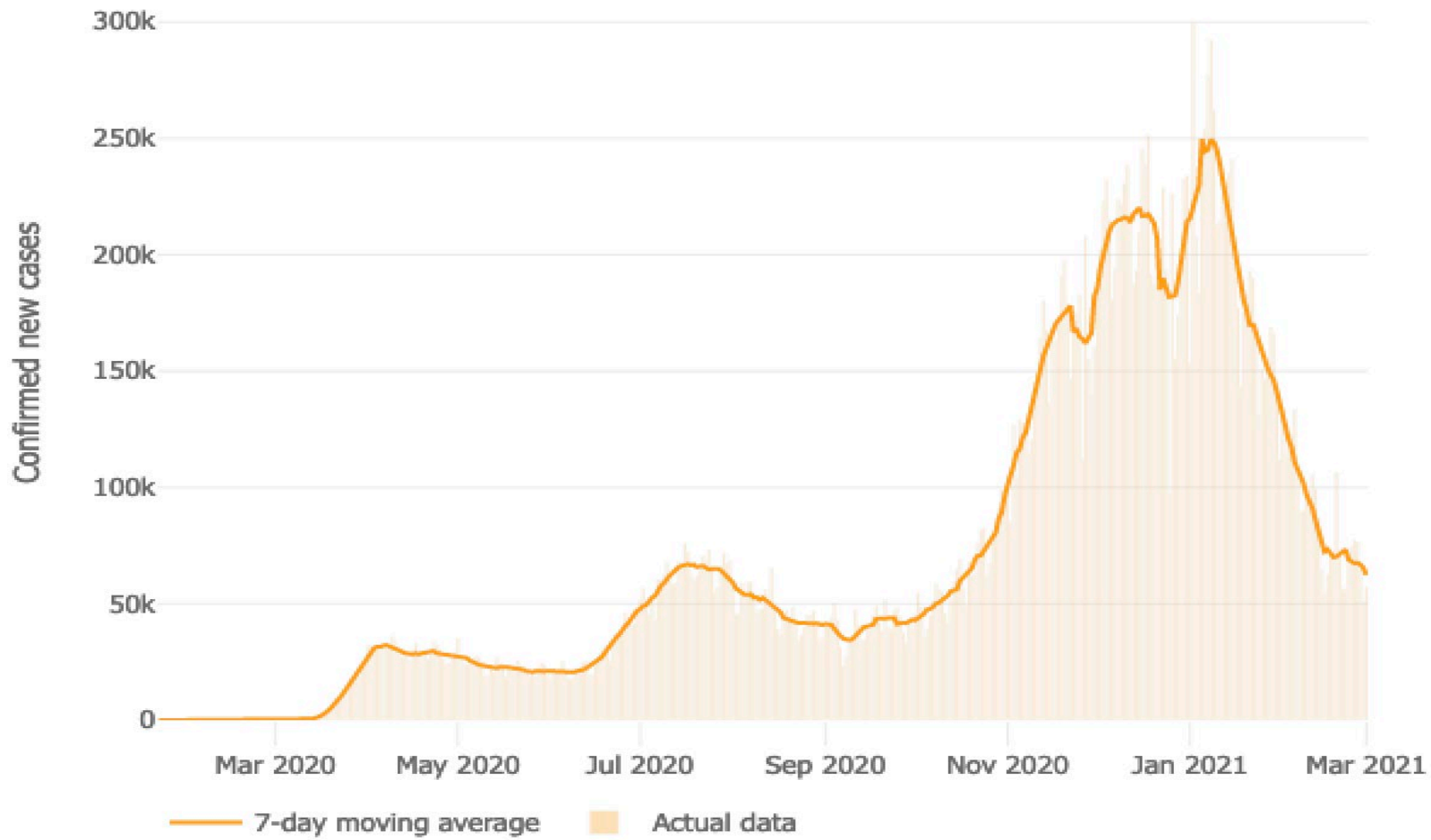
COVID-19 Vaccines

State of the Science:

Where are we???
CAMP 2021

You are here


300k
250k
200k
150k
100k
50k
0
Confirmed new cases
Mar 2020
May 2020
Jul 2020
Sep 2020
Nov 2020
Jan 2021
Mar 2021
7-day moving average
Actual data

Where are we?

