

FGAI4H-P-028-A03

Helsinki, 20-22 September 2022

Source: TG-POC Topic Driver

Title: Att.3 – Presentation (TG-POC)

Purpose: Discussion

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Abstract: This PPT summarizes the content of FG-POC for presentation and discussion during the meeting.

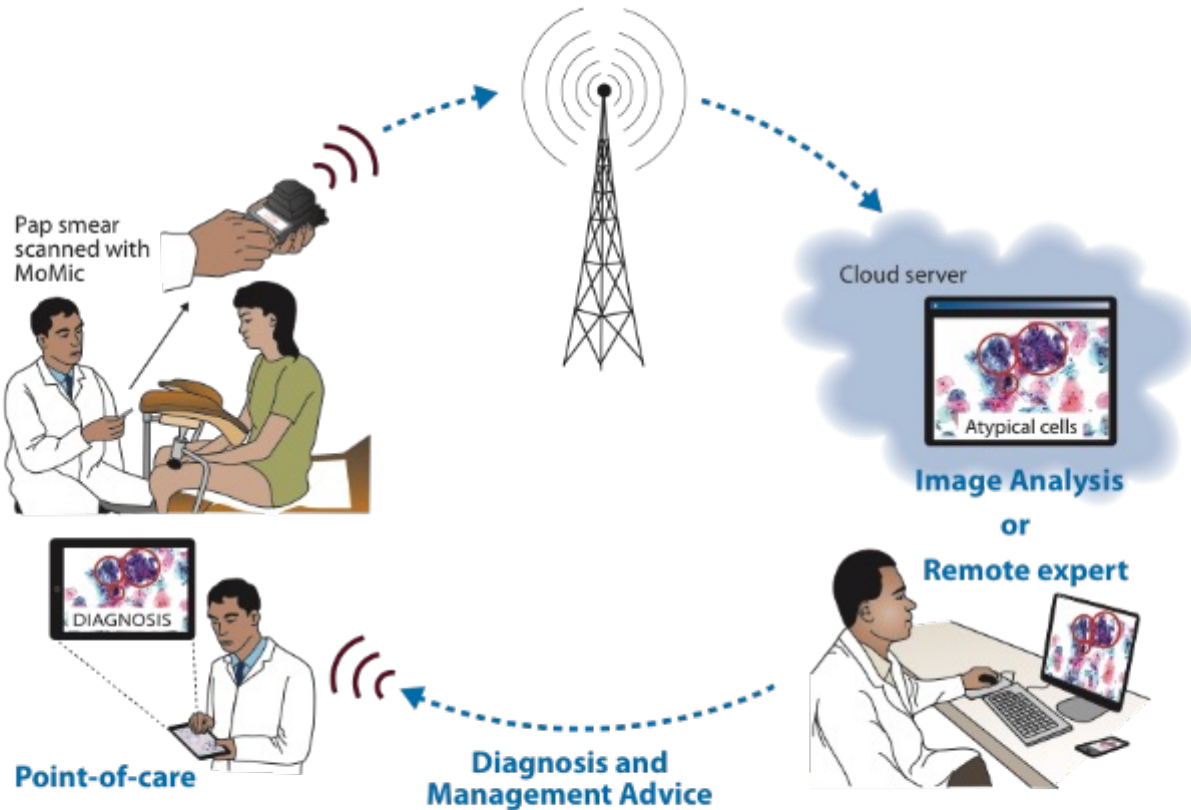


FGAI4H-P

P-meeting, 19-22 Sept

Update
TG-POC

The point-of-care diagnostics using our platform



- We create a digital slide of the sample using a **portable low-cost** scanner
- Magnification comparable to a lab level microscope (10-40x)
- Connected via mobile networks to a central server
- Digital samples are transferred for remote diagnosis done by a
 - ❖ Human expert
 - ❖ AI or
 - ❖ Combination of both



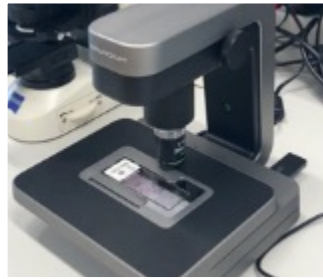
AI-supported point-of-care diagnostic system

Sample retrieval



Patient samples collected at Medical Center

Digitization



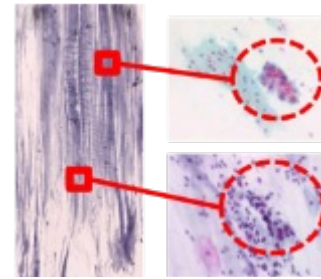
Pap smears digitized by low-cost scanner

Transfer



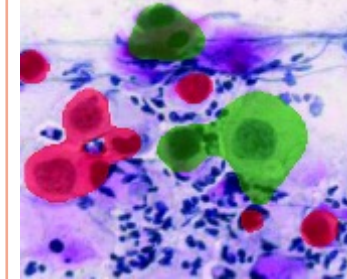
Image transferred to cloud server over 3G/4G

