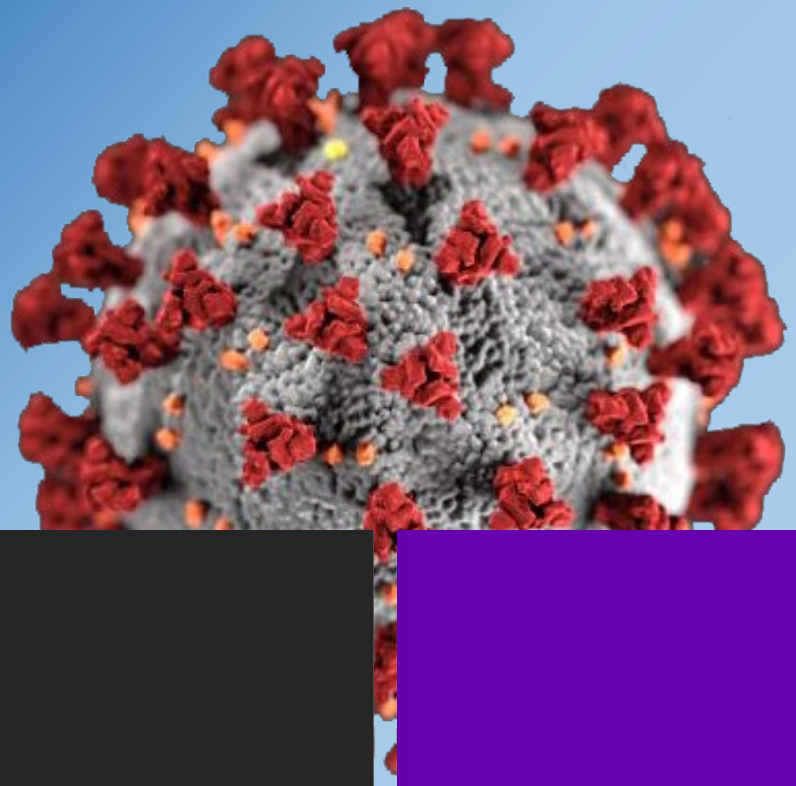
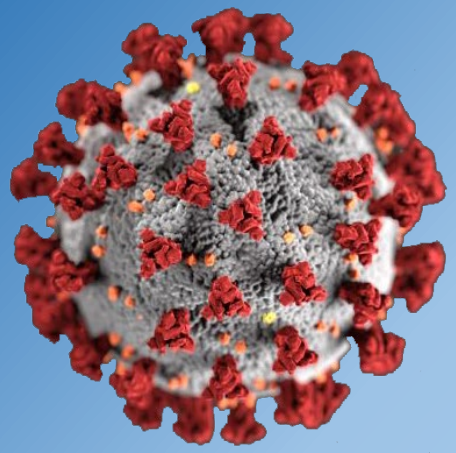


COVID-19 Pandemic

-- Viral Spread & Prevention



Kevin T. Kavanagh, MD, MS
Health Watch USA sm

USA
Health Watch

COVID-19: Coronavirus Survival

The NEW ENGLAND JOURNAL of MEDICINE

April 16, 2020
N Engl J Med 2020; 382:1564-1567
DOI: 10.1056/NEJMc2004973

Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1

Viability of SARS-CoV-2 Virus

- Aerosols – Viable up to 3 hours,
- Plastic – Viable up to 72 hours,
- stainless steel – Viable up to 72 hours,
- copper – Less than 4 hours,
- cardboard – Viable up to 24 hours.

