



COVID-19 Resource

Evidence-based Tips for Healthcare Workers Regarding the Use of Masks

The **COMBINATION** of fit and
filtration is the most important
when wearing a mask!

04/03/2020



THE OHIO STATE UNIVERSITY
COLLEGE OF NURSING

Helene Fuld Health Trust National Institute for
Evidence-based Practice in Nursing and Healthcare



*“The protective effect of masks is created through a combined effect of the transmission-blocking potential of the material, the fit and related air leakage of the mask, and the degree of adherence to proper wearing and disposal of masks.”
(van der Sande et al., 2008)*

It is an unprecedented time in healthcare. The coronavirus pandemic has changed the context of healthcare and how we work. Many healthcare workers (HCWs) do not have access to personal protective equipment (PPE) and they are requesting evidence-based information about the use of homemade cloth masks during the coronavirus pandemic. See below.

Based on the current evidence, the Fuld Institute for EBP recommends and supports the provision of personal protective equipment (PPE) for healthcare workers (HCWs) at all points of care and that HCWs use appropriate PPE consistently and correctly rather than homemade cloth masks. HCWs should consider homemade cloth masks only as a last resort. (03/31/2020)

DEFINITIONS: THREE TYPES OF MASKS

N95 Respirators

A tight-fitting, fit-tested, personal protective device that filters out at least 95% of particles (including bacteria and viruses) from the air to protect the wearer.



Surgical mask

A loose-fitting, commercially made, disposable device that creates a physical barrier over the mouth and nose of the wearer to protect the wearer against large droplets or sprays, and others from the wearer’s respiratory emissions.



Homemade cloth mask

A loose-fitting, homemade device that creates a physical barrier over the mouth and nose of the wearer to protect others from the wearer’s respiratory emissions and to protect the wearer from inhaling particles in the environment.



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FREQUENTLY ASKED QUESTIONS

What is the purpose of N95 Respirators?

To protect the wearer from inhaling particles from others with confirmed or possible respiratory infections (Grinshpun et al., 2009; Yang et al., 2011)

What is the purpose of surgical masks?

1. to prevent the spread of infections from the wearer's respiratory droplets in the environment (Grinshpun et al., 2009; U.S. Centers for Disease Control, n.d.; Yang et al., 2011)
2. to protect the wearer from body fluids splashed or sprayed

How do N95 respirators, surgical masks, and homemade cloth masks differ in terms of their protection against the transmission of respiratory particles?

1. An N95 respirator provides adults with 25 times the protection of a surgical mask and 50 times the protection of a homemade cloth mask (van der Sande et al., 2008).
2. A surgical mask offers about two times the protection of a homemade cloth mask (van der Sande et al., 2008).
3. A homemade cloth mask provides the wearer with some protection from particles in the environment.



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Should healthcare workers wear a homemade cloth mask during a pandemic if nothing else is available?

Yes, *if nothing else is available*. Recommendations:

- Recommendations from the literature vary. (See Table 2 below.)
- Homemade cloth masks for HCWs may provide some protection during a pandemic when no other respiratory protection is available.
- To protect against the potential increased risk of infection (MacIntyre et al., 2015) with a homemade cloth mask:
 - Remove when the mask becomes moist, and
 - Only reuse if/when the mask has been appropriately laundered (to kill any virus on the surface)
- Be vigilant about other infection-prevention measures (such as hand hygiene and not touching eyes or mask) because masks can give a false sense of security
- **Mask Handling**
 - Above all else, make sure to wash your hands before putting on a mask and after taking one off to limit the virus getting from hands to face and mask. Continue to practice good hand washing and do not touch your face (National Academies of Sciences Engineering and Medicine, 2019).



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Synthesis Tables

These tables summarize the study design and the evidence-based recommendation contained within each study.

Table 1. Synthesis Table: Level of Evidence Regarding Use of Homemade Cloth Masks in Healthcare Workers (HCWs)

	1	2	3	4	5	6	7	8	9	10	11
	World Health Organization (World Health Organization, 2020)	CDC (U.S. Centers for Disease Control, 2020)	Mac-Intyre et al. (2015)	Jung et al. (2014)	van der Sande et al. (2008)	Chughtai, Seale, & MacIntyre (2013)	Davies et al. (2013)	Offeddu et al. (2017)	Patel et al. (2019)	Dato et al. (2006)	Yang et al. (2010)
Level I: Systematic review or meta-analysis											
Level II: Randomized controlled trial			X								
Level III: Controlled trial without randomization											
Level IV: Case-control or cohort study											
Level V: Systematic review of qualitative or descriptive studies						X		X			
Level VI: Qualitative or descriptive study, CPG, Lit Review, QI or EBP project				X	X		X				X
Level VII: Expert opinion	X	X							X	X	

