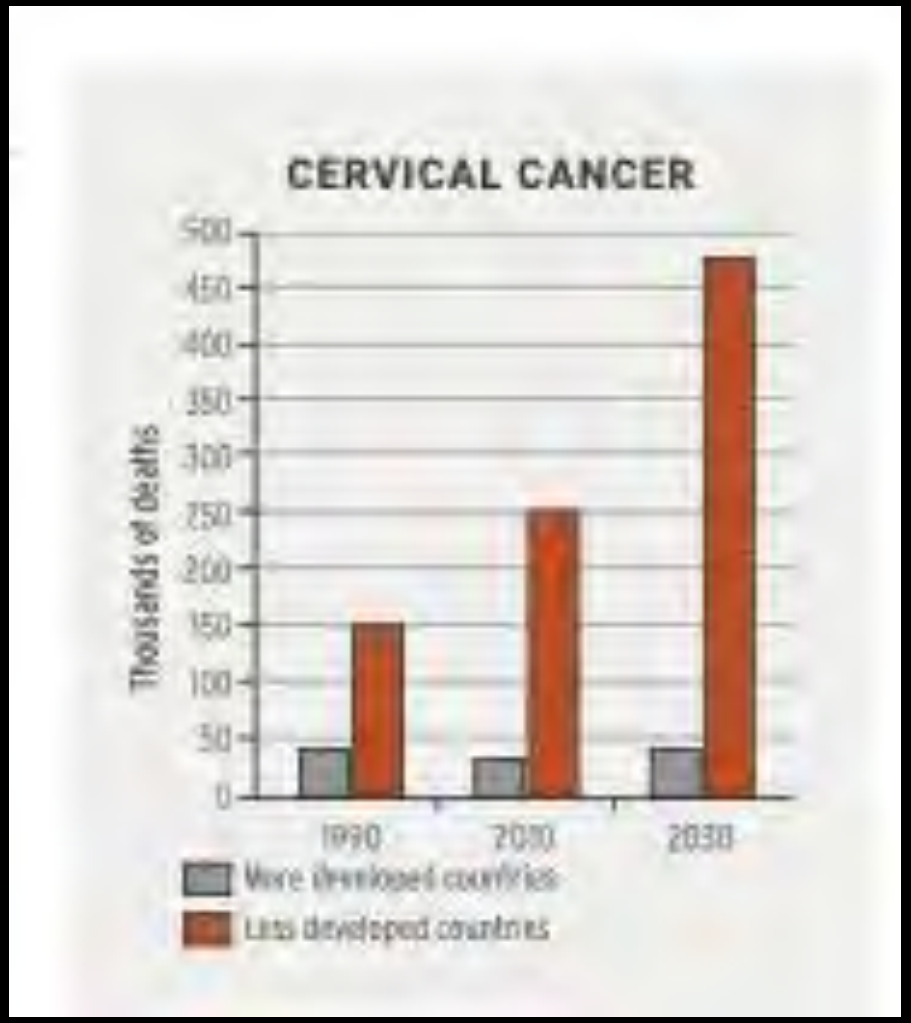
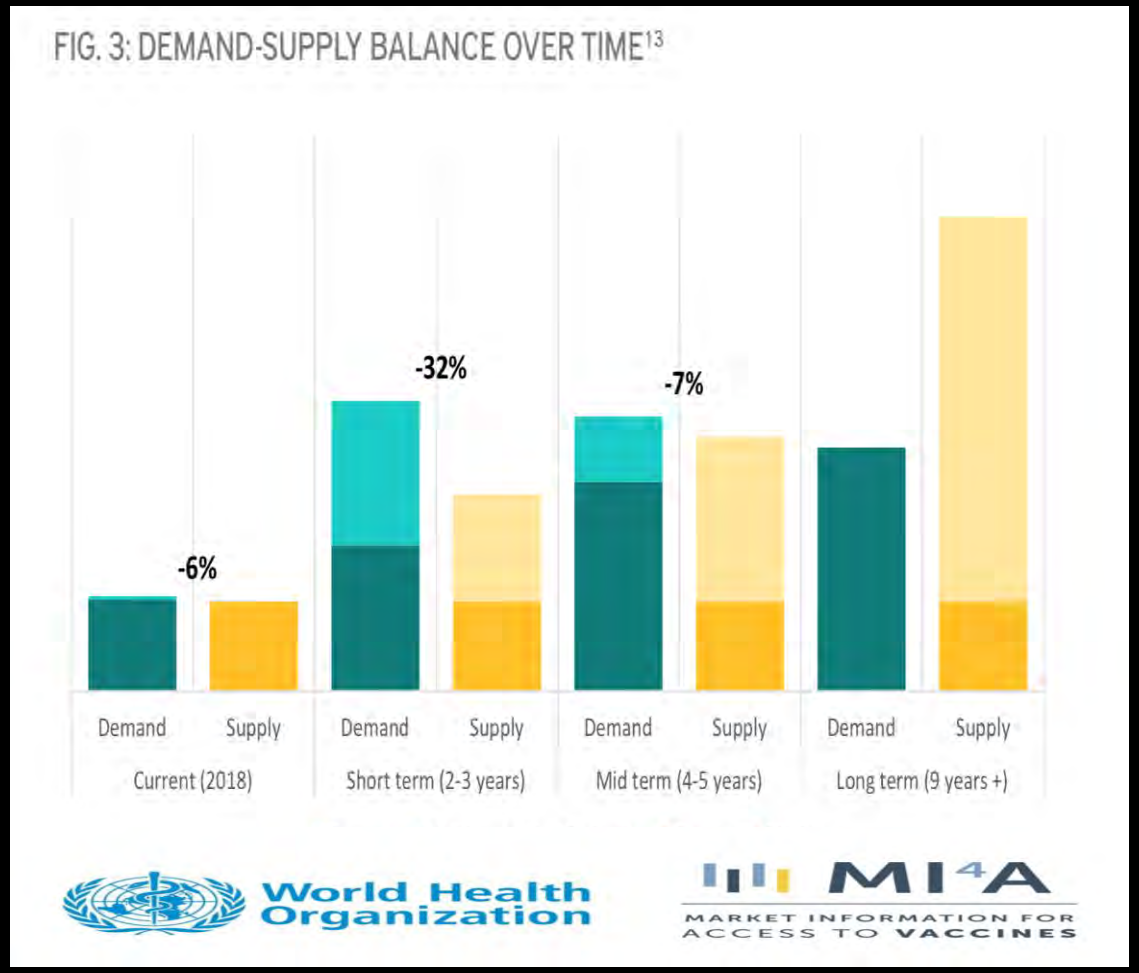
Women-Inspired Strategies for Health (WISH)

