
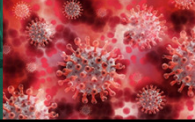


NDSU CENTER FOR IMMUNIZATION RESEARCH AND EDUCATION

COVID-19, Vaccines and Misinformation: Improving Your Game of Whack-a-Mole

Paul J Carson, MD, FACP
NDSU Dept. of Public Health

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NDSU CENTER FOR IMMUNIZATION RESEARCH AND EDUCATION

Paul J Carson, MD, FACP: Bio



- B.S. - St. John's University, Collegeville, MN
M.D. - UND School of Medicine
Residency in Internal Medicine - University of Nebraska
University of MN – Infectious Diseases
- Infectious Disease consultant at MeritCare/Sanford Health, Fargo, ND for > 25 years
- Professor at NDSU in the Dept. of Public Health, and at the UND School of Medicine
- Director, NDSU Center for Immunization Research and Education
- Receive no funding from any pharmaceutical companies and has no financial conflicts of interest

2



Coronavirus delta variant tightens grip on North Dakota; vaccine opponents protest

3

COVID-19 Vaccines

- Are they really necessary?
- Do they really work?
- Are they really safe?

4

Most Common Concerns:

- COVID-19 is being over-blown
- Vaccine was developed too fast
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- Vaccine is killing people
- More vaccinated people are getting COVID than unvax
- You're messing with my DNA
- Rumors about infertility

5

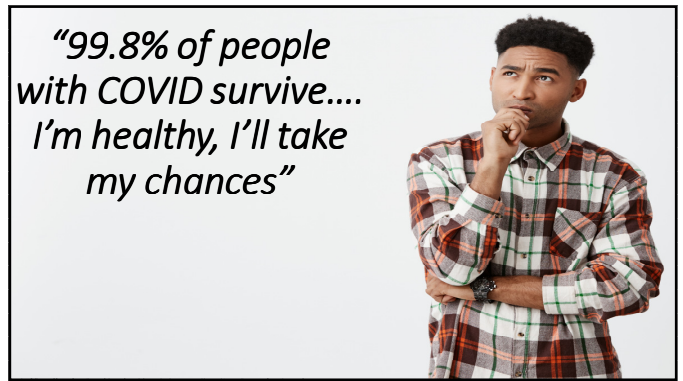
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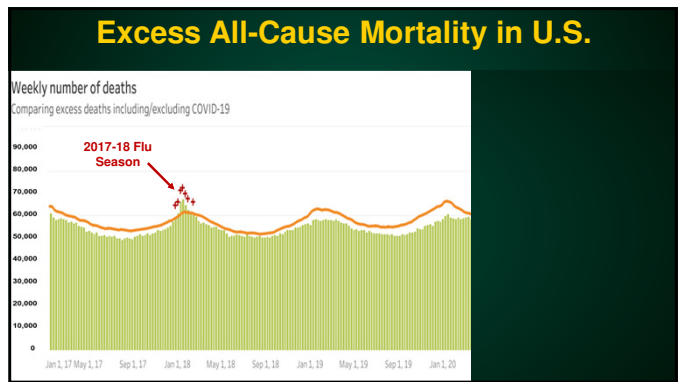


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COVID-19 Morbidity and Mortality

<p>U.S.</p> <ul style="list-style-type: none"> ▪ 44,217,318 cases ▪ 711,020 deaths ▪ 3rd leading cause of death ▪ 2,674,920 hospitalized ▪ Long-COVID? 	<p>ND</p> <ul style="list-style-type: none"> ▪ 1:5 tested positive ▪ 1:138 hospitalized ▪ 1:460 died
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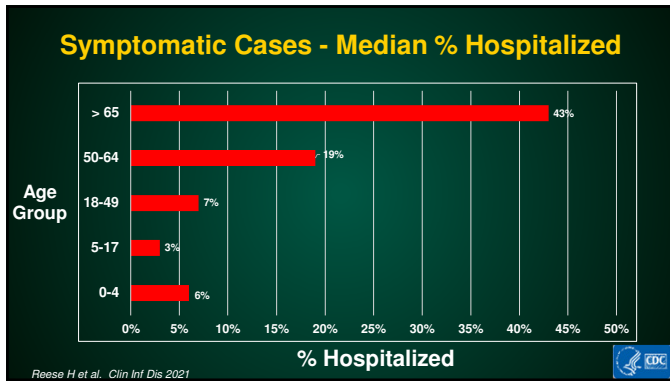
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What Does Survival Look Like?

