Department of Science and Technology
PHILIPPINE TEXTILE RESEARCH INSTITUTE

A FACE Mask Resource Kit

RE|wear SmarTex

DOST-PTRI

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REwear SmarTex

A MESSAGE FROM THE DIRECTOR

The Philippines has a population of more than 104M people. Luzon has a population of 48.52M and the NCR, almost 13M. In these times of COVID-19, we understand the need for personal protective equipment or PPEs. Face masks offer a basic form of protection. The WHO advises that masks should be worn only when a person shows signs of illness or symptoms of a cold or cough, or is taking care of persons who are suspected of being infected (WHO, 2020). A recent study, however, recommends, that in light of the pandemic, it would be reasonable to include to these guidelines, people in quarantine if they need to go outside of their homes for any reason "to prevent potential asymptomatic or presymptomatic transmission" (Feng, S., et al.).

The Department of Science and Technology (DOST) has funded a quick response to the serious lack of face masks. Noting this and the continuing shortfall since available masks are disposables, we will need one every day. With a commitment to sustainability and the eventual disposal of the used masks, the Project **"Quick Response on the Production of REwear (Re-useable, Washable, and Re-wearable) Face Masks Made Smart"** is being undertaken. In this action, we aim to produce 500,000 such masks which, in effect, equates to 25M masks because of its re-useability, in collaboration with 4 private sector partners. They very quickly and very generously responded to the call:

1. **Power Fashion Foundation/NE Noveau Star**, retailer-manufacturers of Bayo, Vise Versa and Unica Hija with factory in Taytay, and who are liaising directly with the local government of Taytay, Rizal. They are donating fabrics and bringing back workers to operate their production lines;
2. **Saffron Philippines, Inc.,** a commercial-scale dyeing facility and a partner in natural dye and smart textile applications. Based in Dasmarinas, Cavite, they are donating chemicals, solicited fabric donations and will reopen the facility for the application of the proprietary repellency finishing;
3. **Reliance Producers Coop**, one of few remaining large-scale exporters and sister-company of Saffron, will likewise donate fabrics and make the production lines available to the ready production of the masks; and
4. **D&L Industries and Chemrez Technologies, Inc.** who have generously facilitated the purchase at no cost to the government.

Because of material considerations, some imported, others being solicited, and the test protocols, this will take time.

Because the situation is already upon us today, we thought we could help assuage a sense of anxiety by putting together this FACE MASK Resource Kit. By doing so, we hope to put some measure of control in the hands of regular folks like you and me who wish to provide for the needs of family and friends and all who have made a plea for help for face masks, at the least.

We are grateful to those who responded to the request for contributions to the FACE Mask Resource Kit design challenge. They worked to provide their design ideas, sharing patterns, references, and additional resource links.

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This Resource or Tool Kit is proof positive that the culture of caring is alive and well in the Philippines, as it is in most parts of the world battling COVID-19. Our contributing team of designers and social entrepreneurs is made up of six individuals in lifestyle, design, creative arts, literary field, and hobbyists. Please know more about them and the work that they do.

Adrienne Charuel of Maison Métisse, https://www.maison-metisse.com

Alice Sarmiento, alicesarmiento@wordpress.com

Ica Serafica, https://icaserafica.com/

Twinkle Ferraren, http://twinkleferraren.com/

PJ Arańador, https://www.facebook.com/pj.aranador.9

Santi Obcena, https://www.facebook.com/pages/category/Company/SantiObcena12156031307/

And Feanne Hontiveros Mauricio, as a contributor and advocate, http://feanne.com/portfolio/

Full disclosure: We are not medical experts or health care workers or experts in face masks. We know a thing or two about textiles and how to functionalize them - water repellency is one of the functional treatments developed at the PTRI Smartex Laboratory, Smartex being the collective term used to refer to Philippine textiles that are infused with functional finishes to provide additional features/functions other than the physical barrier that conventional textiles normally provide.

We are also in touch with medical practitioners who have provided us with additional reference or resource materials.

This Resource Kit is a sincere response to the need for information on face masks. While we have added COVID-19 related resource links, we make no claims as to the completeness of this Kit. Our main goal is to provide information. Information should lead to knowledge, and knowledge, to wisdom. We hope this helps.

Thank you and all best.

Celia B. Elumba
Director IV

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About Face Masks

A face mask is a loose-fitting device that creates a physical barrier between the mouth and nose of the wearer and potential contaminants in the immediate environment. If worn properly, it can help block large-particle droplets, splashes, sprays or splatter that may contain viruses and microbes from reaching one's mouth and nose. It may also help reduce exposure to one's saliva and respiratory secretions to others.

An **N95 respirator**, on the other hand, is a respiratory protective equipment designed to achieve a very close facial fit and very efficient filtration of airborne particles. Its edges are designed to form a seal around the nose and mouth. It is commonly used in healthcare settings as a personal protective equipment (PPE). It undergoes fluid resistance, bacterial filtration efficiency, particle filtration efficiency, breathability, and flammability tests. The 'N95' label indicates that the respirator blocks at least 95% of very small (0.3 micron) test particles. If properly fitted, the filtration capabilities of N95 respirators exceed those of face masks.

However, a face mask does not filter or block very small particles in the air that may be transmitted by coughs, sneezes or certain medical procedures. It also does not provide complete protection from germs and other contaminants because of the loose fit between the surface of the face mask and one's face. It is not intended to be used more than once.

A **surgical mask** is a kind of face mask made with non-woven fabric, which has better bacteria filtration and air permeability while remaining less slippery than woven cloth. The material most commonly used to make them is polypropylene, of 20 or 25 grams per square meter (gsm) in density. It can also be made of other synthetic fibers like polystyrene, polycarbonate, polyethylene, or polyester. It is tested for fluid resistance, bacterial filtration efficiency, particle filtration efficiency, breathability, and flammability. It should only be used once and discarded properly after every use.

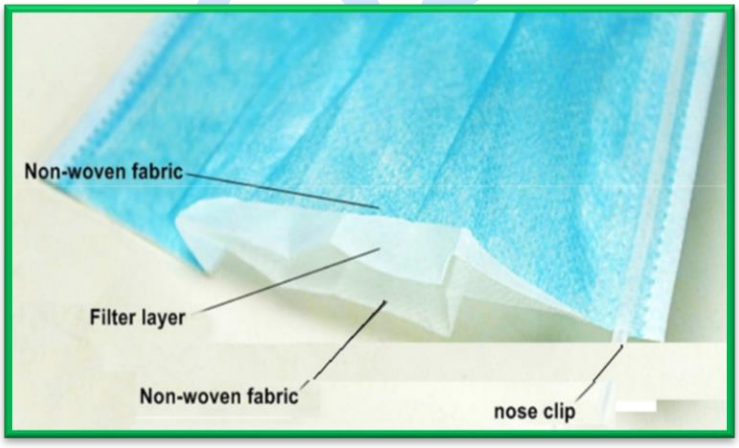

Figure 1. Parts of a surgical mask.

Figure 1 displays the parts of a surgical mask that is composed of multilayered structure: outer layer – nonwoven, water-repellent protective layer; middle layer- high-efficiency filter spray nonwoven; and inner layer – finer fiber, skin-friendly material.

A **cloth mask**, from its name, is made of cloths or fabrics and mostly worn by people to reduce exposure to air pollution. Its effectivity varies mainly with the material used, its design and construction. Specialized cloth masks can provide protection against particulate matter (PM) or microscopic particles that are present in the air.

Photo reference:
https://www.slideshare.net/muralikrishnan71697092/respiratory-protection-face-masks-and-respirators

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REwear face mask, a cloth mask, will be tested for water-repellency, toxicity, fluid resistance, bacterial filtration efficiency, particle filtration efficiency, breathability, and flammability following the protocols shown in Figure 2 below.

