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# Supplementary appendix

This appendix formed part of the original submission and has been peer reviewed. We post it as supplied by the authors.

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# Supplementary appendix: Immunogenicity and Safety of BNT162b2 mRNA Vaccine Booster in Actively Treated Cancer Patients



**Table S1: clinical characteristics of study participants**

| | | Cancer Patients N=72 | Healthy Control N=144 | P Value |
|---|---|---|---|---|
| **Median Age, years (IQR)** | | 62 (48.25-71) | 62 (48.25-66) | 0.25 |
| **Female, N (%)** | | 47 (65.2) | 94 (65.2) | 1 |
| **Days from 3rd dose to SARS-CoV2 Ab test, Median (IQR)** | | 33 (21-43.75) | 27 (23-29) | 0.0056 |
| **Cancer type, N (%)** | Breast | 21 (28.2) | NA | |
| | Gastrointestinal | 20 (27.9) | | |
| | NSCLC | 7 (9.7) | | |
| | Gynecological | 6 (8.3) | | |
| | Sarcoma | 6 (8.3) | | |
| | CNS | 3 (4.2) | | |
| | Genitourinary | 2 (2.8) | | |
| | Skin cancers including melanoma | 2 (2.8) | | |
| | Head and Neck | 2 (2.8) | | |
| | SCLC | 2 (2.8) | | |
| | Mesothelioma | 1 (1.4) | | |
| **Cancer Stage, N (%)** | Local | 19 (26.8) | NA | |
| | Metastatic | 53 (74.7) | | |
| **Chemotherapy based treatment, N (%)** | | 45 (62.5) | NA | |

P values derived from the non-parametric Mann-Whitney U test, two-sided. NA, not applicable; IQR= Interquartile range; NSCLC,=Non small cell lung cancer; CNS=Central nervous system; SCLC=Small cell lung cancer.

**Table S2: Immunogenicity response following 3rd dose in patients with cancer compared to healthy controls**

| | Cancer Patients (N=72) | | Healthy control (N=144) | | P Value | Estimated difference (95% CI) |
|---|---|---|---|---|---|---|
| | **Before 3rd dose** | **After 3rd dose** | **Before 3rd dose** | **After 3rd dose** | | |
| **Median IgG Ab titer (IQR), WHO BAU/mL*** | 24.64 (6.82-69.83) | 1887.32 (260.00-4934.50) | 159.6 (75.37-231.30) | 3270 (1264.67-3270.00) | <0.0001[a]<br><0.0001[b]<br>0.00011[c]<br>0.00011[d]<br><0.0001[e] | 2496.75 (1759.45-2846.39)<br>2993.36 (2427.74-3086.23)<br>105.63 (75.17-137.95)<br>217.71 (-180.55-1134.18)<br>CI NA |
| **Seronegative, N (%)** | 20 (28.2) | 3 (4.2) | 2 (1.4) | 0 (0.0) | <0.0001[f]<br>0.064[g] | 0.26 (0.071-0.48)<br>0.041 (-0.015-0.098) |
| **IgG titer change following 3rd dose, N (%)**<br>**X1-1.99**<br>**X2-9.99**<br>**X10-49.99**<br>**X5-99.99**<br>**X100-999.99**<br>**X1000-5000** | 3 (4.2)<br>9 (12.5)<br>28 (38.9)<br>16 (22.2)<br>13 (18.1)<br>3 (4.2) | | 5 (3.5)<br>12 (8.3)<br>96 (66.7)<br>22 (15.3)<br>9 (5.6)<br>0 (6.3) | | 0.00072[h] | CI NA |

Comparison of median IgG Ab levels within groups was determined by related-samples sign test and comparison of median IgG Ab levels between groups was analyzed using Independent-Samples Mann-Whitney U and Kolmogorov-Smirnov Tests.
The associations between serology status and being a cancer patient, the association between serology status and 3rd dose delivery among cancer patients and the association between IgG titer change following 3rd dose and cancer diagnosis were assessed by the parametric chi-square. All p-values are two-tailed.