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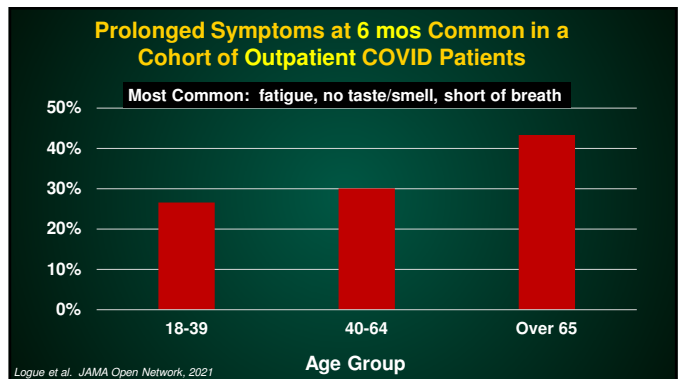
www.thelancet.com Vol 398 August 28, 2021

Articles

1-year outcomes in hospital survivors with COVID-19: a longitudinal cohort study

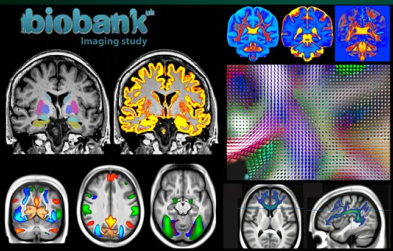
Symptom or Problem	12 mos
Any symptom	49%
Fatigue or weakness	40%
Sleep problems	17%
Smell disorder	12%
Anxiety or depression	26%
Persistent abnormality on CT of the chest	39%
Abnormal gas exchange in lungs	23%
Ongoing shortness of breath	30%

17



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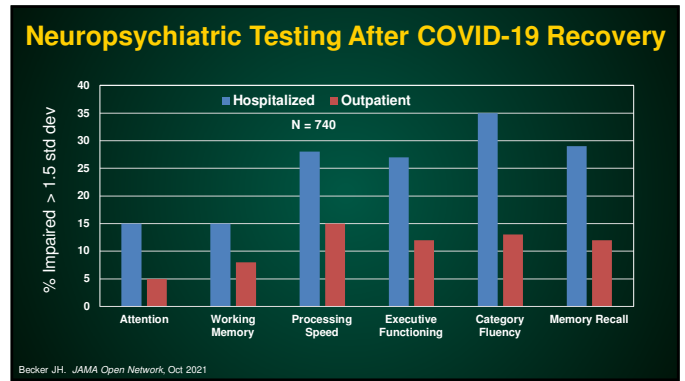
U.K Biobank Study



- Ongoing study of brain structure over time with serial MRI scans of the brain
- Compared 394 COVID patients (over 95% were outpatients) with 388 matched controls
- COVID-19 patients had significant shrinkage in brain grey matter in 5 areas of the brain

Douaud G. medRxiv Jun 2021

19



20

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“This mRNA technology is too new. I need to see the long-term results before I’ll take any vaccine”

23

Trump endorses COVID-19 vaccination as a 'miracle' and 'a real lifesaver' in interview with New York Post

Grace Panetta Apr 23, 2021, 8:58 AM



President Donald Trump speaks during an "Operation Warp Speed Vaccine Summit" on the White House complex, Tuesday, Dec. 8, 2020, in Washington. Evan Vuocoli/Associated Press

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2020 SUCCESS!
Vaccines tested, approved, and distributed

THE HISTORY OF mRNA Vaccines
Today's success with mRNA vaccines against COVID-19 comes from the decades of research that came before it.

2010s Smarts and spikes
After outbreaks of other coronaviruses in 2003 (SARS) and 2012 (MERS), scientists study how the "spike protein" works and how it could be used in vaccines.

2000 And we're off!
In 2005, scientists figure out how to make synthetic mRNA safe for injection into cells. Research in the field accelerates.

1990s Failing forward
Could synthetic forms of mRNA be used in medicine? The potential seems endless, but so do the challenges. Failed experiments still build knowledge.

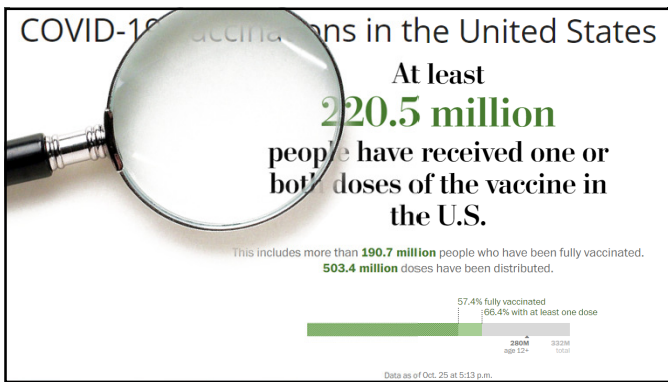
1980s Love those lipids
Researchers study the nature of lipids, which lays the groundwork for using lipid nanoparticles in mRNA vaccines many decades later.