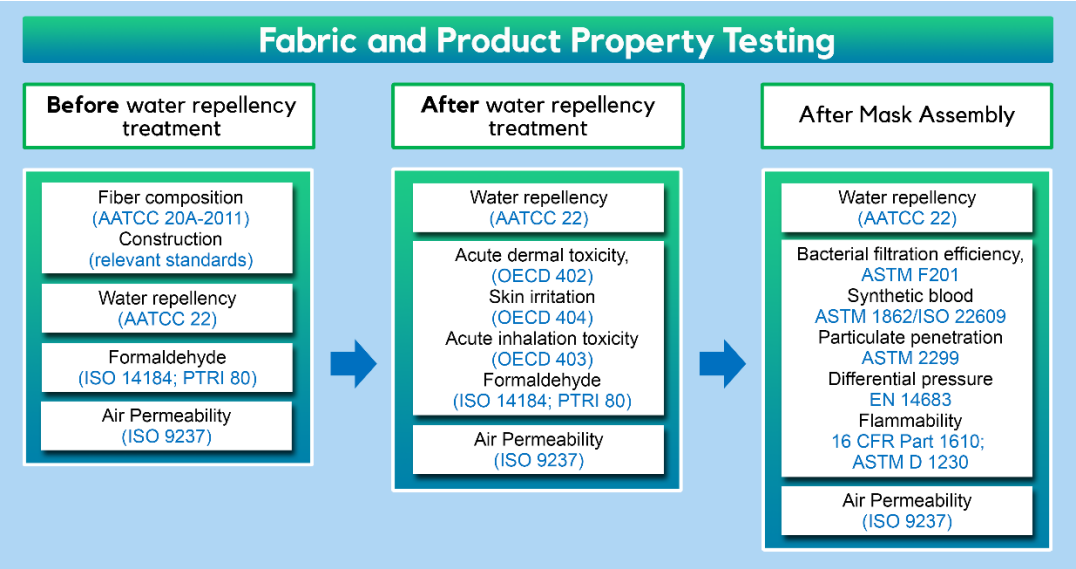

Figure 2. Fabric and product property testing.

Table 1 illustrates the differences of face masks based on its intended use and purpose, breathability, fit, and reusability.

Table 1. Understanding the differences of face masks.

Understanding the differences of face masks

	N95	Surgical Mask	Cloth Mask	REwear Mask
				
Intended Use and Purpose	Reduces wearer's exposure to particulates including small particles aerosols and large droplets (only non-oil aerosols)	Fluid resistant and provides the wearer protection against large droplets, splashes of bodily or other hazardous fluids. Protects the patient from the wearer's respiratory emissions.	Not fluid resistant Breathable (cotton-based)/	Fluid resistant and provides the wearer protection against large droplets, splashes of bodily or other hazardous fluids. For non-medical and community use
Breathability	Difficult	Breathable	Non-breathable (synthetic-based); may get warm	Breathable; may get warm
Fit	Tight-fitting	Loose-fitting	Maybe loose- maybe close-fitting	Close-fitting
Reusability	Yes	No	Yes	Yes

Please refer to Page 15 of this Resource Kit for additional information on studies that have been made on face masks.

For the first three columns, here is the reference: Center for Disease Control and Prevention (CDC), National Institute for Occupational Safety and Health (NIOSH). (n.d.). Understanding the Difference. Retrieved from https://www.cdc.gov/niosh/npptl/pdfs/UnderstandDifferenceInfographic-508.pdf

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RE|wear
Re-usable, Washable, Re-wearable
Face Masks Made Smart

REwear: Face Mask, Made Smart

DOST-PTRI has a water-repellent textile finishing technology under its Smart Textiles R&D Program. This finishing is based on silane compounds which are prepared into a nanosol then applied onto a natural-fiber blended textile such as cotton fabrics.

Many textile materials used for clothing, home textiles, and others may have water repellency or the ability to prevent water from penetrating. A timely example of this is the water-repellent fabric for a face mask.

Respiratory diseases, such as COVID-19 can be transmitted by respiratory droplets over a sort distance through direct contact with a patient's secretions. Wearing a mask offers protection against such diseases by providing a barrier between the wearer and the liquid droplet.

Cloth masks, especially those made of cotton, typically absorb liquid droplets, unless a finishing process is applied to it. Water-repellent finishing, for example, will allow the liquid droplet to slide down the REwear mask.

Figure 3 and Figure 4 below show the prototype REwear Face Masks and the REwear Face Mask when worn, respectively.

Figure 3. Prototype REwear Face Masks.

Figure 4. REwear Face Mask when worn.

*Smart Textiles are functional textiles that respond to certain stimuli either by sensing signals or providing interactive reactions. Examples are antimicrobial, scent-releasing, water-repellent, self-cleaning, and mosquito-repellent textiles.

Figure 5 illustrates that water droplet on cotton fabric is absorbed while the water droplet on water-repellent cotton fabric forms a bead.

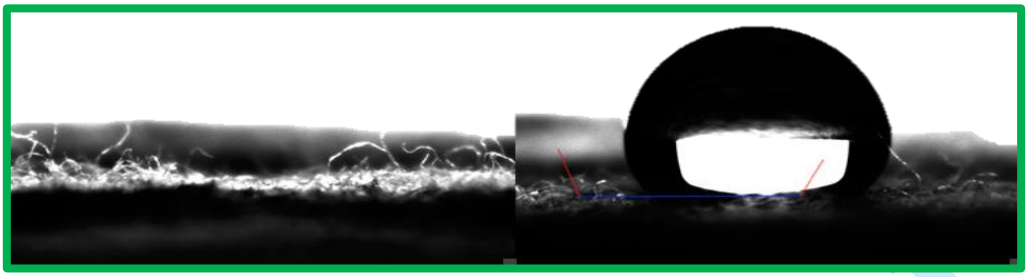


Figure 5. Difference of water droplets on cotton fabric and water-repellent cotton fabric.

Like a surgical mask made of multiple layers, the REwear face mask is a two-piece, three to four-layer mask. Fully detachable, the first piece (outer layer) is made of water-repellent fabric and the second piece (inner layer) is made of absorbent fabric.

WHO published a document entitled, "Advice on the use of masks in the context of COVID-19: Interim guidance" on 5 June 2020. It is an updated version of the previous document published on 6 April 2020. It has various guidelines and considerations in making a non-medical masks including parameters such as the type of material, breathability, number of layers, combinations of materials used, mask shape, and coating. Based on the recommendations for each parameter, the REwear face masks conform to the guidelines as will be noted in the table below which summarizes the WHO recommendations and how REwear Face Masks adhere to these requirements.

Table 2. Guidelines and practical consideration for non-medical mask based on WHO Interim guidance.

Guidelines and practical consideration for non-medical mask based on WHO Interim guidance

Guideline	WHO Recommendation*	REwear™
a) **Type of material**	Woven, knitted, or non-woven	Knitted
b) **Breathability (Differential Pressure, Pa/cm2)**	< 100 Pa/cm2	27 Pa/cm2
c) **Number of layers**	Minimum of three (3)	Four (4) layers
d) **Combination of material used**	**1) Innermost layer** - must be made up of hydrophilic material **2) Outermost layer** - must be made up of hydrophobic material **3) Middle layer** - can either be a nonwoven or cotton layer	**1) Innermost layer** - made up of hydrophilic material[a] **2) Outermost layer** - made up of hydrophobic material[b] **3) Middle layer** - made up of cotton and cotton-blend textile
e) **Mask shape**	Flat-fold or duckbill	Duckbill and curved
f) **Coating**	Not recommended as it may affect the breathability of mask	Finishing technology is covalently grafted onto the textile

**based on World Health Organization's "Advice on the use of masks in the context of COVID-19: Interim guidance", published on June 5, 2020".*
[a]made up of cotton and cotton-blend materials, [b]made up of cotton and cotton-blend materials with PTRI Water Repellent Technology

Who should wear the REwear Mask?

- People who care for patients with respiratory symptoms in a home setting
- People visiting clinics or hospitals
- Workers handling food
- Public transport operations staff
- People in crowded or poorly ventilated places

Repellency Test

Water repellency is the ability of a material to resist the penetration of liquid water in contact. A good illustration of this is shown in Figure 6 below.

Figure 6. Water repellent fabric.

If you want to test the water repellency of a fabric, click the attached link to watch the video.

http://www.ptri.dost.gov.ph/9-transparency-seal/274-how-to-test-if-the-fabric-is-water-repellent

Wearing a REwear Face Mask

Figure 7 demonstrates the steps on how to wear a REwear Face Mask properly.

Figure 7. Points to note about wearing a REwear Face Mask.

Recently, WHO (2020) released a video about the proper use of masks. Click the attached link to watch the video and learn more about how to wear it and how to maintain it.

https://www.youtube.com/watch?v=ciUniZGD4tY&feature=emb_title

Figure 8 shows the instructions on proper washing of the REwear Face Mask.

