
SOCIETY FOR AMBULATORY ANESTHESIA
Outpatient • Office Based • Non-Operating Room
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2022 SAMBA ANNUAL MEETING
MAY 11 – 14, 2022
COVID-19 UPDATE: LESSONS LEARNED
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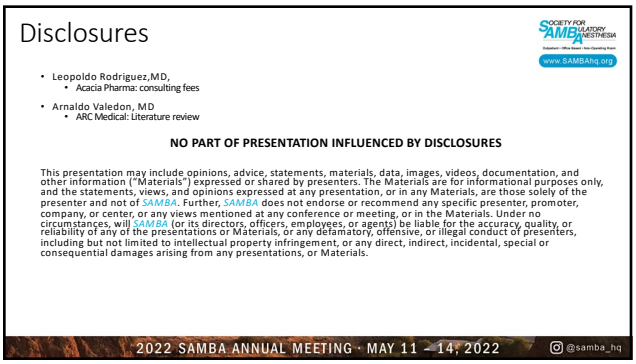
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• Leopoldo Rodriguez,MD,
• Acacia Pharma: consulting fees
• Arnaldo Valedon, MD
• ARC Medical: Literature review
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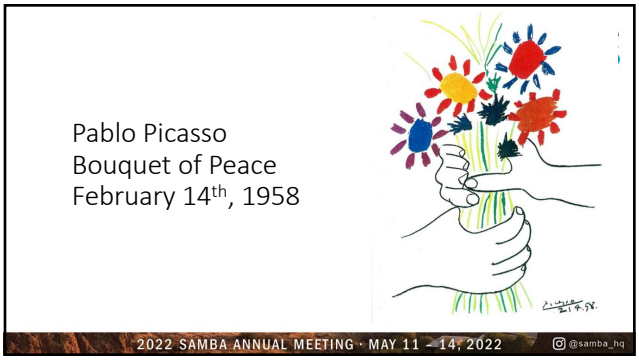
Pablo Picasso
Bouquet of Peace
February 14th, 1958
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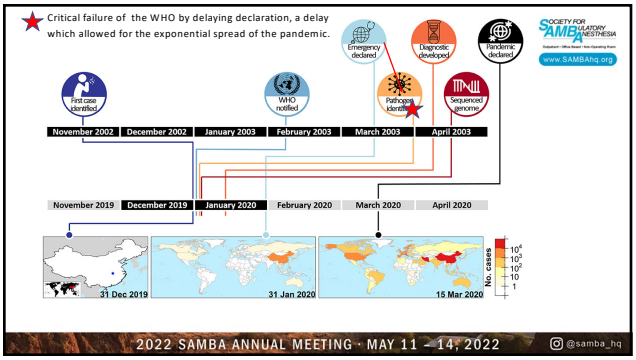
Critical failure of the WHO by delaying declaration, a delay which allowed for the exponential spread of the pandemic.
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www.SAMBAhq.org
Emergency declared
Diagnostic developed
Pandemic declared
First case identified
WHO notified
Pathogen identified
Sequenced genome
November 2002
December 2002
January 2003
February 2003
March 2003
April 2003
November 2019
December 2019
January 2020
February 2020
March 2020
April 2020
31 Dec 2019
31 Jan 2020
15 Mar 2020
No. cases
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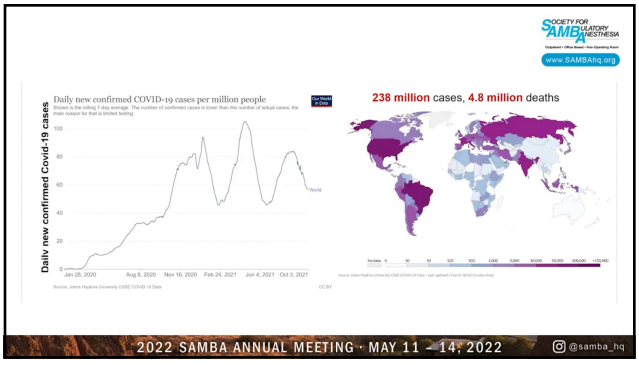
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www.SAMBAhq.org
Daily new confirmed COVID-19 cases per million people
Daily new confirmed Covid-19 cases
238 million cases, 4.8 million deaths
2022 SAMBA ANNUAL MEETING · MAY 11 – 14, 2022
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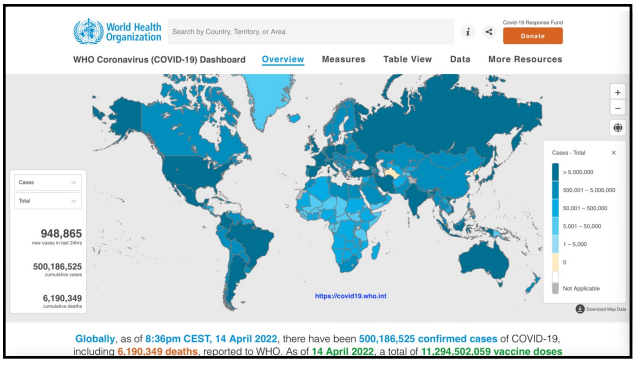
World Health Organization
Search by Country, Territory, or Area
Donate
WHO Coronavirus (COVID-19) Dashboard
Overview
Measures
Table View
Data
More Resources
948,865
500,186,525
6,190,349
https://covid19.who.int
Globally, as of 8:36pm CEST, 14 April 2022, there have been 500,186,525 confirmed cases of COVID-19, including 6,190,349 deaths, reported to WHO. As of 14 April 2022, a total of 11,294,502,059 vaccine doses