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10 Vaccines in the pipeline for closely related SARS CoV1 and MERS from 2007 to 2020

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Multiple Layers of Pre and Post-Licensure Safety Monitoring

- Phase I-III Clinical Trials
- Vaccine Adverse Events Reporting System (VAERS)
- Clinical Immunization Safety Assessment (CISA) Project
- Vaccine Safety Datalink (VSD)
 - Rapid cycle assessments for COVID19 vaccines
- Post-licensure Rapid Immunization Safety Monitoring System (PRISM)
- V-Safe

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Rare serious adverse events reported after COVID-19 vaccination

Janssen vaccine		mRNA vaccines
Thrombosis with thrombocytopenia syndrome (TTS)	Guillain-Barré syndrome (GBS)	Myocarditis
3 : million	7 : million	3.5 : million
8 : million young females	15 : million older males	25-50 : million young males
Anaphylaxis - 5 : million with all the vaccines		

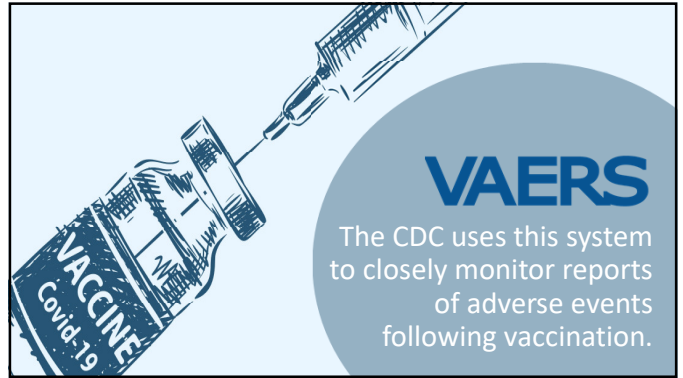
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*"I have heard that over 15,000 people have died **after** the COVID-19 vaccine...Is this true?"*

30



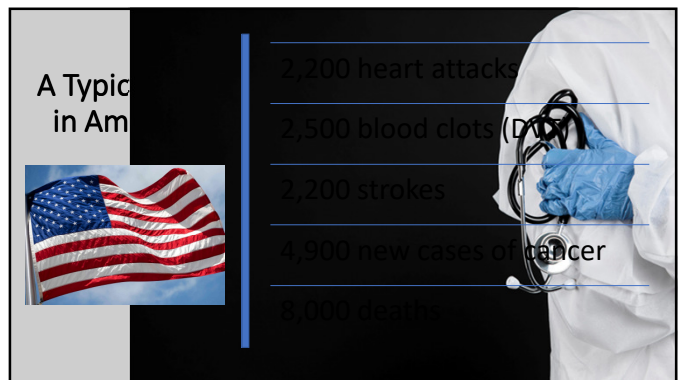
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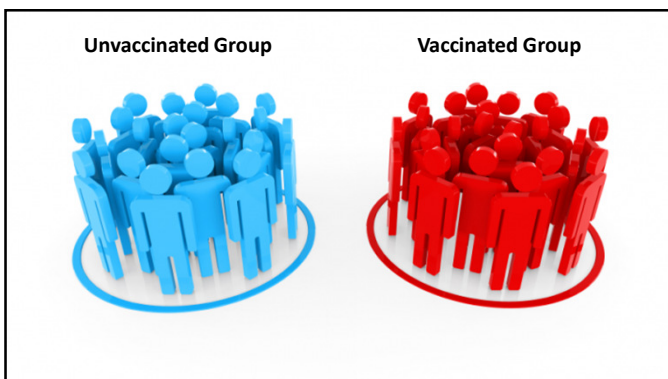
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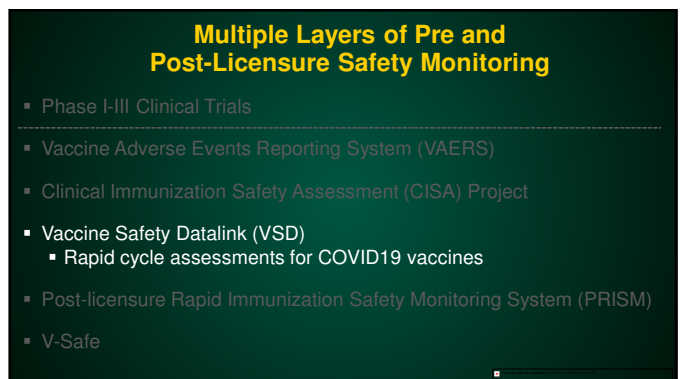
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CDC

VSD
Vaccine Safety Datalink

9 participating integrated healthcare organizations
data on over 12 million persons per year

Participating organizations include: Kaiser Permanente Washington, Kaiser Permanente Northwest, Kaiser Permanente Northern California, Kaiser Permanente Southern California, HealthPartners, Marshfield Clinic Research Institute, Denver Health, Kaiser Permanente Colorado, and CDC Atlanta, GA.