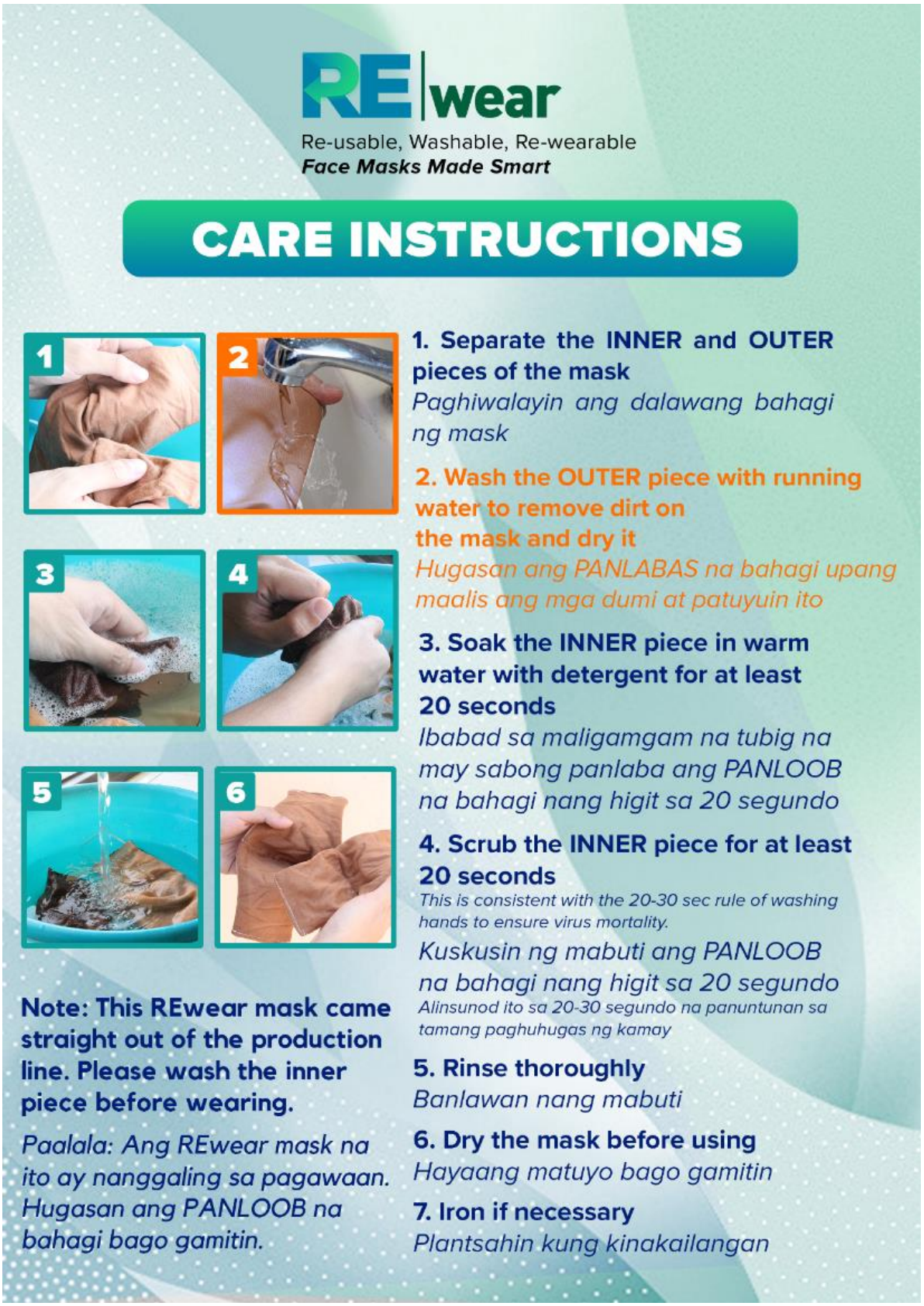


Figure 8. Care instructions.

A Face Mask Design Pattern

If you want to make a face mask, you can use the design pattern as presented in Figures 9, 10, and 11 below.

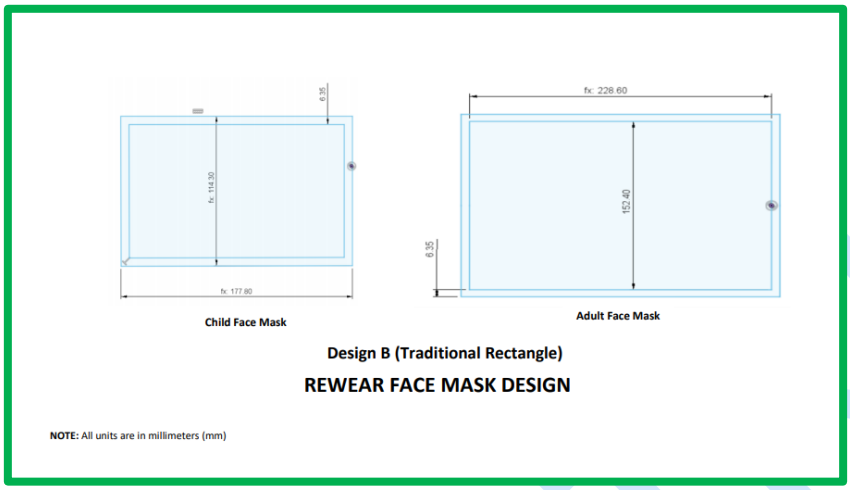


Figure 9. Traditional rectangular design.

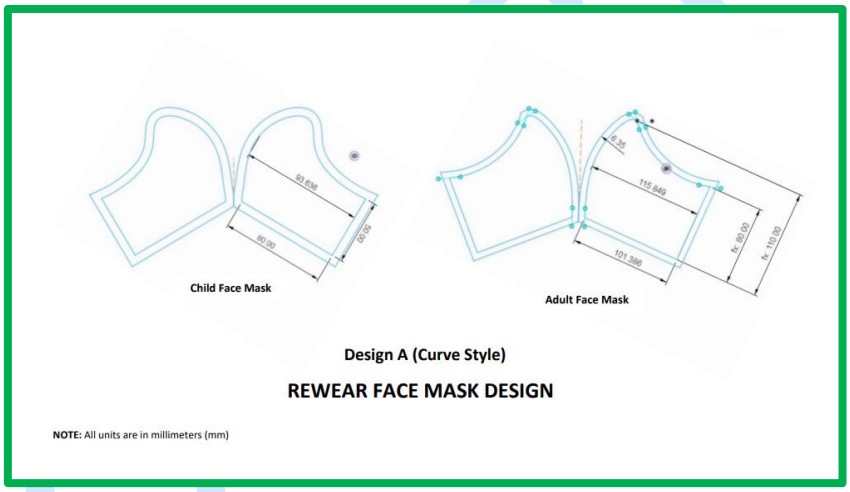


Figure 10. Curve-style design.

