

Progress Report - Week 7

Title: Vaginal Self-Swab Device to Minimize Contact Contamination

Client: Dr. Jean Riquelme

Advisor: Dr. Megan McClean

Team:

Sara Morehouse (Leader)

Cherry Qiu (Communicator)

Katherine Kafkis (BWIG and BSAC)

Adam Berdusco (BPAG)

Date: March 14, 2024

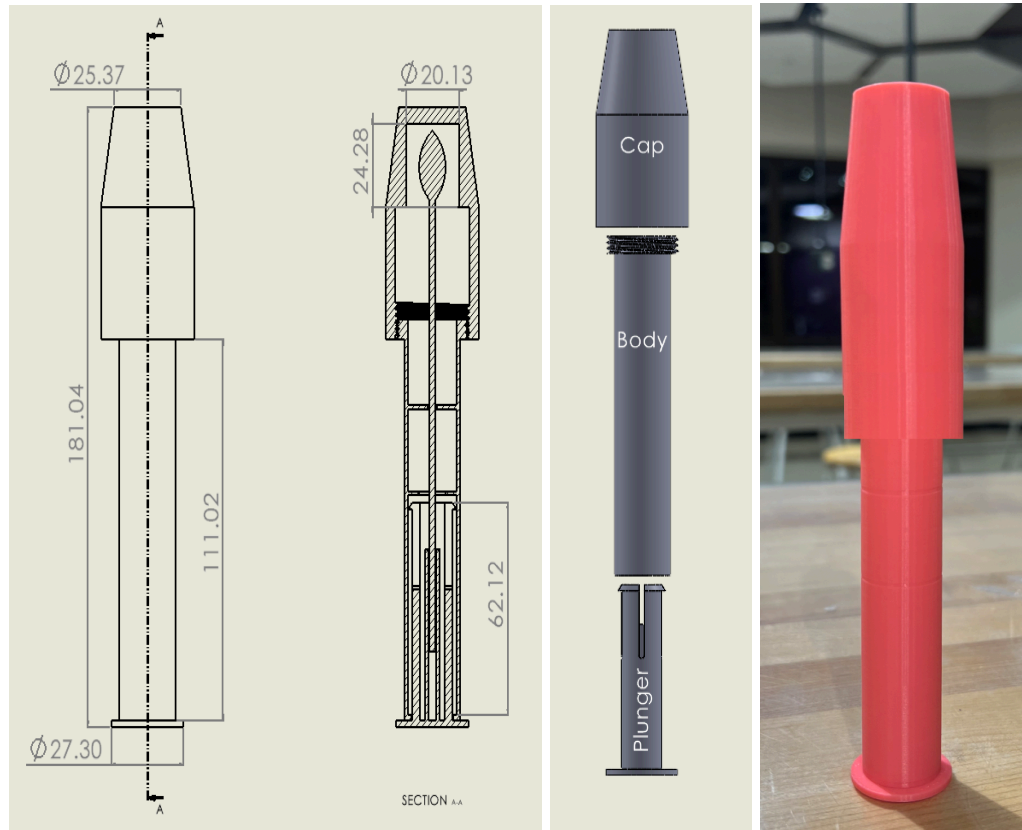
Problem Statement:

Quality sexual health is important for every woman to sustain, but with women ages 15-24 accounting for 43% of undiagnosed STI cases, the system supporting women's sexual health could use some improvement (CDC). The team has developed a novel self-swab STI testing device that allows women the privacy of swabbing themselves without the potential discomfort of a physician present. This was conceived with the goal in mind of making STI testing more accommodating while reducing contamination of the testing environment. However, the current design has issues with media leaking from the device after use, as well as with the aesthetics of the design. Additionally, the device requires the addition of a thin, puncturable film to the cap to contain transport media. The team is tasked with modifying the original design to address the issues currently being faced while still seeking to limit contamination of the device and testing environment as well as account for patient comfort.

Brief Status Update:




This week the team came up with a few new design ideas to work around the requirement for incorporating the Aptima media tube. We met with Dr. Riquelme and shared our designs with her and received helpful feedback on them.