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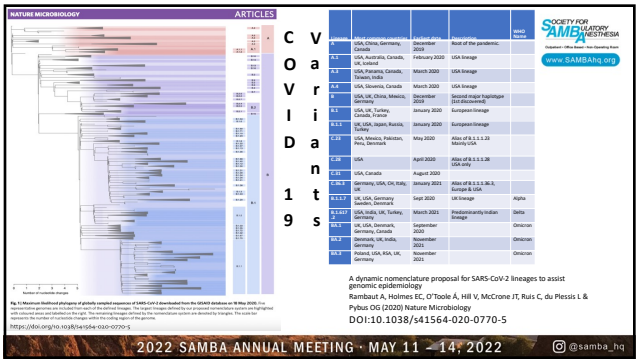

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Current strain is BA.2 Omicron variant

- Clear evidence of the changing antigenicity of the SARS-CoV-2 spike protein and of the amino acid changes that affect antibody neutralization.
- 32 mutations in the Spike protein
- Alpha had only 8 mutations
- Infection despite vaccination
- Monoclonal antibodies are less effective
- Hospitalization less likely
- N501Y mutation makes binding more effective
- E484A keeps antibodies from binding (despite vaccination or previous disease
- Studying if vaccines provide protection?
- Vaccination inequity worldwide promotes more mutations

Harvey, W.T., Carabelli, A.M., Jackson, B. *et al.* SARS-CoV-2 variants, spike mutations and immune escape. *Nat Rev Microbiol* **19,** 409–424 (2021). https://doi.org/10.1038/s41579-021-00573-0

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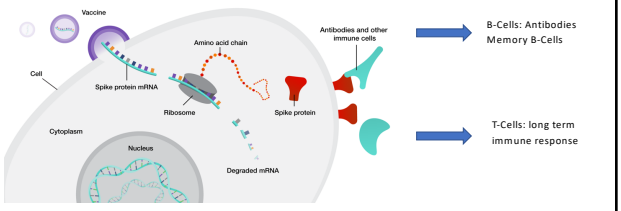
mRNA vaccine



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WHO-approved vaccines

Company or name	Type of vaccine	Reference	
moderna	mRNA vaccine	Baden NEJM, Feb 4, 2021	Spike protein
Pfizer	mRNA vaccine	Polack NEJM, December 31, 2020	
Johnson & Johnson	Adenovirus + DNA vaccine	J&J press release January 29, 2021; FDA document Feb 24	
AstraZeneca	Adenovirus + DNA vaccine	Voysey Lancet December 8, 2020; Preprint Feb 1, 2021	
NOVAVAX	Spike protein + an adjuvant	Novavax press release June 14; Novavax NEJM June 30, 2021	
Sputnik V	Adenovirus + DNA vaccine	Logunov Lancet, February 2, 2021	
SINOPHARM	Whole inactivated virion	Sinopharm, JAMA, May 28, 2021	Full inactive virion
sinovac	Whole inactivated virion	Sinovac, JAMA May 28, 2021	
BHARAT	Whole inactivated virion	Bharat Covaxin, April 21, 2021	

