

Face barriers for COVID-19: A home experiment

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In times of crisis it is often those already vulnerable or marginalized who become even more vulnerable. Aside from health implications of Covid-19 which have affected every one of us in one way or another, I've found myself needing to carefully consider the wellbeing implications of my children. Communication is essential for our wellbeing and the feeling of belonging. In a time where social distancing is the new normal, people with a hearing loss stand to experience loneliness and exclusion more than ever before.

Like with most things, having a child with a hearing loss means a constant process of considering the "other". Parallel processes often need to be explored to see one's child accommodated and included. As a parent of children who are deaf, I have learned that an inclusive approach, usually benefits everyone. I found myself considering the "other" when face mask use recently became mandatory in my country. Cloth mask use has been specifically endorsed by our government, and it didn't take much consideration before realizing the massively isolating and excluding barrier that a face mask would present for someone with a hearing loss. Not only are mouth patterns completely obstructed, but sound is terribly muffled, significantly disabling the listening ability of someone who is already working so much harder than the average hearing person to comprehend sound.

It didn't take long before a number of transparent options of face barriers became available. Quite honestly, I wasn't sure where to start, so with our resident cohort of enthusiastic guinea pigs, we decided to do a little home experiment trying out some the options available to us, focusing on the communication efficacy with each. Not only was this a fantastic learning opportunity for my girls in terms of categorizing and comparing different products, but we did learn a number of things that we thought we'd share with anyone who might also find this helpful.

It is important to consider that the World Health Organization (WHO) is not currently recommending mandatory face barrier use. One of the reasons is that safety of such products is difficult to determine and currently unknown. Potential concerns may include moisture from breathing, suffocation and even eye health for shields and visors.

Currently the most accessible forms of barrier in our country can be divided into 5 types of products which we will compare below. Please note that this was a home experiment and the table below outlines our experience and opinions only. We wanted to see what worked for our girls and thought that our experiences might be helpful for other parents in similar situations.

1. The **transparent face shield**: We tried 13 different shields and I was amazed that each one was actually quite different from the others. The following table appraises one of the shields that we felt performed the best with regards to elevation, comfort and stability.



TRANSPARENT FACE SHIELD	
Communication	<ul style="list-style-type: none"> • With these barriers, the success is in the amount of elevation (distance from forehead to shield). We found anything less than 4cm mists up too quickly. • Some voice reverberation (echoing and sound feedback) was noted. Less reverberation if elevation adequate. • If elevation adequate, mouth patterns and facial expressions are mostly clear. • Sign language is a bit awkward for locations around the face but doable. • Cued speech awkward. • Good FM use without voice distortion.
Visibility	<ul style="list-style-type: none"> • Clear mouth patterns and facial expression visible if not misted up. (Misting does happen with bigger breaths but clears quickly.) • When outside, facing the direction of the sun, the inner surface becomes reflective like a mirror and then the visibility is not ideal. Indoors there was some reflection which may be distracting for some. We found we got used to it quite quickly.
Comfort	<p>This depends on the shield. We tested 13 different shields.</p> <ul style="list-style-type: none"> • There may be some individual preference depending on head shape. Thick rubber or head bands with intermittent gaps tended to be more uncomfortable as the pressure was then not evenly distributed across the band. • Individuality needs to be considered when fitting someone using a cochlear implant to accommodate magnet placement.

Practicality	<ul style="list-style-type: none"> • In the classroom setting, visors up to a length of 20.5cm did not bump into the table surface. For schoolwork and teaching, this seemed the best barrier for both pupil and teacher. • On playground, however, this was not our favourite option, as the plastic is stiff and so less forgiving when playing. However, a ballet class (online) was successfully completed using our favourite visor without causing a problem. • The area behind the ears is free which is more comfortable and more accommodating of behind-the-ear devices such as hearing aids and cochlear implants. • Worn with spectacles quite easily if the elevation allows enough space.
Hygiene	<ul style="list-style-type: none"> • Will need daily cleaning. • Easy to clean. • Foam headbands questionable in this regard.