[a]P value for the comparison of median IgG Ab before and after the 3rd dose of the BNT162b2 vaccine among cancer patients.
[b]P value for the comparison of median IgG Ab before and after the 3rd dose of the BNT162b2 vaccine among healthy control.
[c]P value for the comparison between healthy control and cancer patients median IgG Ab before the 3rd dose of the BNT162b2 vaccine.
[d]P value for the comparison between healthy control and cancer patients median IgG Ab after the 3rd dose of the BNT162b2 vaccine.
[e]P for multivariate analysis assessing the effects of study group (patient or control) and time (before or after 3rd dose) adjusted for the matching factors (age and gender). Administration of the booster was the only significant variable associated with increased titer levels.
[f]P value for the association between serology status and study group (healthy vs. cancer patients) before 3rd dose delivery.
[g]P value for the association between serology status and study group (healthy vs. cancer patients) after 3rd dose delivery.
[h]P value for the association between IgG titer change following 3rd dose and study group (healthy vs. cancer patients).
CI NA: Confidence interval not available.
* Immunogenicity analysis for cancer patients was conducted by the SARS-CoV-2 IgG II Quant (Abbott) kit (9) providing values in arbitrary units (AU/ml) ranging between 0-40,000 for anti-S antibodies, where a level>50 AU/mL considered positive according to the manufacturer's instructions. A conversion factor between AU/mL and BAU/mL has been established as 1 BAU = 0.142 AU (9). For the control group, SARS-CoV-2 IgG titers were analyzed by the ADVIA Centaur (Siemens Healthineers) kit (8), providing an index value up to 150.00, where an index equal to or greater than 1.00 is considered reactive (positive) for SARS-CoV-2 IgG antibodies. A conversion factor between index values and the WHO binding antibody units (BAU/mL) has been established: 1.00 Index on the sCOVG assay would have a WHO BAU/mL value of 21.81 (10). IQR= Interquartile range.

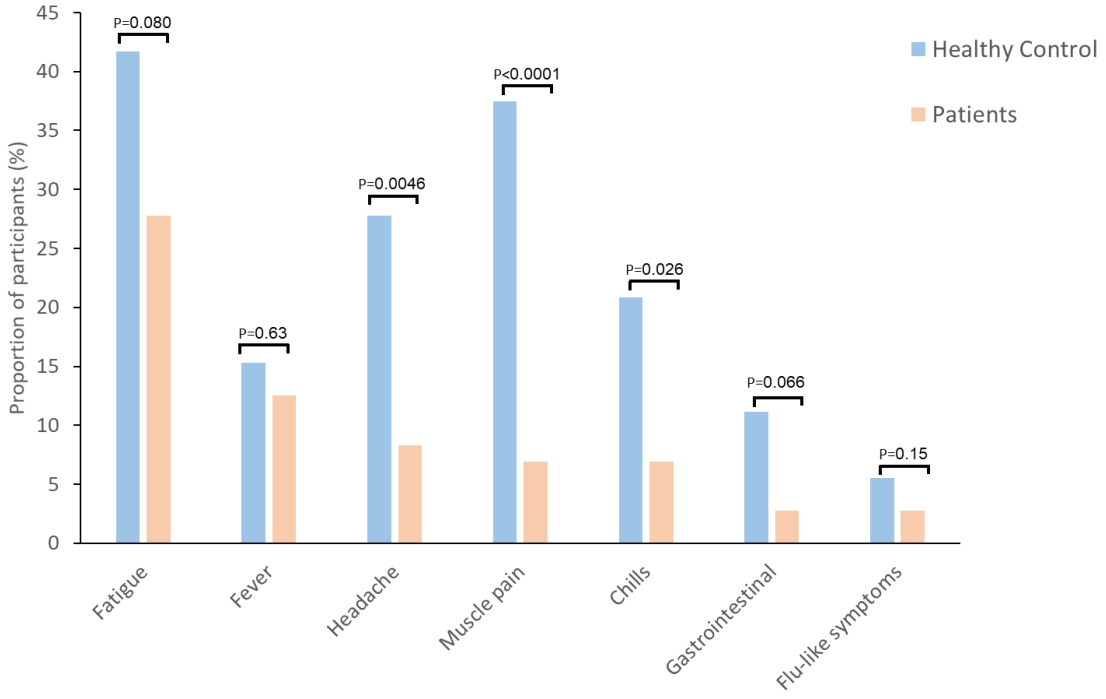


***Figure S1***: Systemic side effects following BNT162b2 mRNA 3rd dose vaccination among 72 actively treated cancer patients and matched control by age and sex. Bars show the proportion of participants reporting on each side-effect. Only side effects reported by more than 1% of the patients are presented. Differences in the proportion of side effects between control group and cancer patients group were statistical envaulted by the parametric chi-square. All p-values are two-tailed.

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