COVID-19 vaccines

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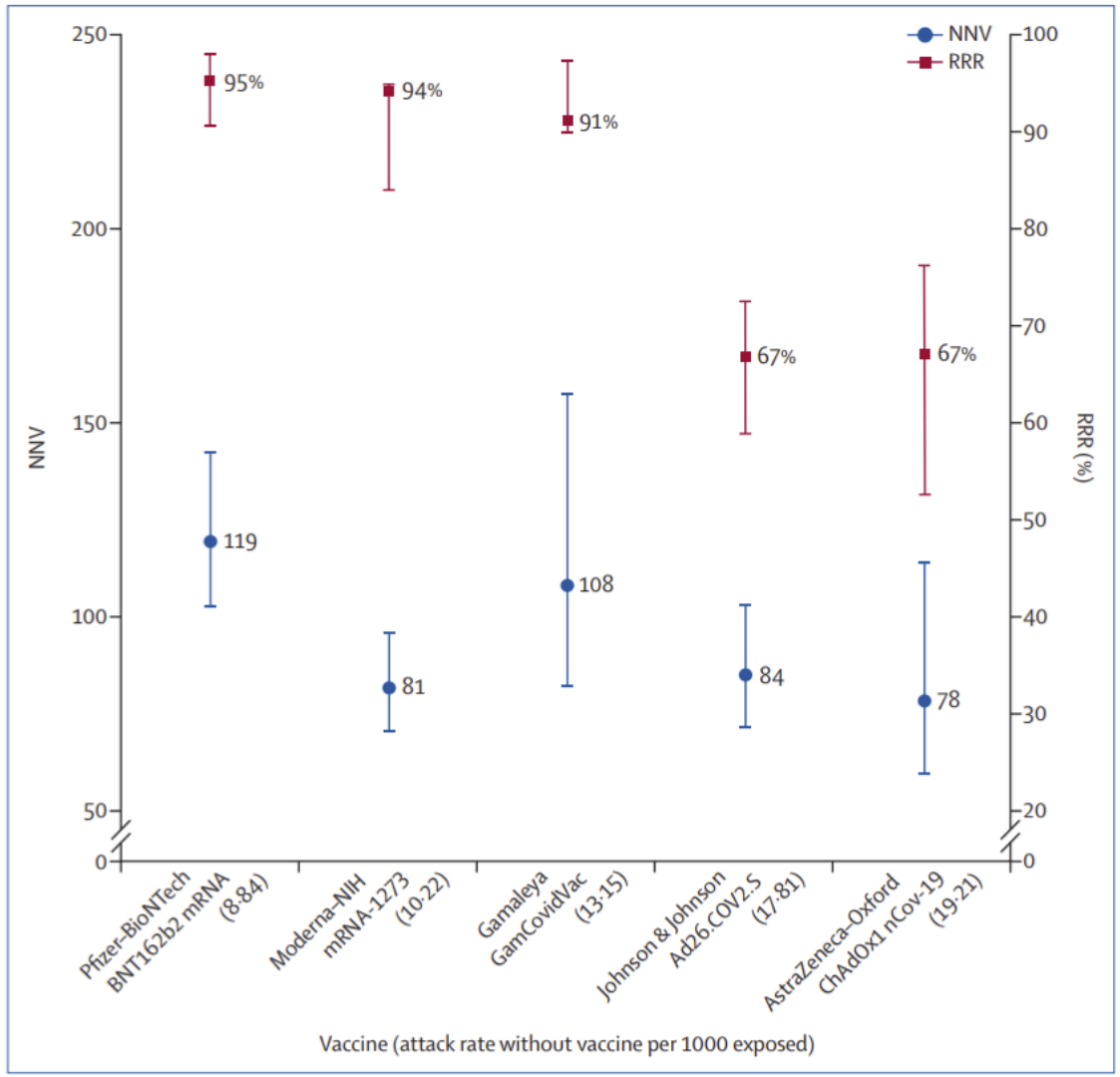
COVID-19 vaccines in Canada – clinical trials

Platform	Vaccine	Dosing regimen	Reported efficacy (*vs.* any symptomatic disease)
mRNA	BNT162b2 (Pfizer/BioNTech)	0, 21 days	95% (2 doses) → 91% @6 mths [press release] 93% (1 dose)
	mRNA-1273 (Moderna)	0, 28 days	95% (2 doses) 92% (1 dose)
Viral vector	ChAdOx1-S (Oxford University/Astra Zeneca)	0, 28-84 days	65-75% (1 or 2 doses)
	Ad26.COV2.S (Janssen)	1 dose	67% (1 dose)
Protein	NVX-CoV2373 (Novavax)	0, 21 days	90% (2 doses) – press release
	Medicago	0,21 days	Currently in phase 3 trials
	Sanofi Pasteur/GlaxoSmithKline	0, 21 days	Completed phase 2 trials

Polack et al. NEJM 2020; Skowronski & De Serres. NEJM 2021; Baden et al. NEJM 2020; Voysey et al. Lancet 2020; Voysey et al. Lancet 2021; Sadoff et al. NEJM 2021; Logunov et al. Lancet 2021

What do the clinical trial data mean?