2. The **bucket hat with attached visor**: We found variations in this with regards to whether or not the visor was detachable. Visors that attach to the inner brim of the hat with press studs or Velcro seem preferable for cleaning purposes. An important consideration with these is the fit of the hat. It needs to be a perfect fit for this to work optimally. The table below explains our findings with this option.



BUCKET HAT WITH ATTACHED VISOR	
Communication	<ul style="list-style-type: none"> • We experienced more voice reverberation than with the face shield. • This sound is carried through with the use of a FM. I feel this is not optimal for a listening and spoken teaching environment for a child with a hearing loss. • Because this plastic is softer than the face shield, location of sign language is better. • Better for cued speech.
Visibility	<ul style="list-style-type: none"> • Slight cloudiness. • Also becomes reflective like a mirror when facing the sun outside.
Comfort	<ul style="list-style-type: none"> • If hat fits, very comfortable.
Practicality	<ul style="list-style-type: none"> • Nice space between plastic and face and good face coverage. • Food and drink can be consumed quite easily under the plastic without removing the barrier.

	<ul style="list-style-type: none"> • Sturdy when playing on playground and moderate physical activity. When running, because the plastic is soft it does tend to blow into the face. • Long hair ideally in a low pony tail or plait. <p>Due to the comfort and stability with outdoor activities, this is our preferred barrier for outdoor time and possibly young children.</p>
Hygiene	<ul style="list-style-type: none"> • The hat needs to be washed too, so a detachable option for the plastic is preferred. This will also allow the plastic to be handled with more care to avoid creasing.

3. **Visor which attaches to a brimmed hat:** This is a good option where the child already has a hat that fits well. It allows for easier cleaning since it is detachable from the hat. The rigidity of the hat might also impact its use as will determine how the plastic visor falls. This didn't work well with a peak cap as the plastic lifted up too high. The distance from the face was substantially more than the bucket hat option in (3). The following table summarizes our findings.



VISOR WHICH ATTACHES TO A BRIMMED HAT	
Communication	<ul style="list-style-type: none"> • Very similar to hat with visor in (3). Because the distance between the visor part and the face is more, sign language location and cued speech isn't as good when compared to the bucket hat (3).
Visibility	<ul style="list-style-type: none"> • Slight cloudiness. • Also becomes reflective like a mirror when facing the sun outside.
Comfort	<ul style="list-style-type: none"> • Depends on the hat, otherwise comfortable.
Practicality	<ul style="list-style-type: none"> • Great on the play ground and snack time as food and drink can be consumed under the plastic quite easily. • Sturdy during play. • Easy to take off and clean. The cleaning of the hat needs consideration. <p>I think it's a great option for play time, but perhaps the shield is better for class time.</p>
Hygiene	<ul style="list-style-type: none"> • Easy to manage and ideal to be able to wash hat and plastic separately to avoid creasing the plastic.

4. **Mask with transparent window:** I received so many referrals for these from friends and family wanting to help us find a viable alternative to the typical mask. Our trial revealed some interesting realities about using such a product. Again our purpose is not to compare anything intended for hospital use, but rather everyday use with a healthy child and carer/teacher where a face barrier is desired or obligatory.



MASK WITH TRANSPARENT WINDOW	
Communication	<ul style="list-style-type: none"> • In our opinion, poor. • All sound is very muffled and lip patterns aren't clear for long as this mists after the first breath which tends to precipitate on the window. For children who listen and speak using devices or those with residual hearing, having an additional barrier of distorted sound is a very real problem. • For sign language, location is better than with the face shield but this means touching the face which is not desired during these circumstances. Facial expression of lower face is not visible. • Might be a better option for cued speech if sound is not also desired.
Visibility	<ul style="list-style-type: none"> • Poor. Mists quickly. If this were to be the preferred product for an individual, see the table below of tips and tricks to minimise misting.
Comfort	<ul style="list-style-type: none"> • We found this to be claustrophobic and hot because this is cupped around the mouth like a typical mask, yet less breathable than a typical mask since some of the surface area is plastic. • One needs to consider the safety of such a product and balance the surface area of transparent window with enough breathable material or a looser fit to allow air flow.
Practicality	<ul style="list-style-type: none"> • Not our favourite option in this regard.
Hygiene	<ul style="list-style-type: none"> • One would have to wash this daily which might crumple the plastic. • The accumulation of moisture from breathing against the plastic is a problem as moisture is specifically cautioned against by the WHO.