https://www.nejm.org/doi/full/10.1056/NEJMc2004973

COVID-19: Coronavirus Survival

Vox

How soap absolutely annihilates the coronavirus

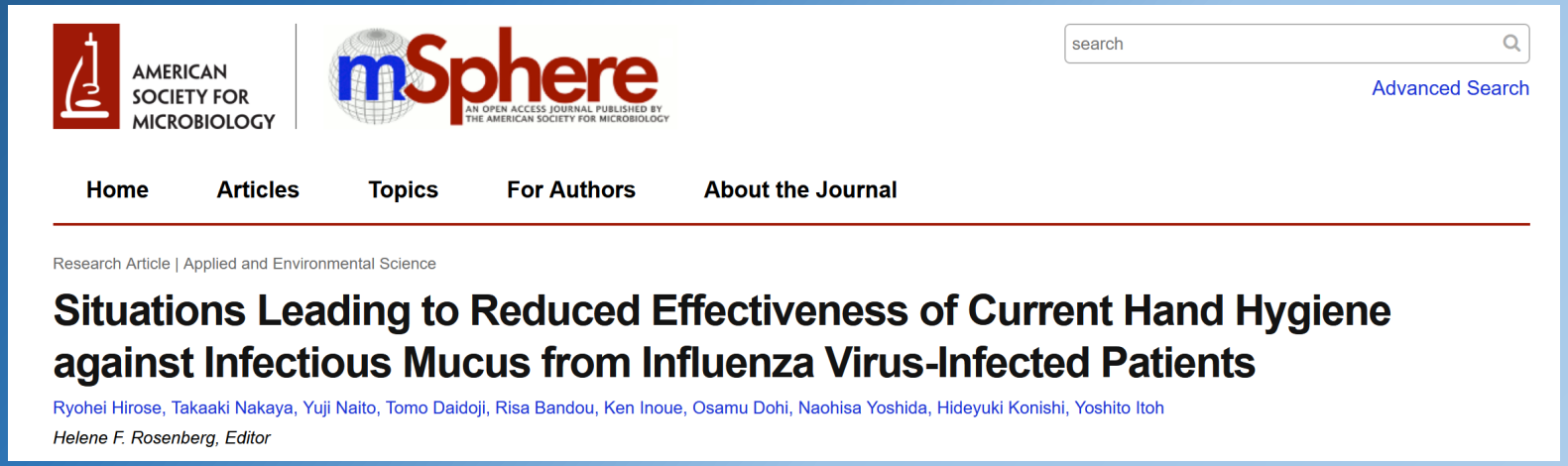
You're not just washing viruses down the drain. Soap destroys the coronavirus, a chemistry professor explains.

The virus has a lipoprotein capsule. Soap would be expected to destroy it. The CDC recommends using Soap and Water and if not available a hand sanitizer with at least 60% alcohol (ethyl alcohol or isopropyl alcohol).

https://www.vox.com/science-and-health/2020/3/11/21173187/coronavirus-covid-19-hand-washing-sanitizer-compared-soap-is-dope

COVID-19: Coronavirus Survival

USA Health Watch



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Situations Leading to Reduced Effectiveness of Current Hand Hygiene against Infectious Mucus from Influenza Virus-Infected Patients

Ryohei Hirose, Takaaki Nakaya, Yuji Naito, Tomo Daidoji, Risa Bandou, Ken Inoue, Osamu Dohi, Naohisa Yoshida, Hideyuki Konishi, Yoshito Itoh

Helene F. Rosenberg, Editor

"IAV (Influenza A Virus) in mucus remained active despite 120 s of AHR (Antiseptic Hand Rubs – 80% Alcohol); however, IAV in saline was completely inactivated within 30 s." https://msphere.asm.org/content/4/5/e00474-19

You need to use an alcohol base hand rub for 20 to 30 seconds.
https://youtu.be/ZnSjFr6J9HI

Recommended to 60% or greater alcohol (Ethanol or Isopropyl Alcohol) to deactivate the virus.

COVID-19: Toxic Hand Sanitizers

USA Health Watch

USA TODAY

MONEY

FDA further expands list of hand sanitizers to avoid due to methanol risk with more added to 'import alert'

Kelly Tyko USA TODAY

Published 5:51 p.m. ET Jul. 18, 2020 | **Updated 5:40 p.m. ET Jul. 27, 2020**

"The FDA's updated chart now includes 76 varieties of hand sanitizer that should be avoided, some which have already been recalled, and other products being recommended for recalls as they may contain the potentially fatal ingredient." https://www.fda.gov/drugs/drug-safety-and-availability/fda-updates-hand-sanitizers-consumers-should-not-use

https://www.usatoday.com/story/money/2020/07/18/hand-sanitizer-recall-avoid-these-brands-may-contain-methanol/5466054002/

COVID-19: Coronavirus Survival

The Washington Post
Democracy Dies in Darkness

White House promotes new lab results suggesting heat and sunlight slow coronavirus

Increased temperature, humidity, and sunlight are detrimental to SARS-CoV-2 in saliva droplets on surfaces and in the air

WH.GOV

CONDITION	*Temp*	*Humidity*	*Solar*	HALF LIFE
Surface	70-75°F	20%	None	18 hours
Surface	70-75°F	80%	None	6 hours
Surface	95°F	80%	None	1 hour
Surface	70-75°F	80%	Summer	2 minutes
Aerosol	70-75°F	20%	None	~60 minutes
Aerosol	70-75°F	20%	Summer	~1.5 minutes

This finding applied to the virus in contact with nonporous surfaces such as door handles. Adding in sunlight, the virus's half-life decreases from six hours to two minutes at temperatures from 70 to 75 degrees and humidity of 80 percent. "That's how much of an impact UV rays has on the virus," Bryan said. https://www.washingtonpost.com/weather/2020/04/23/lab-study-coronavirus-summer-weather/

