COVID-19 Update

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Monday, January 23, 2023





Review of some of the more interesting COVID studies



670 studies a day since first cases in Wuhan on December 8th, 2019



Long covid outcomes at one year after mild SARS-CoV-2 infection

- 1.9M patients who had a PCR test were followed – those who tested positive were matched with those who tested negative. Excluded anyone who was admitted to hospital. Key findings:
 - Study suggests that patients with mild covid-19 are at risk for a small number of health outcomes, most of which are resolved within a year from diagnosis
 - Increased risk for several health outcomes after mild covid-19 that was more prominent during the first six months after infection and decreased thereafter
 - The highest number of health outcomes shown to be persistent six months after covid were reported in the 41-60 years subgroup
 - No significant difference between variants
 - Vaccination associated with reduced risk for dyspnea compared with unvaccinated patients up to three months after infection

Reported health conditions	No of patients 30-180 days	No of events in SARS-CoV-2 positive/negative 30-180 days	No of patients 180-360 days	No of events in SARS-CoV-2 positive/negative 180-360 days	Hazard ratio (95% CI)	Risk difference per 10 000 patients
Symptom						
Anosmia and dysgeusia	162 387	344/90	150 177	208/83	- + - * -	H
Respiratory disorders	161 005	97/44	148 937	30/35		1
Concentration and memo	ry 161785	403/243	149 618	407/276	*	1
Dyspnoea	155 240	2853/1673	143 541	2035/1640	<u>+</u> *	
Weakness	150 829	3681/2023	139 581	2806/2107	<u>+</u> *	
Hair loss	159 395	1055/687	147 371	559/703	• •	H
Palpitations	159 339	1015/734	147 340	833/773	•*	H
Chest pain	151 539	2770/2125	140 058	2413/2479	•*	H H
Muscle atrophy	162 665	83/61	150 445	71/61		B B
Myalgia	156 946	1287/1086	145 093	1200/1184	*	**
Dizziness	155 720	1389/1260	143 996	1515/1355	\$	1
Tremor	162 240	154/143	150 044	150/164		H H
Tinnitus	160 135	611/599	148 054	547/665	*	u <mark>#</mark> H
Voice disorder	161 119	412/347	149 016	443/395	*	4
Arthralgia	156 771	1139/1070	144 926	1217/1137	\$	1
Insomnia	162 758	22/25	150 522	37/42		
Cough	139 170	3851/3598	128 609	3774/3788	*	
Hyperhidrosis	162 707	41/52	150 476	20/47		
Visual disturbances	160 443	460/444	148 369	473/500	*	H
Headache	144 950	2847/2932	134 055	2905/3181	*	- -
Paraesthesia	159 539	713/768	147 529	711/889	*	H
Menstruation abnormalitie	es 123 816	385/392	114 014	347/389	*	4
Abdominal pain	135 627	4356/4671	125 372	4618/5104	*	
Bloody stool	161 980	175/183	149 801	192/206	*	H H
Nausea or vomiting	156 426	1236/1340	144 635	1371/1543	\$	
Skin rash	155 745	1162/1322	143 944	1089/1221	*	出
Loss of appetite	159 712	620/716	147 706	594/710	\$	4
Convulsions	155 920	72/81	144 273	67/57		19 19
Weight loss	161 235	337/407	149 134	310/408	*	4
Sore throat	158 660	708/754	146 769	797/738	*	H.
Rhinorrhoea	162 561	67/82	150 350	62/69		8 8
Lymphadenopathy	160 411	481/682	148 360	501/658	\$	1
Diarrhoea	162 686	17/31	150 464	27/44		





Long-COVID

- Study on long COVID in nonhospitalized patients (US)
 - Brain fog and muscle pain at 90+ days from acute COVID-19 onset are specifically associated with longer time to clearance of SARS-CoV-2 RNA from the upper respiratory tract
 - Speculated that the biological mechanisms underlying these long COVID symptoms could be due to:
 - Persistent immune dysregulation from persistent SARS-CoV-2 virions or
 - Antigen ("reservoirs") triggering chronic inflammation

