New science studies confirm value of required masks for COVID-19 prevention

APPENDIX D - August 20, 2020

To: Leaders and colleagues in state/local health policy
From: Richard Cauchi, Colorado Ideas 2.0, Colorado

On August 7-10, three newly conducted studies were published, providing more "Evidence Supporting Population-Based Face Coverings." Taken together, they make some of the stronger cases yet for mandatory use, ordered by state and local governments in the U.S. The materials are in the public domain and can be applicable nationwide. Their sources are specialized subscription academic journals, not commonly read by non-medical professionals. This email is intended as a convenient short-cut to the experts' calculations and conclusions. The links go to full text online and PDF format versions of the articles as published. This allows you to share, link or print the material for those most interested, but especially so for state or local policymakers.

1. **Universal Masking in the United States: The Role of Mandates, Health Education and the CDC**.
   Article in ***JAMA*** (September 2020 edition; online release August 10)
   https://jamanetwork.com/journals/jama/fullarticle/2769440, (2 pp plus Supplement)
   The authors, from Georgetown, Harvard and Emory universities, examine the questions, "Although many states and localities have ordered mask use, considerable variability and inconsistencies exist. Would a national mandate be an effective COVID-19 prevention strategy, and would it be lawful?... They conclude, "A better way to gain more national uniformity is by inducing states to enact mask laws. This respects states as key decision makers in public health and is more consistent with state autonomy. It is also easier to gain compliance with state and local directives rather than using federal officers to monitor and enforce a national mandate. A well-crafted use of federal spending powers would likely be constitutional…."

2. **Community Use of Face Masks and COVID-19: Evidence From A Natural Experiment Of State Mandates In The US**. Posted in Health Affairs, August 10, 2020. (7 pp. Full text, **PDF**)
   The authors from the Univ. of Iowa, describe "This study provides evidence from a natural experiment on the effects of state government mandates for face mask use in public issued by fifteen states plus Washington, D.C., between April 8 and May 15, 2020. … Estimates suggest that as a result of the implementation of these mandates, more than 200,000 COVID-19 cases were averted by May 22, 2020. The findings suggest that requiring face mask use in public could help in mitigating the spread of COVID-19."
   > For academic pros and cons, both publications post reader comments and have extensive source notes.

3. **Low-cost measurement of facemask efficacy for filtering expelled droplets during speech**
   Study by Duke University researchers from multiple departments (Chemistry, Physics, Radiology, Medicine, Biomedical Engineering and Psychology & Neuroscience) published in Science Advances, August 7, 2020 (Full text, 11 pp, **PDF**). The researchers unveiled a simple method to evaluate the effectiveness of various types of masks, analyzing more than a dozen different facial coverings ranging from hospital-grade N95 respirators to bandanas. The researchers note "We have demonstrated a simple optical measurement method to evaluate the efficacy of masks to reduce the transmission of respiratory droplets during regular speech. In proof-of-principle studies, we compared a variety of commonly available mask types and observed that some mask types approach the performance of standard surgical masks, while some mask alternatives, such as neck fleece or bandanas, offer very little protection." A Washington Post summary analysis, headlined "Wearing a neck gaiter may be worse than no mask at all, researchers find." It noted "Of the 14 masks and other coverings tested, the study found that some easily accessible cotton cloth masks are about as effective as standard surgical masks, while popular alternatives such as neck gaiters made of thin, stretchy material may be worse than not wearing a mask at all. The researchers specifically made note of the effectiveness of common cotton cloth masks, finding that several of the ones tested performed about as well as surgical masks, which come in second to the N95. Experts with the WHO have recommended that fabric masks should ideally have three layers."

Mask, Name	Description
1, **'Surgical' ***	Surgical mask, 3-layer
2, 'Valved N95'	N95 mask with exhalation valve
3, 'Knitted'	Knitted mask
4, **'PolyProp'**	2-layer polypropylene apron mask
5, 'Poly/Cotton'	Cotton-polypropylene-cotton mask
6, 'MaxAT'	1-layer Maxima AT mask
7, 'Cotton2'	2-layer cotton, pleated style mask
8, 'Cotton4'	2-layer cotton, Olson style mask
9, 'Cotton3'	2-layer cotton, pleated style mask
10, 'Cotton1'	1-layer cotton, pleated style mask
11, 'Fleece'	Gaiter type neck fleece
12, 'Bandana' *	Double-layer bandana
13, **'Cotton5' ***	2-layer cotton, pleated style mask
14, 'Fitted N95'	N95 mask/no exhale valve, fitted
Read graph below or PDF for results	

