PUBLIC HEALTH IMPACT OF COVID-19

David Jay Weber, M.D., M.P.H., FSHEA, FIDSA, FRSM (London)
Distinguished Professor of Medicine, Pediatrics & Epidemiology
Associate Chief Medical Officer, UNC Hospitals
Medical Director, Hospital Epidemiology
University of North Carolina at Chapel Hill

COVID-19 AROUND THE WORLD

Deaths from COVID-19 and Other Pandemics and Wars, US

Leading Causes of Death, US, 2015-2020

TOTAL DEATHS: US, ~723,000
World, ~4,890,000

Number dying each day: Heart disease, 2,000;
cancer 1,600; COVID-19 Sept, 1,899

Ahmad FB, Anisrame RN. JAMA; 325:1829-30;

Leading Causes of Death, US

IMAGES OF COVID-19 ON LIFE EXPECTANCY, US AND UK

THE IMPACT OF CORONAVIRUS ON HOUSEHOLDS ACROSS AMERICA, Robert Wood Johnson Foundation, SEPTEMBER 2020

- At least half of households in the four largest U.S. cities (New York City (53%), Los Angeles (56%), Chicago (50%), and Houston (63%)) report serious financial problems including depleted savings, and trouble paying bills or affording medical care.
- Many of these experiences are concentrated among Black and Latino households; households with annual incomes below $50,000, and households experiencing job or wage losses since the start of the outbreak.
- At least four in ten Latino, Black, and Native American households report using up all or most of their household savings during this time.
- One in five households in the United States (20%) report household members unable to get medical care for serious problems. A majority unable to get care when needed (57%) report negative health consequences as a result.
- More than one in three (36%) households with children face serious problems keeping their children’s education going, and among working households, nearly one in five (18%) report serious problems getting childcare when adults need to work.
- About one in three households with children (34%) either do not have a high-speed internet connection at home or report serious problems with their connection while doing schoolwork or their jobs during the pandemic.


SARS-CoV-2 SEROPREVALENCE, US

- Goal: Assess SARS-CoV-2 seroprevalence based on blood donations, 7/20-5/21
- Methods: Repeated cross-sectional study that included 1,443,519 blood donation specimens from a catchment area representing 74% of the US population
- Results: Estimated SARS-CoV-2 seroprevalence weighted for differences between the study sample and general population increased from 3.5% in July 2020 to 20.2% for infection-induced antibodies and 83.3% for combined infection- and vaccine-induced antibodies in May 2021. Seroprevalence differed by age, race and ethnicity, and geographic region of residence, but these differences changed over the course of the study.


IMAGES OF COVID, WORLDWIDE AND US

COVID-19 CASES/DEATHS, DISPARITIES, US

- Nationwide, Black people have died at 1.4 times the rate of white people.

https://covid.cdc.gov/covid-data-tracker/#demographics

COVID-19 VACCINATION, US

**Mental Health Issues Due to COVID-19**

- **Methods:** To evaluate mental health conditions among these workers, a nonprobability-based online survey was conducted during 3/29-4/6/21, among UA public health workers.

- **Results:** Among 26,174 respondents, 53.0% reported that eliminating, reducing, and managing factors that cause or contribute to public health workers' poor mental health might improve mental health outcomes during emergencies.

- **Conclusion:** Implementing prevention and control practices that eliminate, reduce, and manage factors that cause or contribute to public health workers' poor mental health might improve mental health outcomes during emergencies.

**Mental Health Among Healthcare Personnel During COVID-19 in Asia: A Systematic Review**

- **The COVID-19 pandemic has been associated with an insidious wave of psychological stress among healthcare personnel (HCP) in Asia. Mental exhaustion, burnout, fear, depression, anxiety, insomnia, and psychological stress among HCPs have intensified a daunting challenge during the COVID-19 pandemic. The consequences of such stress may negatively impact patient and HCP safety.**

- **Methods:** Recognition of staff efforts, access to psychological interventions, increased support and stay connected response activities.

- **Goal:** Assess long-COVID-19 in large EMR database.