COVID-19: Viral Spread

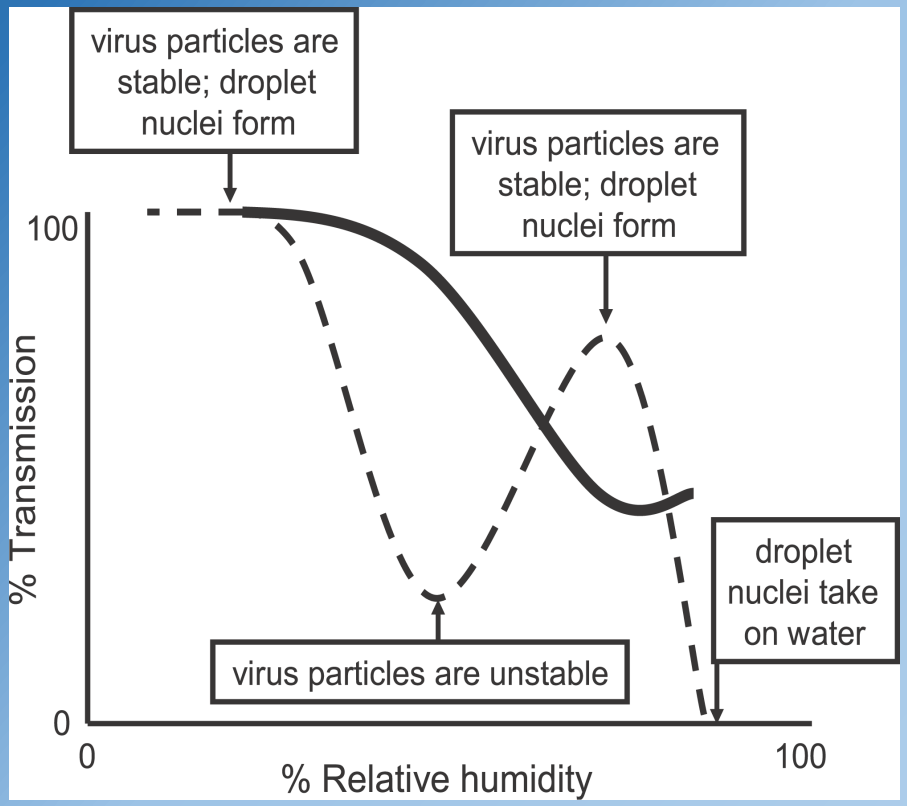
PLOS PATHOGENS

Influenza Virus Transmission Is Dependent on Relative Humidity and Temperature

Anice C Lowen, Samira Mubareka, John Steel, Peter Palese

Published: October 19, 2007 • https://doi.org/10.1371/journal.ppat.0030151

https://journals.plos.org/plospathogens/article?id=10.1371/journal.ppat.0030151



Aerosol Spread of Flu Virus

Solid Line: 5° C or 31° F

Dashed Line: 20° C or 68° F

COVID-19: Droplet Spread

Six feet or greater for normal breathing or talking.
But this may not be enough for Aerosols. Large droplets usually fall short of 6 feet.

https://www.bbc.com/news/science-environment-52522460
https://www.nytimes.com/2020/04/14/health/coronavirus-six-feet.html

A Cough Can Travel -- Up to 12 feet at 22 - 50 mph

https://www.miaminewtimes.com/news/how-far-can-a-cough-or-sneeze-travel-fau-says-up-to-12-feet-11626367

Being exposed to someone coughing is riskier. Being 2m away from a cough carries the same risk as someone talking to you for 30 minutes at the same distance.
https://www.bbc.com/news/science-environment-52522460

A Sneeze Can Travel – Up to 23 to 27 feet at 112 - 200 mph

https://jamanetwork.com/journals/jama/fullarticle/2763852

COVID-19: Aerosolization

"Aerosols are generally considered to be particles under 5 microns in diameter, about the size of a red blood cell, and can be spread in the environment by talking and breathing."

"Even without the launching power of a sneeze, air currents could carry a flow of aerosol sized virus particles exhaled by an infected person 20 feet or more away. https://www.nytimes.com/2020/04/14/health/coronavirus-six-feet.html"

1. **MASKs: An N-95 Mask Is Needed To Prevent Aerosolization and Spread of Particles < 5 µm (micron or micrometer)**
2. **Social Distancing: Since the virus lingers in the air and travels with air currents, the virus can travel greater than 6 feet.**

COVID-19: Aerosolization

Aerosolization Occurs When Small Viral Particles Linger in the Air.