Current Design:

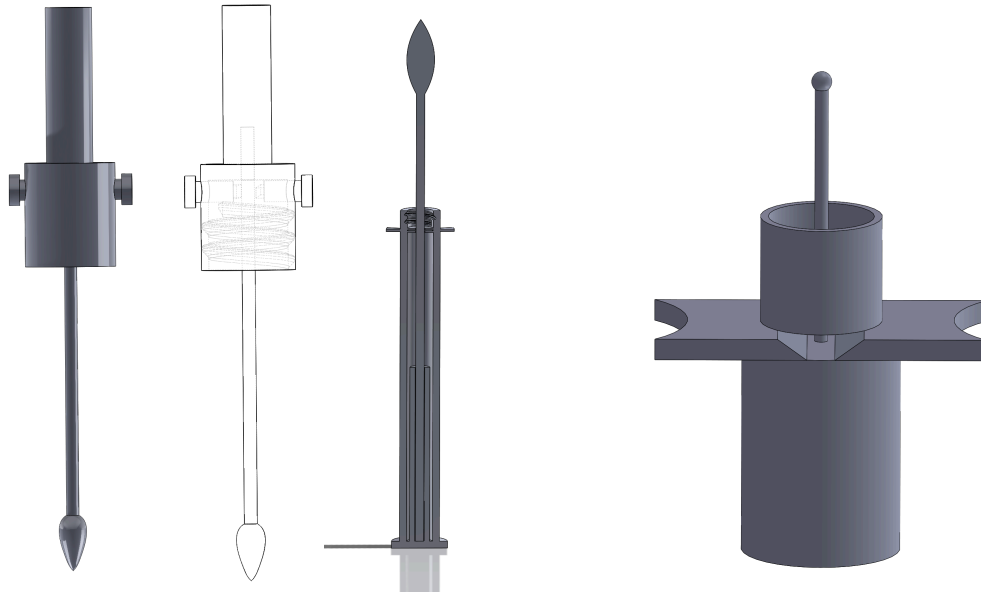


The current design was developed last semester and includes a plunger, body and cap. The prototype was 3D-printed and assembled with the plunger being inserted into the bottom of the body, and the cap screws onto the top of the body. A swab is inserted through the body and into the plunger.

Design Matrix:

Criteria	Weight	1. Modified Plunger		2. Snap On		3. Pull Back	
							
Limiting contamination	30	5/5	30	3/5	18	4/5	24
Leakage Prevention	25	3/5	15	5/5	25	2/5	10
Ease of use	15	3/5	9	5/5	15	4/5	12
Ease of fabrication	10	3/5	6	5/5	10	2/5	4
Patient Comfort	10	5/5	10	4/5	8	4/5	8
Safety	5	5/5	5	5/5	5	5/5	5
Cost	5	5/5	5	5/5	5	5/5	5
Total	100	80		86		68	

New Design Ideas:



We came up with some new designs to overcome the obstacle of the media tube. These involve a handle for the swab and a mechanism to cleave the swab at the perforation that is modeled after a cigar cutter. These images are a few different preliminary ideas for how this could look.

Materials and Expenses:

Item	Description	Manufac- turer	Mft Pt#	Vendor	Vendor Cat#	Date	#	Cost Each	Total	Link
Preliminary prototype print	Material: PLA	n/a	n/a	Makerspace	n/a	2/27	n/a	n/a	\$3.34	n/a
-									\$0.00	
-									\$0.00	
-									\$0.00	
-								TOTAL:	\$3.34	

Previous week's goals and accomplishments:

- Goal: Meet with Dr. Riquelme to discuss the media tube requirement
 - The team accomplished this and discussed the requirements going forward and discussed design ideas that address these requirements.
- Goal: Adjust design ideas to comply with this requirement
 - The team came up with a couple versions of a “cigar-cutter” design to integrate the swab collection with the Aptima tube.

Activities:

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Katherine	3/12/24	Worked on a new SolidWorks design that uses a method of cutting the swab at the breaking point	1	2.5	21.5
	3/13/24	Helped draft fabrication protocols for 3D printing	1		
	3/13/24	Met with the client to discuss new design ideas	0.5		
Sara	3/12/24	Drafted new Solidworks design idea	1	2.5	19.5
	3/13/24	Worked on fabrication protocols, met with client	1.5		
Cherry	3/12/24	Met with team and drafted new design in solidworks	1	2	16.75
	3/13/24	Met with client to discuss new direction of our project, worked on fabrication protocol	1		
Adam	3/12/24	Met with the team to discuss possible solutions	1	2	19
	3/13/24	Met with the client and worked on fabrication protocols	1		