- **Methods:** Retrospective cohort study using EMR data from 81 million patients, 375,618 COVID-19 survivors, incidence within 6 months and 3-6 months after diagnosis.

- **Results:** Among COVID-19 survivors, mean [SD] age: 46.3 [19.8], 55.6% female, 17.00% had one or more long-COVID features recorded during the whole 6-month period (i.e., including the acute phase), and 38.55% between 3 and 6 months.

  - 1 in 3 patients had one or more features of long-COVID recorded between 3 and 6 months after a diagnosis of COVID-19. This was significantly higher than after influenza.
  - 2 in 5 of the patients who had long-COVID features in the 3- to 6-month period, had no record of any such feature in the previous 6 months.
  - The risk of long-COVID features was higher in patients who had more severe COVID-19 illness, and slightly higher among females and young adults. While and non-white patients were equally affected.
COVID-19 Impact on HAI in 2020

Nationally, significant increases in 2020 were observed for CLABSI, CAUTI, VAE, and MRSA bacteremia compared to 2019. The largest increases occurred during quarter 4 (October, November, December) of 2020:

- CLABSI: 47% increase in Q4 across all location types; 65% increase in intensive care units (ICUs); 16% increase in select inpatient wards
- CAUTI: 39% increase in Q4 across all location types; 30% increase in ICUs
- VAE: 45% increase in Q4 across all location types; 44% increase in ICUs; 35% increase in adult inpatient wards
- Significant decreases were observed in C. difficile throughout 2020, compared to 2019
- Increases in device utilization (central line, urinary catheter, and ventilators) were also observed; ventilator utilization increased by 25–35% in 2020-Q2 – 2020-Q4

https://www.cdc.gov/hai/data/portal/covid

THE COVID-19 PANDEMIC: LOOKING BACK AND LOOKING FORWARD, US RESPONSE

Missteps and Misinformation in US Pandemic Response

- Lack of a centralized, coordinated Federal response
- Executive Branch consistently minimized and trivialized risk of COVID-19
- US Public Health infrastructure woefully inadequate
- Slow development and scale-up of rapid, accurate, and widely available testing
- Inaccurate initial assumptions about transmission: Failure to focus on aerosol transmission, failure to recognize the importance of asymptomatic and pre-symptomatic spread
- Inadequate stockpiles of PPE and failure to rapidly ramp up production
- Slow development and scale-up of rapid, accurate, and widely available testing
- Initial failure to recommend masking by the public as a mitigation strategy
- Failure to initially focus on transmission in nursing homes

Henderson D, Haessler S, Weber DJ. ICHE 2021;2 August

STRATEGIES TO PREVENT SARS-CoV-2 TRANSMISSION: AN EVALUATION OF THE SUPPOTIVE EVIDENCE

David Jay Weber, M.D., M.P.H., FSHEA, FIDSA, FRSM (London)
Distinguished Professor of Medicine, Pediatrics & Epidemiology
Associate Chief Medical Officer, UNC Hospitals
Medical Director, Hospital Epidemiology
University of North Carolina at Chapel Hill

https://scoeh.ch/de/kontakt/

TRANSMISSION OF SARS CoV-2

- Aerosol/Droplet (<6 feet) most important mode of transmission
- Aerosol (<6 feet) demonstrated indoor with directional airflow and poor ventilation (less important that short distance transmission)
- Other modes: Direct contact and indirect (via the contaminated environment)
- Pre-symptomatic (i.e., up to 48 hours before person develops symptoms) and asymptomatic transmission well documented – important in maintaining pandemic
- Transmission via blood not demonstrated; via stool very rare: single outbreak linked to plumbing
- Delta has identical transmission mechanisms
- Prevention - In hospital, adhere to Universal Pandemic Precautions


