

Progress Report - Week 11

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: April 18, 2024

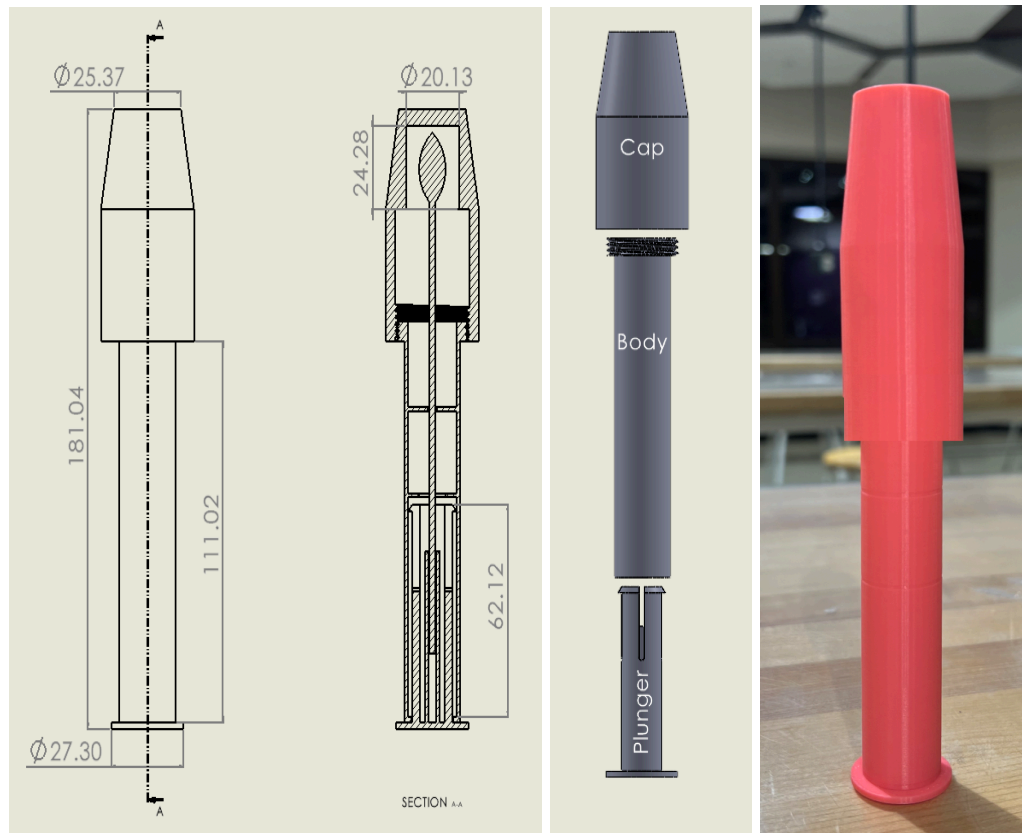
Problem Statement:

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:

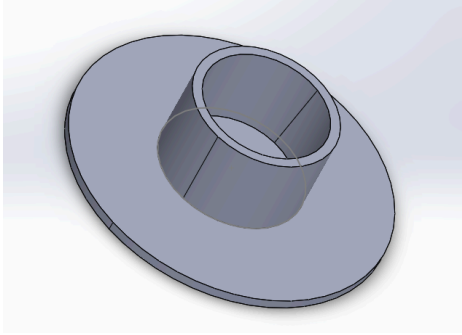
This week the team worked on testing the device. On Friday the 12th, we performed mechanical 3-point bending testing on the swabs to see the amount of force required to break them. This past Wednesday, we worked on executing contamination testing using the plastic vaginal model, the Aptima swabs, and our prototype. Going forward, we are working on fixing up some last minute issues with the device and reprinting as well as organizing results and information for our final presentation next week Friday.