Table 2: Synthesis Table: Evidence Regarding Use of Homemade Cloth Masks in Healthcare Workers (HCWs)

	1	2	3	4	5	6	7	8	9	10	11
	World Health Organization (World Health Organization, 2020)	CDC (U.S. Centers for Disease Control, 2020)	Mac-Intyre et al. (2015)	Jung et al. (2014)	van der Sande et al. (2008)	Chughtai, Seale, & MacIntyre (2013)	Davies et al. (2013)	Offeddu et al. (2017)	Patel et al. (2019)	Dato et al. (2006)	Yang et al. (2010)
No	X		X^b	X^c				X^d			
Yes, during a crisis or pandemic situation		X^a			X		X^a		X^e	X	
Possibly (evidence gap)						X					X

Legend

a = when nothing else is available; b= due to increase in infection; c= conducted under experimental conditions; d=cited MacIntyre et al. (2015); e= cited Davies et al. (2013)

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What are the mask guidelines from international organizations (WHO and CDC)?

1. World Health Organization (WHO, 2020):
 - Does NOT recommend cloth (e.g., cotton or gauze) masks under any circumstance
<https://www.who.int/docs/default-source/documents/advice-on-the-use-of-masks-2019-ncov.pdf>
2. U.S. Center for Disease Control and Prevention (CDC, 2020):
 - In a crisis, when no facemasks are available, healthcare workers (HCWs) might use homemade cloth masks (e.g., bandana, scarf) for the care of patients with COVID-19 as a last resort
 - Homemade cloth masks are NOT personal protective equipment (PPE) since their capability to protect HCWs is unknown
3. In 2013, the WHO and CDC did not provide guidance or policies regarding the use of cloth masks, despite widespread use of cloth masks in low and middle-income countries (Chughtai et al., 2013). The current clearly stated WHO and CDC guidelines represent a noteworthy improvement since 2013.
4. An RCT (Randomized Controlled Trial) comparing the efficacy of surgical masks, cloth masks, or a control group (i.e. usual practice, which included mask wearing for ethical reasons) **DOES NOT RECOMMEND CLOTH MASKS FOR HCWs** because wearing cloth masks resulted in significantly higher rates of infection compared to surgical masks. The authors could not determine if surgical masks had efficacy or whether cloth masks were detrimental to HCWs by causing an increase in infection risk due to study design (MacIntyre et al., 2015).



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Do I need to wear a surgical mask or N95 respirator throughout my work shift?

Yes!

1. A meta-analysis shows that wearing a surgical mask or N95 respirator throughout the work shift provides significant protection against self-reported clinical respiratory illness. This study shows a protective effect (although not statistically significant) against viral infections (Offeddu et al., 2017). Although the findings are not statistically significant, the findings are clinically significant because they suggest the need to wear PPE continuously while interacting with patients to reduce risk of respiratory illness.
 - **Plain language summary:** Wearing a surgical mask or N95 respirator throughout your work shift provides a 41% decrease in the risk of self-reported respiratory illness and a 66% decrease in the risk of influenza-like illness (Offeddu et al., 2017).
2. HCWs with good adherence to wearing a mask or respirator had a lower risk of respiratory infection (Yang et al., 2011).
3. “The protective effect of masks is created through a combined effect of the transmission-blocking potential of the material, the fit and related air leakage of the mask, and the degree of adherence to proper wearing and disposal of masks” (van der Sande et al., 2008).

This is where fit and filtration make the most difference!

I do not have access to an N95 respirator at work. Should I wear a standard surgical mask to protect myself?

Yes. Although a fit-tested N95 respirator is the first choice, a surgical mask provides two times the protection of homemade cloth masks (van der Sande et al., 2008).

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We hope this pamphlet has helped answer some of the questions you may be having about the use of face masks during the COVID-19 pandemic. Please check out the repository for more evidence-based resources to support you and your colleagues, as well as consumers.

We believe that evidence is an especially powerful tool in a time like this. We hope that putting these evidence-based resources into your hands will help you make the best decisions possible while caring for COVID-19 patients and families.

Help this information get to the people who need it. Please consider sharing through social media and other online communication portals and follow us on our social media to be notified of updates and new resources.



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In 2016, The Ohio State University College of Nursing received a \$6.5 million gift from the Helene Fuld National Health Trust to create the Helene Fuld Health Trust National Institute for Evidence-based Practice in Nursing and Healthcare. The Fuld Institute for EBP is a national hub for the formation, teaching and dissemination of best practices to improve healthcare quality, safety, costs and patient outcomes. Its cores include transdisciplinary clinical practice, academics, consumer education, and EBP implementation science.

Mission

We dream, discover and deliver a healthier world through transdisciplinary education, research, and policy focused on evidence-based decision making.

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