These floating particles can travel further than 1 to 3 meters and can spread via air-conditioning. Particle sizes of 5 µm can travel up to 10 meters. https://academic.oup.com/cid/article/doi/10.1093/cid/ciaa939/5867798

Observations of Concern:

1. **High SARS-CoV-2 Attack Rate Following Exposure at a Choir Practice — Skagit County, Washington, March 2020**
   "Following a 2.5-hour choir practice attended by 61 persons, including a symptomatic index patient, 32 confirmed and 20 probable secondary COVID-19 cases occurred (attack rate = 53.3% to 86.7%); three patients were hospitalized, and two died. " https://www.cdc.gov/mmwr/volumes/69/wr/mm6919e6.htm
2. **COVID-19 Outbreak Associated with Air Conditioning in Restaurant, Guangzhou, China, 2020**
   "The airflow direction was consistent with droplet transmission.' https://wwwnc.cdc.gov/eid/article/26/7/20-0764_article
3. **Aerosol and Surface Distribution of Severe Acute Respiratory Syndrome Coronavirus 2 in Hospital Wards, Wuhan, China, 2020**
   "Virus was widely distributed on floors, computer mice, trash cans, and sickbed handrails and was detected in air ≈4 m from patients." https://wwwnc.cdc.gov/eid/article/26/7/20-0885_article
4. **Loud Talking Can Aerosolize Small Particles.**
   "… when the person said "stay healthy," numerous droplets ranging from 20 to 500 µm were generated." https://www.nejm.org/doi/full/10.1056/NEJMc2007800

An N-95 Mask Is Needed To Prevent Aerosolization and Spread of Particles < 5 µm

COVID-19: Aerosolization

Aerosolization Occurs When Small Viral Particles Linger in the Air.

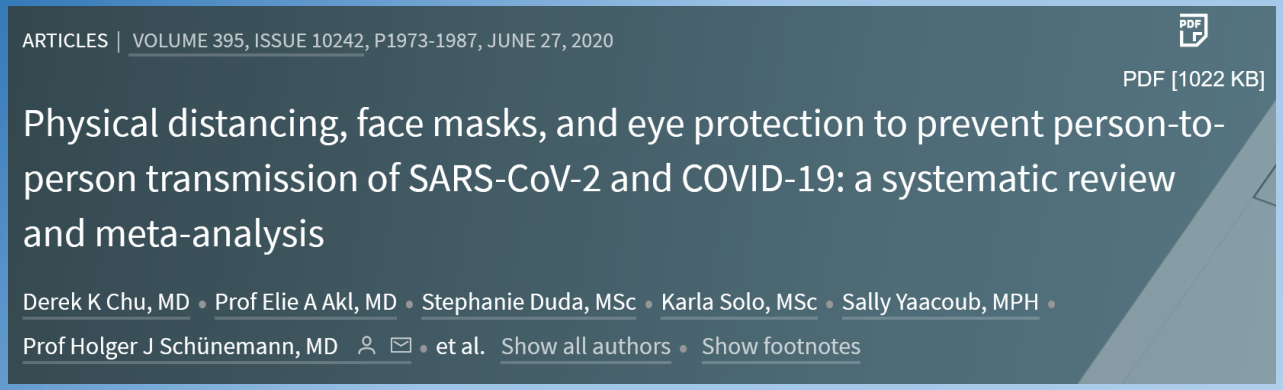
1. **The WHO has stated small particles (< 5 um) only occur with certain medical procedures.**
   "But in an open letter to the W.H.O., 239 scientists in 32 countries have outlined the evidence showing that smaller particles can infect people, and are calling for the agency to revise its recommendations."
   https://www.nytimes.com/2020/07/04/health/239-experts-with-one-big-claim-the-coronavirus-is-airborne.html

2. **This virus (R0 of 5.7) is not as infective as measles (R0 of 12 to 18) a truly aerosolized virus.**
   https://www.pbs.org/wgbh/nova/article/herd-immunity/

3. **Co-inhabitants at a home of a symptomatic patient have a 20% chance of catching the virus.**
   Spread by aerosolization is hard to prevent. "His team estimates that more than 19% of people in the same household as a COVID-19 patient, or nearly 1 in 5, can expect to develop the infection. An estimated 14% of close contacts who aren't in the same household but see the patient regularly will also develop the infection themselves, Yang says."
   https://www.webmd.com/lung/news/20200430/covid-19-household-spread-how-likely

COVID-19: Prevention

THE LANCET



- **Physical distancing:** The chance of transmission:
  At less than 1 meter (3.3 feet) was 12.8%,
  At more than 1 meter (3.3 feet) was 2.6% (1·3% to 5·3%).
- **Face masks:** The chance of transmission without a mask was 17.4%, which fell to 3.1% (1.5% to 6.7%) with a mask or N95 respirator.
- **Eye protection:** The chance of transmission without eye protection was 16%, which fell to 5.5% (3.6% to 8.5%) with eye protection (face shield or goggles).

https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31142-9/fulltext

COVID-19: Prevention – Social Distancing

BBC NEWS

Coronavirus: Could social distancing of less than two metres work?