PREVENTING TRANSMISSION OF AN INFECTIOUS DISEASE REQUIRES UNDERSTANDING THE CHAIN OF TRANSMISSION

https://scoeh.ch/de/
COVID-19 Mitigation Strategies

- Mitigation strategies developed specifically for COVID-19 prevention: Supported by high-quality scientific studies
  - COVID-19 vaccines: Supported by efficacy and safety RCTs, and effectiveness trials (cohort, case-control)*
  - Universal pandemic precautions: Supported by laboratory studies, and cohort and case-control studies (plus meta-analysis)**
    - Masking while in the facility
    - N95 respirators when providing care for known or suspected COVID-19 patients or for aerosol generating procedures
    - Eye protection with direct patient contact (and for ASNs)
    - Physical distancing (ideally, >6 feet; minimally, >3 feet) — especially important when not masked***
    - PPE monitors or buddies to aid in appropriate donning and doffing of PPE****
    - Monoclonal antibodies for pre- and post-exposure prophylaxis (PEP)*****

- Mitigation strategies standard in healthcare facilities; especially important for communicable diseases******
  - Hand hygiene and surface disinfection: Supported by experience with viral respiratory pathogens, survival of SARS-CoV-2 on hands and environmental surfaces, and antiseptic/disinfectant susceptibility
  - Contact tracing with isolation and quarantine as indicated
  - Wellness self-checks (prior to coming to work) with evaluation by occupational health if positive

---

VACCINE EFFECTIVENESS, WORLDWIDE

**Healthcare facility prevention strategies, ^Community prevention strategies**

---

SUMMARY OF COVID-19 VACCINE EFICACY/EFFECTIVENESS

---

IMPACT OF COVID-19 VACCINES ON DEATHS, US

MULTISOCIETY POSITION STATEMENT

- This consensus statement by the Society for Healthcare Epidemiology of America (SHEA) and The Society for Post-Acute and Long-Term Care Medicine (APhA), The Association for Professionals in Infection Control and Epidemiology (APIC), the HIV Medicine Association (HIVMA), the Infectious Diseases Society of America (IDSA), the Pediatric Infectious Diseases Society (PIDS), and the Society of Infectious Diseases Pharmacists (SIDP), recommends that COVID-19 vaccination should be a condition of employment for all healthcare personnel. Exemptions from this policy apply to those with medical contraindications to COVID-19 vaccines available in the United States and other exemptions as specified by federal or state law. The consensus statement also supports COVID-19 vaccination of non-employees functioning at a healthcare facility (for example, students, contract workers, volunteers, etc.).

BASIS FOR MULTISOCIETY POSITION STATEMENT

- The COVID-19 vaccines available in the United States (US) under the Food and Drug Administration (FDA) emergency use authorization (EUA) or approval have high efficacy to prevent symptomatic COVID-19, even higher efficacy to prevent serious COVID-19 (i.e., hospitalizations and deaths), and high effectiveness against symptomatic and asymptomatic COVID-19 infection. The COVID-19 vaccines have similar safety profiles to approved vaccines, as shown by efficacy trials and effectiveness studies.
- Full vaccination against COVID-19 offers several advantages to patient and healthcare personnel (HCP) safety: individual protection against COVID-19 infection; further protection for patients and HCP who are unable to receive COVID-19 vaccination or are not able to mount an adequate immune response; reduced risk of asymptomatic or pre-symptomatic transmission of SARS-CoV-2 between HCP and from HCP to patients or patients to HCP; reduced risk of transmitting infection to household members and community contacts; increased protection for the healthcare workforce in the community setting.
- The COVID-19 vaccines appear to retain good effectiveness against currently circulating SARS-CoV-2 variants against symptomatic illness and even higher effectiveness against severe disease.
- COVID-19 vaccines now recommended for all HCP and pregnant women by CDC.
- Prior experience and current information suggest that a sufficient vaccination rate is unlikely to be achieved without making COVID-19 vaccination a condition of employment.

