

USF Lab Nasal Swab Testing Summary

This study was conducted parallel to the work from Dr. Ramy Arnaout's BIDMC team and their excellent work. Both testing centers were blind to each other's results. We all came to similar conclusions.

BIDMC tested several different materials and several different swab tip geometries. Please see the summary of their results here: <https://github.com/HMS-RIC/Covid19-NP-Swab/blob/master/Results/README.md>

USF results as follows:

Geometries

USF created several geometries before one was settled on. The tip geometry design was a "cat-tailed" tip at 15 mm in length and with at 4 mm diameter.



The shaft total (including tip) is 1.5 mm neck, a 2.5 mm handle and a 2 mm break point. The break point is located 70 mm from the tip. We also have an alternate design with two break points, one at 40 mm and one at 80 mm.

There is not a conclusive "best." Per Dr. Arnaout's results almost all geometries and materials tested passed. Key point being your design and material does not interfere with the PCR test. It should collect enough material to conduct the test. It should also be flexible and strong. At all costs, avoid sharp tips and edges so the mucosa of the nasopharynx is not damaged.

USF Material

We are printing our swabs with Formlabs Surgical Guide and following their post-processing indications for IPA cleaning and UV-curing. We are also following their indications for autoclaving. We are using the Formlabs Form2 and Form3 printers and Surgical Guide resin as it is what we have on hand.

Sample testing

To test the swab's retention/retrieval comparison, we used 1 ml of synthetic sputum that was spiked with 10 PFU of RSV. We compared the 3D printed swab's performance against a synthetic polyester swab. 3D printed swabs were as effective as current spun polyester swabs. Dr. Michael Teng, USF

Leeching testing

Tubes were incubated for 24 and 48 hours at 4 degrees C. There was no effect on the PCR. Leeching is not an issue for up to two days. We are continuing this test for 72 hours. Dr. Michael Teng, USF

Structural performance

Our model resists breakage from torsion forces (the kind typical seen while collecting a nasopharyngeal swab). The neck is flexible. The breakpoints break as designed when applied with a perpendicular force.

Field Testing

USF is currently expanding their local IRB to a WIRB to include testing at multiple sites. This expansion will allow for multiple institutions to participate in the research study. We have been in contact with several institutions to include them on the WIRB.

We want to thank everyone for the hard work at your respective institutions. We are impressed with the call to arms and how everyone showed up.

If you do happen to be using the patent pending USF designed swab, please credit as appropriate.

March 26, 2020 4:21 PM EST

Filename: USF Swab GitHub Update.docx
Directory: C:\Users\Jonathan\Desktop
Template: C:\Users\Jonathan\AppData\Roaming\Microsoft\Templates\Normal.dot

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Title:
Subject:
Author: Ford, Jonathan
Keywords:
Comments:
Creation Date: 3/26/2020 3:20:00 PM
Change Number: 3
Last Saved On: 3/26/2020 4:26:00 PM
Last Saved By: Ford, Jonathan
Total Editing Time: 56 Minutes
Last Printed On: 3/26/2020 4:27:00 PM

As of Last Complete Printing

Number of Pages: 2
Number of Words: 436 (approx.)
Number of Characters: 2,489 (approx.)