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31 May 2023

s 9(2)(a)

Ref: H2023024576

Tēnā koe s 9(2)(a)

Response to your request for official information

Thank you for your request under the Official Information Act 1982 (the Act) that was transferred from Te Whatu Ora (Health New Zealand) to Manatū Hauora (the Ministry of Health) on 2 May 2023 for information regarding mRNA technology and vaccine. You requested:

> *1. Is a randomised control trial being run for the bivalent booster, and if so, how long will the control group remain blinded this time?*

This part of your request is refused under section 18(d) of the Act as the information requested is publicly available on the US clinical trials register available here: clinicaltrials.gov/ct2/results?cond=COVID-19.

> *2. This technology is novel - how confident can I be that using this product won't have long-term consequences on my health?*

The bivalent vaccine has a similar safety profile to the original formulation of the Pfizer vaccine. The data sheet for the Pfizer bivalent vaccine can be found on the Medsafe website here: www.medsafe.govt.nz/profs/datasheet/c/ComirnatyOriginalOmicronBA4-5inj.pdf. More information can be found on the CV TAG memo available here: www.health.govt.nz/system/files/documents/pages/cv_tag_memo_recommendations_for_decision_to_use_pfizers_bivalent_ba.4_ba.5_r.pdf

> *3. I thought one of the advantages of mRNA technology was going to be the ability to quickly adapt the product to new strains of virus - therefore, what is the point of receiving a booster that contains mRNA sequences encoding older versions of spike protein?*

The Pfizer bivalent vaccine stimulates the immune system to create antibodies, against both the original variant of SARS-CoV-2 and Omicron subvariants, to provide better protection than the original formulation of the vaccine. This formulation of the vaccine still provides a high level of protection against currently circulating variants including XBB subvariants.

Updates to the strain composition of COVID-19 vaccines by manufacturers such as Pfizer, often follow after a recommendation by the United States Food & Drug Administration (US

FDA) based upon circulating strains at the time (similar to the process that informs their annual influenza vaccine composition). The US FDA is holding its next meeting to discuss this in June 2023. More information is publicly available here: www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-authorizes-changes-simplify-use-bivalent-mrna-covid-19-vaccines.

Due to the lead time required for vaccine production, the agreed strain composition of the updated vaccine may not directly correspond to circulating strains of the virus at time of approval. However, due to the updated vaccine being more closely matched to these strains compared to prior formulations, it is anticipated to provide better protection against severe disease.

5. What benefit does this bivalent booster provide above whatever natural immunity I might have obtained during the past three years?

A systematic review (of studies to mid-2022) found that hybrid immunity provides higher protection against severe COVID-19 related outcome than infection or vaccination alone. Prior infection and hybrid immunity both provided greater and more sustained protection against Omicron than vaccination alone. However, individuals with hybrid immunity had the highest magnitude and durability of protection against all outcomes.https://www.medrxiv.org/content/medrxiv/early/2022/10/24/2022.10.02.22280610.full.pdf

A more recent study published in The Lancet showed that antibody levels against Omicron subvariants, were highest in those that were triple vaccinated and received a bivalent vaccine and had a previous COVID-19 infection compared to those that were only vaccinated. https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(22)00792-7/fulltext

Please refer to the 'Immunological Data' section in the last Ministry's Variants Updates publicly available here: www.health.govt.nz/system/files/documents/pages/sars-cov-2_variant_of_concern_update_54_final.pdf.

6. What evidence is there that having the booster will reduce my chances of transmitting Covid-19 to others?

The bivalent vaccine has not been assessed for its vaccine efficacy in preventing transmission. Please refer to the last Ministry's Variants Updates for data Manatū Hauora holds on the bivalent vaccine: www.health.govt.nz/system/files/documents/pages/sars-cov-2_variant_of_concern_update_54_final.pdf

9. What is the allowable rate of cDNA plasmid contamination in the booster product?
10. How are these products being tested for cDNA plasmid contamination

Information in response to this part of your request is withheld under section 9(2)(b)(ii) where its release would likely unreasonably prejudice the commercial position of the person who supplied the information. However, you may find useful information regarding Comirnaty quality in document 7 available here: www.health.govt.nz/system/files/documents/information-release/h202106950-_response.pdf.

11. How does an intramuscular injection of mRNA product stimulate an appropriate immune response to what appears now to primarily be a respiratory infection?

The muscle tissue contains immune cells that can recognise the antigen. In the case of the Pfizer vaccine, the spike protein is the antigen that is produced in the body after vaccination,

using the mRNA as instructions. After the antigen is produced within the immune cells in the muscle tissue, the cells transport the antigen to the lymph nodes, where the immune response develops and systemically protects the vaccinated individual. (www.nature.com/articles/s41578-021-00358-0). Many vaccines are injected in the deltoid because it is close to lymph nodes located just under the armpit. Animal studies have found that intramuscular vaccines mostly remain near the site of injection and local lymph nodes (www.sciencedirect.com/science/article/pii/S2211124720302928 and www.ncbi.nlm.nih.gov/pmc/articles/PMC5475249/)

12. What is known about how the lipid nanoparticle delivery mechanism interacts with tissues outside of the muscle?

As per answer to question 11, cells at the site of injection (i.e., muscle cells) uptake the vaccine and the antigen that is produced is acquired by immune cells and transported to nearby lymph nodes where the immune response develops. (www.nature.com/articles/s41578-021-00358-0).

13. How long does the lipid nanoparticle remain in the body once injected?
14. How long does the mRNA contained in the lipid nanoparticle remain in the body once injected?

After vaccination, there is a short timeframe in which the spike protein is produced. Studies are limited on the duration of detectable spike protein in the blood but have shown the level of spike protein detected in the blood are extremely low and require specialised technology to detect the spike protein, that would otherwise be undetectable on by a standard antigen test. https://academic.oup.com/cid/article/74/4/715/6279075?login=true
Many vaccine recipients do not have detectable levels of the antigen after 7 days, nor will there be mRNA in appreciable quantities.
https://onlinelibrary.wiley.com/doi/10.1111/apm.13294

Under section 28(3) of the Act, you have the right to ask the Ombudsman to review any decisions made under this request. The Ombudsman may be contacted by email at: info@ombudsman.parliament.nz or by calling 0800 802 602.

Please note that this response, with your personal details removed, may be published on the Manatū Hauora website at: www.health.govt.nz/about-ministry/information-releases/responses-official-information-act-requests.

Nāku noa, nā

Jane Chambers
Acting Deputy Director-General
Public Health Agency | Te Pou Hauora Tūmatanui