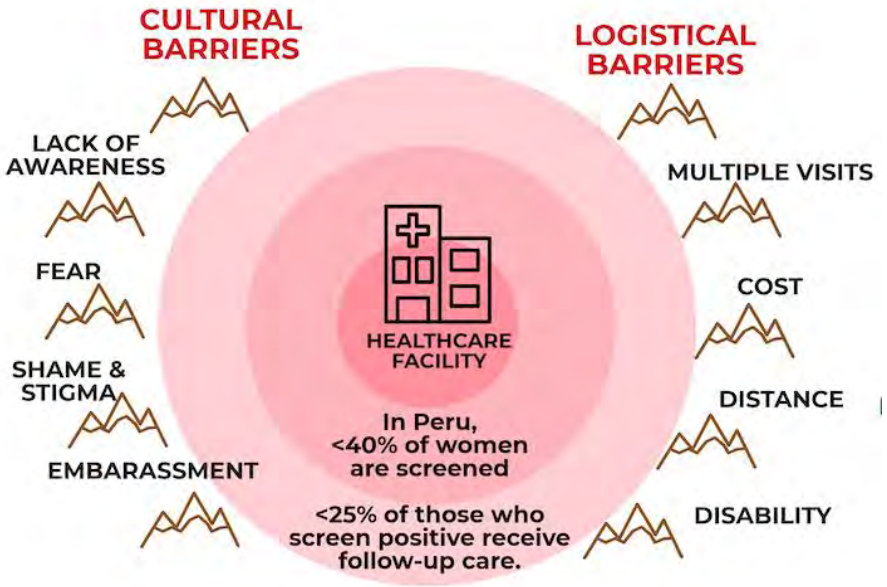
Nimmi Ramanujam, Ph.D.
Director, Global Women's Health Technologies
Robert Carr Professor of Biomedical Engineering
Duke University, Durham, NC