- COVID-19
  - Vaccinate ~100 people to prevent 1 case
  - Vaccinate ~5,000 people to prevent 1 death
    - Vaccinate 1,000 people (60y+) to prevent 1 death
- To prevent 1 death for other vaccines?
  - Varicella: 34,000
  - Meningococcal disease: 21,000
  - Influenza (65y+): 5,000

Olliaro et al. Lancet Microbe 2021; Brisson et al. CMAJ 2007
https://health-infobase.canada.ca/covid-19/epidemiological-summary-covid-19-cases.html#a5

Variants

Table 1. Summary Results on SARS-CoV-2 Vaccine Trial Efficacy and Viral Neutralization of the B.1.1.7, P.1, and 501Y.V2 Variants, as Compared with Preexisting Variants.*

Vaccine (Company)	Preexisting Variants			Neutralization by Pseudovirion or Live Viral Plaque Assay			Efficacy in Settings with 501Y.V2 Variant
	Sample Size	Efficacy in Preventing Clinical Covid-19	Efficacy in Preventing Severe Covid-19	B.1.1.7 Variant	P.1 Variant	501Y.V2 Variant	
	no.	*% (no. of events with vaccine vs. placebo)*					%
Ad26.COV2.S (Johnson & Johnson)	43,783	66 (NA)	85 (NA)	NA	NA	NA	57† 85‡
BNT162b2 (Pfizer)	34,922	95 (8 vs. 162)	90 (1 vs. 9)	Decrease by 2×	Decrease by 6.7×	Decrease by ≤6.5×	NA
mRNA-1273 (Moderna)	28,207	94 (11 vs. 185)	100 (0 vs. 30)	Decrease by 1.8×	Decrease by 4.5×	Decrease by ≤8.6×	NA
Sputnik V (Gamaleya)	19,866	92 (16 vs. 62)	100 (0 vs. 20)	NA	NA	NA	NA
AZD1222 (AstraZeneca)	17,177	67 (84 vs. 248)	100 (0 vs. 3)	NA	NA	Decrease by ≤86× to complete immune escape	22§
NVX-CoV2373 (Novavax)	15,000	89 (6 vs. 56)	100 (0 vs. 1)	Decrease by 1.8×	NA	NA	49§
CoronaVac (Sinovac)¶							
Brazil	12,396	51 (NA)	100 (NA)	NA	NA	NA	NA
Turkey	7,371	91 (3 vs. 26)	NA	NA	NA	NA	NA
BBIBP-CorV (Sinopharm)	NA	79 (NA)	NA	NA	NA	Decrease by 1.6×	NA

* Data were available up to March 18, 2021. The definitions of mild, moderate, and severe coronavirus disease 2019 (Covid-19) vary across the vaccine trials. A list of references associated with these vaccines is provided in the Supplementary Appendix, available with the full text of this letter at NEJM.org. NA denotes not available, and SARS-CoV-2 severe acute respiratory syndrome coronavirus 2.
† Shown is the efficacy of the vaccine, as compared with placebo, against moderate-to-severe Covid-19.
‡ Shown is efficacy of the vaccine, as compared with placebo, against severe Covid-19 and hospitalization.
§ Shown is efficacy of the vaccine, as compared with placebo, against symptomatic Covid-19.
¶ Data are shown separately for the trial sites in Brazil and Turkey.

Abdool Karim and de Oliveira. NEJM 2021

Variants

Table 1. Vaccine Effectiveness against Infection and against Disease in Qatar.

Type of Infection or Disease	PCR-Positive Persons		PCR-Negative Persons		Effectiveness (95% CI)*
	Vaccinated	Unvaccinated	Vaccinated	Unvaccinated	
	number of persons				*percent*
Infection					
PCR-confirmed infection with the B.1.1.7 variant†					
After one dose	892	18,075	1241	17,726	29.5 (22.9–35.5)
≥14 days after second dose	50	16,354	465	15,939	89.5 (85.9–92.3)
PCR-confirmed infection with the B.1.351 variant‡					
After one dose	1329	20,177	1580	19,926	16.9 (10.4–23.0)
≥14 days after second dose	179	19,396	698	18,877	75.0 (70.5–78.9)
Disease§					
Severe, critical, or fatal disease caused by the B.1.1.7 variant					
After one dose	30	468	61	437	54.1 (26.1–71.9)
≥14 days after second dose	0	401	20	381	100.0 (81.7–100.0)
Severe, critical, or fatal disease caused by the B.1.351 variant					
After one dose	45	348	35	358	0.0 (0.0–19.0)
≥14 days after second dose	0	300	14	286	100.0 (73.7–100.0)
Severe, critical, or fatal disease caused by any SARS-CoV-2					
After one dose	139	1,966	220	1,885	39.4 (24.0–51.8)
≥14 days after second dose	3	1,692	109	1,586	97.4 (92.2–99.5)

Abu-Raddad et al.
NEJM 2021

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