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JAMA | Original Investigation

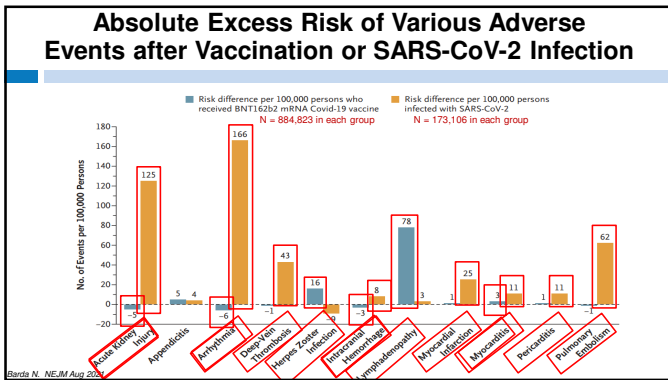
Surveillance for Adverse Events After COVID-19 mRNA Vaccination

Nicola P. Klein, MD, PhD; Ned Lewis, MPH; Kristin Goddard, MPH; Bruce Fireman, MA; Ousseny Zerbo, PhD; Kayla E. Hanson, MPH; James G. Donahue, DVM, PhD; Elyse O. Kharbanda, MD, MPH; Allison Naleway, PhD; JAMA. doi:10.1001/jama.2021.15072. Published online September 3, 2021.

Adverse Event	Rate per 1,000,000 Doses	Rate per 1,000,000 Persons
Acute myocardial infarction	1.1	0.0001
Myocarditis	1.1	0.0001
Pericarditis	1.1	0.0001
Stroke	1.1	0.0001
Death	1.1	0.0001
Other adverse events	1.1	0.0001

- 11,845,128 doses of mRNA vaccines in 6.2 million individuals
- No increased risk of any of the conditions except:
 - Myocarditis in 12-29 y.o. (3.7x increase)
 - Rare anaphylaxis (5-8 per million)

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Myocarditis in Big 10 Athletes After Recent SARS CoV2

Cardiac MRI scans on 1597 athletes after recovering from recent SARS CoV-2 infection

2.3% of athletes diagnosed with COVID-19 myocarditis

JAMA Cardiology. Published online May 27, 2021

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Myocarditis in Healthy Young Male

Vaccine 1 : 20,000

Virus 1 : 43

41

- In the history of all licensed vaccines in the U.S., no serious side effects have ever been found after 6 weeks
- All current vaccines now studied 6-12 mos.

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What Scares People Most?

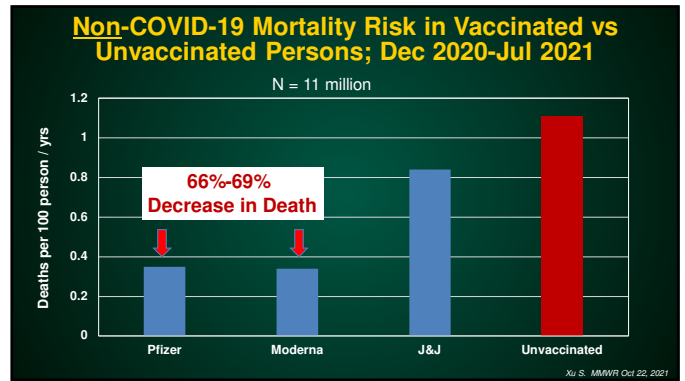
New York Times Bestseller
Tom Clancy
Clear and Present Danger

The possibility of something that has never been found in approved U.S. vaccines

↓

Late serious complications from a vaccine

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Get Ready For Base-Rate Fallacy

INSIDER

Israel says the Delta variant is infecting vaccinated people, representing as many as 50% of new cases.

Marie Perle

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Base Rate Fallacy:

“But over 50% of the people with COVID are vaccinated?!”

Vaccinated (N=90)

Unvaccinated (N=10)