By David Shukman
Science editor

Social Distancing Rules Come From the 1930's. It is based on the Spread of Droplets

It is also not just about distance but also time. Thus, "Scientists advising the UK government say spending six seconds at a distance of 1m from someone is the same as spending one minute at a distance of 2m."

- England, Canada and Spain advise 2 meters.
- Germany, Italy Greece, Netherlands, Portugal advise 1.5 meters.
- South Korea advise 1.4 meters.
- China, France, Singapore, Hong Kong and Denmark advise 1 meter.

However, More Evidence Supports and Scientists Worry the Virus Can Float in the Air – Aerosolized.

https://www.bbc.com/news/science-environment-52522460

COVID-19: Prevention – Masks Types

- **Professional Respirators – N-95**
  These masks can stop aerosolized particles of less than 5 microns.
  A tight facial fit with no gaps is required.

- **Surgical or Procedural Masks**
  These masks can stop droplet particles.

- **Cloth or Do It Yourself (DIY) Masks**
  These masks can stop droplet particles.

COVID-19: Prevention – Protect Others

Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

April 3, 2020

Your cloth face covering may protect them. Their cloth face covering may protect you.

https://www.nbcnews.com/news/us-news/u-s-expected-recommend-masks-americans-coronavirus-hotspots-n1175596

Without Eye Goggles and Protective Clothing and Knowledge on How To Safely Remove, A Mask Alone Will Probably Not Produce Adequate Protection.
But It Will Help.

COVID-19: Prevention – Viral Dose

The New York Times

Masks May Reduce Viral Dose, Some Experts Say

People wearing face coverings will take in fewer coronavirus particles, evidence suggests, making disease less severe.

https://www.nytimes.com/2020/07/27/health/coronavirus-mask-protection.html

Masks Do More than Protect Others during COVID-19: Reducing the Inoculum of SARS-CoV-2 Monica Gandhi, MD, MPH, Chris Beyrer MD, MPH, Eric Goosby, MD Journal of General Internal Medicine (August 2020)

https://ucsf.app.box.com/s/blvolkp5z0mydzd82rjks4wyleagt036

COVID-19: Prevention – Masks Types

JOURNAL OF
MEDICAL VIROLOGY

RESEARCH ARTICLE | Free Access

Potential utilities of mask-wearing and instant hand hygiene for fighting SARS-CoV-2

Qing-Xia Ma, Hu Shan, Hong-Liang Zhang, Gui-Mei Li, Rui-Mei Yang, Ji-Ming Chen

First published: 31 March 2020 | https://doi.org/10.1002/jmv.25805 | Citations: 25

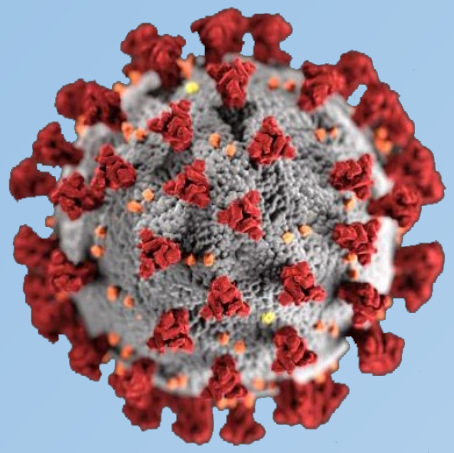


Table 2. Percentage of AIV blocked by masks as compared with one layer of cloth

	C_t increase ($\bar{X} \pm SD$)	Percentage blocked (95% CI)
N95 mask	12.49 ± 0.33	99.98% (99.98%-99.99%)
Medical mask	5.13 ± 0.98	97.14% (94.36%-98.55%)
Homemade mask (one-layer polyester cloth)	4.37 ± 0.90	95.15% (90.97%-97.39%)

Note: avian influenza virus (AIV)

https://onlinelibrary.wiley.com/doi/full/10.1002/jmv.25805

COVID-19: Prevention – Masks Cloth

- **"Filtration efficiencies of the hybrids (such as cotton–silk, cotton–chiffon, cotton–flannel) was >80% (for particles <300 nm) and >90% (for particles >300 nm)."** **(Note: 300 nm is equal to 0.3 microns)**
  Konda A, Prakash A, Moss GA, Schmoldt M, Grant GD, Guha S. Aerosol filtration efficiency of common fabrics used in respiratory cloth masks. ACS Nano 2020;14:6339–47.
  https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7185834/

COVID-19: Prevention – Masks Cloth

USA Health Watch

The Washington Post
Democracy Dies in Darkness

Business

The outbreak that didn't happen: Masks credited with preventing coronavirus spread inside Missouri hair salon

Springfield, Mo., health officials braced for an outbreak. Now they say face coverings prevented one.