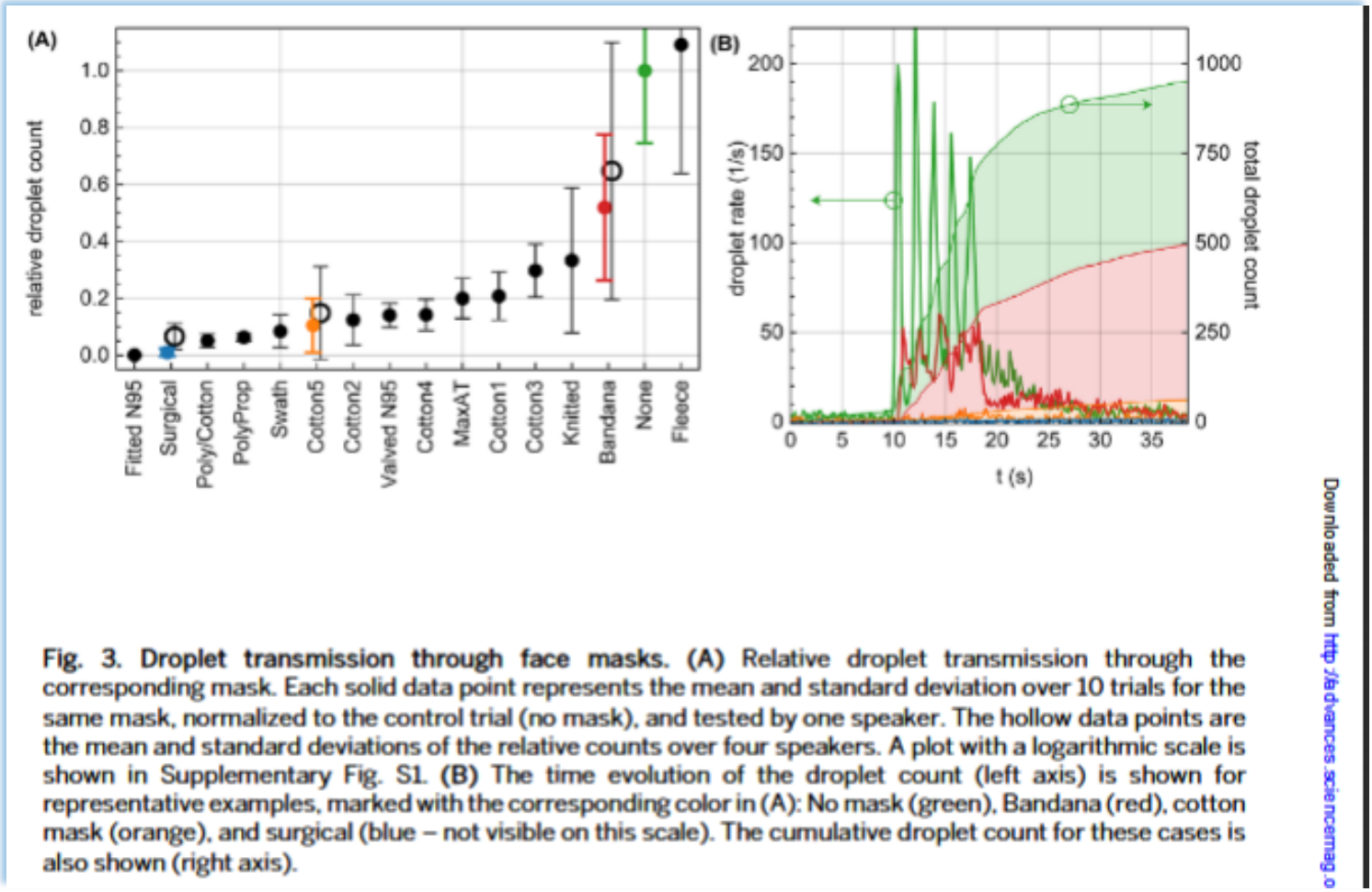

Fig. 3. Droplet transmission through face masks. (A) Relative droplet transmission through the corresponding mask. Each solid data point represents the mean and standard deviation over 10 trials for the same mask, normalized to the control trial (no mask), and tested by one speaker. The hollow data points are the mean and standard deviations of the relative counts over four speakers. A plot with a logarithmic scale is shown in Supplementary Fig. S1. **(B)** The time evolution of the droplet count (left axis) is shown for representative examples, marked with the corresponding color in (A): No mask (green), Bandana (red), cotton mask (orange), and surgical (blue – not visible on this scale). The cumulative droplet count for these cases is also shown (right axis).

"A Smoking Gun': Infectious Coronavirus Retrieved From Hospital Air"

Viable SARS-CoV-2 in the air of a hospital room with COVID-19 patients

(News summary) – "A research team at the University of Florida has confirmed Covid-19 does live in aerosol droplets, and that the standard 6-foot social distancing protocols used around the world as safety precautions may not be sufficient. "It's unambiguous evidence that there is infectious virus in aerosols," Linsey Marr, an expert in airborne spread of viruses who was not involved in the work told the *New York Times*. For this study, researchers collected air samples from a room in a hospital ward dedicated to Covid-19 patients who were not subject to procedures that are known to produce aerosols, the *Times* reported. The research team collected two sets of samples, one at approximately 7 feet from the patients and another at about 16 feet, and found that Covid-19 virus contained in samples at both distances could infect cells in a lab dish. Although not peer reviewed, scientists are pointing to this study as a potential 'smoking gun,' regarding the issue of aerosol transmission.
https://www.medrxiv.org/content/10.1101/2020.08.03.20167395v1 |
https://www.medrxiv.org/content/10.1101/2020.08.03.20167395v1.full.pdf

Excerpts:
"Viable virus was isolated from air samples collected 2 to 4.8meters *(6.5 to 15 feet)* away from the patients. The genome sequence of the SARS-CoV-2 strain isolated from the material collected by the air samplers was identical to that isolated from the NP swab from the patient with an active infection. Estimates of viable viral concentrations ranged from 6 to 74 TCID units/L of air. **Interpretation:** Patients with respiratory manifestations of COVID-19 produce aerosols in the absence of aerosol-generating procedures that contain viable SARS-CoV-2, and these aerosols may serve as a source of transmission of the virus."

Overview Reports:

3. **Broad Public Use of Masks-Evidence-based research-COVID-** updated July 2020 (**PDF**)
4. **Policies on Required Use of Masks to prevent the spread of COVID-19: An Updated Nationwide Review** - August 6, 2020 (15 pp, **PDF**) By Colorado Ideas 2.0

We hope this is of use; if you have difficulty with links, please contact me about offline copies.

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