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Reduction in vaccine efficacy with time

	Reduction in vaccine efficacy		Minimal reduction in vaccine efficacy	
	AstraZeneca	NOVAVAX	Johnson & Johnson	Pfizer
Pre-existing variants USA / UK	**70%** (UK)	**89%** (UK)	**72%** (USA)	**91-95%** (USA)
Beta variant South Africa	**10%**	**43%**	**64%**	**100%**
Delta variant UK, Israel, Canada	**60%**	-	-	**64-87%**

Sources:
- Abdool Karim SS, et al. NEJM;2021:10.1056/NEJMc2100362;
- Sheikh et al. Lancet (2021)
- Lopez Bernal et al. medRxiv
- Stowe et al. PHE preprint;
- Nasreen et al. medRxiv

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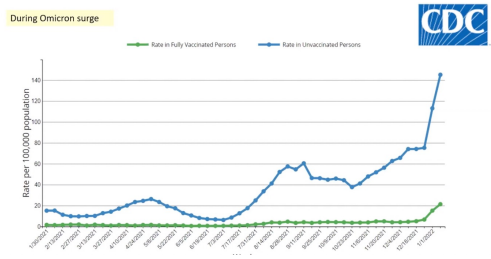
Age-Adjusted Rates of COVID-19-Associated Hospitalizations by Vaccination Status in Adults Ages ≥18 Years, January 2021-January 2022



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Boosters?

- Vaccination with either a short or long interval between two doses was associated with a considerably reduced risk of SARS-CoV-2 infection (asymptomatic and symptomatic) in the short term, but this protection waned after 6 months, during a period when the delta variant predominated.
- The highest and most durable protection was observed in participants who received one or two doses of vaccine **after a primary infection**.
- Strategic use of booster doses of vaccine to avert waning of protection (particularly in double vaccinated, previously uninfected persons) may reduce infection and transmission in the ongoing response to Covid-19.

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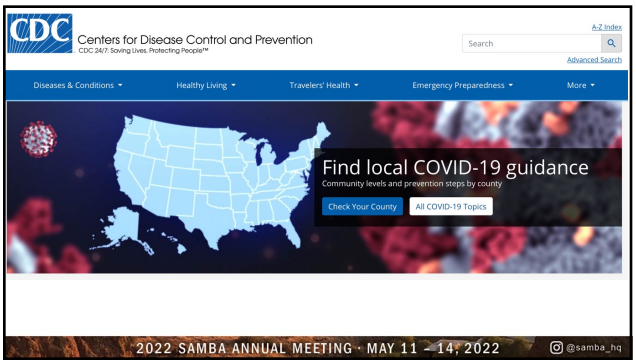

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Recommendations

- 140,231 unvaccinated patients undergoing surgery in 116 countries, 1,674 hospitals
- 3,127 had a COVID-19 infection before surgery.
- **Increased risks of mortality and morbidity**—especially with pulmonary complications–up to 7 weeks post COVID diagnosis, regardless of being asymptomatic or symptomatic, older or younger than 70, having major or minor surgery, or undergoing elective or emergency surgery.
- Symptomatic patients at ≥ 7 weeks were at increased risk for complications versus patients without symptoms.
- Mortality data is summarized in the table below.
  https://associationofanaesthetists-publications.onlinelibrary.wiley.com/doi/epdf/10.1111/anae.15458

Interval Between COVID Diagnosis and Surgery	30-day Mortality Rate for Elective Patients (%, CI)**
No COVID Diagnosis	0.62 (0.57-0.67)
0-2 weeks	3.09 (1.64-4.54)
3-4 weeks	2.29 (1.06-3.53)
5-6 weeks	2.39 (0.87-3.91)
≥7 weeks	0.64 (0.20-1.07)

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Recommendations

1. Elective surgery should be delayed for 7 weeks after a SARS-CoV-2 infection in unvaccinated patients that are asymptomatic at the time of surgery.
2. The evidence is insufficient to make recommendations for those who become infected after COVID vaccination. Although there is evidence that, in general, vaccination reduces post-infection morbidity, the effect of vaccination on the appropriate length of time between infection and surgery/procedure is unknown.
3. Any delay in surgery needs to be weighed against the time-sensitive needs of the individual patient.