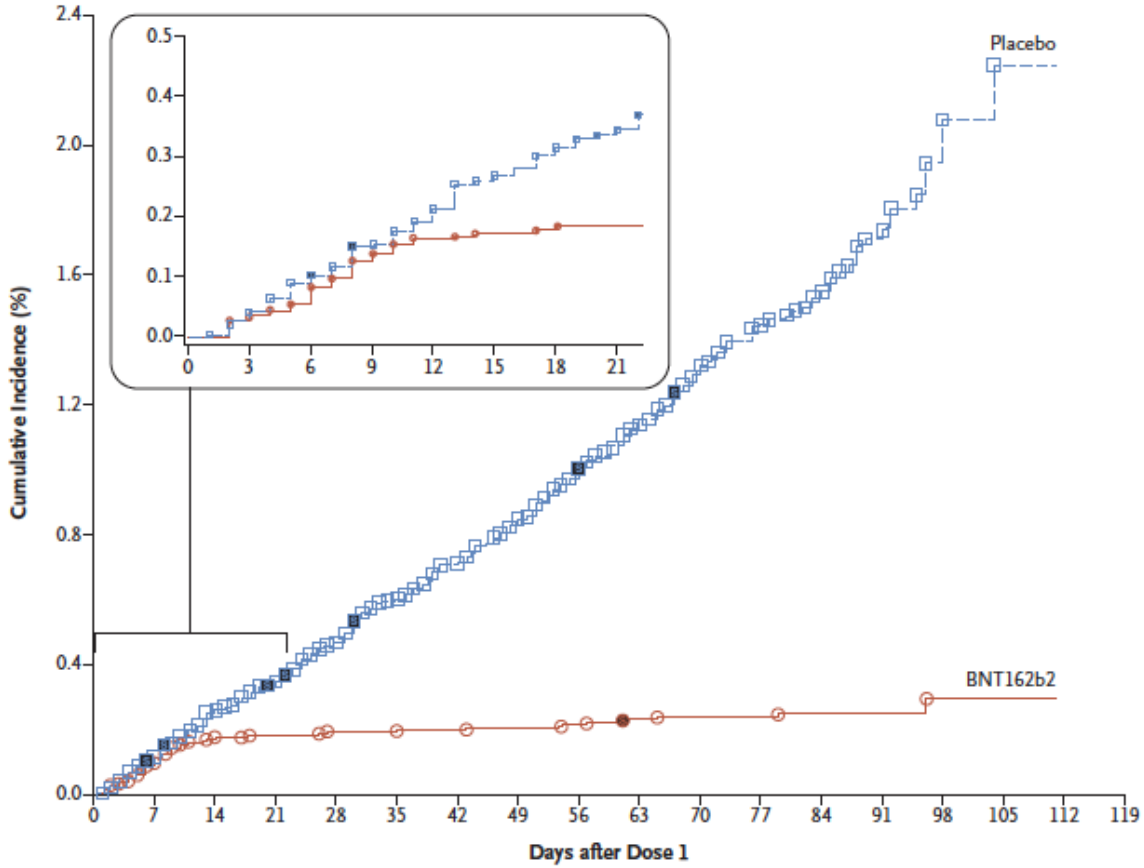
- **Moderna and Pfizer BioNTech mRNA vaccines both shown >90% effective***
- **Janssen now EUA newly approved, ACIP/CDC recommended 85% protective***
- **Novavax, Astra-Zeneca in trials with preliminary evidence of effectiveness from 62-90%**
- **Additional vaccine candidates in varying stages of development**

OWS Vaccine Candidates

- **mRNA**
  - **Pfizer/BioNTech and Moderna**
- **Replication-defective live-vector**
  - **Astra-Zeneca and Janssen**
- **Recombinant-subunit-adjuvanted protein**
  - **Novavax and Sanofi-GSK**
- **Attenuated replicating live-vector**
  - **TBA**