Two Hair Stylists, 140 Clients and 200 to 300 other people inside a salon – No Infections. All wore masks.

https://www.washingtonpost.com/business/2020/06/17/masks-salons-missouri/

Absence of Apparent Transmission of SARS-CoV-2 from Two Stylists After Exposure at a Hair Salon with a Universal Face Covering Policy — Springfield, Missouri, May 2020

Weekly / July 17, 2020 / 69(28);930-932

On July 14, 2020, this report was posted online as an MMWR *Early Release.*

M. Joshua Hendrix, MD[1]; Charles Walde, MD[2]; Kendra Findley, MS[3]; Robin Trotman, DO[4] (View author affiliations)

https://www.cdc.gov/mmwr/volumes/69/wr/mm6928e2.htm?s_cid=mm6928e2_w

COVID-19: Prevention – Masks DYI

Instructional Links On How To Make Cloth Masks.

- **John Hopkins**
  https://www.hopkinsmedicine.org/coronavirus/_documents/INF2003076_VW_Hand-Sewn%20Mask%20instructions-1.pdf
- **Center for Disease Control snd Prevention**
  http://www.healthwatchusa.org/downloads/CDC-DIY-cloth-face-covering-instructions.pdf
- **World Health Organization**
  http://www.healthwatchusa.org/downloads/20200605-WHO-2019-nCov-IPC_Masks-2020.4-eng.pdf

COVID-19: Prevention – Masks N-95

USA Health Watch

Infectious diseases
Research

BMJ Open

A cluster randomised trial of cloth masks compared with medical masks in healthcare workers

C Raina MacIntyre[1], Holly Seale[1], Tham Chi Dung[2], Nguyen Tran Hien[2], Phan Thi Nga[2], Abrar Ahmad Chughtai[1], Bayzidur Rahman[1], Dominic E Dwyer[3], Quanyi Wang[4]

- "This study is the first RCT of cloth masks, and the results caution against the use of cloth masks. This is an important finding to inform occupational health and safety. Moisture retention, reuse of cloth masks and poor filtration may result in increased risk of infection."
- "The rates of all infection outcomes were highest in the cloth mask arm, with the rate of ILI (Influenza Like Illness) statistically significantly higher in the cloth mask arm"

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4420971/

COVID-19: Masks Can Stop Pandemic

COVID-19: Masks Can Stop Pandemic

One Study From the University of Cambridge Found this could stop a second wave of COVID-19, if 100% of the public wore masks combined with a lockdown. If 50% of the public wore masks then the curve could be flattened.
https://www.cnbc.com/2020/06/10/study-suggests-face-masks-could-prevent-or-lessen-second-covid-19-wave.html

Another Study From Berkeley's International Computer Science Institute (Dr. De Kai) ""For 80 or 90% of the population to be wearing masks." Anything less, he added, doesn't work as well. "If you get down to 30 or 40%, you get almost no [beneficial] effect at all.""

Duncan DE. If 80% of Americans Wore Masks, COVID-19 Infections Would Plummet, New Study Says. Vanity Fair. May 8, 2020.
https://www.vanityfair.com/news/2020/05/masks-covid-19-infections-would-plummet-new-study-says

View Mask Simulator & Effects on Pandemic: http://dek.ai/masksim/

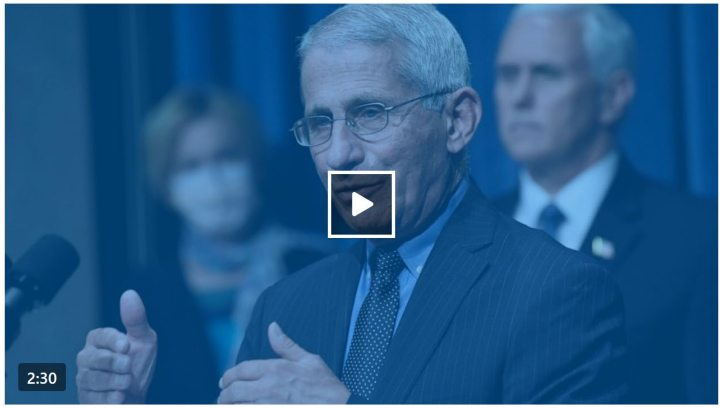
COVID-19: Goggles

ABC NEWS | CORONAVIRUS FAQS

Dr. Fauci: Wear goggles or eye shields to prevent spread of COVID-19; flu vaccine a must

The nation's top infectious disease expert spoke to ABC News live on Instagram.