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Recommendations

4. If surgery is deemed necessary during a period of likely increased risk, those potential risks should be included in the informed consent and shared decision-making with the patient.
5. Extending the above delay should be considered if the patient has continued symptomatology not exclusive of pulmonary symptoms.
6. Any decision to proceed with surgery should consider:
   - The severity of the initial infection
   - The potential risk of ongoing symptoms
   - Comorbidities and frailty status
   - Complexity of surgery

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In practice ASCs have been timing surgery:

Based on the symptom - and severity-based categories, elective surgery should be postponed:

- **Four weeks for an asymptomatic patient** or recovery from only mild, non-respiratory symptoms.
- **Six weeks** for a **symptomatic** patient (e.g., cough, dyspnea) **who did not require hospitalization**.
- **Eight to ten weeks** for a **symptomatic** patient who is **diabetic, immunocompromised, or hospitalized**.
- **Twelve weeks for a patient who was admitted to an intensive care unit** due to COVID-19 infection.

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Lessons learned from a facility point of view

JAMA Network

From: **Nine Lessons Learned From the COVID-19 Pandemic for Improving Hospital Care and Health Care Delivery**

JAMA Intern Med. 2021;181(9):1161-1163. doi:10.1001/jamainternmed.2021.4237

- Repurpose hospital areas to expand areas of care: Preop, PACU
- Canceled elective surgery and used A.C.S. criteria to determine the timing of surgery.
- Canceled all outpatient appointments.
- Rapid discharge of patients to prevent infection.
- Transfer patients to other hospitals with less COVID-19
- Reassignment of staff
- Same-day "emergency" credentialing

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Non-Medical effects of the COVID-19 Pandemic

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COVID-19 impact on society

Five major global impacts by SARS-CoV-2:

1. Increase in Poverty to ~ 150 Million Extreme Poor by 2021.
2. Increase in hunger: 161 million more suffer from food insecurity.
3. Misinformation:
   a. Miracle cures
   b. New world order
   c. Conspiracy theories
   d. Political instability & protests restrictions.
4. Disparities in access to vaccination, and treatment, which was reflected by disparities in mortality.

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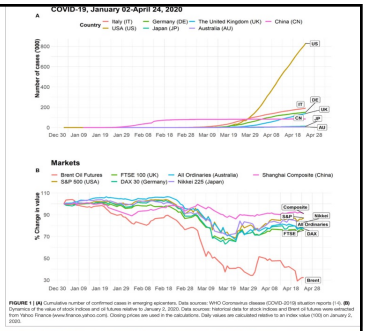
- June 2020, World Bank stated, COVID-19 to Plunge Global Economy into Worst Recession since World War II.
- Decreased demand for oil > cheap oil
- COVID-19 triggered a steep increase in debt, specially in developing economies.
- As the virus spreads, the markets continue to be volatile.
- The most impact has been on manufacturing, and the service industry, especially in developed countries.

Pak, A., Adegboye, OA., Adekunle, A., Rahman, KM., McBryde, ES., Eisen, DP.

Economic Consequences of the COVID-19 Outbreak: the Need for Epidemic Preparedness.

Frontiers in Public Health. May 20, 2020.

doi: 10.3389/fpubh.2020.00241



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In 2022:

The HungerMap^{LIVE} tracks core indicators of **acute hunger** in near real-time.

Acute hunger is measured by key indicators such as household food consumption, livelihoods, child nutritional status, mortality, access to clean water and other contextual factors. The HungerMap^{LIVE} primarily tracks trends on household food consumption, and while this is only one dimension of acute food insecurity, household food consumption can provide an indication of how overall trends are likely to shift.

As of today, 10 April

885 MILLION

people do not have sufficient food consumption across 92 countries, according to the HungerMap^{LIVE} estimates, including:

- 343 million 'ACTUAL' in 35 countries;
- 542 million 'PREDICTED' in 57 countries.