mRNA Vaccines

Pfizer and Moderna

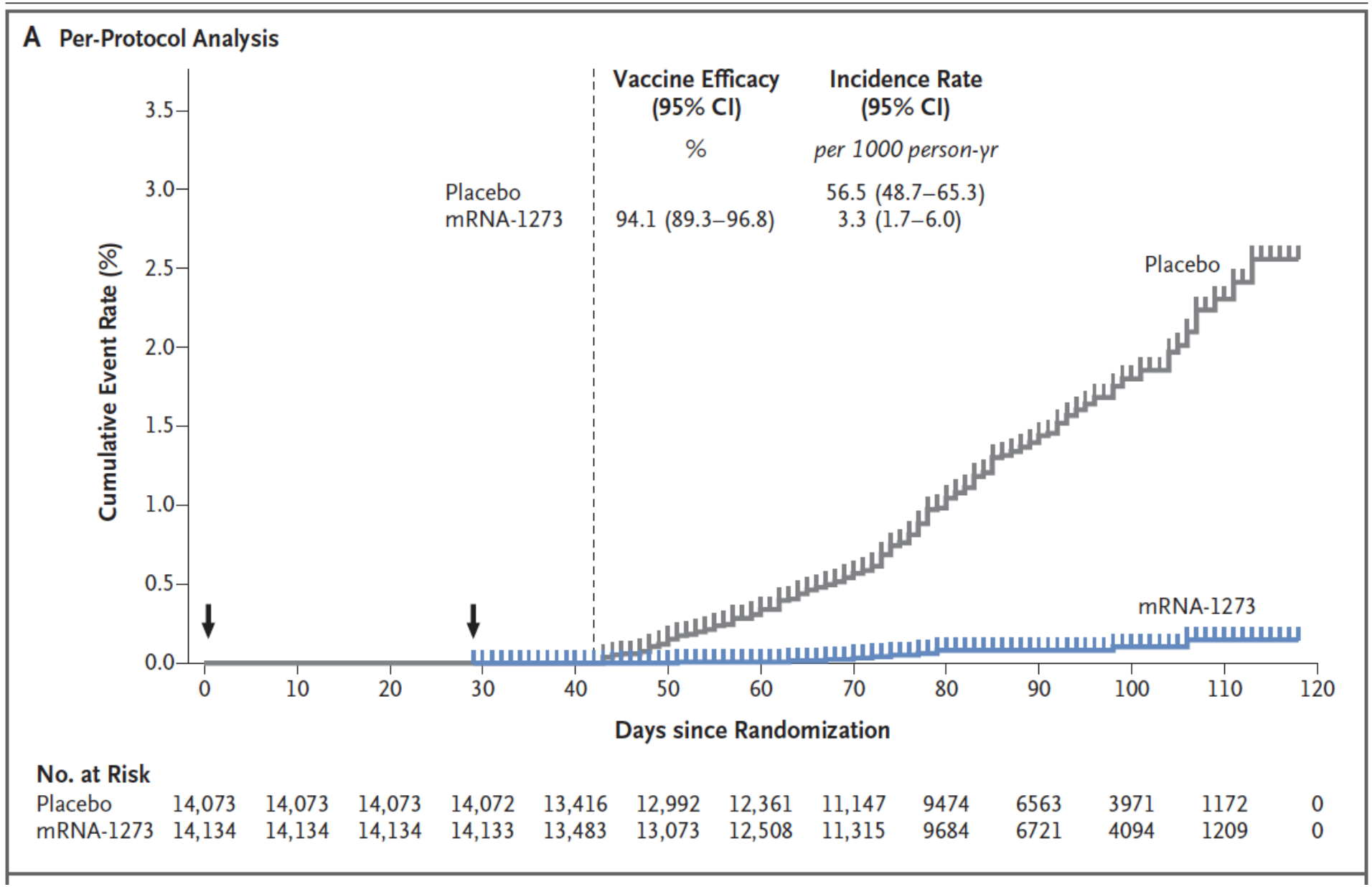


Efficacy End-Point Subgroup	BNT162b2, 30 μg (N=21,669)		Placebo (N=21,686)		VE (95% CI)
	No. of participants	Surveillance time *person-yr (no. at risk)*	No. of participants	Surveillance time *person-yr (no. at risk)*	*percent*
Covid-19 occurrence					
After dose 1	50	4.015 (21,314)	275	3.982 (21,258)	82.0 (75.6–86.9)
After dose 1 to before dose 2	39		82		52.4 (29.5–68.4)
Dose 2 to 7 days after dose 2	2		21		90.5 (61.0–98.9)
≥7 Days after dose 2	9		172		94.8 (89.8–97.6)

Figure 3. Efficacy of BNT162b2 against Covid-19 after the First Dose.

