Progress Report - Week 6

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 7, 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 writing our preliminary report. For the report, we decided to focus our content on the work we have done thus far despite the fact that we must make modifications to our designs in order to comply with the requirement of using the Hologic media tube. We have discussed this in our report, and going forward will be focusing on redesigning for this requirement.

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 Pl	unger	2. Snap (On	3. Pull Back			
		Body Gap		Base		Swab Holder Sheath			
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			

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	

- TOTA \$3.34

Major team goals for the next week:

- 1. Meet with Dr. Riquelme to discuss the media tube requirement
- 2. Adjust design ideas to comply with this requirement

Next week's individual goals:

- Sara:
 - Help redesign device to incorporate media tube
 - Print prototype of redesign
- Cherry:
 - Help redesign products to fit with the Hologic Panther Machine.
 - Research about viable media transfer between tubes.
- Katherine:
 - Draw some design ideas of modifications to the Snap On design to make it compatible with the media tube
 - Conduct research on methods of ejecting a part from a tube or designs that include a part that can break off so that the swab can be transferred into the Aptima media tube
- Adam:
 - Redesign prototypes so that it will fit in the testing device
 - \circ $\,$ Start making the prototypes on CAD and 3d printing them $\,$

Timenne.																
Teel	Jan	Feb			March					April				Мау		
Task	26	2	9	16	23	1	8	15	22	29	5	12	19	26	3	10
Project R&D																
Background research	Х	Х	Х	х	Х	Х	Х									
Design development				Х	Х	Х	Х									
Prototyping						Х										
Testings																
Deliverables																
Progress Reports		Х	Х	Х	Х	Х	Х									
PDS			Х			Х	Х									
Prelim presentation/report						х	Х									
Final Poster																

Timeline:

Meetings												
Client			Х									
Advisor	Х	Х	Х	Х	Х							
Website												
Update	Х	Х	Х	Х	Х	Х	Х					

Previous week's goals and accomplishments:

• Accomplishment: Completed the preliminary report.

Activities:

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Katherine	3/4/24	Modified the pull-back design to be compatible with the Aptima media tube	1	5	19
	3/5/24	Completed assigned sections of the preliminary report	2		
	3/6/24	Edited the preliminary report and submitted it to canvas as well as website	2		
Sara	3/5/24	Worked on preliminary report	2	4	17
	3/6/24	Worked on preliminary report	2		
Cherry	3/5	Worked on assigned section of preliminary report	2	3.5	14.75
	3/6	Revised assigned report sections	1.5		
Adam	3/5	Worked on preliminary report	1.5	3	17
	3/6	Revised preliminary report	1.5		