Digital slide



Digital slide analyzed by the algorithm

Diagnosis



Remote diagnosis by AI is performed

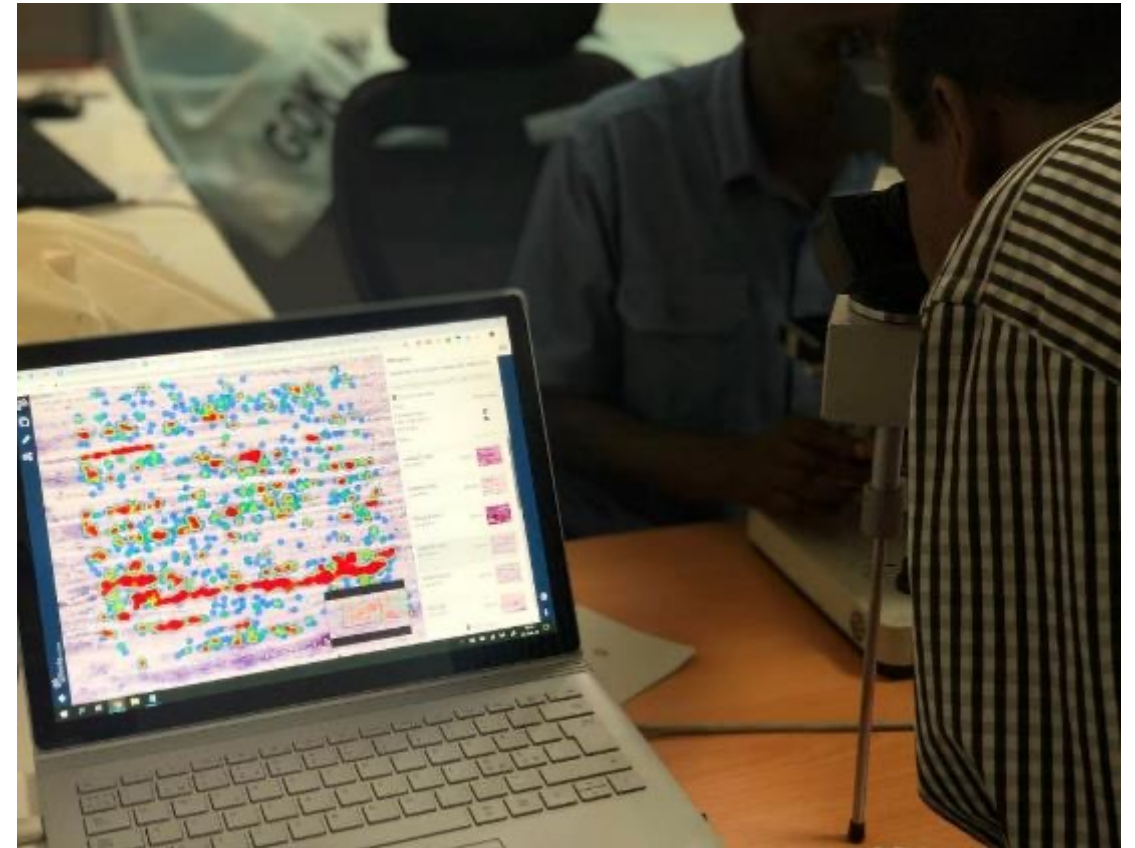
Result



Result sent back to point-of-care

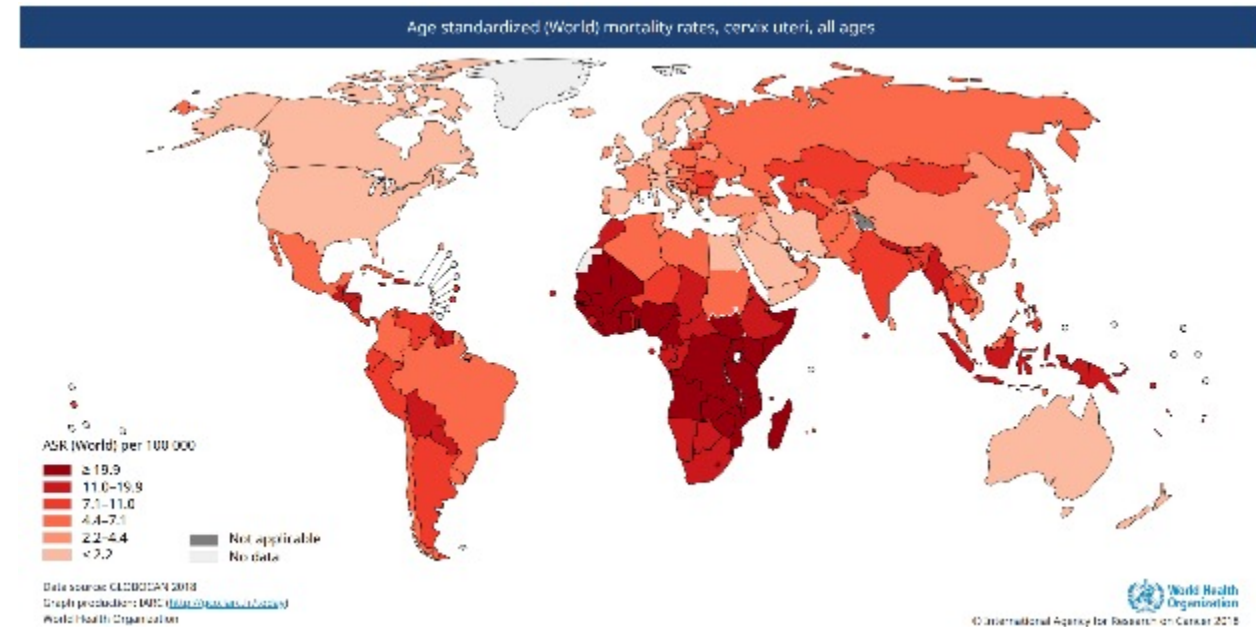
Advantages of image-based diagnostics at the point-of-care

- Creates high quality images for diverse diagnostics
 - We have performed studies on cervical cancer, malaria and neglected tropical diseases
- Remote consultation at the point-of-care
- Allows task-shifting
 - Reduces skills needed and decreases workforce burden
- Can also be used for
 - monitoring disease outbreaks
 - storage of image data within drug and vaccine trials
 - teaching in basic and advanced levels



Probability of death due to cervical cancer

- Most common cancer in the African region (22% of female cancers)
- 90% of new cases and deaths from this preventable cancer occurs in low and middle-income countries
- Mortality is expected to double by 2030, with the largest burden in sub-Saharan Africa
- The WHO recommends “screen and treat” strategies, in which a woman with a positive screening test receives treatment in the same clinical encounter



Deaths due to cervical cancer /100.000 females

Globocan 2018, WHO

Automated detection of abnormal cells in cervical smears

- 750 patient's cervical smears
- Samples digitized with mini scanner
- Images uploaded to cloud server
- Training of algorithm
- Detecting cellular abnormalities
- Results showing heat map for high grade cellular lesions



Search... + Add New... Johan Lundin MoMic

Slides Momic Pap smears - Kinondo Filter content

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Kaija Papa Näytteet	MK0015 Oscar Holmström 1	MK0016 Oscar Holmström 1	MK0017 Oscar Holmström 1	MK0018 Oscar Holmström 1	MK0019 Oscar Holmström 1