Shown is the cumulative incidence of Covid-19 after the first dose (modified intention-to-treat population). Each symbol represents Covid-19 cases starting on a given day; filled symbols represent severe Covid-19 cases. Some symbols represent more than one case, owing to overlapping dates. The inset shows the same data on an enlarged y axis, through 21 days. Surveillance time is the total time in 1000 person-years for the given end point across all participants within each group at risk for the end point. The time period for Covid-19 case accrual is from the first dose to the end of the surveillance period. The confidence interval (CI) for vaccine efficacy (VE) is derived according to the Clopper–Pearson method.

Polack et al., NEJM 2020

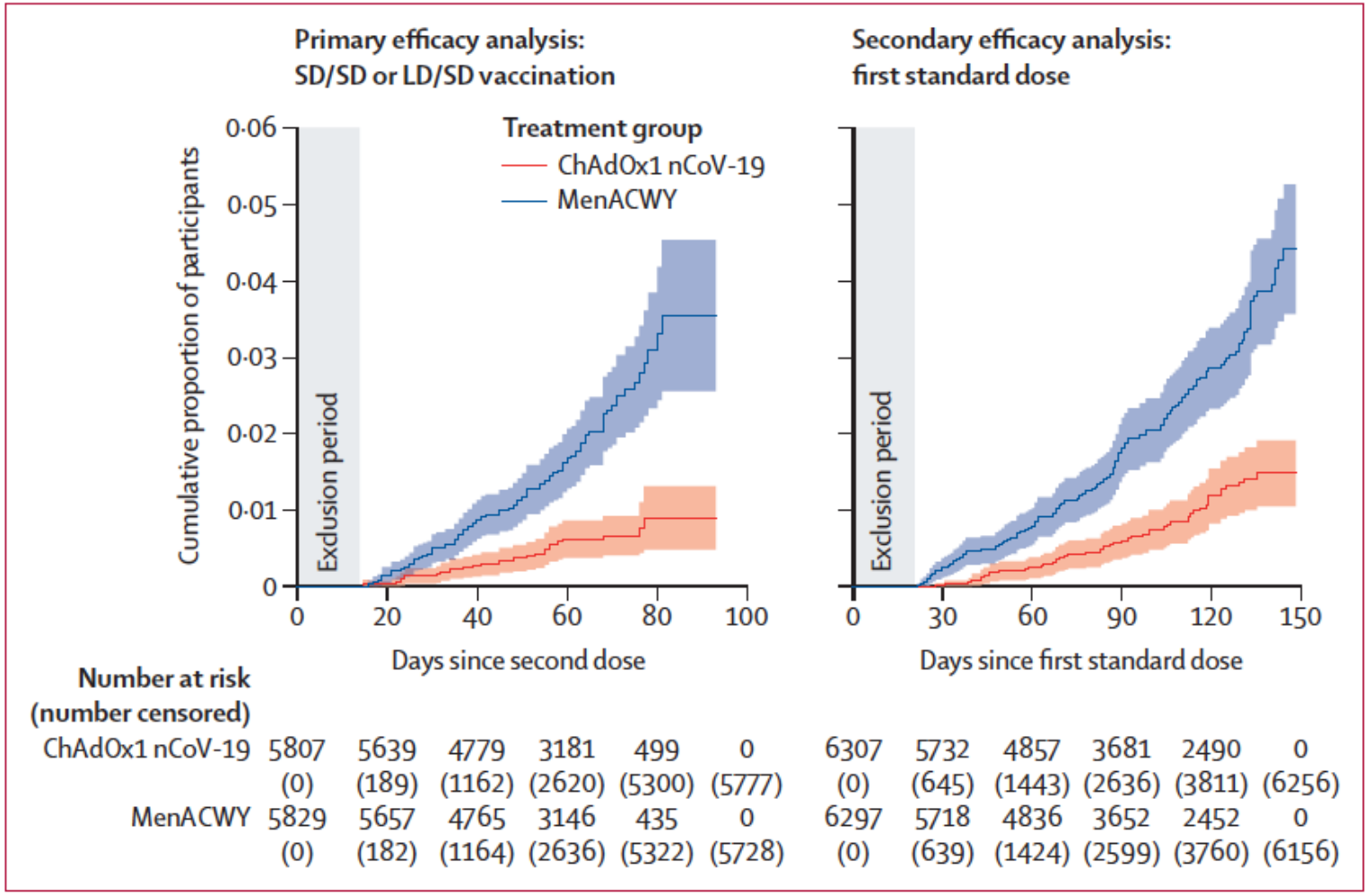


Baden et al., NEJM 2020

Live-Vector Vaccines

Astra-Zeneca and Janssen

Efficacy Outcomes 1 (Astra-Zeneca Phase III)