UNC Medical Center Surveillance

SQ Cas/Imd ANTIBODY COMBINATION TO PREVENT COVID-19, PEP

- Methods:
  - RCT (1:1 ratio mAb to placebo), >12 years of age, household study, enrolled within 96 hours after a household contact had received a diagnosis of COVID-19.
  - Outcome = development of symptomatic infection by day 28
- Results:
  - Symptomatic SARS-CoV-2 infection developed in 11 of 753 participants in the REGEN-COV group (1.5%) and in 59 of 752 participants in the placebo group (7.8%); relative risk reduction [1 minus the relative risk], 81.4%; P<0.001.
  - In 27 of 753 participants in the REGEN-COV group (3.6%) and in 59 of 752 participants in the placebo group (7.8%) had symptomatic SARS-CoV-2 infection (relative risk reduction, 92.6%).
  - No dose-limiting toxic effects of REGEN-COV were noted

BNT162b2 vaccine booster dose protection: A nationwide study from Israel

- Goal: Estimate the reduction in RR for confirmed infection and severe COVID-19 provided by the booster dose (booster dose initiated 87/02/21)
- Methods: 1,144,690 individuals aged 60y and older who were eligible for a booster dose were followed between July 30 and August 22, 2021. Outcomes per person-days at risk were compared between the cohorts using Poisson regression, adjusting for possible confounding factors.
- Results: Twelve days or more after the booster dose we found an 11.4-fold (95% CI: [10.0, 12.9]) decrease in the relative risk of severe illness. Under a conservative sensitivity analysis, we find a 5-fold protection against confirmed infection.
- Conclusion: The COVID-19 vaccines appear to retain good effectiveness against currently circulating SARS-CoV-2 variants against symptomatic illness and even higher effectiveness against severe disease. COVID-19 vaccines now recommended for all HCP and pregnant women by CDC. Prior experience and current information suggest that a sufficient vaccination rate is unlikely to be achieved without making COVID-19 vaccination a condition of employment.
**AGPs: PROTECTING HCP**

- PPE recommended for AGPs (e.g., intubation, bronchoscopy): N95 respirator or higher (or PAPR), eye protection, gowns and gloves.
- Ideal patient placement (known or suspected COVID-19: airborne isolation room (>6-12 air exchanges per hour, direct out exhausted air, and negative pressure). Alternatives: probable HEPA filter (+/- other inactivation methods or patient isolation room (reduces time to re-use of bed/room).)

---

**REDUCTION OF RESPIRATORY DROPLETS AND PREVENTION OF VIRAL EXPULSION BY FACE COVERINGS**

- Coronavirus RNA detected in respiratory droplets and aerosols in 3/10 (30%) coronavirus cases and 4/10 (40%) influenza cases (data not shown) of samples collected without a face mask, respectively but in no samples with a face mask.

**EFFECTIVENESS OF MASKING, PHYSICAL DISTANCING, AND EYE PROTECTION TO PREVENT TRANSMISSION OF EPIDEMIC CORONAVIRUSES**

- Fitted Filtration Efficiency of Double Masking During the COVID-19 Pandemic

**ENVIRONMENTAL TRANSMISSION**

- Environmental surfaces*: SARS-CoV-2 can survive for hours to days on environmental surfaces: Survival depends on viral inoculum surface, temperature, humidity and exposure to UV
- Frequency of contamination (SARS-CoV-2 RNA) varied from 0-62% (median, 10.6%): Of four studies tested concurrently by viral culture, viable SARS-CoV-2 was not confirmed from the environmental samples (Santarpia observed SARS-CoV-2 virions by EM of a viral culture from a window sill sample)
- SARS-CoV-2 susceptible to a large number of disinfections (see list “N” on CDC webpages)
- Possible examples of SARS-CoV-2 via the environment
  - Elevator button in an apartment building (less likely aerosol remaining in elevator) (Xie C, et al. Emerg Infect Dis 2020;26:1163-1165)
  - Elevator buttons or restroom taps in a mall (Cal J, et al. Emerg Infect Dis 2020;26:1343-1345)
ASSESSMENT OF SARS-CoV-2 IN EXHALED BREATH, SURFACES AND AIR