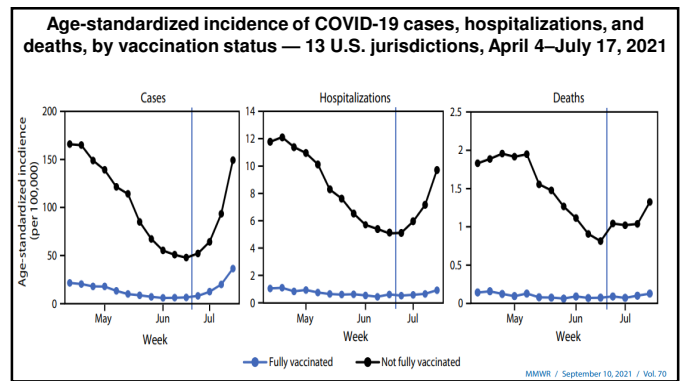
Attack Rate: 50%

6 cases in vaccinated
5 cases in unvaccinated

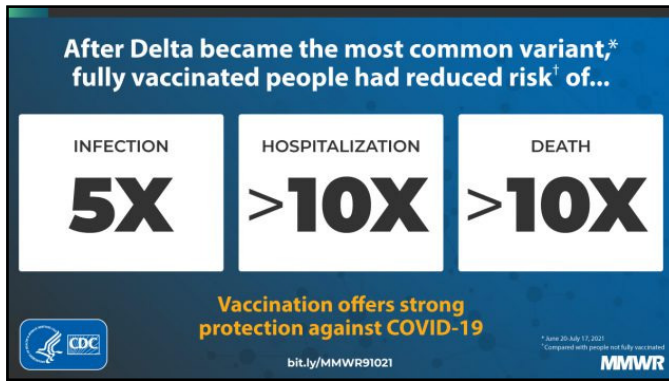
Attack Rate: 7%

👤 = Has COVID-19
👤 = Healthy

47



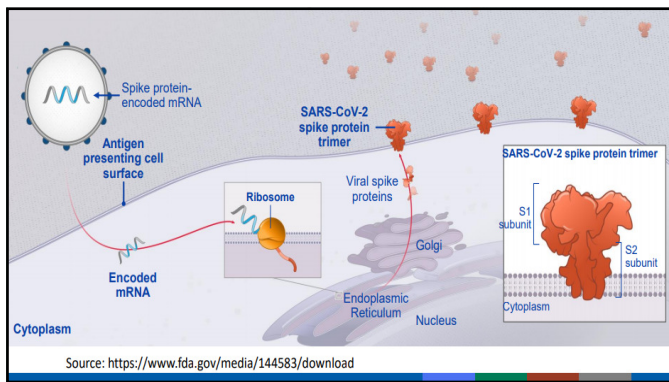
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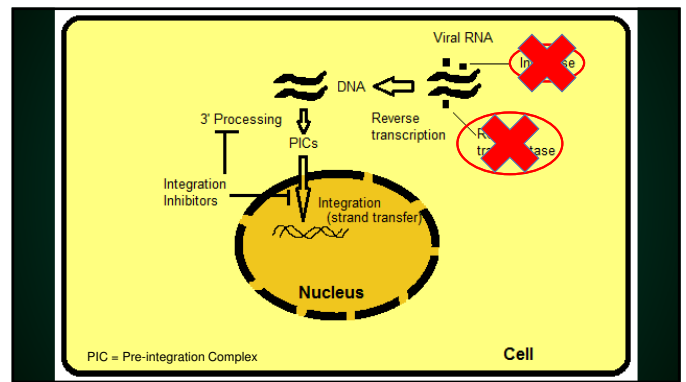
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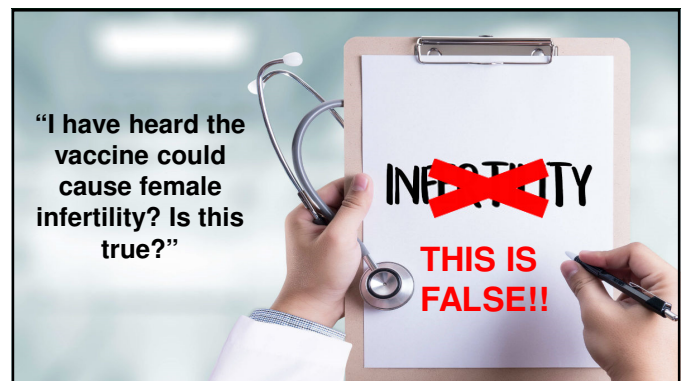
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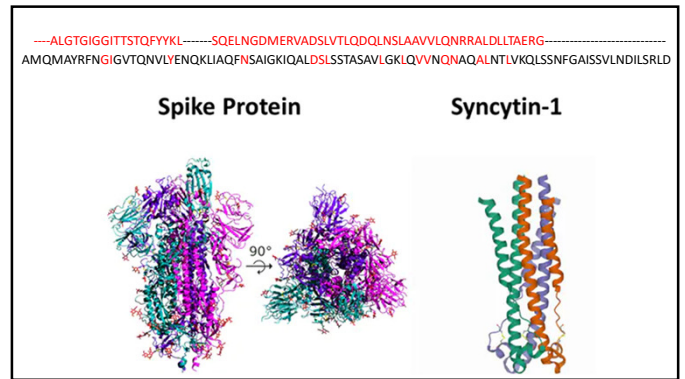
Michael Yeadon, PhD
Retired pharmacologist
researcher at Pfizer
- Allergy and asthma treatments
- Let go by Pfizer in 2011

Spring 2020
"Just a common and garden virus, to which the world has over-reacted"
"Their isn't going to be a 2nd wave. Viruses don't do waves, and btw, herd-immunity is almost certainly accomplished"
"The pandemic is all but over"

December 2020
"Female infertility could result from vaccine-induced antibodies"



55



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v-safe and Registry Monitoring people who report pregnancy

v-safe After Vaccination Health Checker Pregnant people reported, United States, as of October 12, 2021 166,153	v-safe COVID-19 Vaccine Pregnancy Registry Pregnant people enrolled, United States, as of October 12, 2021 5,104
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Results of Registry Surveillance Regularly Reported at ACIP Updates




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Illustrative (and disturbing) little exercise:

Google the term "infertility" or "depopulation", and the following vaccines:


1. HPV
2. Polio
3. Tetanus
4. Influenza
5. MMR

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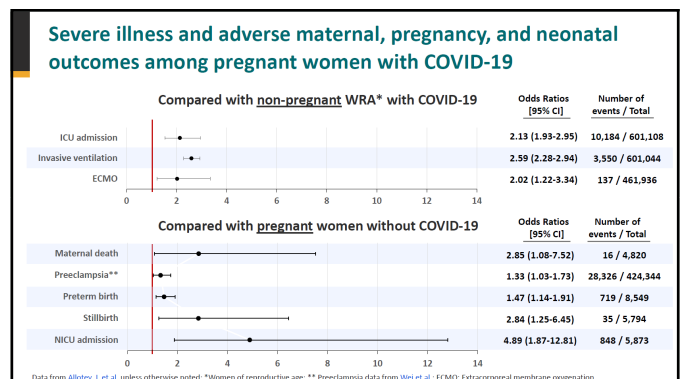
COVID in Pregnancy

- ICU admission 3x ↑
- Invasive ventilation 2.9x ↑
- Death 1.7x ↑
- Increase in premature birth
- Neonatal adverse outcome 2.1x ↑

MMWR Morb Mortal Wkly Rep. 2020;69(44):1641
Elíasia E. J Maternal-Fetal & Neonatal Medicine,



59



60



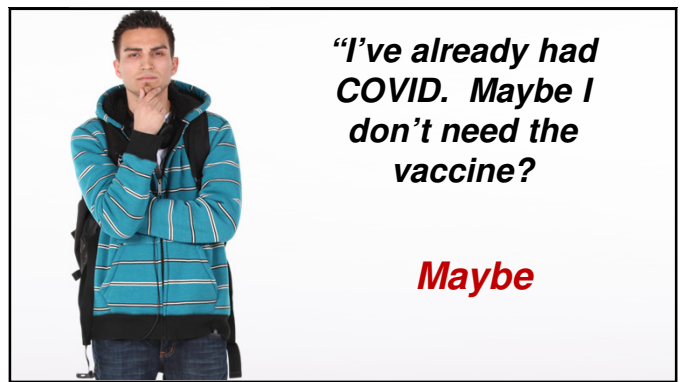
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Natural Infection vs Vaccination

- Natural infection typically produces better immunity
- Test-tube studies suggest antibodies from vaccination may be higher and better than from natural infection
- 2 clinical studies (solid, but not yet published), - natural infection at least as good as and maybe better than vaccination
- 2 published studies (Denmark and India) showed many reinfections after prior infection
- **Prior infection + vaccination - "elite" level of antibodies, lowest reinfection**

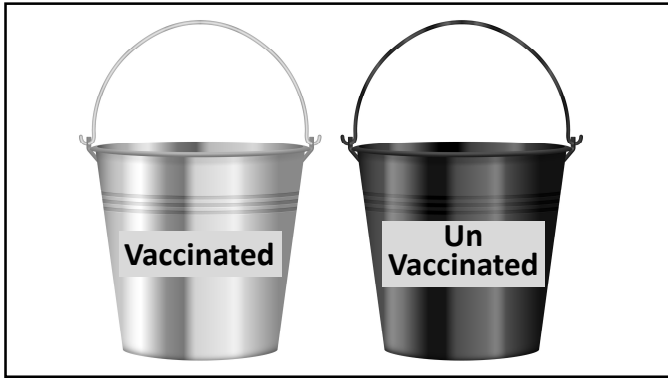
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No Mandates if Prior Infection?

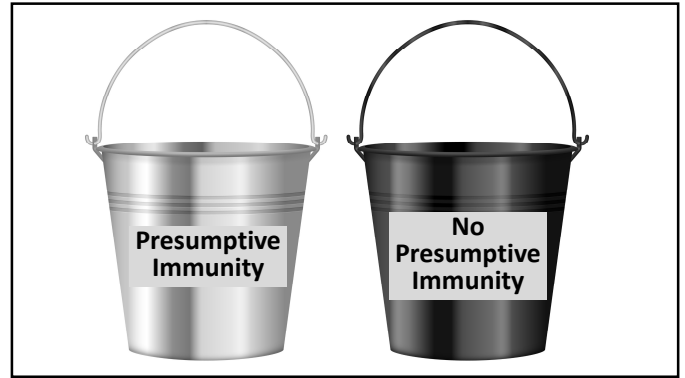
Pros	Cons
<ul style="list-style-type: none"> ▪ Fairness ▪ Reducing resistance ▪ Conserving limited resource 	<ul style="list-style-type: none"> ▪ Implementation challenges ▪ Not optimal protection ▪ Perverse incentives