Number at risk (number censored)												
ChAdOx1 nCoV-19	5807	5639	4779	3181	499	0	6307	5732	4857	3681	2490	0
	(0)	(189)	(1162)	(2620)	(5300)	(5777)	(0)	(645)	(1443)	(2636)	(3811)	(6256)
MenACWY	5829	5657	4765	3146	435	0	6297	5718	4836	3652	2452	0
	(0)	(182)	(1164)	(2636)	(5322)	(5728)	(0)	(639)	(1424)	(2599)	(3760)	(6156)

Voysey, The Lancet 2020

Efficacy Outcomes 2 (Astra-Zeneca Phase III)

	Total number of cases	ChAdOx1 nCoV-19	Control	Vaccine efficacy (95% CI)	p value for interaction
COV002 (UK), age 18–55 years*	..	..	..	..	0·019
LD/SD recipients	33	3/1367 (0·2%)	30/1374 (2·2%)	90·0% (67·3 to 97·0)	..
SD/SD recipients	49	14/1879 (0·7%)	35/1922 (1·8%)	59·3% (25·1 to 77·9)	..
COV002 (UK), age 18–55 years with >8 weeks' interval between vaccine doses*	..	..	..	..	0·082
LD/SD recipients	33	3/1357 (0·2%)	30/1362 (2·2%)	90·0% (67·3 to 97·0)	..
SD/SD recipients	34	8/1407 (0·6%)	26/1512 (1·7%)	65·6% (24·5 to 84·4)	..
All SD/SD (UK and Brazil)†	..	..	..	..	0·557
<6 weeks' interval between vaccine doses	28	9/1702 (0·5%)	19/1698 (1·1%)	53·4% (−2·5 to 78·8)	..
≥6 weeks' interval between vaccine doses	70	18/2738 (0·7%)	52/2757 (1·9%)	65·4% (41·1 to 79·6)	..

