# Safety and Efficacy of Preventative COVID Vaccines

**Sharon L. Walmsley** [1], Leah Szadkowski [1], Rosemarie Clarke [1] Rizani Ravindran [1], , Anne-Claude Gingras [2] for the STOPCoV Research Team
[1]University Health Network, Toronto, Canada, [2]Lunenfeld-Tanenbaum Research Institute, Sinai Health, Toronto, Canada.

1190

## BACKGROUND:

In attempts to partially immunize a greater proportion of the Ontario population against COVID, public health officials recommended extending the interval between vaccine doses and allowed "mixing of vaccine types".

The impact of this on the antibody response to the vaccine particularly in the elderly population is unknown.

The STOPCoV study compared the antibody response ( antibody to spike protein and receptor binding domain) just prior to and 2 weeks after the second vaccine dose in those aged > 70 years compared to a cohort aged 30-50 years.

## METHODS

**Design**: A fully remote longitudinal cohort study of individuals receiving COVID-19 vaccine. www.stopcov.ca

**Study Population**: 911 individuals > 70 years age and 286 individuals 30-50 years of age who were vaccinated at an Ontario distribution centre.

**Recruitment:**. A data sharing agreement with the Ministry of Health enabled the STOPCoV study team to send email information about the study to persons consenting to research at the time of COVID vaccination. A similar email blast was sent Ontario C.A.R.P. members (Canadian Association of Retired Persons-www.carp.ca) to enable wider self-referral

**Consent** was completed electronically on a personal device guided by video. The study, consent process and electronic consent form was approved by the University Health Network Ethics Review Committee.

**Methods**: Participants completed questionnaires and submitted self collected dried blood spots. The DBS were analyzed for IgG antibodies to nucleoprotein, spike and receptor binding domain (RBD) antibodies by an in-house ELISA. The results are reported as ratio-normalized levels. Linear regression models were used to determine the effect of age on the antibody levels after adjusting for potential confounders determined a priori.

Table 1: Baseline Demographics

| | 30-50 year | 70+ year |
|---|---|---|
| n | 341 | 855 |
| Female | 75% | 59% |
| Caucasian | 75% | 93% |
| Diabetes | 1.5% | 14% |
| Cardiovascular disease | 5% | 49% |
| Cancer | 3% | 20% |
| Vaccine Type | | |
| Pfizer (BNT162b2) | 49% | 68% |
| Moderna (mRNA1273) | 18% | 8% |
| Mixed | 16% | 6% |

Community dwelling individuals >70 years have less robust IgG antibody responses to COVID vaccines than those 30-50 years supporting their prioritization for booster doses

Longer dosing intervals and mixing brands is safe

A completely decentralized study can recruit and maintain large numbers of participants including those outside research centers

## RESULTS

Figure 1: Violin Plots of normalized ratios of IgG antibodies to receptor binding domain, prior to and 2 weeks post the second vaccine dose

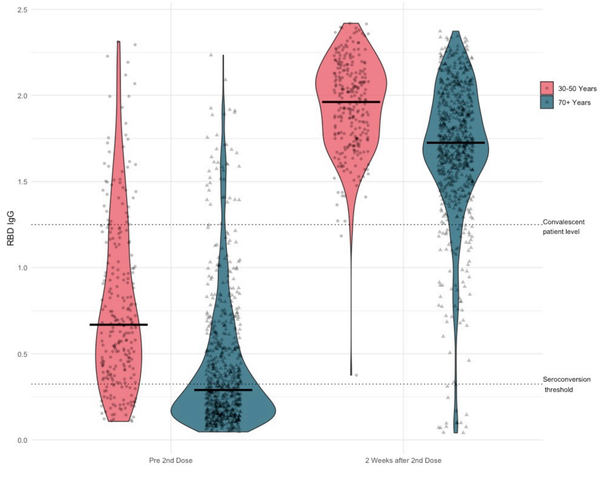
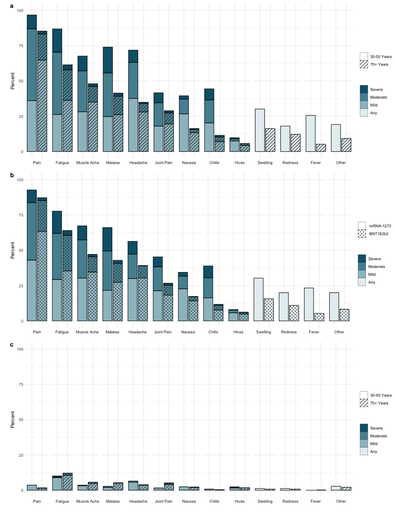