Methodology Note: The HungerMap^{LIVE} includes data from two sources: (1) WFP's continuous, near real-time monitoring systems, which remotely collect thousands of data daily through live calls conducted by call centres around the world; and (2) machine learning-based predictive models. Therefore, to note this differentiation, this report indicates whether a country's data is based on WFP's near real-time monitoring systems (marked 'ACTUAL') or predictive models (marked 'PREDICTED').

[1] Source: FAO, IFAD, UNICEF, WFP and WHO. 2021. The State of Food Security and Nutrition in the World 2021.
[2] Source: FSIN. 2021. Global Report on Food Crises 2021.

https://hungermap.wfp.org

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Looking back: 3 most important new technological developments

- Vaccines.
  - December 2019: 1st case reported
  - 11 days later: full COVID sequence identified
  - November 2020: 1st vaccination by Pfizer / BioNTech
- Diagnostics
  - PCR available within 2 weeks;
  - Few weeks later, rapid antigen tests,
  - Antibody testing
- New treatments:
  - Recovery trial with Dexamethasone
  - REGEN-COV antibody
  - Tocilizumab in severe covid
  - Molnupiravir decreases death by ~50%
- Trials to demonstrate some drugs don't work:
  - Ivermectin
  - Convalescent plasma
  - Lopinavir / Ritonavir
  - Favipiravir
  - Hydroxychloroquine

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Society

1. Infectious diseases are a whole society issue
2. The vaccine paradigm has been transformed for emergencies
3. Weaknesses in vaccine manufacturing and equitable distribution require change
4. Trust is one of the most delicate but critical requirements for an effective pandemic response.
5. Agility and speed will be the new basis for differentiation.
6. Government policy matters—but individual behavior sometimes matters more.
7. Schools are the true fulcrum for the functioning of society.
8. Work will never be the same.
9. Economic stimulus works, but only in concert with strong public-health measures.
10. Whether we experience these problems again will depend on the investments and institutions we establish now.

McKinsey & Company - Healthcare Systems & Services Practice
Ten lessons from the first two years of COVID-19
by Matt Craven, Mark Staples, and Matt Wilson

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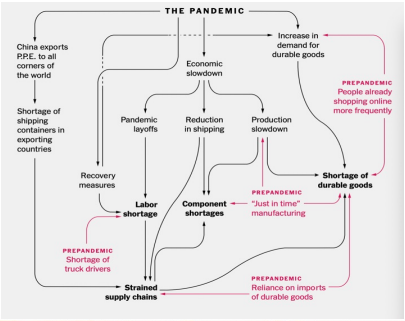
Pandemic & the supply chain disruption

New York Times



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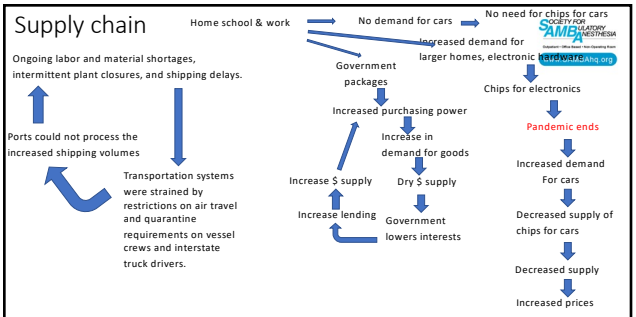
Supply chain



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Semper imitatum, nunquam idem

Physician anesthesiologists are the perioperative medicine specialists who assess and modify risk factors to decrease complications and implement evidence-based medicine to decrease discharge time and postoperative visits to the ER and/or post-discharge hospitalizations.

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PERIOPERATIVE COMPLICATIONS AND POST-OPERATIVE MORTALITY

Perioperative COVID-19+ Conversion

To Worry or Not to Worry?

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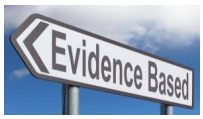
PERIOPERATIVE COMPLICATIONS AND POST-OPERATIVE MORTALITY

CURRENT EVIDENCE

Patients undergoing surgery who have SARS-CoV-2 infection confirmed within 7 days before or 30 days after surgery have worse morbidity and mortality post-operatively[1,2].