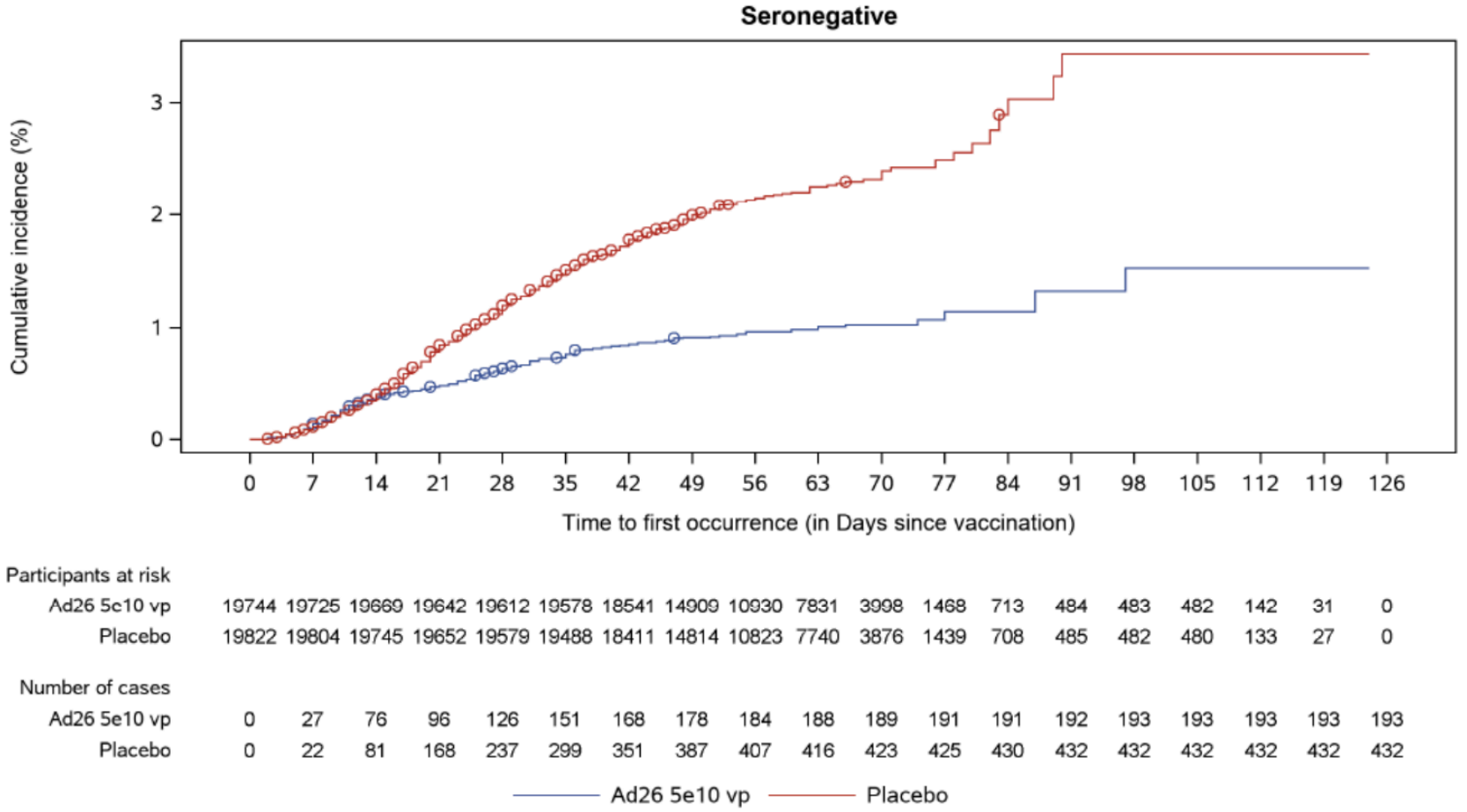
Cohorts are all subsets of the primary efficacy population. SARS-CoV-2=severe acute respiratory syndrome coronavirus 2. LD/SD=low-dose prime plus standard-dose boost. SD/SD=two standard-dose vaccines given. BMI=body-mass index. *Models adjusted for BMI (<30 *vs* ≥30 kg/m²), health-care worker status (yes *vs* no), and ethnicity (white *vs* non-white). †Model adjusted for BMI (<30 *vs* ≥30 kg/m²), health-care worker status (yes *vs* no), ethnicity (white *vs* non-white), age (<56 years *vs* ≥56 years), and study (COV002 *vs* COV003).

Table 3: **Subgroup comparisons of efficacy against SARS-CoV-2 more than 14 days after a second dose of ChAdOx1 nCoV-19 vaccine in the primary efficacy population**

Voysey, The Lancet 2020

Janssen Phase 3 Data (FDA VRBPAC review)

Figure 1. Cumulative Incidence Curve of Centrally Confirmed Moderate to Severe/Critical COVID-19 Cases With Onset at Least 1 Day After Vaccination, Full Analysis Set



Estimated vaccine effectiveness

Vaccine	Efficacy at preventing disease - wildtype / B.1.1.7	Efficacy at preventing infection - wildtype/B.1.1.7	Efficacy at preventing disease - B.1.351 / P.1	Efficacy at preventing infection - B.1.351 / P.1
Pfizer	95%	86%	72%	63%
Moderna	94%	85%	72%	62%
AstraZeneca	74%	52%	10%	9%
Janssen	72%	72%	64%	56%
Sputnik V	92%	80%	70%	61%
Novavax	89%	77%	49%	43%
CoronaVac	50%	43%	38%	33%
Sinopharm	73%	63%	56%	48%
CanSinoBio	66%	57%	50%	44%
Other mRNA vaccines	95%	83%	72%	63%
All other vaccines	75%	65%	57%	50%

	Based on observed value	
	Assumed efficacy	
	Imputed based on average infection:disease ratio	0.87
	Imputed based on Pfizer infection:disease ratio	0.91
	Imputed based on B.1.351:Wildtype ratio (excl. AZ)	0.76
	Imputed based on B.1.351:Wildtype ratio (excl. AZ) and infection:disease ratio	

Kids!

- **Pfizer – began 12-16 yo trial in fall**
- **Moderna began 12-18 yo trial in December**
- **AZ has announced 6-19 yo trial**
- **No information yet from J&J and others**