

COVID-19 and the Use of Cloth Face Masks

Summary of Findings

Issues:

Should cloth masks be worn during this COVID-19 pandemic in either the community setting or in places of business where food is sold?

Conclusions:

1. There is no incontrovertible, compelling or even a preponderance of evidence to support an Order to wear a cloth mask in the community setting at this time.
2. I am supportive of cashiers and customers wearing cloth masks inside a grocery store or any essential business where social distancing is difficult to maintain. Supporting evidence is not strong enough to issue an Order to mandate the use of cloth masks at this time; consumer preference is already accomplishing this in most parts of the County.

Introduction

A number of counties in California have adopted recommendations regarding the use of cloth masks in the community setting. The evidence is not conclusive regarding whether this practice is helpful or harmful in reducing the spread of COVID-19. There are convincing arguments both for and against the use of cloth masks in public places (see table: The Pros and Cons of Wearing a Cloth Mask). In creating a guideline for Ventura County, we have considered the prevalence of COVID-19 in our community as well as our success in flattening the curve by implementing known infection control strategies such as strict social distancing.

Note that local, state, and national guidelines, when they support the use of masks, uniformly support the use of cloth masks only and recommend **against** the use of medical masks (whether called surgical or procedure masks or N95 respirators). There is a global shortage of personal protective equipment (PPE) for healthcare workers and without adequate supplies of masks, gloves and gowns, our medical professionals are not only putting themselves at risk, they are putting their patients at risk.

A study of 600 patrons at 6 retailers in Ventura County (see table: Grocery Store Masks Polling Data) demonstrates that over 50% of people choosing to wear face masks in public are wearing medical-grade masks. We urge those of you who have a supply of unused medical-grade masks to donate these for use by our local health care providers by going to vcemergency.com and using the “donate” tab.

The Pros and Cons of Wearing a Cloth Mask

The following is information about the effectiveness of cloth masks and medical (surgical, procedure) masks in preventing infection that may prove useful in deciding whether to wear a cloth mask in the community setting. **The public should not use medical masks due to a shortage for health care professionals.** Medical masks are discussed below because cloth and medical masks are often compared in medical studies and also to show that they are by no means a perfect option for use in the community setting.

Arguments in Favor of Wearing a Mask	Arguments Against Wearing a Mask
<p>There is a “very slight protective advantage” to wearing a medical mask as opposed to wearing nothing at all in a community setting. The risk of acquiring a viral infection is reduced by 6%. When both ill and well wear a medical mask in a household, the risk is reduced by 19%. There is more “evidence to support the use of medical masks for short periods of time by particularly vulnerable individuals when in transient high-risk situations.”</p> <p>https://www.medrxiv.org/content/10.1101/2020.04.01.20049528v1</p>	<p>With near universal use of cloth and medical masks worn in public in Wuhan, China during the 2019-2020 flu season leading up to the COVID-19 outbreak, the outbreak spread virtually unchecked.</p>
<p>CDC recommends wearing cloth masks in public settings where other social distancing measures are difficult to maintain (e.g., grocery stores and pharmacies) due to the possible asymptomatic spread of COVID 19 from individuals who are not aware they have the virus.</p> <p>https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/cloth-face-cover.html</p>	<p>With no masking order in place, Ventura County residents have successfully “flattened the curve” by using social distancing.</p>
<p>Cloth masks should be considered the last resort to prevent droplet transmission from infected individuals but would be better than no protection at all when in close proximity to others. Both cloth and medical masks significantly reduced the number of microorganisms expelled but medical masks were 3 times more effective. The testing was</p>	<p>In a study involving 1607 health care workers across 14 hospitals, the rate of infection outcomes were 13 times higher in the cloth mask group compared with the medical mask group. Penetration of cloth masks by particles was almost 97% and medical masks 44%.</p>