- **Goal:** Assess presence of SARS-CoV-2 by RT-PCR in exhaled breath, surfaces, and air
- **Methods:** 76 subjects (COVID-19, 57; non-COVID, 4; healthy, 15); samples taken in quarantine hotels and hospitals
- **Results:**
  - Highest positive rate in exhaled breath (26.9%), followed by surface swabs (1.4%), and air samples (3.3%)
  - Highest estimated SARS-CoV-2 viral levels in exhaled breath

| Table 2 Detection of SARS-CoV-2 and its positive rates from 129 EBC samples collected from 48 COVID-19 patients, 26 air samples, and 35 surface swabs; SARS-CoV-2 detection rate and concentration levels. For all EBC samples, SARS-CoV-2 detection rates were estimated based on an assumed amplification efficiency of 75% and RT-PCR detection limit of 300 copies. a,b,c, lower and upper bounds of 95% confidence intervals correspond to upper and lower bounds of calculation.

![Image](https://example.com/image1)

METHODS OF DECONTAMINATING ENVIRONMENTAL SURFACES

- Microbicide-impregnated
- Microbicide-coated
- Gas, mist or foam
- Self-sanitizing (e.g., copper)
- Portable steam
- Photonsensitized
- Liquid disinfectants
- UV-C light (254 nm)
- Hand decontamination (reduces contamination), surface type

Hierarchy of susceptibility of pathogens to formulated microbicidal actives (adapted from Sattar (2007)).

SURFACE DISINFECTION WITH WIPES ELIMINATES SARS-CoV-2 CONTAMINATION

- **Goal:** Assess extent of air and surface contamination of SARS-CoV-2 in 4 healthcare facilities (8 patients) by RT-PCR
- **Results:**
  - All 52 air samples negative for SARS-CoV-2
  - Overall, 27% (9/32) of environmental surfaces positive
  - In rooms of hospital A (AIR without routine disinfection), SARS-CoV-2 detected in 48% (52/108) surface samples [A]. Despite extensive surface sampling, SARS-CoV-2 RNA was NOT detected in room in hospital B (AIR with routine cleansing with using disinfectant wipes [B]) – however, considerable viral RNA detected in patient’s respiratory samples

![Image](https://example.com/image2)

RATIONAL FOR HAND ANTISEPSIS AND SURFACE/SHARED DEVICE DISINFECTION

- **Goal:** Assess survival of SARS-CoV-2 and influenza A virus (IAv) on human skin and surfaces
- **SARS-CoV-2** survived hours on human skin; longer survival time on surfaces; IAv does not survive as well as SARS-CoV-2
- Both SARS-CoV-2 and IAv in the mucus/medium on human skin were completely inactivated within 15s by 80%

Employee COVID Trends and Mitigation, UNC, US

- From April 1, 2020, through February 15, 2021, UNC-MC admitted 1,427 COVID-19 positive patients within the high-risk containment zones; within these units there were only 2 possible healthcare-associated COVID-19 transmissions
- In the last month (July 11-Aug 12), 83 new positive employees; 49 among fully vaccinated; only 2 cases possibly healthcare-associated (UNC Medical Center, facility-wide)
  - Five times increased number of cases from previous month
  - Transmission primarily occurring in community; workplace strategies are effective – masking, vaccination, physical distancing when eating/drinking, staying home when sick
- Vaccination and Universal Pandemic Precautions important prevention strategies for our healthcare providers and patients (remember to wear eye protection when in patient rooms)
  - For aerosol generating procedures, PPE includes an N95 respirator (or PAPR) plus eye protection

VALUE OF MASK WEARING, PHYSICAL DISTANCING, AND HAND HYGIENE

- Goal: To assess effectiveness of PPE to prevent acquisition of SARS-CoV-2 infection
- Methods: Case control study, 211 cases and 839 controls, Thailand
- Results:
  - Wearing a mask at all times during contact was independently associated with lower risk for SARS-CoV-2
  - Gender, age group Q15, 16-40, 41-65, >65, contact place (night club, boxing stadium, workplace, household, others), Sharing dishes or cups – NOT significant
  - Shortest distance of contact (physical contact, ≤1m, >1m), duration of contact within 1m (<=60min, 16-60min, >60min), sharing cigarettes (none, sometimes, often), type of mask (none, nonmedical only, nonmedical and medical, medical only), and compliance with mask wearing (never, sometimes, always) – SIGNIFICANT REDUCTION IN RISK OF ACQUIRING COVID-19
- Maintaining >1m distance from a person with COVID-19, having close contact for <15 minutes, and frequent handwashing were independently associated with lower risk for infection.

