What is the difference in effectiveness between one JYNNEOS vaccination and two JYNNEOS vaccinations within a 3-month time period?

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Mpox, formerly known as Monkeypox, is a zoonotic disease caused by the monkeypox virus of the genus *Orthopoxvirus*. (1) The symptoms include rashes, blisters, fever, and swollen lymph nodes, and the onset of these takes anywhere from 3 to 17 days from exposure to occur. (2) While most cases are minor, with patients recovering in a few weeks without treatment, certain individuals, such as pregnant women, children, and people with suppressed immune systems, can have cases that are much more severe. Transmission can occur between individuals from direct contact with infected skin or bodily fluids. (3) Mpox used to be a disease endemic in Central and Western Africa, with animals such as African rope squirrels, African giant pouched rats, and dormice, getting the name Monkeypox from the monkeys that were carrying the disease. This discovery was made in 1958 in Denmark, and it stayed a mostly minor disease until its recent global spread in July of 2022, nearly sending the world into yet another pandemic before it was gradually put under control by behavioral changes, vaccination efforts, and isolation measures in certain parts of the world. (1)

In a study conducted by CIDRAP, it was revealed by Barouch and colleagues that there had been a decreasing antibody response in the JYNNEOS vaccine, in which a single dose of the vaccine only provided a 36% efficacy rate in a 3-month testing period, whereas two doses provided an 66% efficacy rate. Efficacy is the percent decrease in disease cases between a vaccinated group of people and a non-vaccinated group, so a 66% efficacy rate means there are 66% less mpox cases in the two-dose vaccine group than in a no vaccine group. This clear disparity shows how much more effective two doses is at preventing mpox than one dose is. Even though the antibodies do decline after 3 months, there is a greater number of them and a lesser change of a full decline when using 2 doses than 1. As such, it is clearly more effective and recommended to get 2 doses of vaccination. (4) A similar study conducted by medRxiv used similar data to also try to find the vaccine efficacy of the JYNNEOS vaccine, finding it to be 66-88.5%. While the source did not specify how many doses were provided, we can infer from the previous data that this was probably a full 2 doses. This fortifies the previous study's findings that two doses have a higher efficacy rate than a single dose. (5)

Another study conducted by the New England Journal of Medicine found that there once again was a large disparity between the prevention rates of one dose of vaccine versus two. This study was again carried out over a roughly 3 month window, and pulled data from a group of case and control subjects, totalling about 10,500 participants. Of these, 146 case subjects and 1000 control subjects had one vaccine, and 25 case subjects and 335 control subjects were fully vaccinated. The single vaccine group had an overall unadjusted vaccine effectiveness rating of 52%, and the two doses group had an overall vaccine effectiveness of 77.2%. This proves that two doses are much more effective at preventing mpox than a single dose is. (6) Another study conducted by the CDC pulled data from conditional logistic regression models of 252 mpox patients and 255 control patients to find that a single dose had a vaccine effectiveness of 68.1% and that two doses had a vaccine effectiveness of 88.5%. This study was also done over the course of roughly 3 months and only pulled data from subjects in New York outside of New York City. (7)

In a study conducted by JAMA, 5402 victims of mpox were evaluated based on their vaccination status when they became ill. The study found that of these 5402 subjects, 85% were unvaccinated, 1.4% had at least one dose 2 weeks prior to infection, and 5.2% had at least one dose less than 2 weeks before infection. They also said that the length of a single dose's immunity was undetermined, and two doses is strongly recommended in order to keep oneself as safe as possible. (8) A similar study was conducted by CDPH to find how long after exposure to mpox could the JYNNEOS vaccine be given. They discovered that if the vaccine was given 1-4 days after exposure, the vaccine may prevent infection. However, they found that if administered 4-14 days after exposure, the vaccine may not fully prevent the infection but can prevent major symptoms. (9)

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