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<p>performed immediately after putting on the mask.</p> <p>“Any mask (cloth or medical), no matter how efficient at filtration or how good the seal, will have minimal effect if is not used in conjunction with other preventative measures such as... good respiratory etiquette and regular hand hygiene.”</p> <p>https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7108646/pdf/S1935789313000438a.pdf</p>	<p>The conclusions of this study “caution against the use of cloth masks”.</p> <p>https://bmiopen.bmj.com/content/5/4/e006577</p>
<p>The California Department of Public Health recommends people wear cloth masks if they feel comfortable doing so however it should not be a replacement for other evidence-based practices such as physical distancing, frequent hand washing, and remaining at home.</p> <p>“There may be a benefit to reducing asymptomatic transmission and reinforcing physical distancing from the use of (cloth) face coverings.”</p> <p>https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/Face-Coverings-Guidance.aspx</p>	<p>“Available evidence shows that (cloth masks)... may even increase the risk of infection due to moisture, liquid diffusion and retention of the virus. Penetration of particles through cloth is reported to be high.” “Altogether, common fabric cloth masks are not considered protective against respiratory viruses and their use should not be encouraged.”</p> <p>https://www.cdc.gov/coronavirus/2019-ncov/hcp/ppe-strategy/face-masks.html</p>
<p>CDC recommends wearing cloth masks in public settings where other social distancing measures are difficult to maintain (e.g., grocery stores and pharmacies) especially in areas of significant community-based transmission.</p> <p>https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/cloth-face-cover.html</p>	<p>“Moisture retention, reuse of cloth masks and poor filtration may result in increased risk of infection.”</p> <p>The virus may survive on the surface of the facemasks.”</p> <p>“Self-contamination through repeated use and improper doffing is possible.”</p> <p>https://bmiopen.bmj.com/content/5/4/e006577</p>
<p>In close proximity (approximately 3 ft.), medical masks can block up to 90% of large droplets (not viral aerosols) expelled directly onto the front surface of the mask. In this study, only 7% of the droplets penetrated the mask.</p>	<p>Textile materials (that can be used for cloth masks) can contain harmful chemicals and dyes (i.e. formaldehyde). There is no research available regarding the safety of breathing through such materials but formaldehyde is a gas that can irritate a person’s eyes, nose, throat and lungs, or trigger an asthma attack,</p>

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<p>https://www.ncbi.nlm.nih.gov/pubmed/21197329</p>	<p>even at low concentrations. Prolonged exposure to formaldehyde can cause cancer.</p> <p>https://ww2.arb.ca.gov/resources/fact-sheets/formaldehyde</p> <p>https://www.gao.gov/new.items/d10875.pdf</p>
<p>Medical masks can reduce but not eliminate the emission of viral particles into the environment in respiratory droplets (not viral aerosols) emitted by someone who is wearing the mask. Studied in individuals with a fresh mask for the first 30 minutes of use.</p> <p>https://www.nature.com/articles/s41591-020-0843-2</p>	<p>According to the World Health Organization, the use of a medical mask by healthy people to protect themselves from COVID-19 in community settings is not supported by current evidence.</p> <p>The following potential risks should be carefully taken into account in deciding to wear a medical mask in the community setting:</p> <ul style="list-style-type: none"> • self-contamination that can occur by touching and reusing a contaminated mask • depending on type of mask used, potential breathing difficulties • diversion of mask supplies and consequent shortage of masks for health care workers • diversion of resources from effective public health measures, such as hand hygiene <p>https://www.who.int/publications-detail/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-(2019-ncov)-outbreak</p>
<p>“Of the nine trials of facemasks identified in community settings, in all but one, facemasks were used for respiratory protection of well people. They found that facemasks and facemasks plus hand hygiene may prevent infection in community settings, subject to early use and compliance.”</p> <p>https://www.bmj.com/content/350/bmj.h694.full</p>	<p>Wearing cloth masks in public can create a false sense of security and complacency in which people may neglect other hygiene practices.</p> <p>https://www.who.int/publications-detail/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-(2019-ncov)-outbreak</p>

