy and disorganization. In addition, some web pages are disorganized since some information is also referenced on irrelevant web pages. I acknowledge that redundancy is a practical way to promote the vaccines' efficacy; nevertheless, some visitors might get disoriented by repeated data/information and may not find the information they wanted to acquire. For instance, many CDC web pages frequently cite adverse events that are rare. But, the problem is that some web pages that explain the manufacturing process of the vaccines also note that adverse events are rare in ways that can blur the main topic. Additionally, people look for web pages that include medical articles to analyze their scientific data in some cases. But, as it is hard for people to easily find and visit those web pages in NIAID and especially in CDC's websites, I believe that CDC and NIAID should change the interface by trimming down repetitive information and prioritizing sections that lay out the scientific research.

Second, to support people who have trouble comprehending medical articles regarding vaccines, a modified version of the medical papers is essential. I was a little skeptical about the vaccines at first, due to the omnipresence of disinformation. Yet, as I analyzed and interpreted medical articles to gain more information regarding the vaccines, I reassured myself of the vaccines' safety. Thus far, it may be clear that the public should now start reading medical papers for their health; but unfortunately, reading them is challenging. Most people refuse to invest their time toward comprehending medical articles since medical articles are complex and time-consuming. At this point, some may argue that there is no need for the public to find and fully comprehend the medical articles if they are too complicated. However, after reading scientific papers, I realized that analyzing them was important amid this pandemic because medical reports explicitly reveal how unbiased and empirically minded the scientists and researchers actually are when conducting medical experiments. Therefore, I suggest that the CDC and NIAID make new modified versions of relevant medical articles, which contain lucid yet detailed information about the vaccines. Creating new modified versions of medical articles using paraphrased terminologies and compendious explanations of certain biological phenomena will help the public to better understand the medical papers and to trust scientists.

Additionally, you and your colleagues could update the websites by including research papers emphasizing the vaccines' efficacies and their side effects, to reduce perceptions of bias and thereby increase reliability. According to a study published in PubMed July 2021 by a CDC COVID-19 Response Team, Stanford University School of Medicine, and other institutions, ACIP found the benefit of using the Covid -19 vaccines under the FDA's EUA outweighed the risks of myocarditis in all populations regardless of ages. This study found that among males aged 30 years or more, “15,300 COVID-19 cases, 4,598 hospitalizations, 1,242 ICU admissions, and 700 deaths could be prevented compared with about three to four mild myocarditis cases after the COVID-19 vaccinations” (PMC). These articles that inform people about the vaccines' efficacy are present on CDC and NIAID's websites. Still, few if any articles highlight both the vaccine's effectiveness and the relative severity of the vaccine's side effects.

Some experts say that including such papers that underscore the severity of the vaccine side effects in medical websites could easily backfire and become controversial because these medical websites' primary purposes are to encourage vaccinations. Still, I suggest that you and your colleagues update your websites by including comprehensible articles that stress the significance of the vaccines' side effects since I believe that including articles that demonstrate the risks of the vaccines will uphold the government, CDC, and NIAID's reputations for credibility. For example, including one such study published in JAMA Network could make this possible since it found high correlation between the vaccines and myocarditis/pericarditis. According to one research article published in JAMA Network by George A. Diaz and others, among people who developed pericarditis, the median age of pericarditis was 59 years, and the median hospital stay was one day. No patients needed intensive care since most of them resolved their symptoms and improved. Although this study concluded that the vaccines could protect people from the Covid-19, this article also added that the vaccine adverse events are at a high incidence and that there might be a positive correlation between the vaccines and the side effects (myocarditis/pericarditis). (JAMA Network) I found these research articles not only helpful as they helped me realize the vaccines' efficacy and their possible dangers, but also helped me realize how uncommon it is for people who developed side effects to eventually die or to need intensive care in order to recover from vaccine side effects. Therefore, including medical articles like the case study above discussed above can remind people that adverse events may be an essential element to consider when deciding whether they should get vaccinated based on their health, and could ultimately make the CDC and NIAID more credible and reliable than some now perceive.

Lastly, the CDC and NIAID's websites could include pages that emphasize the need for future clinical trials concerning the long-term side effects of the Covid-19 vaccines. The CDC and NIAID could conduct a long-term project that examines and analyzes long-term side effects of the vaccines and update emergent new data and analyses on their websites. This implementation could diversify and enrich the websites and may help to convert the public's negative reactions toward science and medical institutions into positive perceptions by highlighting the CDC and NIAID transparency.

In a time when getting vaccinated has become a more crucial task than perhaps ever before, vaccination rates are not increasing. In a world where independent media affect people's daily lives, it is hard for many people to distinguish truth from falsity regarding vaccine information, because special interest groups and individuals misinform the public via media platforms. To go back to normalcy and push back against media platforms that are teeming with misinformation and hatred, I believe that the CDC and NIAID can save the world by modifying and utilizing their media in more practical ways. You, Dr. Fauci, once said, "I believe I have a personal responsibility to make a positive impact on society." Now is the time to change the world and make more positive impacts. As I firmly believe that the vaccination rates would increase and help the world claim victory over misinformation and over the pandemic once you and your colleagues can learn to utilize your media presence by reflecting on my suggestions, I humbly ask you to deliberate on the possible solutions that I have described in this letter. Thank you for your time and consideration.