 Study on 2-year follow up of <u>complex</u> long COVID cases (FR)

Ο



Might benefit from a coordination team

 2/3 returned to work either partially or fully, but 1/3 remained complaining of symptoms and out of work as late as 22 months after COVID occurrence

https://www.mdpi.com/2077-0383/12/3/741#



Studies on the Bi-valent vaccines

Bivalent BA.5 Booster Neutralizing Antibody Lab Assessments							
Lab	Assay	Bivalent vs. BA.5 Compared to Original	Bivalent vs. XBB Compared to Original^	Citation			
Suthar	Live virus	2-fold improved	5-fold increased	NEJM 21 December 2022			
Shi	Live virus	3-fold improved	5-fold increased	Nat Medicine 6 December 2022			
Zhou/CDC	Live virus	8-fold improved	4-fold increased	bioRxiv 9 January 2023			
UT Galveston	Live virus	4-fold improved	2 to 6-fold increased*	bioRxiv 17 November 2022			
Shan-Lu Lui	Pseudovirus	5-fold improved	3-fold increased	bioRxiv 17 January 2023			
Veesler	Pseudovirus	3-fold improved	2-fold increased	bioRxiv 17 January 2023			
Moderna	Pseudovirus	5 to 6-fold improved	4-fold increased	MedRxiv 13 December 2022			
Но	Pseudovirus	No difference	Not assessed	NEJM 11 January 2023			
Barouch	Pseudovirus	1.3-fold increase	Not assessed	NEJM 11 January 2023			
Barouch	Pseudovirus	No difference	Not assessed	bioRxiv 25 October 2022			

*range related to prior Covid or not; ^ by geometric median titer GMT @erictopol

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Overall, these showed consistent evidence (7 of 10 reports) of the bivalent's superior neutralizing antibody response to BA.5 (compared with the original booster), but also against XBB. This is indicative of broadened immunity against other new variants that were induced by the bivalent.

Studies on the Bi-valent vaccines

700,000 participants aged 65 and older, who either had the bivalent or did not, **Cumulative Hazard** there was an 81% reduction of Covid hospitalizations and an 86% reduction of deaths during the 70-days post vaccination



https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4314067



CDC Data

TABLE 2. Effectiveness of a bivalent COVID-19 mRNA booster dose against COVID-19–associated hospitalization among immunocompetent adults aged ≥65 years — IVY Network, 22 hospitals,* 18 states, September 8, 2022–November 30, 2022

	Received BV vac status,	cine dose, by case n/N (%)	Median interval [†] from last vaccine		
Characteristic	Case-patients	Control patients	dose to illness onset (IQR), days	Adjusted VE, % (95% CI) [§]	
Absolute VE (BV booster dose versus no vaccine)					
Unvaccinated (Ref)	_	_	NA	_	
BV booster dose [¶] ≥7 days before illness onset	20/101 (20)	59/121 (49)	29 (15-45)	84 (64–93)	
Relative VE (BV booster dose versus MV-only, by interval since last dose)					
≥2 MV-only mRNA doses, last dose ≥2 mos before illness onset (Ref)	_	_	305 (168–377)	_	
BV booster dose ≥7 days before illness onset	20/300 (7)	59/355 (17)	29 (15-45)	73 (52-85)	
≥2 MV-only mRNA doses, last dose 2–5 mos before illness onset (Ref)		_	137 (111–155)	_	
BV booster dose ≥7 days before illness onset	20/82 (24)	59/155 (38)	29 (15-45)	**	
≥2 MV-only mRNA doses, last dose 6–11 mos before illness onset (Ref)	_	_	304 (258–333)	_	
BV booster dose ≥7 days before illness onset	20/155 (13)	59/176 (34)	29 (15-45)	78 (57-89)	
≥2 MV-only mRNA doses, last dose ≥12 mos before illness onset (Ref)	_	_	528 (386-575)	_	
BV booster dose ≥7 days before illness onset	20/103 (19)	59/142 (42)	29 (15–45)	83 (63–92)	

A second report was for all adults age 18 and up, showing bivalent booster 38 to 57% effectiveness vs hospitalization