RECOMMENDED COVID-19 MITIGATION STRATEGIES THAT LACK SUPPORTIVE EVIDENCE

- Improved or enhanced ventilation: Installation of higher efficiency air filters, improved air exchanges, introduction of larger amounts of fresh air, in-room HEPA devices, and/or upper-room ultraviolet germicidal irradiation devices
- Routine COVID-19 testing prior to aerosol generating procedures (excluding patients undergoing major surgery)
- Routine COVID-19 testing of asymptomatic persons; might be useful in some community settings (e.g., sports teams, universities) – not a mitigation strategy but an early detection strategy for limiting transmission when coupled with contact tracing and isolation/quarantine – evidence does NOT suggest useful for HCP
- Plexiglass barriers

VENTILATION IN BUILDINGS, CDC, 2 JUNE 2021

- Recommendations refer to “community” – no specific recommendations regarding ventilation for hospitals
- CDC recommends a layered approach to reduce exposures to SARS-CoV-2, the virus that causes COVID-19. This approach includes using multiple mitigation strategies, including improvements to building ventilation, to reduce the spread and disease of the virus. In addition to ventilation improvements, the layered approach includes physical distancing, wearing face masks, hand hygiene, and vaccination.
- SARS-CoV-2 viral particles spread between people more readily indoors than outdoors. Protective ventilation practices and interventions can reduce the virus concentrations and reduce the overall viral dose to occupants.
- Costs:
  - No cost: opening windows; inspecting and maintaining dedicated exhaust ventilation; disabling DCV controls; repositioning outdoor air dampers
  - Less than $100: using fans to increase effectiveness of open windows; positioning supply/exhaust diffusers to create directional airflow
  - $500 (approximately): adding portable HEPA fan/filter systems
  - $1,500 to $2,500 (approximately): adding upper room UVGI (cost for UNC = $2,000,000)
- No references cited by CDC to support above statements

COVID-19 TRANSMISSION ON AIRPLANES: DEMONSTRATES THAT IMPROVED VENTILATION MAY NOT PREVENT SHORT-DISTANCE TRANSMISSION

Modern commercial airlines have ≥20 air exchanges per hour with ~75% of fresh air (recycled air is usually HEPA filtered)
- Tel Aviv to Frankfurt (4hr, 10min): 2 cases; likely transmission = droplet [source: LAMA Open]
- Singapore to Hangzhou (3hr on ground, 5hr in air): 10 cases; likely transmission = droplet (passengers not masked) [source: on the plane]
- Boston to Hong Kong (15+ hours): 4 cases (2 passengers, 2 crew) – strains genetically identical [source: EMA, et al. DOI: 10.1056/NEJMoa2002597]
- Ireland (7.5 hours): 59 COVID-19 cases (13 cases in passengers) linked to flight [source: Health, et al. EID 2020 June 25:02 (Oct)]
- London to Hanau (19 hours): 15 cases (12 in business class, AF 629); RR for seating ≥2m = 7 (CI, 1.2-46.2) [source: NCLEX 2020] – see below

USE OF UVGI UNIT WITH RECYCLED AIR IN HOSPITAL ROOMS DID NOT PREVENT Viable SARS-CoV-2 >4m FROM PATIENT

- Goal: Assess air in rooms of patients with COVID-19
- Methods: Assessment by RT-qPCR and virus culture in patient rooms (not during ASIP)
  - Rooms, 6 air exchanges/hour; UV-C irradiation prior to recycling 90% of treated air back to room
  - Viable virus assessed by cytopathic effects and presence of SARS-CoV-2 by RT-PCR
- Results:
  - Virus by RT-qPCR detected 2-4m from patients
  - Viable virus also detected 2-4m from patients
  - Estimates of viable virus, 6-74 TCID50 units/L of air