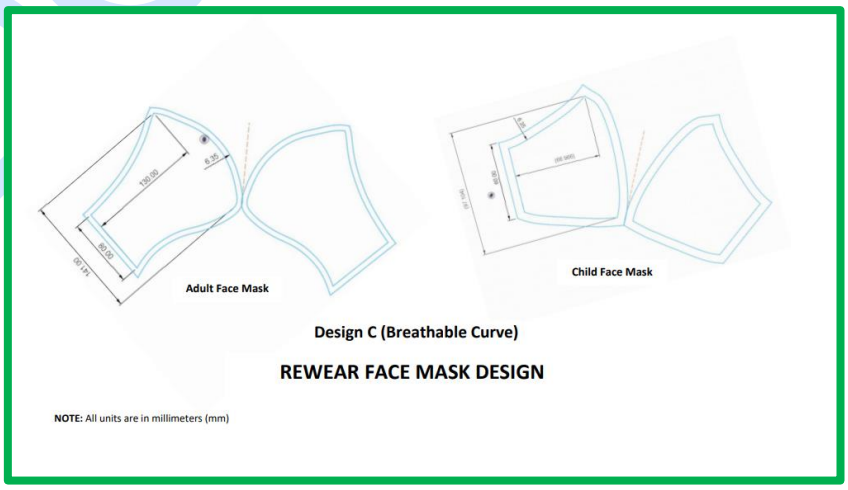
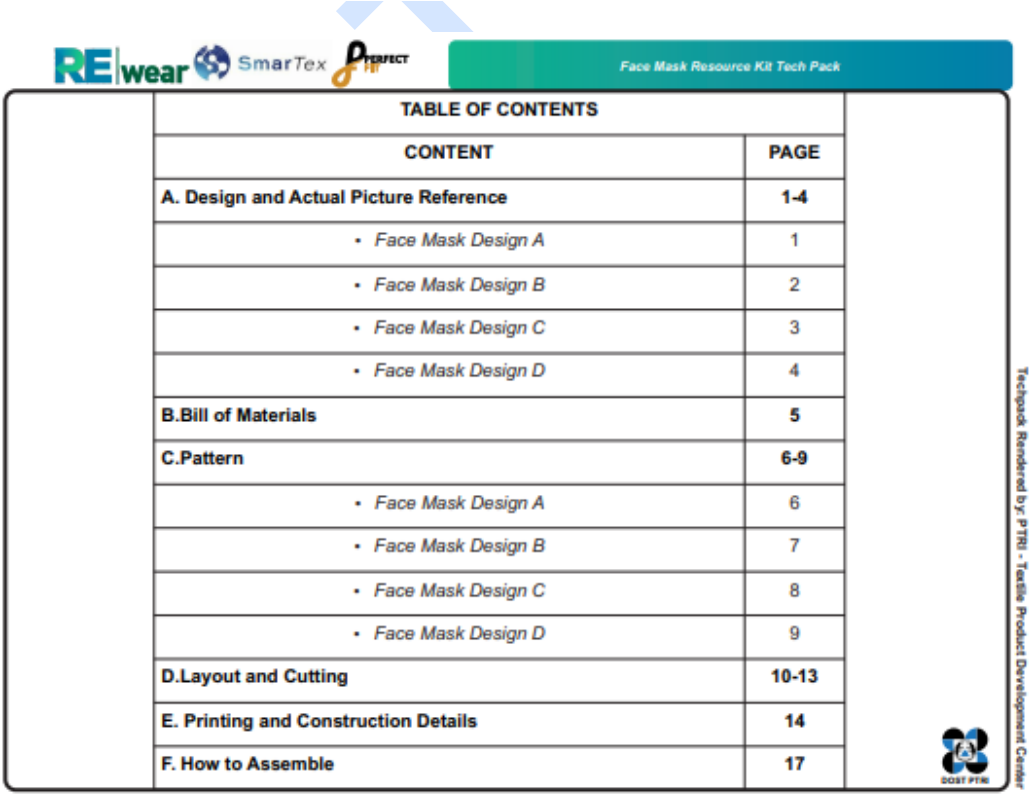


Figure 11. Breathable curve design.

Tech Pack

DOST - PTRI's Face Mask Tech Pack includes patterns of 4 mask designs including the items to be used, placement, color, and specifications as well as the assembly instructions to help manufacturers and anyone interested in making face masks.



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Face Mask Resource Kit Tech Pack

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Techpack Rendered by: PTRI - Textile Product Development Center

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Please refer to this link: http://ptri.dost.gov.ph/index.php/286

Call for Donations for the Production of Face Masks
Attn: Fabric Manufacturers and Suppliers

A call for fabric donations for the production of face masks has been started to mobilize the production and distribution. The fabric specifications and contact details are written in Figure 12.

Figure 12. Call for fabric donations.

HOW-TO'S

The following shows some designers' approach to the face mask conundrum. Please view this from a design perspective and not necessarily an endorsement of materials used.

Designed by Adrienne Charuel

Click the link here:
http://www.ptri.dost.gov.ph/index.php?option=com_content&view=article&id=276

Designed by Alice Sarmiento

Click the link here:
http://www.ptri.dost.gov.ph/index.php?option=com_content&view=article&id=277

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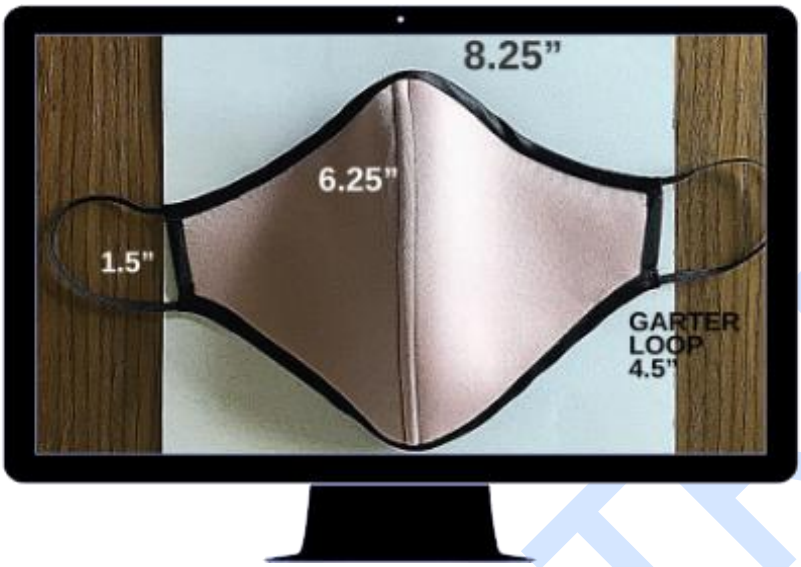
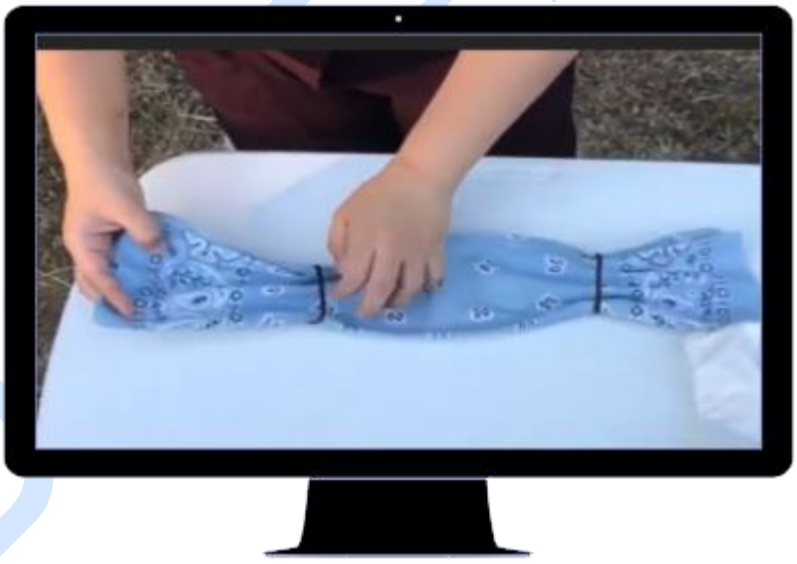
Designed by Ica Serafica



Click the link here:
http://www.ptri.dost.gov.ph/index.php?option=com_content&view=article&id=278

Designed by Twinkle Ferraren



Click the link here:
http://ptri.dost.gov.ph/index.php?option=com_content&view=article&id=273

DRAFT

Designed by PJ Arañador

Click the link here:
http://www.ptri.dost.gov.ph/index.php?option=com_content&view=article&id=275

Designed by Santi Obcena

Click the link here:
http://ptri.dost.gov.ph/index.php?option=com_content&view=article&id=272

ADDITIONAL INFORMATION

Researches about Effectiveness of Face Masks

Several researches were conducted to test the effectiveness of cloth masks as protective equipment against diseases. A research study conducted in Vietnam and published in 2015 compared the efficacy of cloth masks to medical masks in the hospital healthcare workers (HCWs). Randomized groups of HCWs were provided with a medical mask or cloth mask. Rates of infections were measured and results revealed that the higher rates of infection were observed in the group that used cloth masks. Moisture retention, reuse of cloth masks and poor filtration may result in increased risk of infection. As a precautionary measure, cloth masks should not be recommended for HCWs during high-risk situations. (MacIntyre, et al., 2015)

In another study conducted in the Netherlands, the face masks were evaluated to determine its effectivity in reducing the exposure of the general public to respiratory infections such as influenza. In the study, the potential of transmission reduction provided by personal respirators, surgical masks, and home-made masks when worn was assessed. The assessment was done with healthy volunteers and a simulated patient during a variety of activities. The key findings were that all types of masks reduced aerosol exposure, relatively stable over time, unaffected by duration of wear or type of activity, but with a high degree of variation from person to person. Personal respirators were the most efficient while the homemade masks are the least efficient. Regardless of mask type, children were less protected than adults, which is attributed to the misfit of the mask on smaller faces (van der Sande, et al., 2008).