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https://www.cdc.gov/mmwr/volumes/71/wr/pdfs/mm715152e2-H.pdf

Monthly Rates of COVID-19-Associated Hospitalization by Vaccination Status

and Age Group, January 2021 - November 2022

CDC Data



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CDC Data

In November 2022, compared to adults ages 18 years and older who received an updated COVID-19 bivalent booster dose, monthly rates of COVID-19-associated hospitalizations were **16.0x Higher in Unvaccinated** and **2.7x Higher in Vaccinated Adults without an updated booster.***

29.9X Higher in Unvaccinated Adults Ages 18-49 Years

3.2X Higher in Adults Ages 18-49 Years Vaccinated but Without an Updated booster **13.6x** Higher in Unvaccinated Adults Ages 50-64 Years

2.9x Higher in Adults Ages 50-64 Years Vaccinated but Without an Updated booster **13.5x** Higher in Unvaccinated Adults Ages 65 Years and Older

2.5X Higher in Adults Ages 65 Years and Older Vaccinated but Without an Updated booster

https://covid.cdc.gov/covid-data-tracker/#covidnet-hospitalizations-vaccination



A survey of COVID-19 vaccine acceptance across 23 countries in 2022

- 23,000 people tracked and surveyed since 2019 across 23 countries
- Findings:
 - Overall willingness to accept vaccination at 79.1%, up 5.2% from June 2021
 - Hesitancy increased in eight countries, however, ranging from 1.0% (United Kingdom) to 21.1% (South Africa)
 - Almost one in eight (12.1%) vaccinated respondents are hesitant about booster doses.
 - Overall support for vaccinating children under 18 years of age increased slightly but declined among parents who were personally hesitant
 - Almost two in five (38.6%) respondents reported paying less attention to new COVID-19 information than previously, and support for vaccination mandates decreased



Va	accine	% change in	acceptance
% hesitant	% acceptance	2020 to 2022	2021 to 2022
20.9	79.1	↑ 10.9	↑ 5.2
19.8 🛑	80.2	↑ 6.4	↑ 20.4
19.6 🛑	80.4	↑ 12.4	↓ -1.0
28.0	72.0	N/A	↓ -2.7
20.8	79.2	↑ 21.5	↑ 2.6
10.1 💻	89.	9 1.0	↑ 4.2
7.5	92.	5 1 36.2	↑ 12.3
10.8 💻	89.2	2 11.8	↑ 8.4
52.1	47.9	↓ -41.3	↓ -21.1
39.2	60.8	↑ 10.7	17.8
35.9	64.1	↑ 13.9	↑ 8.1
10.4 💻	89.	6 N/A	↑ 2.6
28.1	71.9	↑ 10.3	1 26.1
26.4	73.6	↓ -3.5	↓ -9.4
31.2	68.8	N/A	↓ -8.5
15.4 💻	84.6	↑ 19.5	↑ 6.3
1.7	98	3.3 1 31.9	↑ 26.0
42.0	58.0	N/A	↓ –13.8
21.9	78.1	↑ 14.5	↑ 6.0
18.3 💻	81.7	↑ 38.7	↑ 28.7
11.4 💻	88.6	of ↑ 23.2	↑ 12.2
3.4	96	6.6 1 9.0	↓ –1.0
13.0 💻	87.0	1 26.6	↑ 9.8
12.8 💻	87.2	<u>↑</u> 2.1	↓ -3.3
	Va % hesitant 20.9 19.8 19.6 28.0 20.8 10.1 7.5 10.8 52.1 39.2 35.9 10.4 28.1 26.4 31.2 15.4 1.7 42.0 21.9 18.3 11.4 3.4 13.0 12.8	Vaccine % hesitant % acceptance 20.9 79.1 19.8 80.2 19.6 80.4 28.0 72.0 20.8 79.2 10.1 89.3 7.5 92. 10.8 89.2 39.2 60.8 35.9 64.1 10.4 89.0 28.1 71.9 26.4 73.6 31.2 68.8 15.4 84.6 1.7 98 42.0 58.0 21.9 78.1 18.3 81.7 11.4 88.6 3.4 96 13.0 87.0 12.8 87.2	Vaccine% change in 2020 to 2022 20.9 79.110.9 19.8 80.26.4 19.6 80.412.4 28.0 72.0N/A 20.8 79.221.5 10.1 89.921.0 7.5 92.536.2 10.8 89.211.8 52.1 47.9-41.3 39.2 60.810.7 35.9 64.113.9 10.4 89.6N/A 28.1 71.910.3 26.4 73.6-3.5 31.2 68.8N/A 15.4 84.619.5 1.7 98.331.9 42.0 58.0N/A 21.9 78.114.5 18.3 81.738.7 11.4 88.623.2 3.4 96.69.0 13.0 87.026.6 12.8 87.22.1