https://doi.org/10.1101/2020.05.03.20167385
Community SARS-CoV-2 Surge and Within-School Transmission
Kanacia O, Zimmerman, MD, MPH; M. Alain Brookhart, PhD; Bukunwima C, Kali, MD Angelique E. Boutzoukas, MD; Kathleen A. McGinn, MD; Michael J. Smith, MD, NSCE; Galabria M. Manasagu Panayoyotis, MD; Sarah L. Armstrong, MD, David J. Weber, MD, MPH; Ganga S. Moorthy, MD; Daniel K. Benjamin, Jr., MD, PhD; For The ABC Science Collaborative

• Results: More than 100,000 students and staff from 13 school districts attended school in-person; of these, 4,969 community-acquired SARS-CoV-2 infections were documented by molecular testing. Through contact tracing, NC local health department staff identified an additional 209 infections among >30,000 school close contacts (secondary attack rate <1%). Most within-school transmissions in high schools (75%) were linked to school-sponsored sports. School-acquired cases slightly increased during the surge; however, within-school transmission rates remained constant, from pre-surge to surge, with approximately 1 school-acquired case for every 20 primary cases.

• No district implemented large scale overhaul of their ventilation systems; none installed HEPA filters or UVGI; only 1 upgraded filters during the surge; however, within-school transmission rates remained constant, from pre-surge to surge, with approximately 1 school-acquired case for every 20 primary cases.

• Summary: During the 2020–2021 winter surge of SARS-CoV-2 in North Carolina, K–12 within-school transmission remained extremely low among districts implementing basic mitigation strategies.

Rationale for Current COVID-19 Testing Recommendations

• Testing on admission for all persons, including those fully vaccinated
• Surge of COVID-19 cases due to Delta variant, diminution of mask mandates, and vaccine hesitancy
• Breakthrough infections a current concern in fully vaccinated persons due to the Delta variant (even though the COVID-19 vaccines remain highly effective in preventing serious disease and death)
• Reduce rate of patient-to-patient transmission in congregate units (e.g., shared suites, curated areas, Psychiatric, Rehabilitation)
• Testing prior to a procedure in an OR (inpatient or outpatient)
• Surge as noted above
• Patients undergoing major surgery have a higher risk for morbidity and mortality (even if asymptomatic)

• No pre-procedural testing outside of the OR (even for aerosol generating procedures)
• Healthcare personnel using recommended PPE are NOT at risk for acquiring COVID-19
• See statement by American Gastroenterology Association

SCHOOL SAFETY, MASKING AND THE DELTA VARIANT

• Goal: Assess K-12 school safety in the Delta era
• Methods: Study time, 14 June–13 August 2021; NC; mitigation (>3ft recommended, mask mandate, quarantine for contacts)
• Results: Participants: >20 school districts, 783 schools, 59,561 students, 11,864 staff. No schools closed as result of COVID-19. The community-acquired-to-within-school-acquired infection ratio was ~12.4 (MO/64). The estimated secondary attack rate was 2.6% (94 secondary infections/2,431 quarantined close contacts).

OUTCOME OF PATIENTS UNDERGOING SURGERY DURING THE INCUBATION PERIOD OF COVID-19

• Goal: Assess impact of performing surgery on asymptomatic patients who developed COVID-19 post-operatively
• Methods: Multicenter, retrospective study, Wuhan
• Results (N=16)
• Median age, 55 (21–84 years)
• 15% admitted to ICU due to organ dysfunction or need for mechanical ventilation
• Se of COVID onset: fever, 91.2%; fatigue, 73.3%; cough, 52.9%; dyspnea, 44.1%; myalgia or arthralgia, 32.4%; expectoration, 32.4%
• Median time for surgery to sx: 2.0 days (0.9–6.8 days)
• All patients developed pneumonia post-op
• Seven died (all had level 3 surgery)

