

LITERATURE REVIEW SARS-CoV 2

Impact on Health Systems



MASKS

MASK WEARING IN PUBLIC

- Masks function as source control and personal protection to the mask wearer.
- Non-medical mask materials with a filtration efficiency >90% include a blend of cotton/chiffon, cotton/silk and cotton quilt.
- Fabric masks should include: 1) innermost layer: hydrophilic material (e.g., cotton or cotton blends); 2) middle layer: a synthetic non-woven material (e.g. polypropylene), and 3) outermost layer: a hydrophobic material (e.g. polypropylene, polyester, or polyester blend). Masks should not have breathing valves or vents.
- State government mandates for community use of face masks or covers across 15 US states has been associated with a decline in daily COVID-19 growth rates from 0.9 1-5 days after signing orders to 2.0 over 21 days after signing.
- The average jet distance traveled by a cough covered by a two-layer stitched mask made of quilting cotton was 2.5 in as compared to an uncovered cough which traveled approximately 8 ft. The droplets from a cough covered by a single-layer bandana style covering had an average jet distance of 3 ft 7 in.



TRANSMISSION

EFFECTIVENESS OF STAY-AT-HOME ORDERS AND EFFECTS OF RE-OPENINGS

- Data from four major cities in the US show that stricter stay-at-home measures corresponded to decreases in the average percent change in daily new cases. COVID outbreaks were reported in facilities that have re-opened (e.g., summer camps, nursing homes, and child care facilities) even when precautions were taken.
- In Wisconsin, 1,739 outbreak associated cases occurred in mid-August which correlated with the time that universities began to open again. Beginning on September 3, long-term care, correctional, and childcare facilities as well as schools and more universities showed a large spike in outbreak associated cases. This may suggest that outbreaks associated with universities precede further outbreaks in the community.
- In Kansas, counties with no mask mandate saw an increase of 0.11 cases/100,000 people per day in COVID-19 incidence, while those with a mask mandate saw a decrease of 0.08 cases/100,000 people per day.
- Florida observed a 1.2x increase in COVID-19 cases among elementary school aged children (6-16) and a 1.3x increase among high school aged children (14-17) in counties that returned to in-person schooling.

Recommendation: Social distancing helped flatten the curve. As businesses begin to open up and people return to work and school, caution must continue to be taken. With adequate ventilation, social distancing, low % occupancy of a room, low exposure time, and mask requirements, the benefits of re-opening may outweigh the risk of spread. As childcare facilities and schools open, children should also wear masks. Although they tend to have milder symptoms, they can still transmit COVID-19. School re-openings have also been associated with increases in active cases; therefore, virtual schooling may be beneficial. The 18-24 age group may be playing a larger role in community spread, so safety precautions should be targeted to this age group.

TRANSMISSION FROM SURFACES

- Virus viability is greatest on surfaces that are cooler, have lower humidity, and are not exposed to sunlight. COVID-19 virus lifespan varies on different objects: plastic and stainless steel (72 hours), cardboard (24 hours), and copper (4 hours). Under ideal conditions, its persistence on smooth, non-porous surfaces lasts up to 28 days.
- No virus was detected after disinfection and sanitation of objects with a 0.1% hypochlorite solution. Other disinfecting chemicals (e.g. 75% ethanol, 10% bleach, advanced hand sanitizer) can also reduce its infectivity.

Recommendation: Be cautious when handling objects made of plastic, stainless steel, and cardboard, especially in higher risk settings such as the ICU, public computers, and door handles. Disinfecting techniques should be continued.

TRANSMISSION IN DROPLET VS AEROSOL FORM

- There is increasing evidence to support aerosol transmission (ranked 8/9 on plausibility of aerosol transmission)
 - In South Korea, transmission between apartment units was shown to be connected by a ventilation shaft.
 - Another study detected viral RNA in exhaust filters over 50 m away from patient care areas.
 - A model of New York City public schools showed an increased risk of transmission in areas with newer buildings where had better insulation and ventilation.
 - Another model showed droplets less than 60 μm can travel ~6-26 ft. Aerosols of COVID-19 were found to travel up to 13 ft.
- Some studies showed otherwise, disputing the spread mechanism by aerosols:
 - Measles which is spread by aerosols has a reproductive value of ~18 vs. COVID-19 ~ 2.5.
- Increasing ventilation and decreasing air-recirculation may reduce airborne transmission. Experimental studies showed better positioning for ventilation devices would decrease the likelihood of particles landing on surfaces due to ventilation.

Recommendation: With increasing evidence supporting the aerosol transmission model, caution should be taken to optimize ventilation and reduce aerosolization, such as opening windows, avoiding large crowds and poorly ventilated areas, refraining from shouting/yelling around others, and installing/strategizing the location of ventilation devices.