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<p>There is limited (some) evidence that wearing a medical mask by healthy individuals in the households or among contacts of a sick patient, or among attendees of mass gatherings may be beneficial as a preventive measure.</p> <p>https://www.who.int/publications-detail/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-(2019-ncov)-outbreak</p>	<p>Frequent washing and drying of a cloth mask can decrease the filtration capacity of the mask.</p> <p>https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6599448/</p>
	<p>Failing to wash a cloth mask daily increases the risk of self-contamination for the person wearing the mask due to contaminants found on the outer surface of the mask after use. The risk increases with longer duration of use.</p> <p>https://bmcinfectdis.biomedcentral.com/track/pdf/10.1186/s12879-019-4109-x</p>
	<p>Buying pre-manufactured masks such as N95 and medical masks can create shortages of PPE for health care providers.</p> <p>https://www.who.int/news-room/detail/03-03-2020-shortage-of-personal-protective-equipment-endangering-health-workers-worldwide</p>
	<p>Virus-contaminated aerosols can pass through cloth and medical masks with coughing and sneezing.</p> <p>https://annals.org/aim/fullarticle/2764367</p>
	<p>“The evidence is not sufficiently strong to support widespread use of facemasks as a protective measure against COVID-19.”</p> <p>https://www.medrxiv.org/content/10.1101/2020.04.01.20049528v1</p>

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	<p>“Neither surgical nor cotton masks effectively filtered SARS–CoV-2 during coughs by infected patients... the size and concentrations of SARS–CoV-2 in aerosols generated during coughing are unknown. Oberg and Brousseau demonstrated that surgical masks did not exhibit adequate filter performance against aerosols measuring 0.9, 2.0, and 3.1 μm in diameter. Lee and colleagues showed that particles 0.04 to 0.2 μm can penetrate surgical masks. The size of the SARS–CoV particle from the 2002–2004 outbreak was estimated as 0.08 to 0.14 μm; assuming that SARS-CoV-2 has a similar size, surgical masks are unlikely to effectively filter this virus.”</p> <p>https://annals.org/aim/fullarticle/2764367</p>
	<p>“The CDC does not <i>mandate</i> that face coverings be worn statewide.”</p> <p>https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/Face-Coverings-Guidance.aspx</p>
	<p>There is no evidence that cloth masks or medical masks worn in public plus practicing social distancing is any better than social distancing alone.</p>
	<p>“A historical overview of cloth masks notes their use in US healthcare settings starting in the late 1800s, first as source control on patients and nurses and later as PPE by nurses.</p> <p>Kellogg, seeking a reason for the failure of cloth masks required for the public in stopping the 1918 influenza pandemic, found that the number of cloth layers needed to achieve acceptable efficiency made them difficult to breathe through and caused leakage around the mask. We found no well-designed studies</p>

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	<p>of cloth masks as source control in household or healthcare settings.</p> <p>In sum, given the paucity of information about their performance as source control in real-world settings, along with the extremely low efficiency of cloth masks as filters and their poor fit, there is no evidence to support their use by the public or healthcare workers to control the emission of particles from the wearer.”</p> <p>“In sum, wearing surgical (medical) masks in households appears to have very little impact on transmission of respiratory disease. One possible reason may be that masks are not likely worn continuously in households. These data suggest that surgical masks worn by the public will have no or very low impact on disease transmission during a pandemic.”</p> <p>Dr. Brosseau from the Center for Infectious Disease Research and Policy</p> <p>https://www.cidrap.umn.edu/news-perspective/2020/04/commentary-masks-all-covid-19-not-based-sound-data</p>
	<p>The outer surface of a mask in a patient with COVID-19 is almost always positive for virus, even more often than the inside surface. Coughing and speaking have been documented to disperse the virus out into the air.</p> <p>https://annals.org/aim/fullarticle/2764367</p>

With these published and observed findings in mind, Public Health will not mandate that cloth face masks be worn in all public places in Ventura County at this time. Were the prevalence in our community to increase or with the advent of more convincing evidence in favor of this strategy, this guidance may change.