Healthy volunteers made face masks using cotton t-shirts and the masks were then tested. The number of microorganisms isolated from coughs of healthy volunteers wearing the homemade mask, a surgical mask, or no mask was compared using several air-sampling techniques. It was found that both surgical and homemade masks significantly reduced the number of microorganisms expelled by volunteers. As shown in Figure 13, the surgical mask was 3 times more effective in blocking transmission than the homemade mask. Findings suggest that a homemade mask should only be considered as a last resort to prevent droplet transmission from infected individuals, but it would be better than no protection (Davies, et al., 2013).

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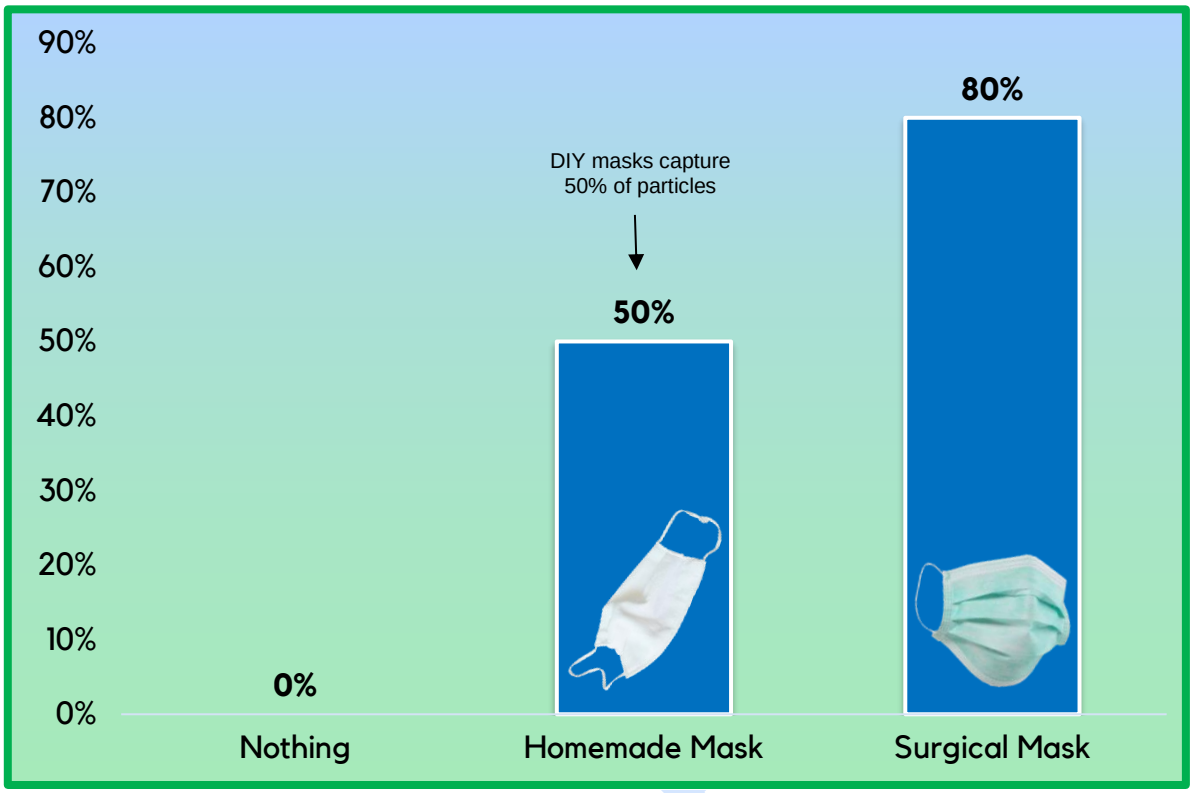

Figure 13. Homemade mask effectiveness compared to surgical masks. (Smart Air, 2020)

In the same study, the researchers tested the homemade masks' effectiveness after people had worn them for 3 hours. In Figure 14, the results revealed that moisture and time have no significant effect on the effectiveness of the masks.

In the context of severe PPE shortages when surgical masks or respirators are not available, the US Center for Disease Control and Prevention proposed the use of homemade cloth masks as the last interim solution until the standard PPE supply is restored (ECDC, 2020).

It is important to recognize that the best way to prevent airborne transmission is to use a combination of precautionary measures, including personal hygiene and prudent social distancing measures.

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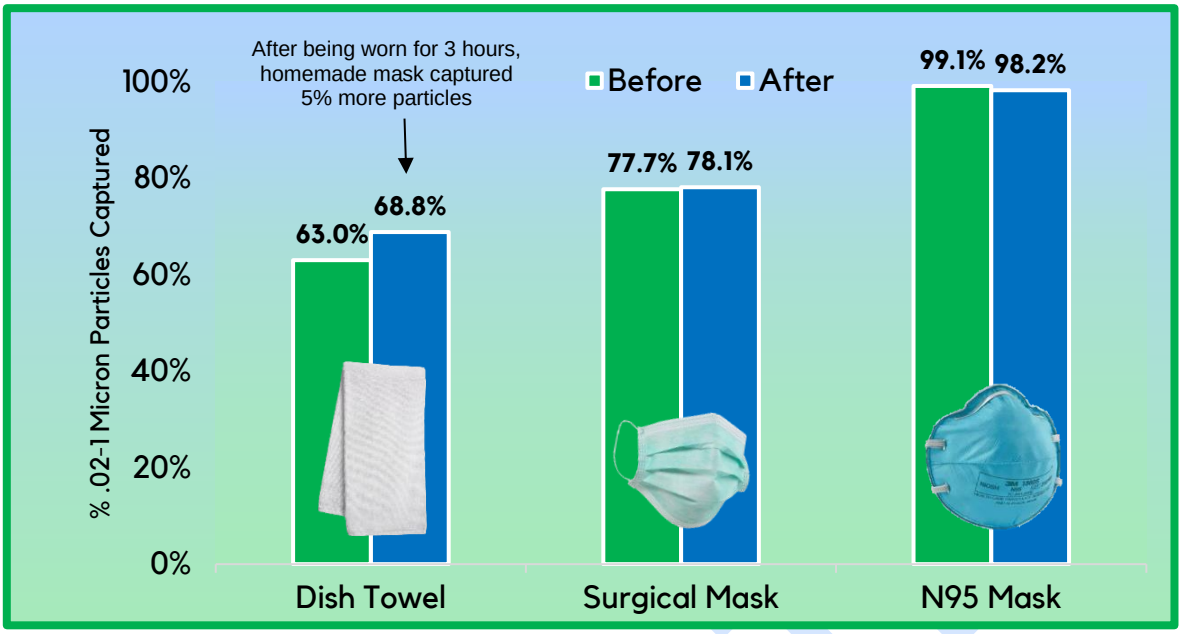


Figure 14. Mask effectiveness before and after 3 hours. (van der Sande, et al., 2008)

Figure 15 shows the size of a coronavirus as compared with other organisms (Cascella, et al., 2020).

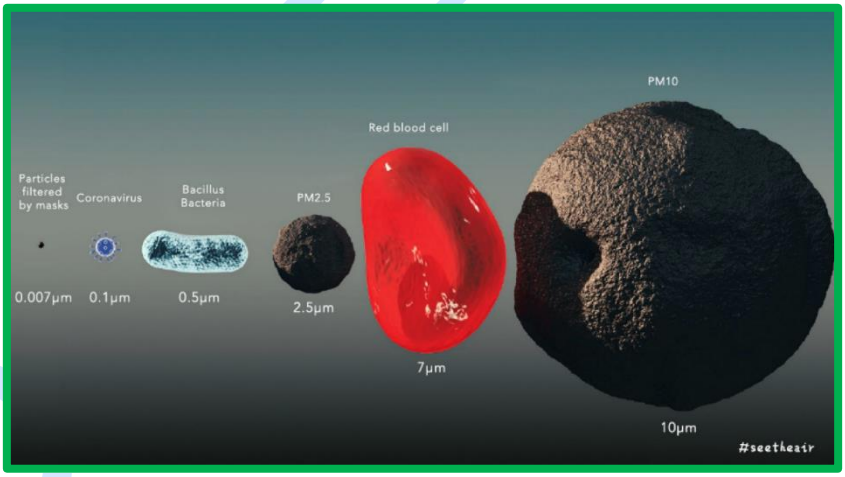


Figure 15. The size of a coronavirus in comparison to other organisms.

