Appendix 1. Co-authors Making Up the Rice360 Student Team

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Appendix 2. Instructions on How to Make the Gel Cervix Models

The gel cervical models are designed for one-time use and are made from ballistic gel (VYSE® Professional Grade Ballistic Gelatin) that has been dyed pink using food coloring. Each model costs \$0.09-\$0.23 depending on the concentration of gel powder used. Reusable, custom molds were designed and 3D printed using PLA so that the gel models resemble the size and shape of a human cervix. The molds consist of 2 parts (base and top) that are fitted together to form the mold (Fig. i). Gel models are created by mixing the desired weight to volume concentration of ballistic gel powder to hot water (Fig. ii). Biopsy gel cervical models are made using a 35% gel concentration (35 g gel powder mixed in 65 mL hot water), cryotherapy gel cervical models are made using a 30% gel concentration (30 g gel powder mixed in 70 mL hot water), and LEEP gel cervical models are made at a 15% gel concentration (12 g gel powder mixed in 68 mL hot water). The measurements listed in parentheses will make 6 gel models each.

While mixing the ballistic gel powder and water, a drop of pink food coloring is added (Fig. iii). The liquid gel mixture is then poured into a cervix mold. In order to make a biopsy gel cervical model, four 600 µm black beads (The Crafts Outlet glass microbeads) are placed at the base of the mold before pouring in the liquid gel. A thin layer of gel mixture can be used to adhere the black beads to the bottom before pouring the rest of the gel into the mold (Fig. iv). For the cryotherapy and LEEP gel cervical models, the liquid gel mixture is simply poured into the mold.

The top of the mold is covered with aluminum foil and the gel is refrigerated for 3 hours to set. Once the gel solidifies, it is removed from the mold and ready for use (Fig. v). Pink paint is painted in and around the cervical os of the biopsy gel cervical models to represent the squamocolumnar junction. Care is taken to paint close to but not over the black beads (Fig. 3). For the LEEP gel cervical models, liquid paper or white paint is used to paint a large white lesion in the center of the gel model (Fig. 4B).

Gel models are stored in a refrigerator until use. When traveling, the gel models can be placed in a plastic container or tupperware. It is best if the storage container is kept in a cooler or insulated packaging during travel to keep the models cool, however, this is not always necessary as the models tend to keep their consistency and shape up to 48 hours at ambient temperature.



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Appendix 3. Cost Table for LUCIA

Process	Material	Cost per Model
Wooden Frame	1/4" Plywood sheet	\$2.50
	3/4" MDF sheet	\$0.72
	Brown or tan spray paint	\$1.93
	WaterSeal spray	\$0.50
	Zinc-plated steel corner brackets with	\$3.76
	1" long sides	
	Phillips flat head wood screws	\$1.11
	Hex nuts	\$0.70
	Phillips pan head machine screws	\$0.99
	Duct tape	\$0.75
	Super glue	\$2.00
	Gorilla Glue wood glue	\$0.04
	"Amazing Goop" adhesive	\$2.00
	Hot glue	\$1.00
Vaginal Canal	3" PVC pipe	\$0.60
	4" PVC pipe	\$0.60
	1" PVC pipe	\$0.30
	Waterproof polyurethane coated pink	\$0.97
	fabric	
	Waterproof nylon pink fabric	\$1.16
	1" thick egg crate foam	\$2.00
	1/8" Charcoal regular foam	\$0.65
Stationary Cervical Model Holder	Pink PLA filament	\$1.50
Ball and Socket Cervical Model Holder	Fast-setting epoxy	\$0.50
	Scunci no-slip grip jaw clips, 3.5cm	\$1.30
	Insulated wire	\$0.86
	Insulated alligator clip	\$0.05
	Adhesive metal tape	\$0.02
	1/2 x 1/8 Neodyminum rare earth	\$3.00
	countersunk ring magnets	
	PLA for 3D printed ball and socket	\$1.50
	Magnet-Receptive sheet, Adhesive-	\$0.76
	Back, 0.029" thick	
	Pink spray paint	\$0.08
3D Printed Cervical Models	NinjaFlex 1.75mm pink filament	\$1.32
(Price for 20 models)	PLA filament	\$1.82
	Temperature sensitive pigment 88F/33C	Ş1.05
	Red enamel paint	\$1.80
	Yellow enamel paint	\$0.43
	White enamel paint	\$0.72
	Paint thinner, clear coat (fast drying)	\$0.48
	Paint turpentine, clear coat (slow	\$0.75
	drying)	
	Clear final coat	\$0.67
Gel Cervical Models	VYSE [®] Professional Grade Ballistic	\$0.09-\$0.23*
(Price for one gel cervical model)	Gelatin	
	PLA for cervix model mold	\$0.28

