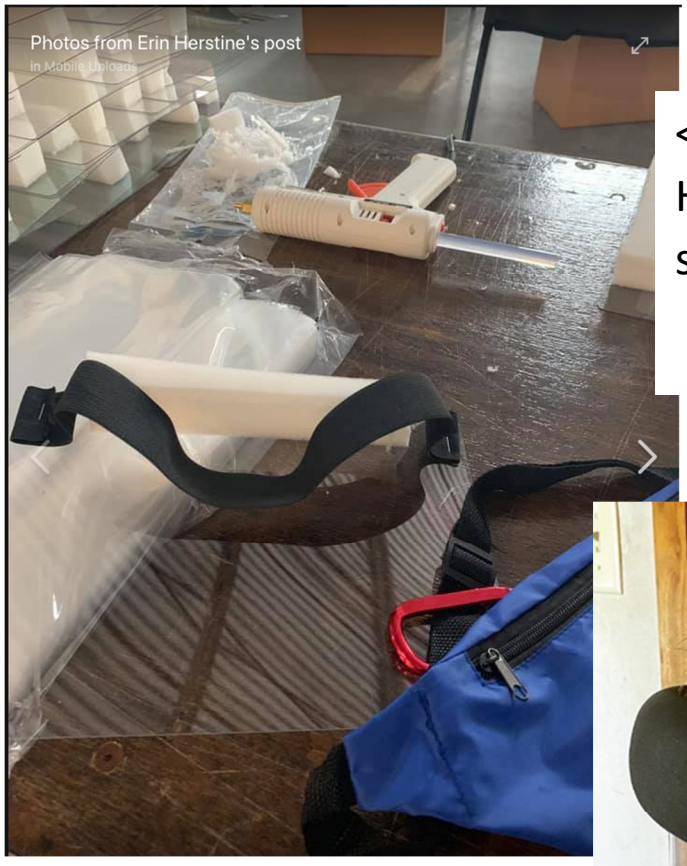
ReliAvail DIY Face Shield (Johns Hopkins variation)

In response to the Coronavirus-19 outbreak and a drastic shortage of N95 face masks, Johns Hopkins put out a call for volunteers to assemble DIY full face shields to protect precious N95 masks from direct contamination. Full face shields can be cleaned and sanitized and allow healthcare professionals (HCPs) to wear N95 for several days.

While the Johns Hopkins design is certainly ingenious and uses commercial off the shelf (COTS) materials that are readily available under normal circumstances, several problems exist with the JHU design:

- Lexan face shields can be expensive and hard to source in pandemics
- Staples present a physical injury and point of failure to the mask design (mask or elastic may rip at staple)
- Hot glue may not be available and slows assembly



<< Sample Johns Hopkins version (uses staples and hot glue)

Variation sample >> does not use any staples or hot glue, speeding assembly

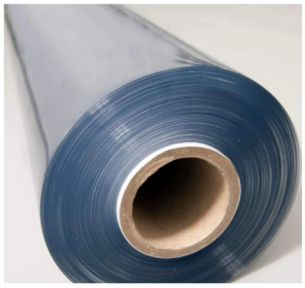
Alternative design proposal:

In the midst of the coronavirus outbreak and resulting material shortages for the JHU design, we set out to identify an alternative design that would be faster to assemble, easier to source materials for and use materials that were still readily available during a pandemic. Our design uses just (3) raw materials, no staples, no special tools (though a sewing machine is helpful) and uses materials that are still plentiful and available at a local level.

During our planning and research, we encountered another individual who executed a similar alternative design and his idea to use COTS pipe insulation for the face pad was integrated into our design. A video of the alternative design can be seen here: https://youtu.be/qlU7IRThjHw

Alternative Design Materials List:

- **Marine-grade 30-gauge roll vinyl** that we sourced from MarineVinylFabric.com – we anticipate cutting vinyl into 8" x 11" pieces and can therefore make 294 face shields from each 54" x 15 yard roll acquired. Shields will be 11" wide x 8" long, providing good side face protection and falling below the chin.

  Marine-grade vinyl of this thickness should provide a stable yet flexible shield, allowing for ease and range of head movement. Additionally, it should hold up well to repeated cleanings and disinfection.