Challenges to Reducing Cervical Cancer Incidence

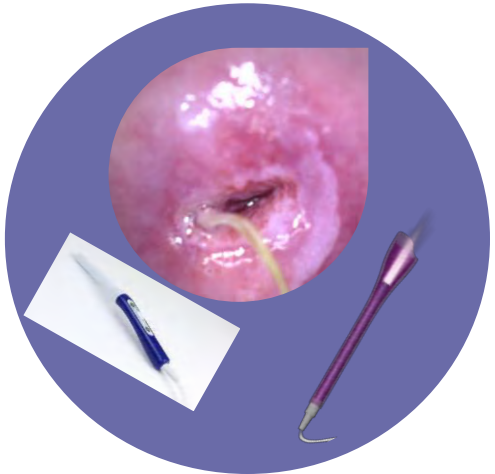




WISH Revolution
Top 100 Proposals
Macarthur 100&Change



Visualization
Low-cost, high quality imaging tools that enable provider-based and self-cervix imaging



Communication & Decision Making
mHealth Platform for secure data storage, telemedicine and Artificial intelligence assessment

Education & Empowerment
Educate women on cervical cancer and empower women to take ownership of their reproductive health

Facility-centered model of cervical cancer prevention requires 1 visit for all women and up to 3 visits for women with cervical disease

1. 

Screening

2. 

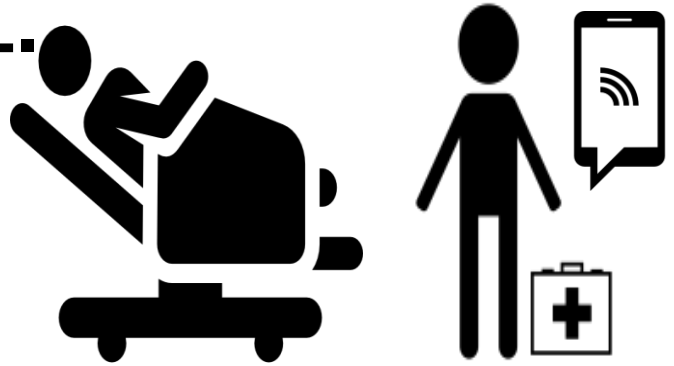
Diagnosis

3. 

Treatment

Women-centered model of cervical cancer prevention requires no health facility visits for the majority of women and only one visit for women with cervical disease

Screening and diagnosis testing at home

1. 

Identification and treatment of cervical disease at local health center

- Shifting care to a **woman's** home eliminates health care facility visits for 98 out of every 100 women screened
- Women who need follow-up treatment can receive it at a local health center near their home

A complete Suite of “See and Treat”