By Caterina Andreano
July 29, 2020, 5:26 PM • 9 min read



What you need to know about Dr. Anthony Fauci

Dr. Jen Ashton shares some facts you might not know about the acclaimed immunologist.

Dr. Anthony Fauci suggested Wednesday that Americans should consider wearing goggles or a face shield in order to prevent spreading or catching COVID-19.

NEWS

Birx, Fauci recommend wearing goggles, face shields in addition to masks

by: Alexa Mae Asperin and Nexstar Media Wire
Posted: Jul 30, 2020 / 05:32 PM CDT / Updated: Jul 30, 2020 / 12:59 PM CDT

OKLAHOMA'S NEWS 4

SAN FRANCISCO (KRON) – Dr. Anthony Fauci is now suggesting that people wear goggles, or some other type of eye protection to better protect themselves from COVID-19.

- **Eye protection:** The chance of transmission without eye protection was 16%, which fell to 5.5% (3.6% to 8.5%) with eye protection (face shield or goggles).

https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31142-9/fulltext

COVID-19: High Risk Venues

The highest risk activities are:

- Indoors with poor ventilation.
  (being outside has a 20x lower risk)
- Individuals are crowded together.
- Loud talking, cheering or singing.

COVID-19: Bars

Outside Bar In Lexington Kentucky

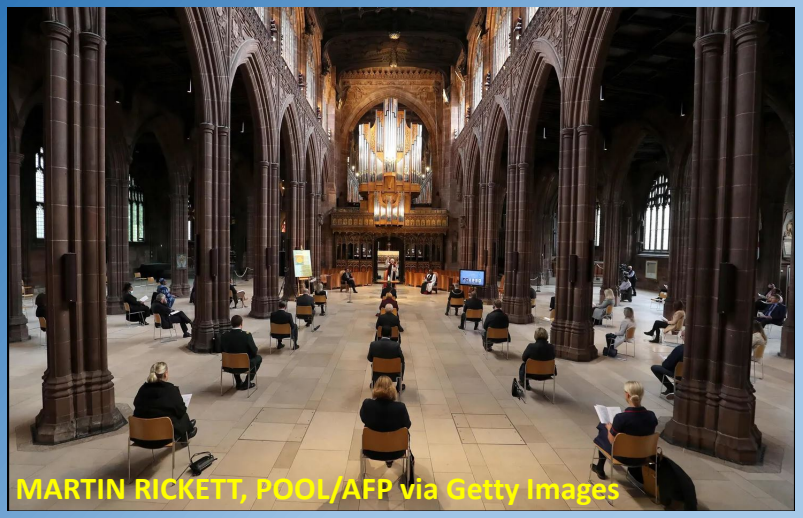
Risk Factors:

1. Close Together
2. Loud Talking Over Music
3. Indoors – Poor Ventilation
4. Exposure Time Greater Than 15 mins.
5. Not Wearing Masks

Mitigation Strategies:

1. Social Distancing & Wearing Masks.
2. Adequate Ventilation with Air Sterilization.
3. No Singing or Loud Talking.
4. Outdoor or Parking Lot Services.
5. Stay In Your Family “Bubble”.

COVID-19: Churches



Risk Factors:

1. Close Together
2. Singing
3. Indoors – Poor Ventilation
4. Exposure Time Greater Than 15 mins.

Mitigation Strategies:

1. Social Distancing & Wearing Masks.
2. Adequate Ventilation with Air Sterilization.
3. No Singing or Singing with Masks.
4. Outdoor or Parking Lot Services.
5. Stay In Your Family "Bubble".
6. Online Services.

COVID-19: Churches

courier journal

Kentucky pastor spars with Beshear after 18 church members test positive for COVID-19