Current Design:

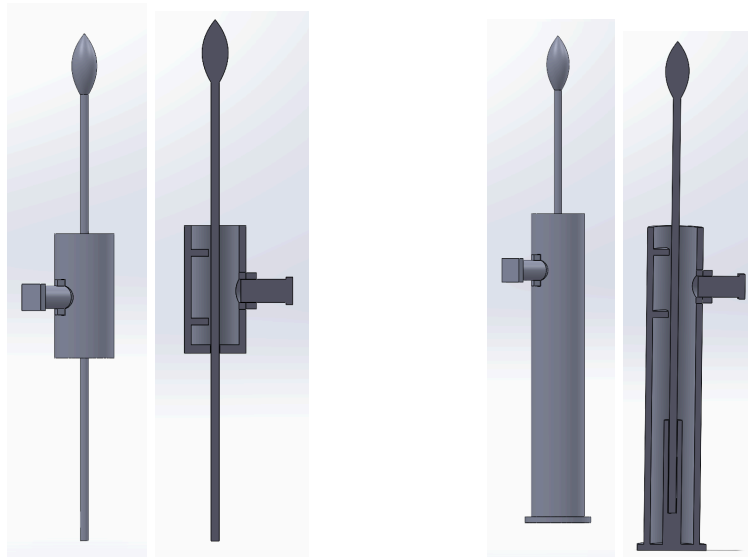


The current design was developed last semester and includes a plunger, body and cap. The prototype was 3D-printed and assembled with the plunger being inserted into the bottom of the body, and the cap screws onto the top of the body. A swab is inserted through the body and into the plunger.

New Design:



This component is a base to house the Aptima tube while the patient conducts the test.



The left design utilizes 3-point bending to break the swab and uses a button to apply a central force at the swab perforation.

The right design is identical to the middle design except that it includes a full body that is the length of the swab and provides a base for it to stand up on.

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
Prototype prints	Material: PLA	n/a	n/a	Makerspace	n/a	3/20	n/a	n/a	\$4.92	n/a
Prototype print	Material: PLA	n/a	n/a	Makerspace	n/a	4/9	n/a	n/a	\$1.00	n/a
Bag of Lemons	n/a	n/a	n/a	Target	n/a	4/15	1	\$5.39	\$5.39	n/a
Washable paint	n/a	Crayola	081- 04-1 137	Target	n/a	4/15	1	\$5.99	\$5.99	link
-								TOTAL:	\$20.64	

Major team goals for the next week:

1. Ensure the final prototype is printed.
2. Complete poster for final presentation.
3. Begin work on the final report.

Next week's individual goals:

- Sara:
 - Analyze contamination testing results.
 - Complete poster for presentation.
 - Begin working on final report.
- Katherine:
 - Begin analyzing the results from the survey and complete the base tipping test in SolidWorks
 - Complete assigned sections of the poster presentation
 - Begin working on the final report
- Cherry:
 - Finish assigned sections of the poster presentation.
 - Start working on final report
- Adam:
 - Finish analyzing data from testing
 - Finish and practice the poster presentation

- Start working on the final report

Timeline:

Task	Jan	Feb				March					April				May	
	26	2	9	16	23	1	8	15	22	29	5	12	19	26	3	10
Project R&D																
Background research	X	X	X	X	X	X	X									
Design development				X	X	X	X	X	X		X	X	X			
Prototyping						X			X		X	X	X			
Testings												X	X			
Deliverables																
Progress Reports		X	X	X	X	X	X	X	X		X	X	X			
PDS			X			X	X									
Prelim presentation/report						X	X									
Final Poster													X			
Meetings																
Client			X					X								
Advisor	X	X	X	X	X			X			X	X				
Website																
Update	X	X	X	X	X	X	X	X	X		X	X	X			

Previous week's goals and accomplishments:

- Goal: Complete all tests and analyze results.
 - We have completed all physical tests and have begun analyzing results. In the next few days, we will finish up simulation testing and will have results analyzed so we can include them for our presentation
- Goal: Print final prototype for final presentation.
 - We are finalizing last minute changes on the designs and reprinting in the next day.
- Goal: Begin work on final deliverables.
 - We have assigned sections for the poster and report and have started working on them

Activities:

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Katherine	4/16/24	Completed a modified design of the push-button that breaks the swab	1	1.5	34.5
	4/18/24	3D printed the final prototype	0.5		
Sara	4/17/24	Completed contamination testing	1	2	31
	4/18/24	Worked on analyzing results of testing	1		
Cherry	4/17	Worked with team to conduct contamination testing	0.5	1.5	25.75
	4/18	Analyzed results of MTS testing	1		
Adam	4/17/24	Finished contamination testing	1	2	29
	4/18/24	Analyzed results of testing	1		