

Progress Report - Week 3

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: February 15, 2024

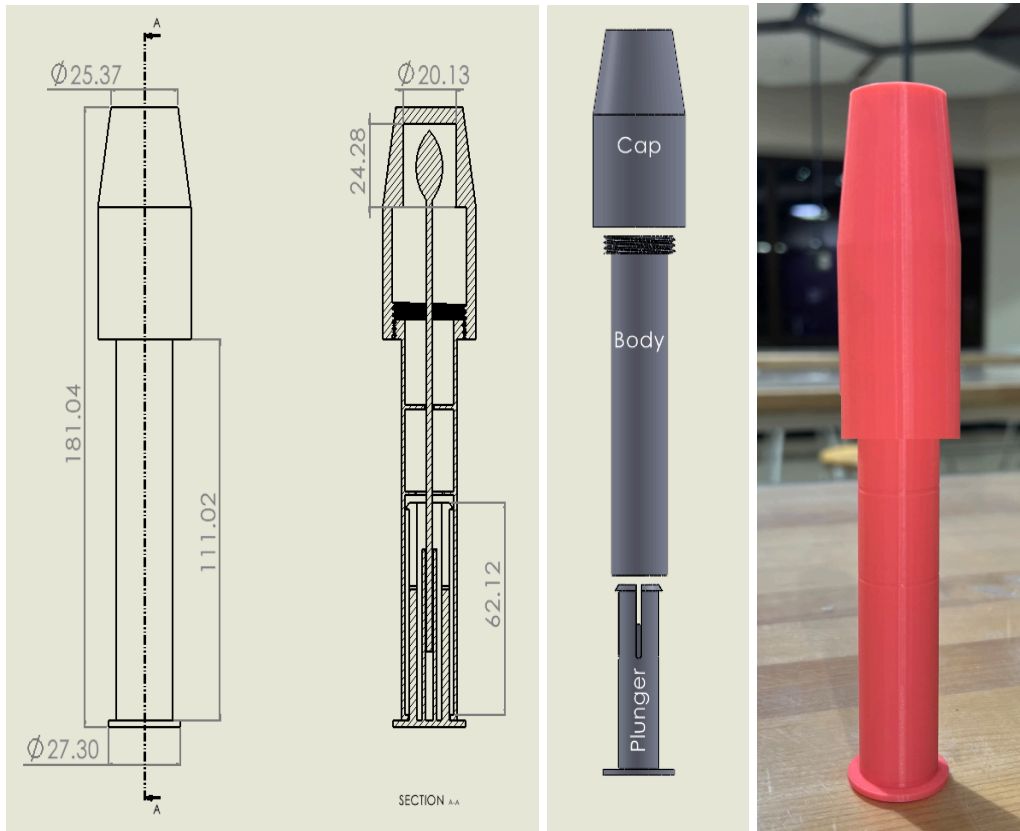
Problem Statement:

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:

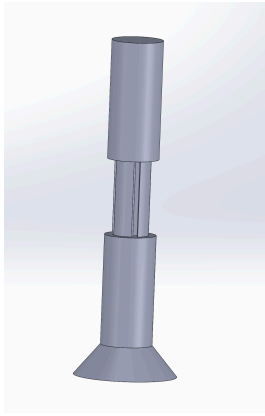

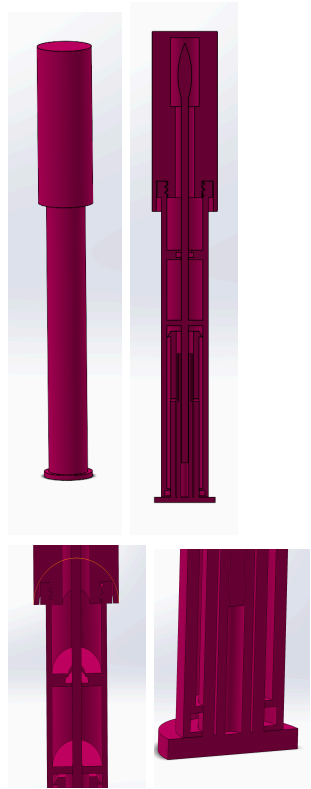
This week the team worked on coming up with a few design ideas and compiling them in a design matrix to be evaluated. This process involved some research on some design components, but mostly was done in SolidWorks. The designs are included in this report in the design matrix and preliminary evaluations have been done for each design.

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	Design 1:		Design 2:		Design 3:	
							
Limiting contamination	30	3/5	18	4/5	24	4/5	24
Leakage Prevention	25	3/5	15	5/5	25	3/5	15
Ease of use	15	5/5	15	4/5	12	4/5	12
Ease of fabrication	10	3/5	6	2/5	4	4/5	8
Patient Comfort	10	3/5	6	3/5	6	5/5	10
Safety	5	5/5	5	5/5	5	4/5	4
Cost	5	5/5	5	4/5	4	5/5	5
Total	100	70		80		78	

**The scoring on the matrix is very preliminary. We will be reevaluating them when we finalize the designs and further discuss the pros and cons of each design.

Background research	X	X	X														
Design development				X													
Prototyping																	
Testings																	
Deliverables																	
Progress Reports		X	X	X													
PDS			X														
Prelim presentation																	
Final Poster																	
Meetings																	
Client			X														
Advisor	X	X	X	X													
Website																	
Update	X	X	X	X													

Previous week's goals and accomplishments:

- Goal: Research relevant information and brainstorm design ideas to be evaluated with the Design Matrix next week.
 - This was accomplished. The team brainstormed a number of ideas and used any research necessary to do so.
- Goal: Complete design matrix and choose our design we will proceed with for the semester.
 - A preliminary form of the design matrix was created, but a final design has not been chosen yet.

Activities:

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Katherine	2/13	Conducted research on O-ring groove designs	1	3	8
	2/14	Modified the existing design in SolidWorks	2		
Sara	2/14	Built design idea on SolidWorks	3	3.5	7.5
	2/15	Helped evaluate designs on matrix	0.5		
Cherry	2/13	Sent email to laboratory specialist	0.25	1.75	4.25
	2/15	Drafted design criteria	0.5		

	2/15	Researched thin foil for caps	1		
Adam	2/13	Brainstormed potential design solutions	0.5	3.5	8
	2/14	Made design on Solidworks	2		
	2/15	Researched snap on cap designs	1		