# COVID-19 Brand Switching: Expectation on Protective Efficacy

Dear Editor,

The new available coronavirus disesae COVID-19 vaccine becomes the new hope for the control of the disease. A recent report showed that the vaccine could induce protection in a large group of vaccinated subjects.[1] With the rapidly increasing demand for the COVID-19 vaccine, the supply is usually insufficient and the price of the vaccines becomes greatly different among different buyers.[2] At present, there are many brands of the COVID-19 vaccine with different cost-effectiveness properties.[3] Sometimes, it takes a long time to get a sufficient amount of COVID-19 vaccine supplied by a manufacturer. There is a new idea for vaccine brand mixing—different vaccine brands in different doses. As noted by Public Health England, this should be on extremely rare occasions.[4] To date, there are no data from the trial on the newly proposed ideas. However, it might be roughly predicted using a medical mathematical prediction. Here, the authors focus on the three different available vaccines for the switching model.

A basic assumption is that different vaccines are produced from different biotechnologies and have different basic components and immunogeneration mechanisms. The effect of switching the brand might be modeled based on the basic information on protective efficacy induced by the first dose of each vaccine. After the first dose, the protective efficacy is assumed to be according to the reported rate of each vaccine. After the second dose, the efficacy will be equal to the background protective efficacy from the first dosage plus additional protection from the second dose. The additional protection from the second dose by the switched second brand vaccine will be estimated by "the reported protective efficacy of the second switched brand vaccine if it is used as the first dose—the already derived protective efficacy of the first brand vaccine before switching."

According to the switch modeling, the results are shown in Table 1. It can show that the expected effect of switching is various— either increasing or decreasing protective efficacy. This confirms the fact that it still requires further studies to evaluate the effect of switching. In case there is a lack of clinical data, the switching of vaccine brand should not be considered if it is not necessary.


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## Conflicts of interest

There are no conflicts of interest.

**Table 1: Switched brand modeling for the COVID-19 vaccines**

| The first dose vaccine brand | The second dose vaccine brand | Expected protective rate (%) | |
|---|---|---|---|
| | | After the first dose | After the second dose |
| A | A | 59 | 86 |
| | B | 59 | 85 |
| | C | 59 | 94 |
| B | A | 52 | 81.5 |
| | B | 52 | 89 |
| | C | 52 | 87 |
| C | A | 70 | 99.5 |
| | B | 70 | 96 |
| | C | 70 | 94 |


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