In another study, the researchers from the University of Cambridge and Public Health England in 2013 examined homemade masks as an alternative to commercial face masks. Some household materials were evaluated for the capacity to block bacterial and viral aerosols. Note that the average size of SARS-CoV-2 is 0.06-0.14 μm. As illustrated in Figure 16, among the household cloths used, the dish/kitchen towel was the most effective in filtering 0.02 μm large size of a bacteria, filtering 73%, while the cotton t-shirt filtered 70% of the bacteria. The surgical mask filtered 89% (Davies, et al., 2013).

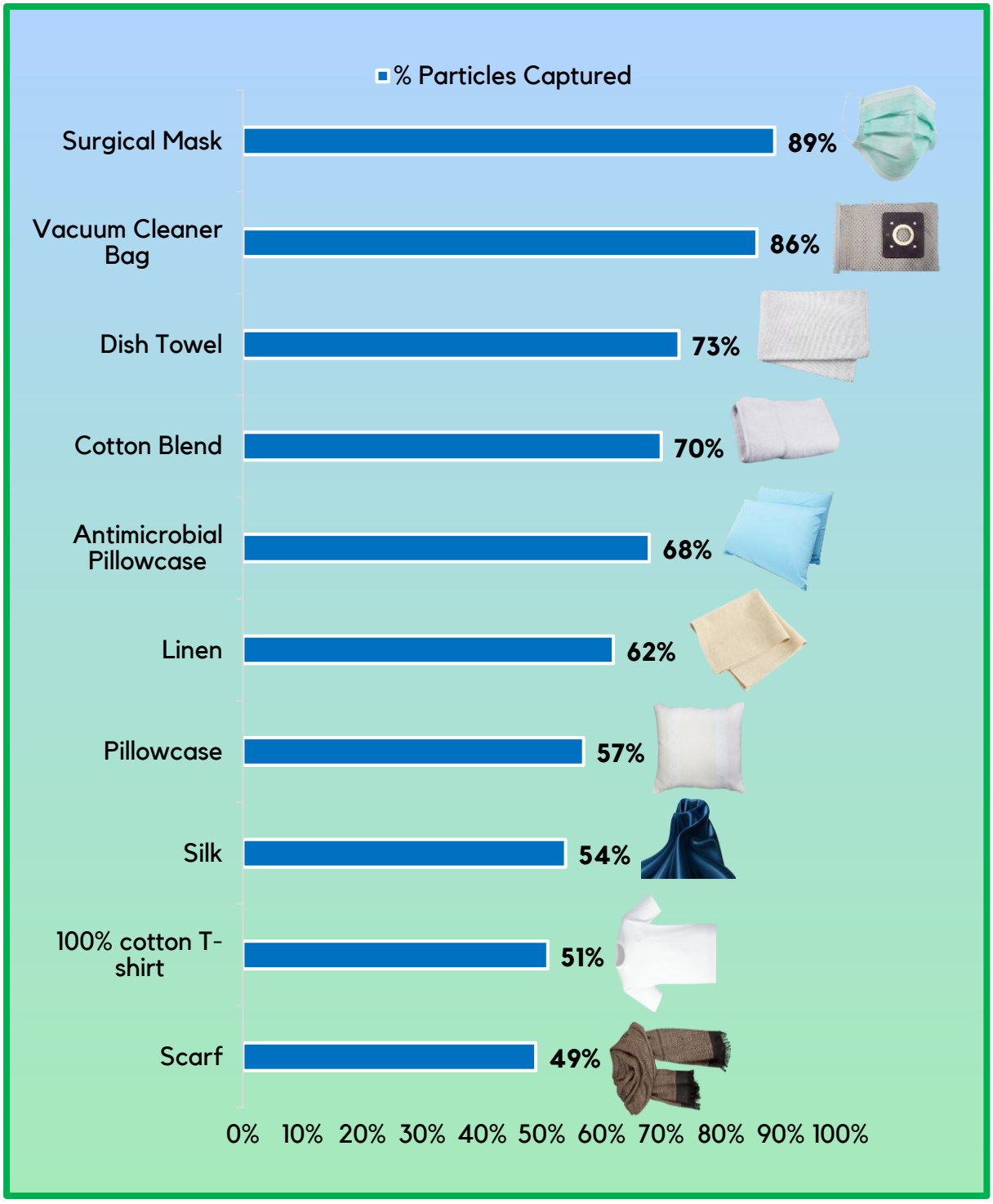


Figure 16. Household material's effectiveness against 0.02-micron particles. (Smart Air, 2020)

Photo reference:
https://smartairfilters.com/en/blog/best-materials-make-diy-face-mask-virus/

In another research, scientists assessed that doubling the layers of a material provides a very small increase in filtration effectiveness. Figure 17 exhibits that only 1% of micron particles were gained by the double-layer pillowcase. While for the double-layer 100% cotton t-shirt, it captured just 2% added particles. Compared to the other materials, the extra dish towel layer increased its performance by 14%. Thus, the dish towel turned out to be as effective as the surgical mask.

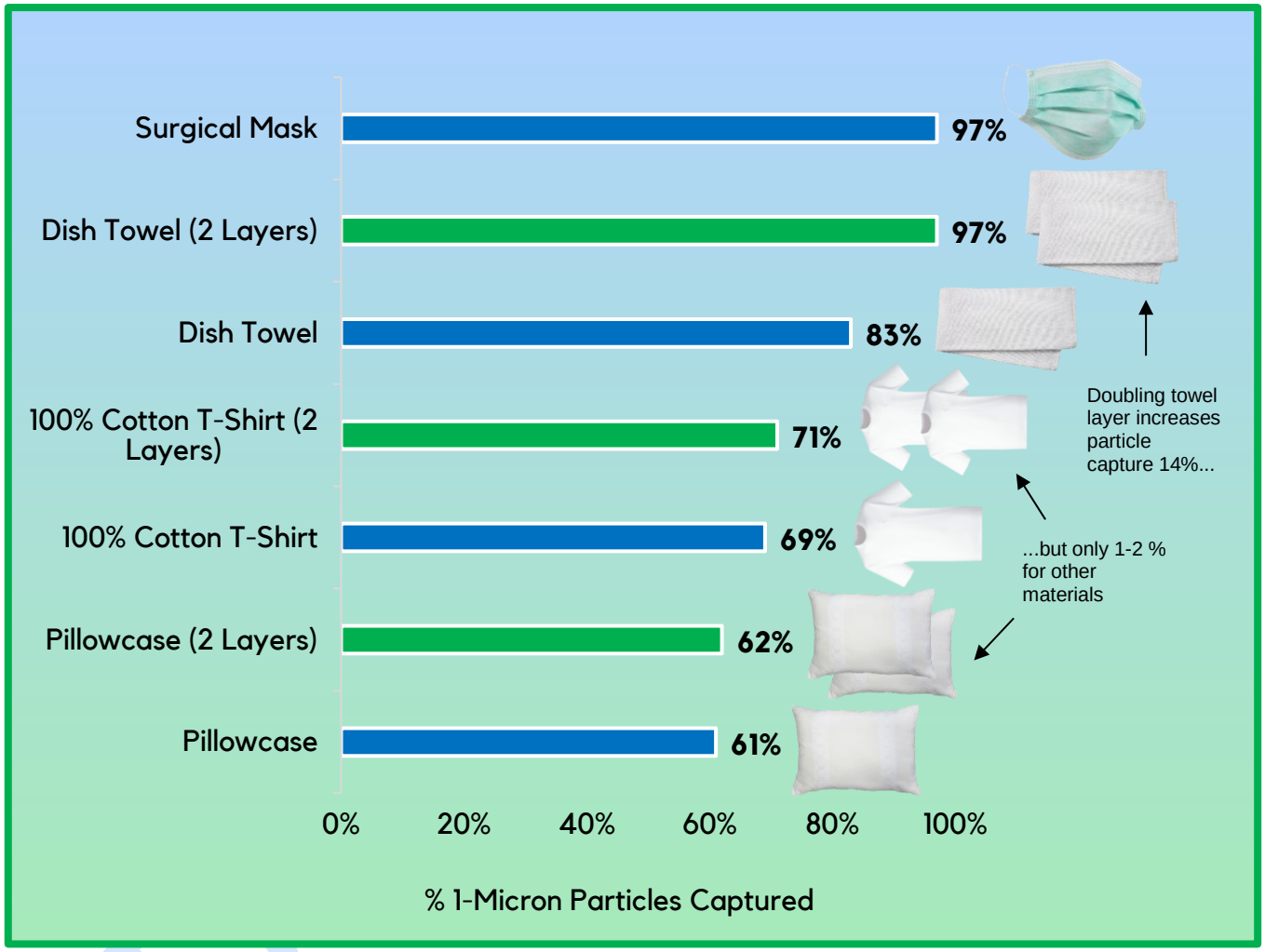


Figure 17. Doubling mask layers only modestly increases effectiveness. (Smart Air, 2020)

As shown in Figure 18 below, the test results display that the dish towel and the vacuum bag captured the most particles. However, these materials were also the hardest to breathe through among all the materials examined. By using two layers, the dish towel was more than twice as difficult to breathe through as the surgical mask. On the other hand, the pillowcase, t-shirt, scarf, and linen were all easier to breathe through than the surgical mask.