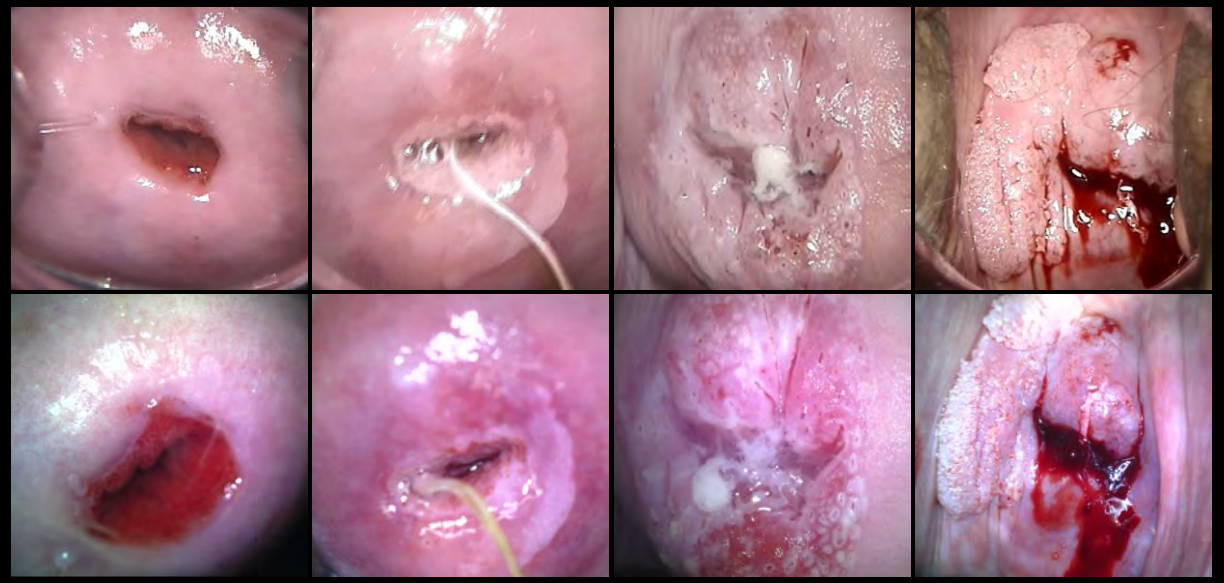
Diagnose

Treat

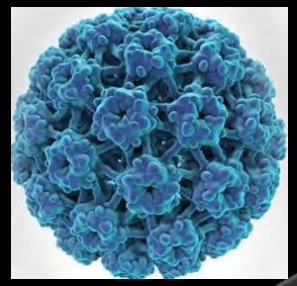
Follow up

The Pocket colposcope: A radically simplified, highly portable colposcope

FDA
510(k)



Self-HPV sampling and self-imaging for screening and diagnosis



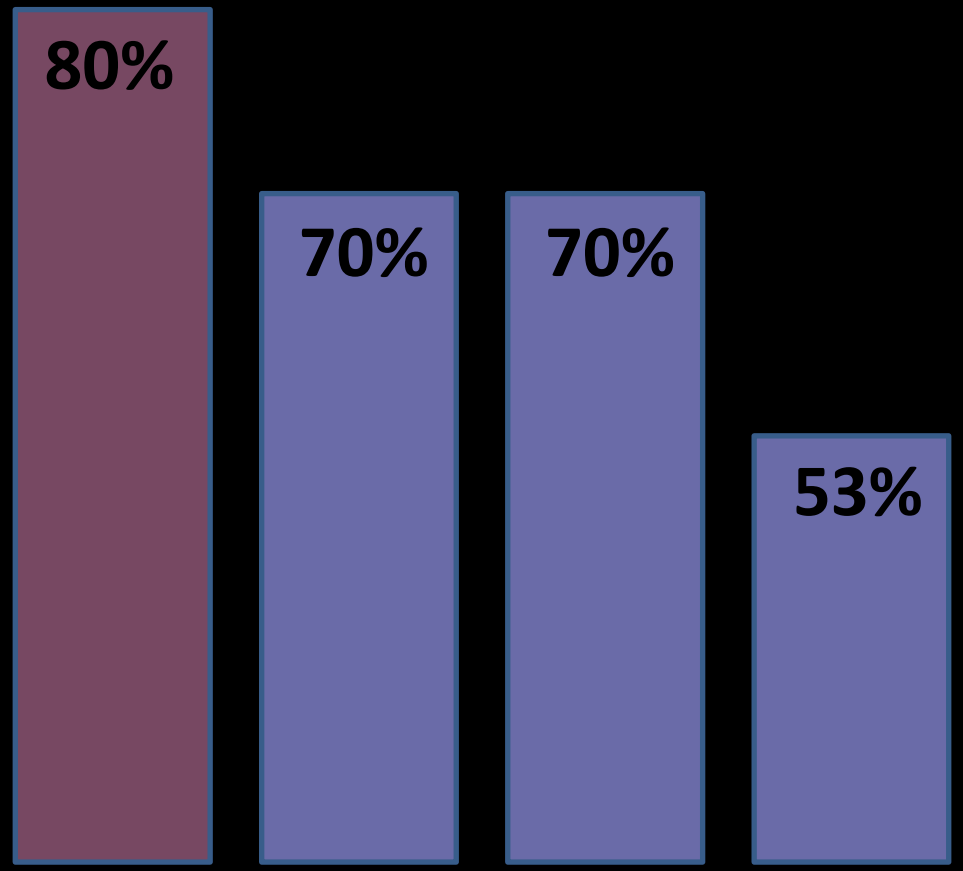
Self-HPV Testing

Visual Inspection with Acetic Acid (VIA)

The speculum -no change for over 150 years

The Callascope

Calla AI outperforms expert colposcopists



Impact of the *Wish* Model

3 visits

1 visit

Barriers

Only 30% show up for Screening

Only 25% of those screened get confirmatory diagnosis

Bridges

Women complete screening and diagnosis at home

Only those with lesions visit health center for treatment

Global Reach with over 10 Partners

Question for Q and A

- What are some of the challenges in implementing the WISH model in terms of adoption
- Do you envision any technical challenges in implementing the technologies you have developed
- How does the standard of care in different settings impact the use of the technologies