  Source: https://www.marinevinylfabric.com/products/clear-marine-vinyl

- **Common 1" sewing elastic headband** - we chose to use common 1" sewing elastic, sewn in a circle and with a supporting arch, for the headband; the arch will keep the band on the crown of the head, especially for those with thick hair or larger heads. A sewn, full-circle headband will eliminate use of staples, which might injure the HCP wearing the face shield and /or tear the face shield where staples fail under stress of repeated use or strain from larger heads. We feel that elastic is superior to plastic headbands for long-term wear (ie: sores can develop). Admittedly, elastic that is not shielded behind the vinyl could potentially be contaminated. In this case though, a new headband could easily be fashioned from new elastic.

  Source: any local sewing supply

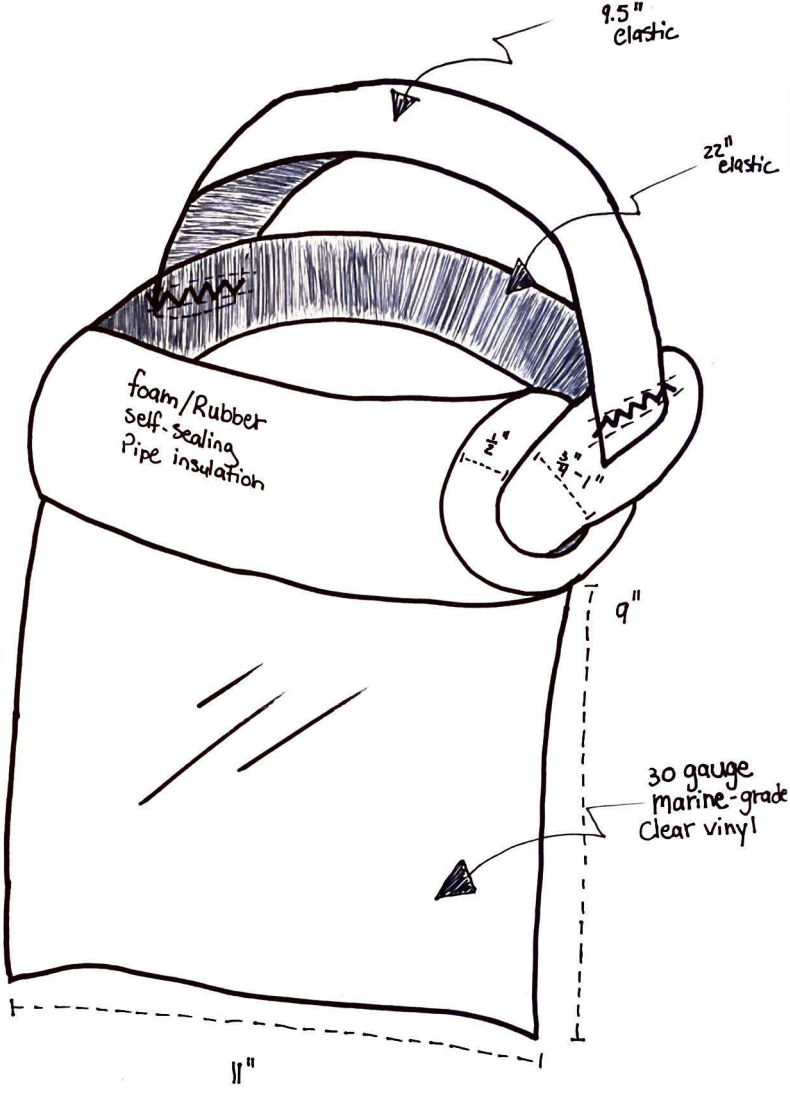
- **Half-inch plumbing pipe insulation (face pad)** – ½" plumbing pipe insulation is in plentiful supply at home improvement stores nationwide and can be easily cut to make comfortable face pads. Additionally, the pipe cover generally has two self-sealing strips of high adhesive attached, allowing for rapid attachment to the vinyl face shield and containment of the elastic headband material. Cost is minimal (~$2-3 for 6' of foam and <$6 for 6' of rubber insulation) as well and each length can accommodate (6) 1-foot pieces of face pad. **Special thanks to YouTuber "A H Publicmail" for this idea:** https://youtu.be/qlU7IRThjHw

  Sources: https://www.homedepot.com/p/Everbilt-1-2-in-x-6-ft-Foam-Self-Seal-Pipe-Insulation-ORS05812/204760809

  https://www.lowes.com/pd/Frost-King-Core-1-2-in-Wall-Thickness-x-1-2-in-Id-x-6-ft-Self-Sealing-Pipe-Insulation/1001277268

Assembled face shield:


9.5" elastic
22" elastic
foam/Rubber self-sealing Pipe insulation
1/2"
3/4" - 1"
9"
30 gauge marine-grade Clear vinyl
11"