**FOOD SECURITY**

- Food insecurity rates in the US have doubled from 18% to 35% since the pandemic. Previous large observational studies suggest that living in food poverty increases the risk of developing childhood asthma, and that parents of children with Cystic Fibrosis are twice as likely to be living in food insecurity. One study found that self-reported food security rates among low income Latinx families decreased from 76.9-80% in 2019 to 34.2-38.1% between May and September 2020.

Recommendation: Clinicians should screen for food insecurity and connect patients with appropriate resources.

NONCOMMUNICABLE DISEASES & LIFE EXPECTANCY

- 75% of countries surveyed by the World Health Organization (WHO) reported considerable disruptions to noncommunicable disease services due to the pandemic. The CDC reported that by June 30th, 41% of US adults had delayed or avoided care due to the pandemic. Children may experience unhealthy weight gain, possibly attributed to food insecurity, or decreased physical activity because of social distancing measures.
- The average 2020 US life expectancy is estimated to decrease by 1.41 years. The Black-white life expectancy gap is estimated to increase by 50% (from 3.6 years to over 5 years), undoing 20 years of progress towards closing the gap. The previous Latino mortality average is expected to be reduced by over 70% (from >3-year survival advantage to <1-year).

Recommendation: Practitioners should educate patients with chronic diseases about telemedicine options in order to ensure adequate management. Clinicians should also counsel parents on healthy practices to avoid unhealthy weight gain despite closures. This should include screening for food insecurity. Public health messages should encourage chronic disease management.

MENTAL HEALTH

- Psychiatric symptoms such as depression, stress, and anxiety in the general population have increased since the pandemic with 40% of adults struggling with mental health or substance abuse. Young adults, essential workers, health care workers, LGBTQ+ individuals, unpaid caregivers of adults, families of children with special needs/disabilities, and racial/ethnic minorities are experiencing these symptoms at higher rates. Levels of clinically significant depression and anxiety have increased in kids aged 0-8. With 57% of children receiving mental health services through schools, school closures hence reduced access to mental health care. Peripartum women have increasingly experienced anxiety and depression associated with information seeking, worries about child wellbeing, and access to medical care. Immigrant patients experienced worsening anxiety and depressive symptoms. One study in the UK found that lockdown is a risk factor for increased alcohol consumption.

Recommendation: Practitioners should screen for psychiatric symptoms, address patient concerns, and connect patients with mental health resources, including affordable and telemedicine options where possible. Public health efforts should endeavor to mitigate psychiatric symptoms, namely providing financial support, promoting social connectedness, and educating against substance abuse.

GENDER EQUALITY, DOMESTIC VIOLENCE, CHILD ABUSE & NEGLECT

- A study of working parents found that 36% of surveyed dual-earner couples adopted a strategy for childcare in which the wife worked and did all or most of the childcare, and that this group had the lowest measures of well-being and job performance.
- Domestic violence increased compared to pre-COVID-19 levels due to increased stress, especially in the LGBTQ+ population. Child abuse reporting in several states has decreased by up to 70% percent compared to pre-COVID-19 levels. In the US, 67% of substantiated reports come from victim-serving professionals like educators, so reduced reporting of child abuse and neglect may be related to school closures. Child ED visits related to abuse and neglect decreased by up to 53% compared to 2019, with a nadir in late March. In contrast, abuse related visits requiring hospitalization remained relatively stable.

Recommendations: As clinicians are some of the few remaining reporters, they should screen for signs of domestic violence, child abuse or neglect regardless of trends in cases reported in the community.

CHILDHOOD VACCINATIONS

- A WHO poll found that in 85% of 61 countries that responded, childhood immunization rates had decreased since January 2020. A Colorado study found that childhood vaccine administration had decreased by 78% for children 3-9, and 82% for ages 10-18 from January to May 2020.

Recommendations: Clinicians should continue outreach efforts for keeping pediatric patients up to date with routine vaccinations and educating parents on the importance of vaccination even during the pandemic. Making vaccine administration available with limited contact (for example, via a drive-thru vaccine clinic) could ease parental concerns.

STIGMA & RACISM

- In one survey, a quarter of respondents felt that healthcare workers should have restrictions placed on their freedom of mobility to avoid infecting people with COVID-19. Nearly a third would avoid healthcare workers to avoid infection.
- In a survey of Chinese American families, nearly half of parents and youth reported being directly targeted by COVID-19 racial discrimination online. Parental and youth perceived racism and racial discrimination were associated with poorer mental health.
- In New Zealand, a survey of undergraduate pharmacy students, half of whom being Asians, found that 13% of respondents experienced direct racism, 35% reported indirect racism, and 37% admitted racism associated with COVID-19 affected their well-being.
- Analysis of county-level segregation, racial disparities in socioeconomic outcomes, and incarceration rates was found to show that structural racism remains a driving force behind health disparities.

For details and references please visit <https://oume.uthscsa.edu/longco/>