OUTCOMES IN PATIENTS UNDERGOING SURGERY WITH PERIOPERATIVE SARS-COV-2 INFECTION

• Goal: Assess the 30-day mortality, and pulmonary complications rates in patients with perioperative COVID-19
• Methods: International, multicentre, cohort study at 235 hospitals in 24 countries included all patients undergoing surgery who had SARS-CoV-2 infection confirmed within 7 days before or 30 days after surgery
• The main secondary outcome measure was pulmonary complications (pneumonia, ARDS, or unexpected postoperative ventilation)
• Results
• This analysis includes 1128 patients; who had surgery between Jan 3 and March 31, 2020, of whom 835 (74%) had emergency surgery and 282 (24.8%) had elective surgery
• SARS-CoV-2 infection was confirmed preoperatively in 254 (21.5%) patients. 30-day mortality was 23.8% (268 patients; 23.8% vs 11.28%)

• Pulmonary complications occurred in 577 (51.7%) of 1128 patients; 30-day mortality in these patients was 38.6% (221 patients; 221 patients; 42.2% vs 23.8%)
• In adjusted analysis, 30-day mortality was associated with male sex (OR 1.75 [95% CI 1.28–2.40], p=0.001), and all patients who developed postoperative mortality within 30 days of surgery who developed pneumonia (20.9% vs 11.2% of all patients; p=0.003)
• In adjusted analysis, patients who had perioperative COVID-19 associated with increased risk of mortality (hazard ratio [HR] 1.28 [95% CI 1.02–1.59], p=0.036)
• Multivariable analysis including all patients with postoperative mortality within 30 days of surgery (n=406) revealed patients who had perioperative COVID-19 were more likely to have pneumonia (21% vs 11%; p=0.047)

Lei S, et al. EClinicalMedicine 21, 2020

COVIDSurg Collaborative. Lancet 2020, 9 June
PRE-PROCEDURE TESTING, AGA STATEMENT

- Data suggests that routine testing of asymptomatic HCP is not of value
- Very low positive rate
- Concerns: 1) false positive likely exceed true positives; 2) high burden (staffing, test expense, HCP adherence)

Routine surveillance of asymptomatic healthcare personnel for severe acute respiratory coronavirus virus 2 (SARS-CoV-2): Not a prevention strategy

- Recommended by CDC for office buildings, K-12 schools and healthcare facilities
- Required by OSHA for healthcare facilities (e.g., entryway/lobby, check-in desks, triage, hospital pharmacy windows, bill payment), retail locations (counters, cash registers), and workplaces
- The sales of plexiglass in response to CDC and OSHA has been reported to triple to $750,000,000
- An assessment of COVID-19 mitigation measures in Georgia elementary schools revealed that mask use and ventilation improvement were effective but that barriers on all desks were not (Settegast L, et al. MMWR 2021;70:779)
- A study of school-based mitigation strategies reported that desk shields actually slightly increased the risk of developing a COVID-19-like illness (Lambert J, et al. Science 2021:372:1062)
- A review of a cluster of tuberculosis cases in a commercial office in Australia noted that cubicle dividers were a factor that may have contributed to transmission (Bagheriad M, et al. Med J Aust 2014;200:177)
- Based on these reports and other research, the British Environmental Modelling Group concluded that "There is very little data on the effectiveness of screens and barriers at reducing infection transmission from epidemiological, modelling or laboratory studies" (EMS, available on-line)

PLEXIGLASS BARRIERS

CONCLUSIONS

- COVID-19 mitigation strategies of proven benefit in healthcare facilities include COVID-19 vaccines, universal pandemic precautions (e.g., masking, eye protection), and physical distancing
- All of the above mitigation strategies are of value in the community as well
- Strategies to prevent infectious disease transmission that are also recommended to reduce risk of SARS-CoV-2 transmission include hand hygiene, surface disinfection, and contract tracing (with as appropriate, isolation and quarantine)
- COVID-19 mitigation strategies that have been recommended, but for which scientific evidence of benefit is lacking, include improved ventilation, routine testing of asymptomatic HCP, Plexiglass barriers, and routine testing of asymptomatic patients prior to outpatient procedures
- High quality research studies should be conducted to determine the benefits, if any, of these recommended practices