All community members should respect the desires of individual establishments or cities that have elected to require face masks. I endorse their doing so without reservation but based on the evidence, do not feel I can require it at this time.

This review is in no way intended to lead to the conclusion that one should use medical masks over cloth masks; medical masks are for health care providers. This review will leave the reader with **the two valid choices of using either a cloth mask in a community setting or no mask at all.**

The fact that there are more comments listed in the “Against” column is not a reflection of bias on behalf of this reviewer but rather that there seem to be more researchers performing studies that produced those results. More plentiful results do not mean more meaningful results.

The reason that this document is lengthy and does not point to a clear-cut conclusion is because there is no conclusive evidence on either side of the issue. One might say that the obvious choice then is to choose the more conservative masking side of the issue. This might be the clear approach were it not for concerns raised about the safety of wearing cloth masks and their effectiveness. If unable to accept the complexity of the issue, then rely on your beliefs.

Statements of endorsement and concern are expressed about the use of cloth masks by reputable organizations on both sides of the issue.

In an effort to better understand usage patterns in Ventura County, a survey was conducted of mask choices worn by individuals exiting selected places of business.

Grocery Store Mask Polling Data*

Store	N95 Mask	Surgical Mask	Cloth Mask	Dust Mask	No Mask
Walmart Oxnard	15	30	35	1	19
Costco Oxnard	13	33	42	4	8
Vallarta Oxnard	12	47	38	3	0
Whole Foods Oxnard	20	39	38	0	3
Trader Joes Ventura (Victoria)	22	30	44	4	0
Target Camarillo	17	31	41	1	10
Total	99	210	238	13	40

*This survey was performed on 4/23/2020. One hundred customers were counted as they exited each store and the type of mask each person was wearing was recorded.

This survey of types of masks that are being worn, in spite of frequent admonishments to the public not to use medical masks, is sobering.

Homemade Cloth Masks

Material	Mean Percent Viral Filtration Efficiency
100% cotton T-shirt	51%
Scarf	49%
Pillowcase	51%
Antimicrobial pillowcase	69%
Cotton mix	70%
Linen	62%
Silk	54%

Recommendations for Homemade Cloth Face Masks

The following guidance outlines safety considerations associated with homemade cloth masks.

Material Considerations

When considering a fabric to make your mask, please keep in mind that some textile fabrics can contain dyes and chemicals from the factory.

- Try to avoid any fabrics that are labeled "wrinkle-free", "durable press" or "easy care finish" since these fabrics may be treated with a product that includes formaldehyde.

CDC recommends using 100% cotton fabric for making a cloth face mask. Although "organic cotton" would be the best choice, any clean woven cotton fabric should work.

- Do not use fabrics that have been in contact with harmful household chemicals such as paint removers, stain removers and cleaning products.

Once you have chosen a fabric to create your mask:

- Please make sure to launder the fabric **at least two times before first use** in order to ensure any harmful contaminants are removed. Be cautious of using scented detergent because the residual odor may cause a respiratory reaction.

Other Considerations

Cloth face coverings **should not** be placed on:

- Children under age 2
- Anyone who has trouble breathing
- Anyone who is unconscious
- Anyone who is incapacitated or otherwise unable to remove the mask without assistance

For CDC guidance on how to make a cloth mask, please visit <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/diy-cloth-face-coverings.html>

If you should decide to wear a cloth face mask, please remember to:

- Wash your hands after putting the mask on and after taking the mask off
- Do not touch your face or the mask while wearing it
- Disinfect areas where the mask is stored while not in use
- Wash your cloth mask daily
- Do not fail to abide by social distancing standards

Plexiglass Shields

Plexiglass shields have been placed in many essential businesses as a barrier between the cashier and the customer. If interfering with the passage of respiratory droplets is the intent of those who wish to wear a mask, the same outcome might be achieved by the placement of plexiglass barriers at points of cashier-customer interaction in the grocery store and in other essential businesses where 6 feet of distance can't be maintained. <https://abc3340.com/news/coronavirus/grocery-stores-protecting-workers-and-customers-from-covid-19>

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