

COVID-19 Vaccine Efficacy in Previously SARS-CoV-2 (COVID-19)-Infected Individuals and SARS-CoV-2 (COVID-19) Infection after Vaccination

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Only a single dose of a mRNA vaccine might be needed in confirmed-COVID-19-infected persons, recently demonstrated in at least two studies. Seropositive persons revealed a rapid antibody response after one dose of either the Moderna or Pfizer-BioNTech vaccines, demonstrated in a not-yet-peer-reviewed preprint [1]. Furthermore, previously SARS-CoV-2 (COVID-19)-infected individuals demonstrated more frequent vaccine-side effects after first dose was demonstrated in individuals with previously SARS-CoV-2 (COVID-19) infection, same as demonstrated for the second dose in phase III vaccine trials [1]. This recent study in 109 persons, conducted by scientists from Paris, France and Mount Sinai in New York, United States revealed that the antibody titers of 41 previously positive-SARS-CoV-2 (COVID-19) tested individuals were 10-20 folds those of having never had it at the same time points [1]. Previously SARS-CoV-2 (COVID-19)-infected individuals demonstrated high, or up to 10 times higher antibody concentrations, than the levels shown in uninfected persons with receipt of two doses of vaccine [1]. Lifelong maintenance is questionable in this early immune response difference. Negatively impact on their antibody titers would not occur in one-dose-vaccinated persons with previously SARS-CoV-2 (COVID-19) infection [1]. Higher frequency of vaccine-adverse reactions were demonstrated in those with pre-existing immunity-experienced-systemic side effects, such as muscle or joint pain, headache, fatigue, chills, and fever [1]. Another small study, as a preprint from the University of Maryland, United States in 59 healthcare workers demonstrated the same results as the first study, whereas the localized-injection-site symptoms were similar in both groups patient groups [2]. At 10 and 14 days after one-dose vaccination, the antibody response will be peaked in previously SARS-CoV-2 (COVID-19)-infected persons [2].

Since the beginning of COVID-19 vaccination campaign, the development of COVID-19 in one or two doses of COVID-19 vaccination has been reported [3], whereas at 14 days after the second dose of mRNA-1273 vaccine (Moderna) revealed 94.1% efficacy for the prevention of symptomatic SARS-CoV-2 (COVID-19) [4] and at 7 days after the second dose of the BNT162b2 vaccine (Pfizer) revealed 95% efficacy [5]. During December 16, 2020 and February 9, 2021, the data from the University of California, San Diego (UCSD) and the University of California, Los Angeles (UCLA), United States found that 379 unique healthcare workers among a total of 36,659 healthcare workers who received the first dose of vaccine at both UCSD and UCLA, and 28,184 of these individuals (77%) demonstrated positive testing for SARS-CoV-2 (COVID-19) at least 1 day after the second-dose vaccination [6]. Within the first 2 weeks after the first dose of vaccination, the majority (71%) of these individuals demonstrated positive testing for SARS-CoV-2 (COVID-19) [6]. Positive test results were found within 7 days after the second dose of vaccination in 22 healthcare workers of 37 SARS-CoV-2 (COVID-19)-infected healthcare workers, positive testing for SARS-CoV-2 (COVID-19) within 8 to 14 days after the second dose of vaccination was found in 8 SARS-CoV-2 (COVID-19)-infected healthcare workers, and positive testing for SARS-CoV-2 (COVID-19) was found within 15 or more days after the second dose of vaccination in 7 SARS-CoV-2 (COVID-19)-infected healthcare workers [6]. Among those who infected with SARS-CoV-2 (COVID-19) and vaccinated at UCSD and UCLA, these findings provide a positive rate of SARS-CoV-2 (COVID-19) of 0.05%, 1.19% and 0.97% of the absolute risk of testing positive for SARS-CoV-2 (COVID-19) after vaccination, respectively [6]. Comparing with the risks demonstrated in the mRNA-1273 vaccine [4] and BNT162b2 vaccine [5] trials, these rates are higher due to several reasons, such as regular testing for asymptomatic and symptomatic individuals availability at the UCSD and UCLA, etc. [4,5,7].

In conclusion, the herd immunity is largely targeted if future studies confirm this high level of immunity after a single mRNA vaccination, this could be a viable option. Encouraging the maintenance of one or two doses of COVID-19 vaccines outside the trial is suggested, whereas continued public health mitigation measures are critical importance.

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