Dorit Rubinstein Reiss

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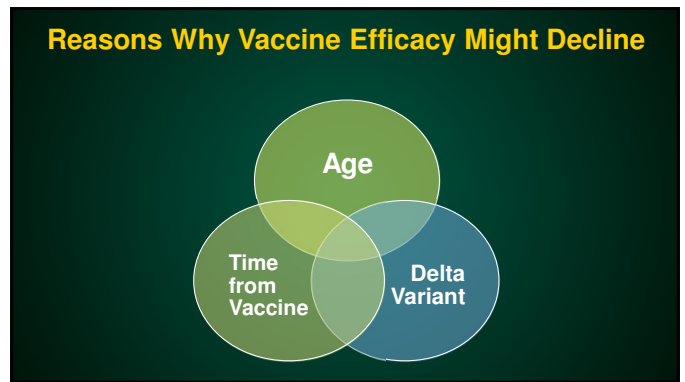


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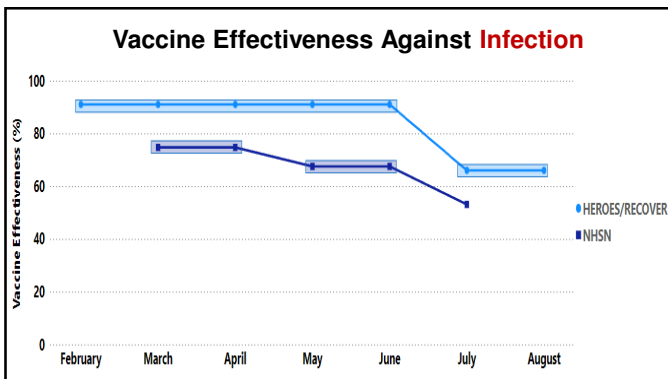
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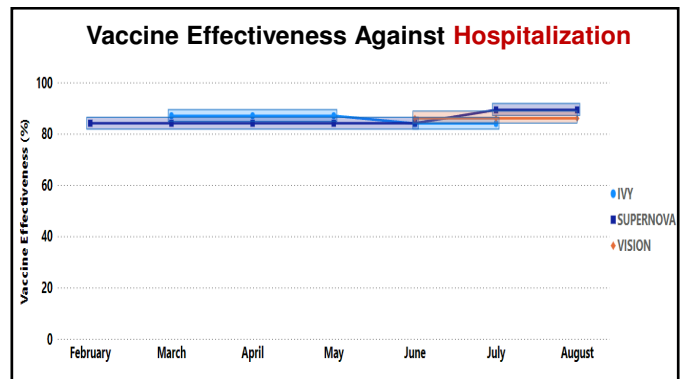
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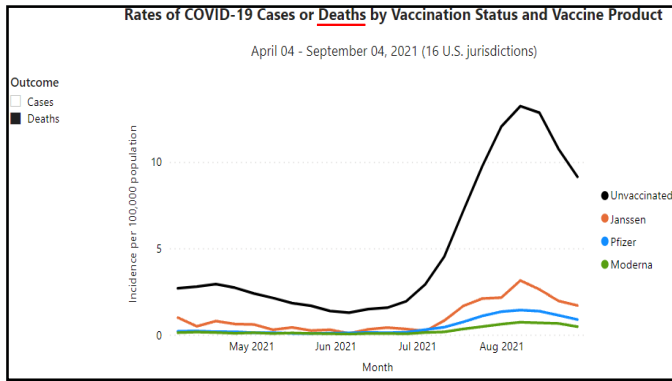
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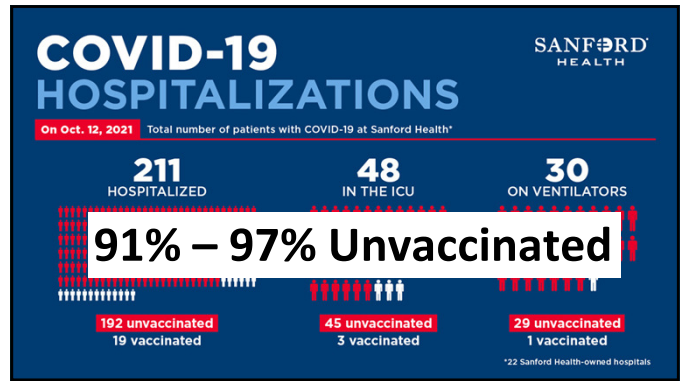
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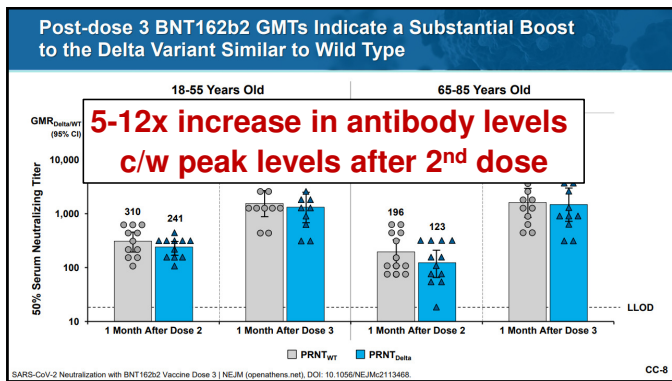
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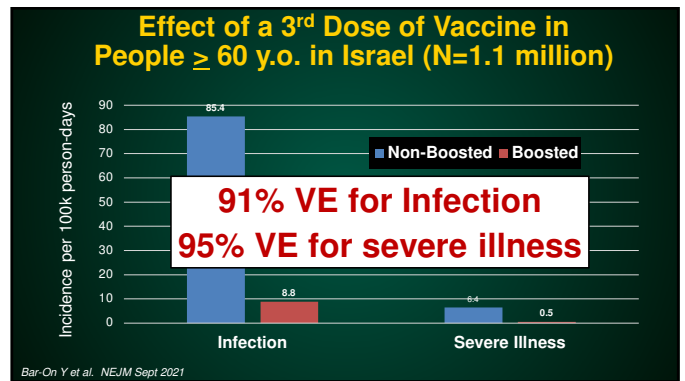
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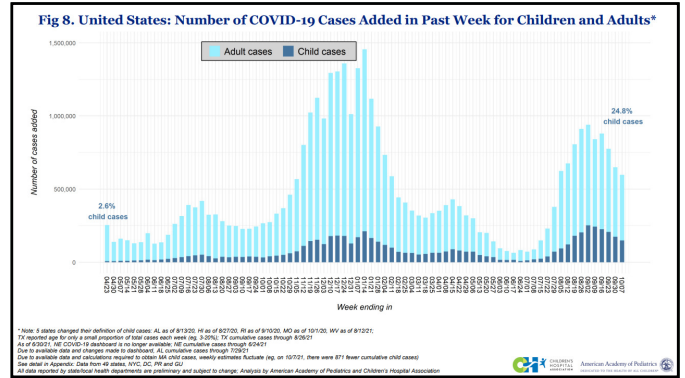
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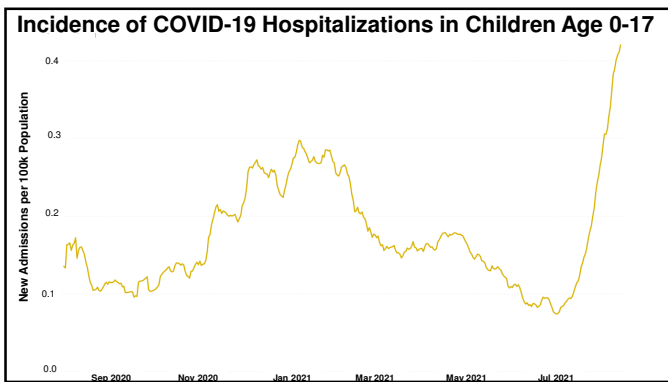
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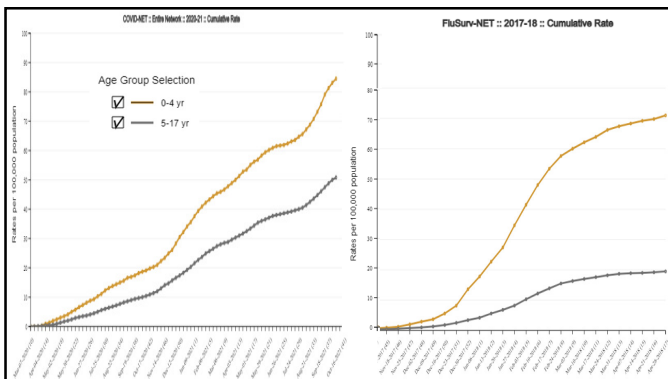
Should Children be Immunized?