Figure 2: Reported adverse events by age cohort and vaccine brand




We acknowledge the other members of the StopCoV Team: B. Wouters, K. Cowill., P Rochon, A. Oza, C. Graham, M. Brudno, J. Raboud, A. mcgeer, A. Silva, D. Manase, L. parente, J. Simpson, R. Dayam, A, Pasculescu

Table 2:**Linear Regression Model of 2-week after 2nd Dose RBD**

| | Univariable | | Multivariable | |
|---|---|---|---|---|
| | β (95%CI) | p | β (95%CI) | p |
| Female or Non-Binary | 0.076 (0.033, 0.12) | <0.001 | 0.046 (0.0061, 0.087) | **0.02** |
| Age 70+ | -0.23 (-0.27, -0.18) | <0.0001 | -0.14 (-0.19, -0.084) | **<0.0001** |
| CVD | -0.087 (-0.13, -0.045) | <0.0001 | -0.011 (-0.056, 0.034) | **0.64** |
| Cancer | -0.11 (-0.17, -0.059) | <0.0001 | -0.062 (-0.12, -0.0092) | **0.02** |
| Diabetes | -0.056 (-0.12, 0.012) | 0.1 | -0.011 (-0.077, 0.055) | **0.75** |
| Transplant or Immune Suppressed | -0.0023 (-0.11, 0.11) | 0.97 | -0.036 (-0.14, 0.069) | **0.5** |
| BMI Category | | | | |
| Under/Healthy Weight (BMI<25) | Ref. | | Ref. | |
| Overweight (BMI 25-30) | -0.021 (-0.068, 0.026) | 0.37 | 0.015 (-0.029, 0.059) | **0.5** |
| Obese (BMI≥30) | 0.054 (0.00056, 0.11) | 0.05 | 0.063 (0.012, 0.11) | **0.01** |
| Vaccine Type | | | | |
| BNT162b2 (2 doses) | Ref. | | Ref. | |
| mRNA1273 (2 doses) | 0.2 (0.13, 0.26) | <0.0001 | 0.14 (0.075, 0.2) | **<0.0001** |
| BNT162b2 (1 dose) mRNA1273 (1 dose) | 0.16 (0.11, 0.22) | <0.0001 | 0.14 (0.089, 0.19) | **<0.0001** |
| ChAdOx1 (1 dose) mRNA (1 dose) | 0.13 (0.043, 0.21) | <0.01 | 0.077 (-0.0049, 0.16) | **0.07** |
| Mixed/Other/ Unknown | -0.23 (-0.35, -0.1) | <0.001 | -0.31 (-0.43, -0.19) | **<0.0001** |
| **≥8 Weeks Between Doses** | **-0.2 (-0.24, -0.15)** | **<0.0001** | **-0.1 (-0.15, -0.051)** | **<0.0001** |

## CONCLUSIONS

**The older cohort had a lower antibody response to COVID vaccine than the younger cohort as characterized by a lower seroconversion rate after first dose and lower normalized ratio of IgG to RBD 2 weeks after the second vaccine dose**

**Antibody responses were higher in those who received at least one dose of mRNA1273 ( Moderna)**