Billy Kobin Louisville Courier Journal

Published 11:28 a.m. ET Jun. 9, 2020 | **Updated 4:47 p.m. ET Jun. 9, 2020**

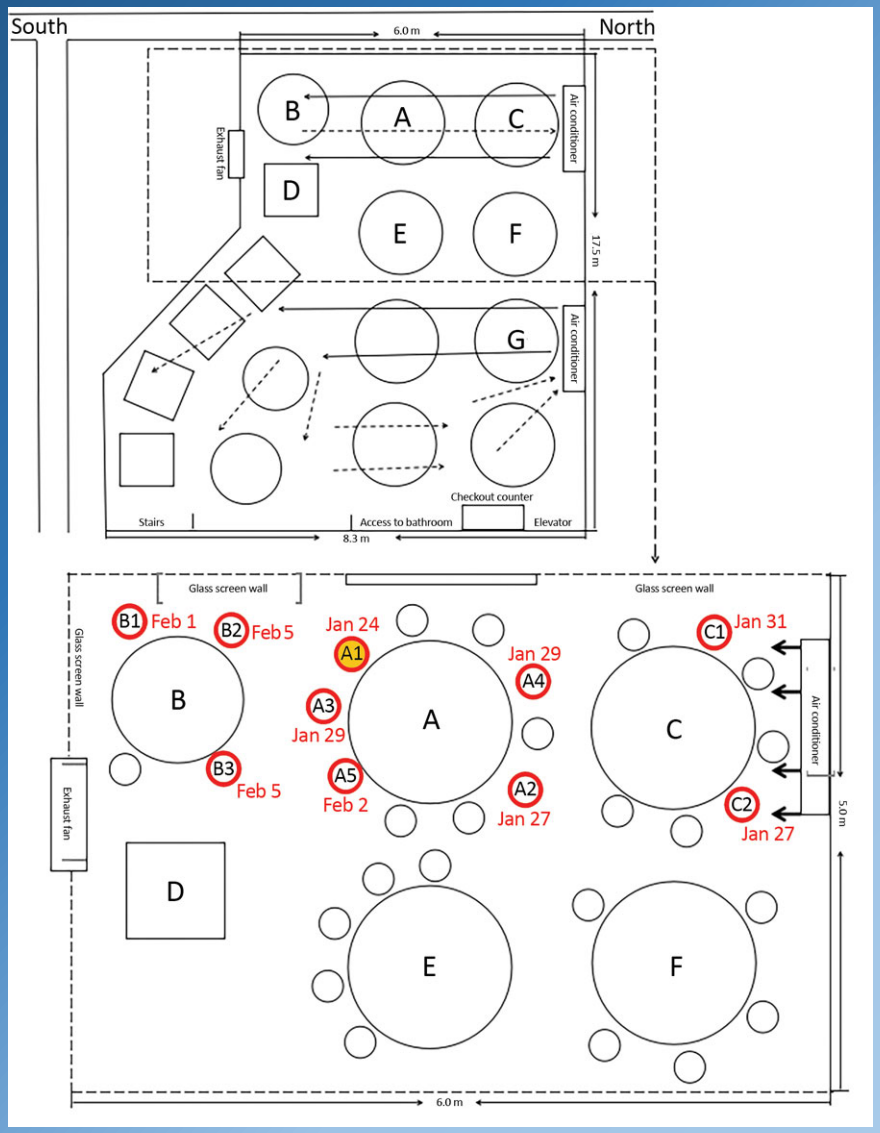
But pastor Jeff Fugate, who stood alongside Kentucky Attorney General Daniel Cameron in April and called for Gov. Andy Beshear to lift restrictions on in-person worship, stressed there is "no indication" anyone contracted the virus while at church.

"I decided it would just be best to go back to online services until we can figure out exactly what's going on and we can figure out what to do," Fugate told The Courier Journal on Saturday. "... The last thing I want is for my folks to get sick."

But Randy Gooch, executive director of the Jessamine County Health Department, said evidence suggests the cases are linked to attendance at the church.

https://www.courier-journal.com/story/news/local/2020/06/09/coronavirus-kentucky-17-clays-mill-baptist-church-members-infected/3164299001/

COVID-19: Restaurants



Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

COVID-19 Outbreak Associated with Air Conditioning in Restaurant, Guangzhou, China, 2020
Volume 26, Number 7—July 2020

"During January 26–February 10, 2020, an outbreak of 2019 novel coronavirus disease in an air-conditioned restaurant in Guangzhou, China, involved 3 family clusters. The airflow direction was consistent with droplet transmission. **To prevent the spread of the virus in restaurants, we recommend increasing the distance between tables and improving ventilation.**"

https://wwwnc.cdc.gov/eid/article/26/7/20-0764_article

Mitigation Strategies:

1. Social Distancing & Wearing Masks.
2. Outdoor tables.
3. Adequate Ventilation with Air Sterilization.
4. Delivery or Pick Up Services.

COVID-19: Other Businesses

Mitigation Strategies - Minimal

1. Online Ordering and Delivery.
2. Curbside Pickup.
3. Require Masks & Social Distancing for Patrons and Staff.
4. Employees With Barriers or Face shields.

COVID-19: Animals

Health Watch USA @healthwatchusa · Now

The first dog to test positive for coronavirus in the U.S. has died via @natgeo

Exclusive: Buddy, first dog to test positive for COVID-19 in the U.S., has ...

Even though the German shepherd likely had cancer, his health records show how little we know about animals and the coronavirus.

nationalgeographic.com