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	(1 Model Set)	
	TOTAL COST	\$46.22**
Cervical Model Platforms	1/4" Plywood sheet	\$1.65
	White liquid paper corrector	\$0.05
	Black 600 um beads	\$0.01
	Pink food coloring	\$0.02

*Price depends on whether you are making a LEEP gel model (\$0.09) or a gel model for biopsies or cryotherapy (\$0.23) **Total cost includes 6 gel cervix molds, but does not include price for the gel.

Process	Material	Cost per Model
Storage Box	Medium smart store tote	\$12.00
	Bubble wrap	\$2.00

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Appendix 4. IRB-Approved Survey Used to Collect User Feedback on LUCIA

Subject Number:	Date:
Email address:	

Post course assessment evaluation of cervical models

Please check the box that reflects your immediate response to each statement. Make sure you respond to every statement.

1. Overall, I would rate the usefulness of this model for cervical cancer training as:

Worst Imaginable	Awful	Fair	Excellent	Best Imaginable
1	2	3	4	5

2. I will likely recommend the cervical cancer training model to my colleagues.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1	2	3	4	5

3. I believe I have improved my skills to screen for cervical cancer after using the cervical cancer training model.

Strongly	Disagree	Neither Agree	Agree	Strongly Agree
Disagree		nor Disagree		
1	2	3	4	5

 It was easy to self-evaluate my ability to perform the skills (VIA, colposcopy, cervical biopsy, cryotherapy, LEEP) related to cervical cancer screening/ treatment.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1	2	3	4	5

5. The training model added significant learning value to the overall course.

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Strongly	Disagree	Neither Agree	Agree	Strongly Agree
Disagree		noi Disagree		
1	2	3	4	5

Please circle the best option

- 6. Which method did you prefer for VIA and colposcopy training?
 - a. Traditional (JPIEGO flash cards)
 - b. Innovative cervical cancer training model
- 7. Why? _____
- 8. Which method did you prefer for cervical biopsy training?
 - a. Traditional (Chicken breast/beef tongue simulation)
 - b. Innovative cervical cancer training model
- 9. Why? _____

10. Which method did you prefer for cryotherapy training?

- a. Traditional (Chicken breast/beef tongue simulation)
- b. Innovative cervical cancer training model

11.Why? _____

12. Which method did you prefer for LEEP training?

- a. Traditional (Chicken breast/beef tongue simulation)
- b. Innovative cervical cancer training model
- 13.Why? _____

14. What aspect(s) of the training model did you like least?

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1.	
2.	
3.	
15.Wł	nat aspect(s) of the training model did you like most?
1	
2.	
3.	
16.Do	you have any recommendations for improvements?
1.	
2.	
3.	

End of Survey... Thank you so much for participating!

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Appendix 5. Qualitative Feedback Received From Trainees Using LUCIA During Project ECHO Courses for Cervical Cancer Prevention Training

Overall model or skill being evaluated	Feedback received
OVERALL MODEL	"Easy to use"
	"Provides realistic practice"
Visual inspection with acetic acid (VIA)	"More practical"
	"More realistic"
	"More interactive and hands-on"
Colposcopy/Biopsy	"Provides more practice"
	"Gel doesn't have the same consistency as tissue"
Cryotherapy	"Provides more realistic practice"
LEEP	"Gel model doesn't have the same consistency as tissue"
	"Less smelly than animal meat"
	"Easy to use"

Below is a table summarizing the most common feedback received (5+ people).

Parra S, Oden M, Schmeler K, Richards-Kortum R. Low-cost instructional apparatus to improve training for cervical cancer screening and prevention. Obstet Gynecol 2019; 133. The authors provided this information as a supplement to their article. ©2019 American College of Obstetricians and Gynecologists. Page 8 of 9 Appendix 6. Beef tongue being used during a Project ECHO cervical cancer prevention course for loop electrosurgical excision procedure training.



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