



**Immunogenicity and SARS-CoV-2
Infection following the Fourth BNT162b2
Booster Dose among Health Care Workers**

**Presentation for ASPHER Task Force
11.5.2023**

Presenter: Dr. Avi Magid



Introduction

- **The fourth SARS-CoV-2 vaccine dose was found to protect against infection and more importantly against severe disease and death**
- **It was also shown that the risk of symptomatic or severe disease was related to the antibody levels after vaccination or infection, with lower protection against the BA.4 BA.5 Omicron variants**



Introduction – cont.

- **Study aims:**
 - **To assess the impact of the fourth dose on infection and among healthcare workers (HCWs) at a tertiary health care campus in Haifa, Israel**
 - **to investigate the possible protective effect of antibody levels against infection**



Methods

- **A prospective cohort study among fully vaccinated healthcare workers (HCW) and retired employees at Rambam Healthcare Campus (RHCC)**
- **Recruiting process:**
 - **Step 1: all HCWs who were vaccinated with at least two BNT162b2 vaccine doses and had no history of known infection prior to the second vaccine dose administration were invited to participate in the study. Those who consented, underwent serial serological tests at 1, 3, 6, 9, 12 and 18 months after receiving the second vaccination dose**



Methods – Cont.

- **Step 2: A second recruitment time point was in January 2022, where all other HCWs were offered the opportunity to participate in the study, including those who were infected with SARS-CoV-2 before the vaccine was approved**
- **During December 2021 a fourth vaccine dose was offered to individuals for whom 4 months had passed since they received the third vaccine dose**



Methods – Cont.

- **As a result, there were two distinct groups at the fourth and fifth serological testing time points at 9 and 12 months after the second dose: those who received three doses and those who received four doses (with or without previous SARS-CoV-2 infection)**
- **A multivariable logistic regression was conducted to test the adjusted association between vaccination, and the risk of infection with SARS-CoV-2**



Methods – Cont.

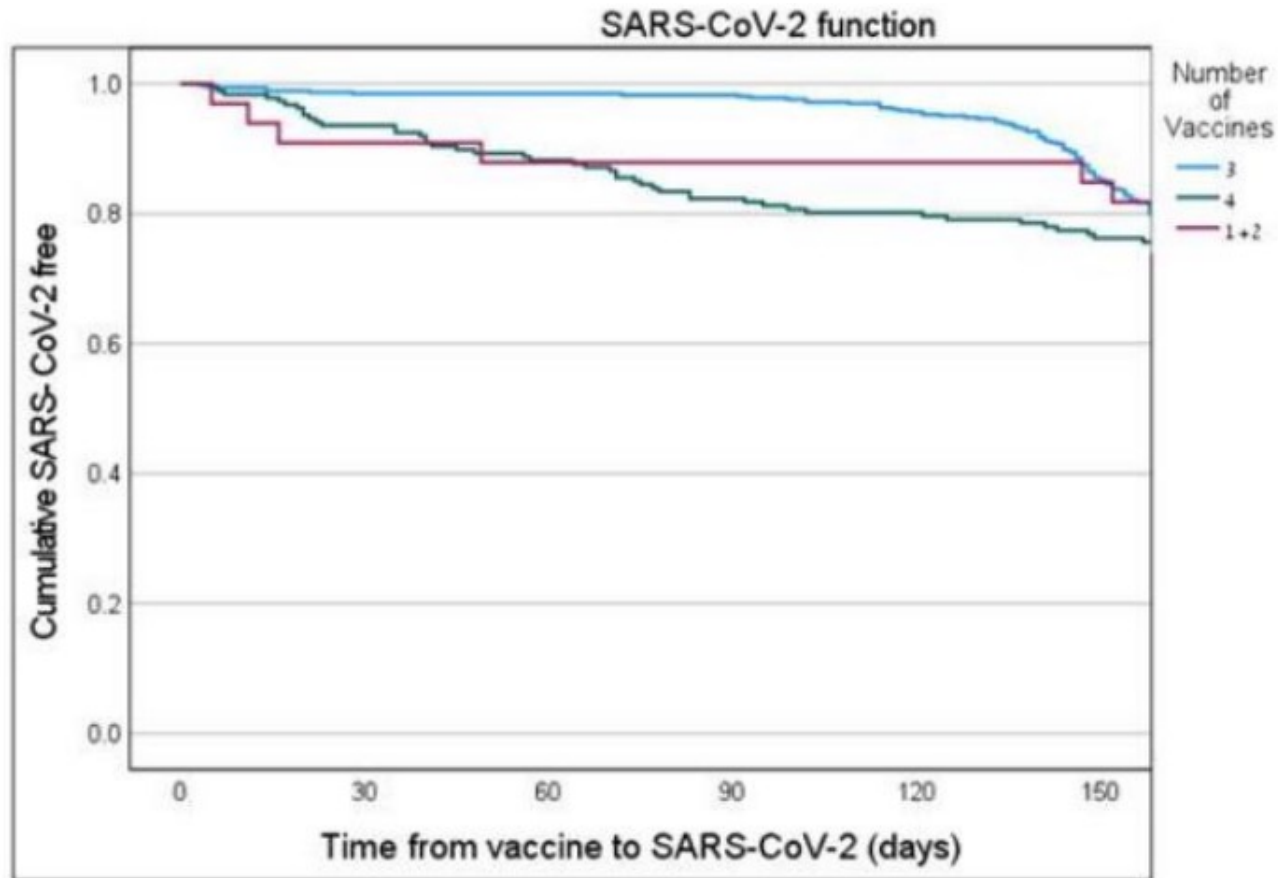
- **Kaplan–Meier SARS-CoV-2 free “survival” analysis was conducted to compare the waning effect of the first and second, third and fourth vaccines**
- **Receiver Operating Characteristic (ROC) curve was plotted for different values of the sixth serology to identify workers at risk for disease**



Results

- **Main results:**
 - **The fourth vaccine had better protection against infection compared to the third vaccine, however it also had a faster waning immunity compared to the third vaccine dose**
 - **Antibody titer of 955 AU/mL was found as a cutoff protecting from infection**

Results – Cont.





Discussion and Conclusions

- **We found that the fourth vaccine dose had a protective effect, but shorter than the third vaccine dose**
- **Cutoff point of 955 AU/mL was recognised for protection from illness**



Discussion and Conclusions

- **The decision to vaccinate the population with a booster dose should consider other factors, including the spread of disease at the point, chronic comorbidities and age, especially during shortage of vaccine supply**



Points to discuss at task force meeting

- **Can we rely on serological tests?**
- **During shortage of vaccine supply, can we prioritise based on serological tests (and other factors)?**



Article

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Abstract: Introduction: The fourth SARS-CoV-2 vaccine dose was found to protect against infection and more importantly against severe disease and death. It was also shown that the risk of symptomatic or severe disease was related to the antibody levels after vaccination or infection, with lower protection against the BA.4 BA.5 Omicron variants. The aim of our study was to assess the impact of the fourth dose on infection and perception of illness seriousness among healthcare workers (HCWs) at a tertiary





Thank you for listening