Related publications

- Asiedu, Mercy N., et al. "A Novel, Versatile Speculum-free Callascope for Clinical Examination and Self-Visualization of the Cervix." *bioRxiv* (2019): 618348. (Submitted to PNAS for review)
- Asiedu, Mercy Nyamewaa, et al. "Development of algorithms for automated detection of cervical pre-cancers with a low-cost, point-of-care, Pocket Colposcope." *IEEE Transactions on Biomedical Engineering* 66.8 (2018): 2306-2318.
- Asiedu, Mercy Nyamewaa, et al. "Image processing and machine learning techniques to automate diagnosis of Lugol's iodine cervigrams for a low-cost point-of-care digital colposcope." *Optics and Biophotonics in Low-Resource Settings IV*. Vol. 10485. International Society for Optics and Photonics, 2018.
- Lam, Christopher T., et al. "An integrated strategy for improving contrast, durability, and portability of a Pocket Colposcope for cervical cancer screening and diagnosis." *PloS one* 13.2 (2018).
- Mueller, Jenna L., et al. "Portable Pocket colposcopy performs comparably to standard-of-care clinical colposcopy using acetic acid and Lugol's iodine as contrast mediators: an investigational study in Peru." *BJOG: An International Journal of Obstetrics & Gynaecology* 125.10 (2018): 1321-1329.
- Asiedu, Mercy Nyamewaa, et al. "Design and preliminary analysis of a vaginal inserter for speculum-free cervical cancer screening." *PloS one* 12.5 (2017).
- Mueller, Jenna L., et al. "International Image Concordance Study to Compare a Point of Care Tampon Colposcope to a Standard-of-Care Colposcope." *Journal of lower genital tract disease* 21.2 (2017): 112.
- Mueller, Jenna L., et al. "Clinical evaluation of a portable pocket colposcope for cervical cancer screening in the United States, Perú, and Tanzania." *2017 IEEE Healthcare Innovations and Point of Care Technologies (HI-POCT)*. IEEE, 2017.
- Ramanujam, Nirmala, et al. "Colposcopes and mammoscopes having curved ends and flat ends, associated methods, and speculum-free imaging methods." U.S. Patent Application No. 16/089,522.
- Lam, Christopher T., et al. "Design of a novel low cost point of care tampon (POCkeT) colposcope for use in resource limited settings." *PloS one* 10.9 (2015).

Callascope testimonials

- *“The new Callascope was much more comfortable and really easy to use. The instructions were really straightforward. It’s never enjoyable going to an obgyn, however this is much more welcoming than the old speculum.” – study participant*

- *“ The speculum cold and very just, mechanical. Not natural, at all. It almost looks like something you would see in a horror movie. You know when they show the torture chamber with all the weird stuff hanging. The speculum could be right in there with all the rest of the torture instruments”. - Study participant*

- *Before you have access to the cervix, you have to perform an examination and introduce an instrument into the woman. Many women are uncomfortable with this, so they would rather not come forward for the screening. People say that it is painful. People say that it is so much of a discomfort. Some people simply will shy away because it involves an intimate part of their body. The Callascope overcomes this barrier. – Dr. Emmanuel Srofenyoh, GARH, Ghana*

Pocket Colposcope Testimonials

- *For decades those of us working in the trenches of cervical cancer control in LMICs have been waiting for technology that was truly designed to accommodate the women we serve and cognizant of the environmental challenges we face, instead of always being forced to rigorously retrofit approaches that have been successful, and profitable, in radically different contexts. In my opinion the Pocket Colposcope and Callascope represent a giant leap in the right direction. - Groesbeck Parharm M.D.*

- *If we can put in the hands of providers technology like the Pocket Colposcope, that is relatively low-cost, that is easy to use, that doesn't require electricity and can get to a small health center, land have a corresponding treatment like the thermocoagulator we can really change the story – Patricia Garcia, Former Minister of Health, Peru, Recognized leader in global health .*

- *The Pocket Colposcope is a significant advance in cervical cancer screening. It is a small and simple device, easy to use, store and transport. Yet, the pictures are as good or better than [the] standard colposcope. Health workers can be trained to use the device and record images that can be transmitted to experts elsewhere, who can evaluate them and advise appropriate therapeutic options," - Dr Neerja Bhatla, the Professor of Gynaecology at AIIMS, speaking to **The Indian Express**.*