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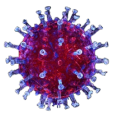
PERIOPERATIVE COMPLICATIONS AND POST-OPERATIVE MORTALITY

- Retrospective analysis of 1128 patients s/p surgery 1-1 and 1-31, 2020 [3]
  - 74·0% had emergency surgery
  - 24·8% had elective surgery.
  - SARS-CoV-2 infection was confirmed preoperatively in 26·1% patients.
    - **30-day mortality: 23·8%.**
    - **Pulmonary complications: 51·2% of 1128 patients**
      - **30-day mortality in these patients was 38·0%.**



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PERIOPERATIVE COMPLICATIONS AND POST-OPERATIVE MORTALITY

Important Notes

- Even though the mortality and pulmonary complications showed higher statistical significance for emergency cases, patients having elective surgery still had a mortality rate of 18.9% overall

- From this group, **a higher percentage of mortality was observed in who had a post-operative diagnosis as opposed to preoperatively.**
  - Pulmonary complications for such outpatients followed the same pattern
  - Thrombotic complications have also been observed post-operatively with increased incidence in COVID -19 patients[2,4].

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PERIOPERATIVE COMPLICATIONS AND POST-OPERATIVE MORTALITY

Retrospective study of 10,940 surgical patients in different hospital settings[5]:
COVID-19 infection positivity was an independent risk factor for increased perioperative mortality but not complications

- Overall mortality rates:
  - Cohort with COVID-19 : 14.8%
  - Cohort without COVID-19: 7.1%
- Limitations
  - Patient outcomes could not be compared by clinical severity of COVID-19 infection.
  - Could not determine specific types of surgery or whether the surgery was elective, urgent, or emergent.

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PERIOPERATIVE COMPLICATIONS AND POST-OPERATIVE MORTALITY

- **In adjusted analyses, 30-day mortality was associated with[2]:**
  - *Male sex*
  - *Age 70 years or older*
  - *American Society of Anesthesiologists status 3–5 versus 1-2*
  - *Malignant versus benign or obstetric diagnosis*
  - *Emergency versus elective surgery*
  - *Major versus minor surgery*

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Am J Surg. 2022 Feb; 223(2): 380–387. PMCID: PMC8045424
Published online 2021 Apr 14. doi: 10.1016/j.amjsurg.2021.04.005 PMID: 33894979

Increased complications in patients who test COVID-19 positive after elective surgery and implications for pre and postoperative screening

- Prospective study: 90,093 patients undergoing elective surgery at 170 VA hospitals across US
- Patient groups:
  - First positive COVID-19 test:
    - Within 30 days after surgery (COVID[-/+])
    - Before surgery (COVID[+/−])
    - Negative throughout (COVID[−/−]).
- Cumulative incidence, risk factors for and complications of COVID[-/+] estimated

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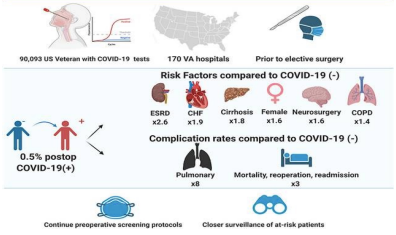
Increased complications in patients who test COVID-19 positive after elective surgery and implications for pre and postoperative screening



- 0.5% turned COVID+ Post-Op(COVID[-/+])
- Risk factors for COVID[-/+] group: Female sex, ESRD, COPD, CHF, Cancer Cirrhosis, Undergoing neurosurgical procedures
- Complication rate ratio for COVID[-/+] group vs. COVID[-/-]:
  - **8.4** Pulmonary complications
  - **3.0** Major complications
  - **2.6** Any complication

Prasad, et al. 2022 (Ref.11)

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PERIOPERATIVE COMPLICATIONS AND POST-OPERATIVE MORTALITY

Perioperative COVID-19+ Conversion

To Worry or Not to Worry?

WORRY……

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PERIOPERATIVE COMPLICATIONS AND POST-OPERATIVE MORTALITY

WHY ARE WE OBSERVING THESE TRENDS?

It is well known that patients undergoing surgery have pro-inflammatory cytokine and immunosuppressive responses to surgery and mechanical ventilation[6,7]. It is theorized that surgical patients are therefore a more susceptible group at risk of SARS-CoV-2 complications, possibly explaining the increased morbidity and mortality observed……..