Fig. 1 | **COVID-19 vaccine acceptance and hesitancy in June 2022, percent change from 2020 and 2021.** COVID-19 vaccine acceptance in June 2021



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Fig. 2 | COVID-19 booster acceptance and hesitancy among vaccinated respondents in June 2022. COVID-19 booster acceptance among vaccinated in



Reported COVID-19 experience



Medications when sick with COVID-19 within the past year

24.0	12.	1	15.9	48.0	
23.2	8.9	11.9		55.9	
0.0 0.0	11 5			70.7	
9.3 0.0	11.5			12.1	
34	.5	13	.1	28	24.4
9938	11		-	75.2	
3.3 5.0				/3.5	
7.2 5.7 1	3.6			73.5	
19.1	13.3	14.1	1	53.5	
40.4					
16.4	11.5		31.9	40	0.1
25.2		20.2	12.4	42.	.2
11.3	21	19	8	/0.8	
11.5	21		0	43.0	
6.9 15	8.5			69.6	
	44.9		20.4	10.4	24.4
10.0.0		17.5			
12.6 0		47.5		4	0
33.	.9	10.8	3 13.6	41.	6
11 4	10.2	14.6	_	E4.0	
11.4	19.2	14.0		54.9	
9.6 17	.6 1	1.1		61.8	
		68.8		23	3.8 16.4
				5 0 10	
		68.9		5.3 10	.5 15.4
6.2 6 6.3			81.	.6	
79 74	11 7			73	
7.5 7.4				70	
36	5.3		28	14.4	21.3
	51.4		5.8	36.7	6.1
67 00	10			70.1	
0.7 8.2	13			72.1	
30.9	9	7.7	13.6	47.8	

Pharmaceutical medications

- Traditional medicine/herbal extracts and treatments
- Don't know
- No medication taken

Pharmaceutical medication

20.0	27	.2	27.0
2.7	17.8	27.9	11.6
16	.2	35	17
	27.8	20.8	19.2
1	26.5	19.2	13.3
14.1		48.6	8.4
50.5	2	0 19	9.9 9.5
6.8	13.5	23.7	16
20.1	24.9	41	.7
34.4	19.2	2	32.3
	19.9	30.6	14.9
	85.7	·	
0		69.8	
13.4	34.1		31.9
	34	19.9	13.2
25.3		41	16.4
18.4	32	.8	24.2
	7	6	2.3
34	4.2	35	6.8
21.1	4	0.2	18
.9		68.8	
	45.2	14.	5 14.2
19	17.8	3 27	7.4 5.8
40			
	79	.5	
	20.0 .7 16 14.1 50.5 6.8 0.1 34.4 34.4 0 13.4 25.3 18.4 25.3 18.4 .3 .21.1 .9	20.0 27 .7 17.8 16.2 27.8 14.1 26.5 14.1 24.9 34.4 19.2 34.4 19.2 13.4 34.1 34.2 34.2 21.1 45.2 40 12.4	20.0 27.2 17.8 27.9 16.2 35 27.8 20.8 14.1 48.6 50.5 20 14.1 48.6 50.5 20 6.8 13.5 24.9 41 34.4 19.2 19.9 30.6 85.7 69.8 13.4 34.1 34.4 19.9 25.3 41 18.4 32.8 13.4 34.2 34.2 35 21.1 40.2 9 68.8 45.2 14.