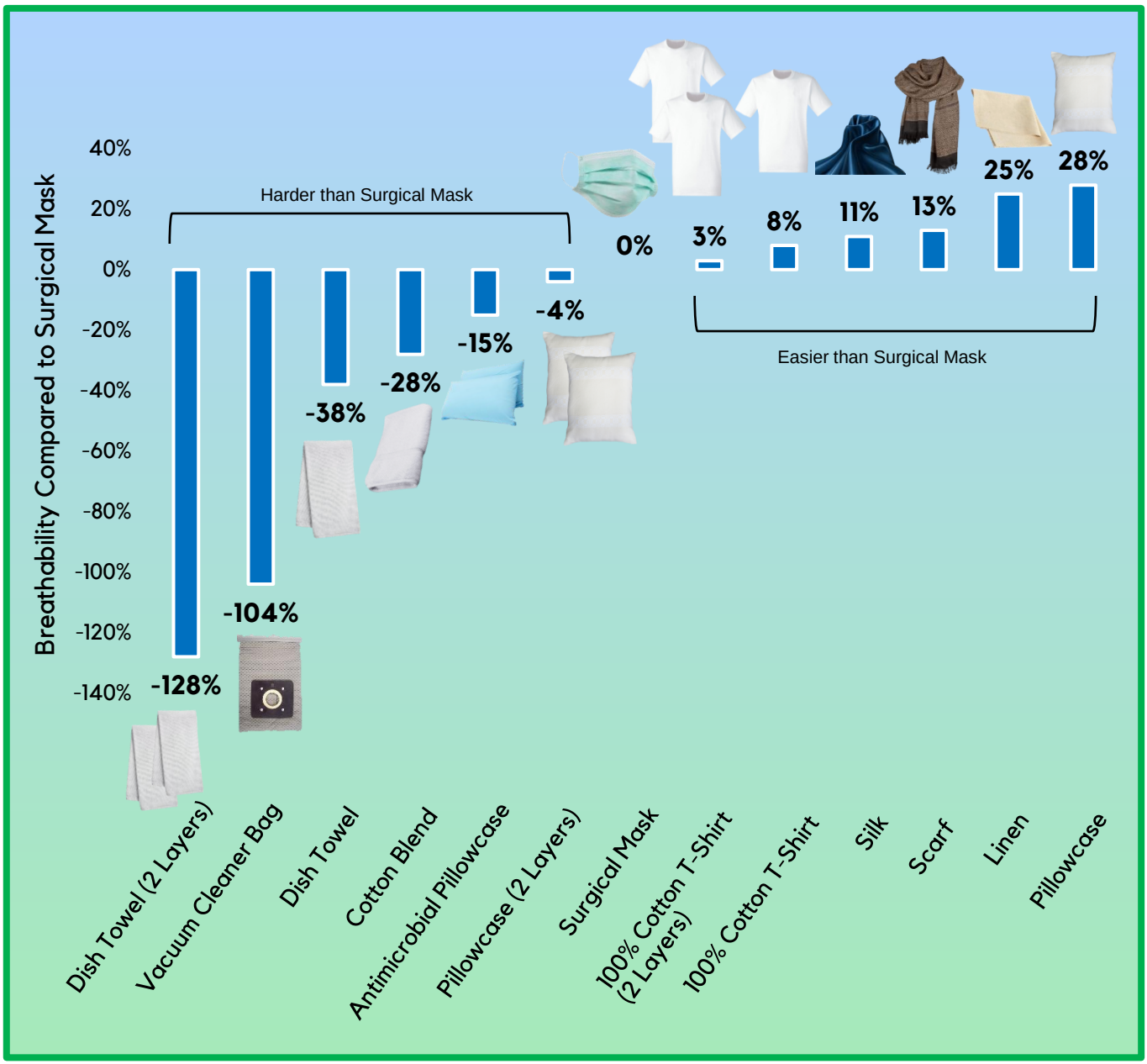
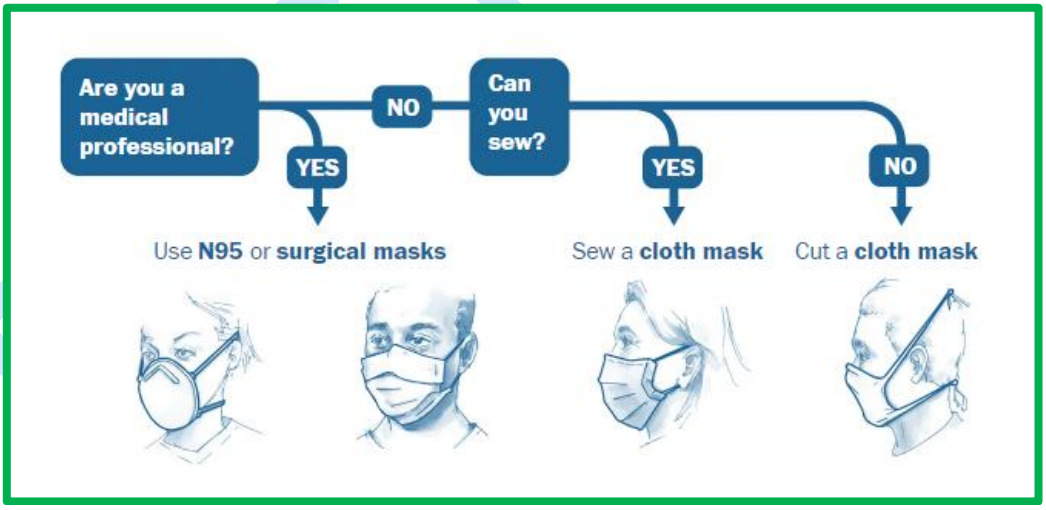


Figure 18. Breathability of homemade mask materials vs. surgical mask. (Davies, A. et al., 2013)

When there are no more masks, what are the best materials for making DIY masks? as Shared by Twinkle Ferraren

Click the link here:
https://smartairfilters.com/en/blog/best-materials-make-diy-face-mask-virus/

Answers to your DIY face mask questions, including what material you should use



Click the link here:
https://www.washingtonpost.com/health/2020/04/07/answers-your-diy-face-mask-questions-including-what-material-you-should-use/?arc404=true&fbclid=IwAR0Xpf8Vm9J9gFSo25IkRAf3d3oaKYFct8DBzYm3_k8rh7dNyEaq8KRb5dg

When a face mask is intended to be used as a personal protective equipment (PPE), it should comply with the requirements of standards using various test methods as presented in Table 2 below.

Table 3. Medical face mask tests and requirements.
(Nelson Laboratories, LLC, n.d.)