Momic Pap smears - Kinondo					
Ocus HUSLAB Samples	MK0020 (LSIL) Oscar Holmström 1	MK0021 (LSIL) Oscar Holmström 1	MK0022 Oscar Holmström 1	MK0023 Oscar Holmström 1	MK0024 (LSIL) Oscar Holmström 1

Validation study in Kenya-ongoing

- Evaluating the feasibility for detecting cervical dysplasia using AI at the POC in HIV-neg women
- HPV-PCR diagnostics is performed
- Validation of algorithms on new patients started Feb/2022-ending October/2022
- 650/720 samples now collected from women attending the Kinondo Kwetu Hospital and the Diani Health Center, Kenya
- Cost effectiveness study done in parallel



AI-lab at Kinondo Hospital, Sept 2022, Kenya

Next steps-upcoming

- Expanding **cervical screening** to HIV neg women in Kenya and Tanzania
 - Target 1000 women
 - Cervical atypia and HPV status
 - Cost-effectiveness (time spent for staining, AI-analysis, training, patient waiting time, time spent with patient, costs /patient)
- Preparation for publication 10-12/2022
- Validation studies for POC diagnostics for **helminth infections and malaria** in Tanzania (MUHAS) and Kenya (Kinondo)
 - Discussions with health authorities
 - Identifying new study centers (small and medium sized hospitals)
 - Discussions with local ethics committees are ongoing



Collaboration

- Nordics
 - **Finland-** FIMM, **Sweden-**KI and Uppsala University
- Sub-Saharan Africa
 - **Kenya-**Kinondo, Diani,
 - **Tanzania-**MUHAS, Technical Univ. of Mombasa
- Bangladesh, discussions ongoing
 - icddr,b





Team in Kenya and Tanzania



Team at at FIMM-Helsinki University

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Andreas Mårtensson, Uppsala University

Billy Ngasala, MUHAS, Tanzania

Call for collaboration

- nina.linder@helsinki.fi
- Thank you for your attention!



 **AI for Health**
An ITU Focus Group
In collaboration with WHO