- Molnupiravir (lagevrio)
- Monoclonal antibodies (olumiant/baricitinib)
- Ivermectin

Fig. 3 | **Reported COVID-19 experience and medication used for COVID-19 within the past year.** Specific pharmaceutical medications are reported as % of pharmaceutical medications combined. Traditional medicine/herbal extracts and treatments were respondent-interpreted.



Panel d. Belief that COVID-19 vaccine	protects against Long-COVID.
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Global average		53.2			20.1		26.7	7
United States	48.3			21.1			30.6	
United Kingdom	4	1		24.5			34.6	
Turkey		54.4			18.9		26.7	1
Sweden	4	3.6		23.9			32.6	
Spain		52.6		1	7.8		29.6	
Singapore		52.1		15	.8		32.1	
South Korea		44.7			35		2	0.4
South Africa	33.9		31.	3			34.8	
Russia	28.3	21	.4			50.3		
Poland		48.9		2	26.3		24.	.7
Peru		70.3				14.3		15.5
Nigeria		63.2			12.2		24.	.7
Mexico		58.9			21		2	0.2
Kenya		60.5			14.8		24.	.6
Italy	40	.3	:	25.2			34.5	
India		7	9.7				12.9	7.4
Ghana		46.5		12.9		40	.6	
Germany	4	2.9		32.	4		24.	.7
France		51.6			22.6		25.9	9
Ecuador		72.8				7.7	1	19.6
China		72.6				15	5.3	12.1
Canada		47.8		22			30.2	
Brazil		67.8				13.8		18.4
			Ves					
			No					
			Uns	ure				



Mass testing to end the COVID-19 public health threat

- Rationale for mass testing:
 - Vaccines great at protecting against severe illness but less good at stopping transmission
 - Lockdowns are not viable
 - Concerns about new variants and long-COVID
 - Economic impacts
- Propose that mass testing with PCR or LAMP 1 test to reduce transmission and limit spread:
 - Pooled testing maybe up to 100 people per sample
 - Frequent testing daily to every few days
 - Cost of testing a fraction of cost of lost GDP





COVID today



Daily new confirmed COVID-19 cases per million people



infections

Daily new confirmed COVID-19 cases per million people 7-day rolling average. Due to limited testing, the number of confirmed cases is lower than the true number of



Source: Johns Hopkins University CSSE COVID-19 Data

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Our World in Data



Daily new confirmed COVID-19 cases per million people, Jan 22, 2023

7-day rolling average. Due to limited testing, the number of confirmed cases is lower than the true number of infections.





Source: Johns Hopkins University CSSE COVID-19 Data

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New reported cases









Symptoms of COVID-19 Compared with Flu, Cold and RSV.

RARELY
 •• SOMETIMES
 ••• OFTEN

Symptoms 👻	Cold	Flu	Covid-19	R.S.V.
Cough	•••	•••	•••	•••
 Difficulty breathing 	•	•	•••	••
Fatigue	••	•••	•••	•
Fever	•	•••	••	••
□ Headaches	**	•••	•••	••
□ Muscle pain or body aches	••	•••	••	•
New loss of taste or smell*	•	•	••	•
□ Runny or stuffy nose	•••	••	••	•••
□ Sneezing	•••	••	••	••
□ Sore throat	•••	••	•••	•
Vomiting or diarrhea	•	••	••	•
□ Wheezing	•	•	•	•••

*A stuffy nose may temporarily decrease the ability to taste or smell but it does not cause a sudden, complete loss of these senses. • Source: Centers for Disease Control and Prevention



Questions

Upcoming NEBGH events

- Feb. 6 Monday Bi-Weekly COVID-19 Update w/ Dr. Mark Feb. 8 – Promote Immune Fitness Among Your Employees!
- Feb. 13 The Dobbs Decision: What's New and What's Brewing
- Feb. 16 Retaining and Recruiting Employees: Tackling Two Essential Benefits Challenges
- June 15 12th Annual Health & Wellness Benefits Conference