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POST ACUTE COVID-19 SYNDROME (PACS)

DEFINITION(S)

NO CLEARLY DELINEATED CONSENSUS….

"Long Covid"
"Post-COVID Syndrome"
"Post Acute COVID-19 Syndrome"
"Long Haulers"

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POST ACUTE COVID-19 SYNDROME(PACS)

- **Key Features**
  - Persistent symptoms after recovering from initial illness[8]
  - May affect those with mild as well as moderate-to-severe disease[8]
  - Incidence, natural history, and etiology currently unknown[8]
  - Link to vaccination status studies evolving
  - Link to equal or worse outcomes after surgery currently unknown

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POST ACUTE COVID-19 SYNDROME (PACS)

- **Six-Month Consequences of COVID-19 in patients post-hospital discharge[9]**
  - *1,733 patients with COVID-19 assessed*
  - *Most patients exhibited at least one symptom, particularly fatigue or muscle weakness, sleep difficulties, and anxiety or depression.*
  - *More severely ill patients had increased risk of pulmonary diffusion abnormality, fatigue or muscle weakness, and anxiety or depression.*
  - *Seropositivity and titers of the neutralizing antibodies were significantly lower than at acute phase.*

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POST ACUTE COVID-19 SYNDROME (PACS)

- **Two-month Outcomes Among Patient Hospitalized with COVID-10[9]**
  - *1,648 patients hospitalized with COVID-19 in Michigan.*
  - *Nearly 1 in 3 patients died during hospitalization or within 60 days of discharge.*
  - *For most patients who survived, ongoing morbidity, including the inability to return to normal activities, physical and emotional symptoms, was common.*

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POST ACUTE COVID-19 SYNDROME (PACS)

Role of COVID-19 Vaccination in PACS

Anecdotal Reports/Informal Patient and Clinicians' Surveys

- About 40% of the 577 long-covid patients contacted by the group Survivor Corps* said they felt better after getting vaccinated.
- Sub-set of patients of at Columbia University Medical Center: approximately 30-40% of "brain fog" and gastrointestinal problems most commonly-resolved symptoms post-vaccination**

*Grassroots movements connecting COVID-19 Survivors to support all medical, scientific and academic research. https://www.survivorcorps.com/
**https://www.pbs.org/newshour/health/vaccines-may-help-some-long-covid-patients

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POST ACUTE COVID-19 SYNDROME (PACS)

Role of COVID-19 Vaccination in PACS

- Small UK study: about 23% of long-COVID patients had an "increase in symptom resolution" post-vaccination, compared with about 15% of those who were unvaccinated[10].
- No difference in response was identified between Pfizer-BioNTech or Oxford-AstraZeneca vaccine[10].
- Receipt of vaccination was not associated with a worsening of Long Covid symptoms, quality of life, or mental wellbeing[10].

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POST ACUTE COVID-19 SYNDROME (PACS)

Role of COVID-19 Vaccination in PACS

- **Several leading theories for why vaccines could alleviate the symptoms of PACS:**
  - *vaccines may clear up leftover virus or fragments?*
  - *vaccines may interrupt a damaging autoimmune response?*
  - *vaccines may "reset" the immune system in some other way?*

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PACS

SUMMARY

Many unknowns….BUT

1. Prevalence is increasing
2. Can affect patients with both mild, moderate or severe infections
3. It may have an effect of surgical outcomes
4. Vaccination *MIGHT* help decrease symptoms

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CASE #1
WOULD YOU DO THIS PATIENT IN YOUR ASC?

- 72 y/o male scheduled for resection of scalp malignant melanoma under general anesthesia
  - History:
    - COVID-19 5 weeks ago requiring high flow oxygen, antibody therapy, and antivirals. Patient recovered well and went home 9 days after initial diagnosis.
    - Other: Arthritis, glaucoma, DVT 12 year ago
  - BMI 29. Vitals stable with POX 96% at PMD's office. Lungs are clear, and rest of exam is unremarkable
  - Meds: Truspot, PRN Tylenol, Daily asa 81mg
  - Would you like any more history?

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1. YES, PROCEED

2. YOU CAN'T BE SERIOUS..!!
OF COURSE NOT!!

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avaledon@verizon.net
leopoldorodriguez@icloud.com

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REFERENCES

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