Outcome	# Through 10/7/21
Cases	6,047,371
Hospitalizations (23 states and NYC)	23,071
Deaths (43 states and NYC)	542
Multi-Inflammatory Syndrome in Children	5,217

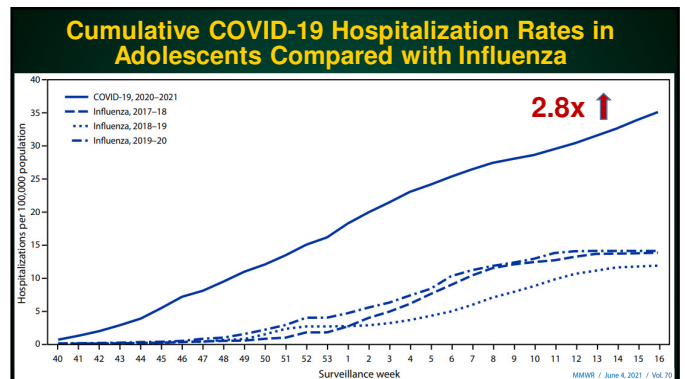
AAP Children and COVID-19 State Data Report
CDC - State Reporting of MISIC

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NEWS | 14 July 2021

Long COVID and kids: scientists race to find answers

Children get long COVID too, but researchers are still working to determine how frequently and how severely.

Dyani Lewis

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