U.S.A.: ASTM F2100-19 Standard Specification for Performance of Materials Used in Medical Face Masks
Europe: EN 14683:2019 Medical Face Masks – Requirements and Test Methods

		ASTM F2100-19			EN 14683:2019 Barrier Levels		
		Level 1	Level 2	Level 3	Type I	Type II	Type IIR
Barrier Testing	BFE % ASTM F2101, EN 14683	≥95	≥98		≥95	≥98	
	PFE % ASTM F2299	≥95	≥98		Not required		
	Synthetic Blood ASTM F1862, ISO22609	Pass at 80 mmHg	Pass at 120 mmHg	Pass at 160 mmHg	Not required		Pass at ≥ 16.0 kPa (>120 mmHg)
Physical Testing	Differential Pressure EN 14683	<5.0 mm H2O/cm2	<6.0 mm H2O/cm2		<40 Pa/cm2	<60 Pa/cm2	
Safety Testing	Flammability 16 CFR Part 1610	Class 1 (≥ 3.5 seconds)			See European Medical Directive (2007/47/EC, MDD 93/42/EEC)		
	Microbial Cleanliness ISO 11737-1	Not required			≤30 cfu/g		
	Biocompatibility ISO 10993	510 K Guidance recommends testing to ISO 10993			Complete an evaluation according to ISO 10993		
Sampling ANSI/ASQC Z1.4 ISO 2859-1		AQL 4% for BFE, PFE, Delta P 32 masks for Synthetic Blood (Pass = ≥29 passing, Fail = ≤28 passing) 14 masks for Flammability			Minimum of 5 masks up to an AQL of 4% for BFE, Delta P, and Microbial Cleanliness 32 masks for Synthetic Blood (Pass = ≥29 passing,Fail = ≤28 passing)		

Recent studies revealed that a significant portion of individuals with coronavirus lacks symptoms or asymptomatic and can be contagious spreaders of the virus. This is the reason why CDC (2020) recommends wearing cloth face coverings in a public setting where social distancing is difficult to maintain like in grocery stores and pharmacies.

According to the London School of Hygiene & Tropical Medicine Director, when a mask is carefully fitted and worn properly by infected people, it offers protection to other people, thus slowing down the spread of the virus. Wearing masks makes it less likely for the wearer to touch his/her mouth, thereby reducing the risk of viruses present in the hands to enter the body through the mouth (LSHTM, 2020).

The video below illustrates how speech droplets spread is prevented by using homemade masks. Click the link here: https://youtu.be/_OSz5Gr7gG0

Figure 19 shows how the wearing of masks in some countries particularly in Asia helped in flattening the curve of coronavirus.

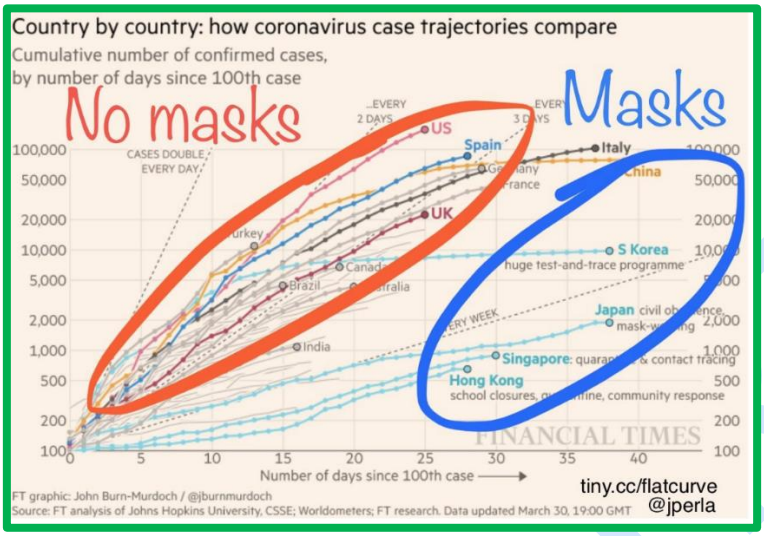


Figure 19. How coronavirus case trajectories compare.

In summary, wearing masks 1) protect others by not spreading the virus if you have it, 2) protect oneself by reducing the chances of catching the virus when going out, and 3) reduce face touching by wearing something that covers one's face.

How COVID-19 Spreads?

Person-to-person spread

The virus is thought to spread mainly from person-to-person.

- Between people who are in close contact with one another (within about 3 feet).
- Through respiratory droplets produced when an infected person coughs or sneezes.

These droplets can land in the mouths or noses of people who are nearby or possibly be inhaled into the lungs.

There is a possibility that other people may catch COVID-19 by touching objects or surfaces, then touching their eyes, nose or mouth but it is not the main way the virus spreads (CDC, 2020). Researchers are still learning about this possibility. People can also catch COVID-19 if they breathe in droplets from a person with COVID (WHO, 2020).

The emerging scientific evidence on Coronavirus transmission has made official by the US government's Centre for Disease Control. To manage the pandemic situation in the best possible way, the following findings should be applied by everyone.

Photo reference: Johns Hopkins University, CSSE: Worldometers: FT research

WHAT IT TAKES TO INFECT?

To successfully infect the person, the virus needs a dose of: ~1000 viral particles (vp).

Table 4. The typical environmental spread of activities.

The typical environmental spread of activities	
Breath	~20 vp/minute
Speaking	~200 vp/minute
Cough	~200 million vp (enough of these may remain in air for hours in a poorly ventilated environment)
Sneeze	~200 million vp

FORMULA

Successful infection = Exposure to Virus * Time

SCENARIOS

Table 5. The level of risk of each scenario.

The level of risk of each scenario	
Being in vicinity of someone (with 6 ft distancing)	**Low risk** if limit to less than 45 minutes
Talking to someone face to face (with mask)	**Low risk** if limit to less than 4 minutes
Someone passing you walking/jogging/cycling	**Low risk**
Well-ventilated spaces, with distancing	**Low risk** (limit duration)
Grocery shopping	**Medium risk** (can reduce to low by limiting time and following hygiene)
Indoor spaces	**High risk**
Public Bathrooms/Common areas	**High fomite/surface transfer risk**
Restaurants	**High risk** (can reduce to medium risk by sitting outdoors with distancing and surface touch awareness)
Workplaces/Schools (even with social distancing)	**Very high risk**, including high fomite transfer risk
Parties/Weddings	**Very high risk**
Business networking/conferences	**Very high risk**
Arenas/Concerts/Cinemas	**Very high risk**

The bottom line factors used to calculate risk are the following:

- **Indoors vs. outdoors**
- **Narrow spaces vs. large, ventilated spaces**
- **High people density vs. low density**
- **Longer exposure vs. brief exposure**

The risks will be higher for former scenarios.

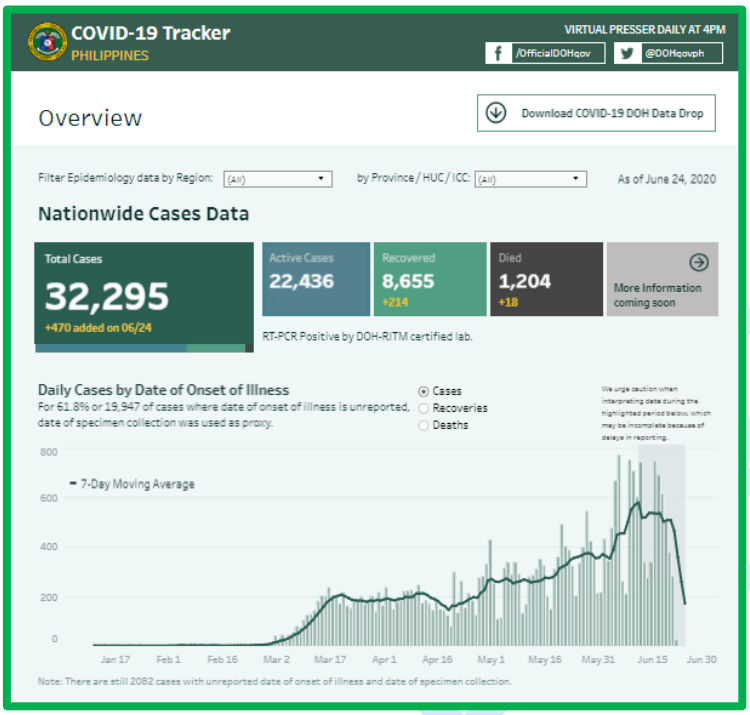
RESOURCE LINKS

1. COVID-19 Transmission (photo from WHO)

2. COVID-19 Tracker Philippines

Click the link here: https://www.covid19.gov.ph/

3. DOH COVID19 Advisory



Click the link here: DOH website, http://www.doh.gov.ph/covid19tracker

4. COVID-19 cases across the globe, as shared by Chary Dino

Click the link here: https://www.covidvisualizer.com/

5. Coronavirus Disease (COVID-19) Advice for Public: Myth Busters

Click the link here: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/myth-busters

6. How to Properly Wash Your Hands

Click the link here: https://www.youtube.com/watch?v=cbX0xwKORjk

7. How to Sanitize your Groceries?

Click the link here: https://youtu.be/sjDuwc9KBps

8. So we stay at home: COVID Anaesthetic Induction

Click the link here:
https://m.youtube.com/watch?v=OF6dMhRvD8M&feature=youtu.be

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