COVID-19 Evidence Digest 12/15/20

Evaluation of Cloth Masks and Modified Procedure Masks as Personal Protective Equipment for the Public During the COVID-19 Pandemic (JAMA)

Bottom Line: In this small study evaluating the fitted filtration efficiency (FFE) of various consumer and medical grade masks with and without fit modifications, nylon masks performed as well or better than non-respirator medical procedure masks.

Details: Various types of face coverings/masks have been used by the general public during the COVID-19 pandemic. This lab-based study evaluated the fitted filtration efficiency (FFE) of consumer-grade masks, improvised face coverings, and modified medical procedure masks against exposure to an aerosol of small particles. Seven consumer-grade (e.g., 2-layer woven nylon mask with ear loops, aluminum nose bridge and filter insert in place, cotton bandana, 1-layer woven mask with ties, nonwoven polypropylene mask with ear loops, 1-layer woven gaiter, and 3-layer woven cotton mask with ear loops) and 5 medical procedure mask modifications (e.g., tying mask's ear loops and tucking in side pleats, using ear guards or a hair clip to fasten ear loops behind head, rubber bands or a band of nylon hosiery over mask to enhance the mask/face seal) were fitted on an adult male with no beard, with FFE measurements taken during various repeated movements of the head, torso, and facial muscles. The average FFE of consumer grade masks ranged from 27% to 79%; 2-layer washed, woven nylon masks had the highest FFE, and the 3-layer woven cotton mask had the lowest (perhaps due to the looser weave of layers). Unmodified medical procedure masks with ear loops had an average FFE of 39%; all described modifications increased FFE for this mask (range 60%-80%); the nylon hosiery modification improved FFE the most.

Key Takeaways:

- FFE of consumer-grade masks are, in many cases, almost equal to or better than non-respirator medical procedure masks.
- Fit modifications to medical procedure masks that enhance the fit between the wearer's face and the mask can improve filtration and reduce inhalation of airborne particles.

Male Sex Identified by Global COVID-19 Meta-analysis As a Risk Factor for Death and ITU Admission (Nature Communications)

Bottom Line: A large-scale statistical analysis of over 3.1 million COVID-19 cases reported globally indicates that while females and males have equal risk for SARS-CoV-2 infection, males have a higher risk of ICU admission and death.

Details: This study sought to assess whether anecdotal evidence about differential COVID-19 outcomes by sex could be validated in analysis of global data. COVID-19 case data from 46 countries and 44 US states available from 1/1-6/1 were analyzed to examine sex as a risk factor for SARS-CoV-2 infection and COVID-19 outcomes (e.g., intensive therapy unit, or ICU admission, and deaths). In total, 2,751,115 COVID-19 cases and 214,361 deaths with information about patient sex[1] were included in the analysis. Meta-analysis of infections demonstrated that the proportion of COVID-19 cases in males and females was equal; however, male sex was associated with an increased odds of ICU

admission and death (odds ratio = 2.84 and 1.39, respectively; the odds ratio for death in New York State was 1.33). These findings echo earlier coronavirus outbreaks, with sex bias evident in SARS-CoV-1 outbreaks Hong Kong and Singapore, and a MERS outbreak in Saudi Arabia. Possible reasons for sex differences in outcomes include: differences in immune responses to infection, with females having an increased capacity to mount humoral immune responses and increased adaptive immunity towards viral antigens; immune-protective versus suppressive roles of estrogen and testosterone; age-related changes in the immune system that differ between sexes; and other biological factors such as the expression of angiotensin converting enzyme 2 (ACE2) receptors, which facilitate SARS-CoV-2 entry into cells and transmission.

Key Takeaways:

- The sex bias of COVID-19 morbidity and mortality is observed worldwide.
- More research is needed to understand the mechanisms underlying sex bias in COVID-19 outcomes, including the intersections between biological and environmental/social factors.

[1]**Note:** It is unclear how biological sex was defined within and across studies, though findings suggest a binary conceptualization.

Baricitinib plus Remdesivir for Hospitalized Adults with Covid-19 (NEJM)

Bottom Line: Hospitalized patients with COVID-19 receiving both an anti-inflammatory and antiviral drug (baricitinib and remdesivir) experienced reduced recovery time and accelerated clinical improvement compared with patients receiving remdesivir alone.

Details: This double-blind (neither participants nor study team know what arm of the study participants are randomized to), randomized controlled trial compared the use of baricitinib and remdesivir versus remdesivir alone in hospitalized patients with COVID-19. Patients received either remdesivir (10 or fewer days) and a placebo or remdesivir (10 or fewer days) and baricitinib (14 or fewer days). 1033 hospitalized patients with COVID-19 were enrolled (515 to combination treatment arm and 518 to control arm of study). Patients receiving combination treatment had a shorter median time to recovery than those receiving remdesivir alone (7 days vs 8 days, respectively); recovery time differences were greater among patients receiving high-flow oxygen or non-invasive ventilation (10 days with combination treatment versus 18 days with remdesivir alone). In addition, new use of oxygen and mechanical ventilation or extracorporeal membrane oxygenation (ECMO) was lower in the combination group than the control group (22.9% vs 40.3% and 10% vs 15.2%, respectively). The odds of improved clinical status at day 15 were greater in the treatment versus control group (odds ratio for improvement, 1.3). Death at 28 days was 5.1% and 7.8% in the treatment and control groups, respectively. Serious adverse events and new infections were less frequent in the treatment group (16% and 5.9% versus 21% and 11.2% in the control group).

Key Takeaways:

- Several improvements/benefits were observed in the treatment group receiving both baricitinib and remdesivir, including modestly shorter recovery time and greater improvement in clinical status; faster recovery may suggest the combination

treatment lowering the risk of thrombosis, hospital acquired infections, and hospital drug administration errors.

- Clinical benefits reported in this study were observed across different age groups, races/ethnicities, and sexes, regardless of symptom duration or disease severity at enrollment.
- Lower occurrences of adverse events observed in the combination treatment group may be related to several factors, including baricitinib's ability to reduce inflammation associated with lung injury, its antiviral properties, and its associated shorter recovery time and faster clinical improvement.