5. This would not be complete without comparing the typical **cloth mask**:
The table below shows our findings. There are specific regulations that some countries may insist on for these regarding the layers of material used.

CLOTH FACE MASK	
Communication	<ul style="list-style-type: none"> • Very poor. • Significant sound muffling noted.

	<ul style="list-style-type: none"> • Lip patterns and facial expression are obscured. Cued speech incompatible as a result. • For sign language the location is good, but the obstruction of the mouth and lower half the face makes this in my opinion, incompatible. • The muffled sound is transmitted to FM.
Visibility	<ul style="list-style-type: none"> • Mouth patterns are not visible.
Comfort	<ul style="list-style-type: none"> • Depends on the mask, but generally hot air becomes uncomfortable. • Various “ear savers” have been created to take the tension off the ears. These make the fit more comfortable. Examples are buttons on caps, plastic or button adapters around the back of the head. • The mask tends to retract into mouth when talking if the material is thin. <p>If this option is used, ear savers need to be considered for those with behind-the-ear devices (cochlear implant processors and hearing aids) as the ear hooks tend to knock these off.</p>
Practicality	<ul style="list-style-type: none"> • Impractical for communication in our opinion. • We find it tends to increase face touching. I noticed that my girls touched their faces often while wearing these – at least every minute!
Hygiene	<ul style="list-style-type: none"> • Needs daily washing and becomes damp from respiratory droplets quickly. Moisture is a factor of caution mentioned by the WHO.

If one is only to consider communication alone, no barrier is the best barrier. However, in times like these, when in certain situations this is no longer a choice, it may be helpful to consider alternatives in an informed manner. We do not yet know all aspects of safety regarding each option. What we do know is that our children need to feel included and enabled to communicate with others. This may seem obvious, but one shouldn’t forget that communication considerations need to be for the child as well as those engaging with the child.

All barriers will need to be kept clean using soap and water or a disinfectant. Thereafter cleaning the surfaces to keep visibility maximal is important. We found that window cleaner (we used a product intended to be hypoallergenic) worked really well in removing all residues and smudges and the surfaces were crystal clear thereafter. We haven’t tested wear and tear after weeks of use, so I am unable to comment on the clear transparency after multiple uses or washes. Misting is still a factor that needs to be addressed, especially if a product with close proximity to the mouth is chosen for use. We tried a few different tips and tricks we had come across, to see which actually helped. The product was applied to the mouth facing surface of the barrier, left for a few minutes, and then wiped off with paper towel until the plastic surface was completely clear again. Barriers which had previously misted on the first breath were used to adequately compare the effect of the product applied. We then timed how long it took for misting to start appearing again after continued talking while wearing.

The following table shows our findings.

Substance applied	Time until misting started	Comments
Toothpaste	4 min	Very messy and took time to clean to adequate transparency
Cooking Oil	1 min	Made the mask very clear, left no residue
Window cleaner	Immediate misting	Cleaned the mask beautifully but didn't help with misting
Dish washing liquid	15 min	Left a very fine residue which may be unnoticeable if barrier only over mouth but noticeable when looking through the barrier as in a shield.
Shaving foam	55 min	No residue left, slight misting started at 55 min

We find ourselves in a time consumed with comparing risks. While we consider the risks of various barriers, it's important to see these risks holistically. Screen time has risks of its own which includes eye health implications. With the increased online everything, we need to remain mindful of these risks in disguise. Like all things, different choices will be more appropriate for some and less for others. Find what works for your family. On this note, it's important to mention that children with sensory sensitivities may really struggle with wearing something on their face. This needs to be considered and accommodated too where possible.

"We're in the same storm but not in the same boat," seems an appropriate reminder when considering the realities of this pandemic. Access to communication is a boat we parents of children with a hearing loss find ourselves in. Be bold and educate people of your child's unique communication needs, consider the risks of the known and the unknown, make informed choices, stay updated with new thoughts and discoveries and stay safe. But most of all, take a moment to pause, to breath and to love. We can only do our best.

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