Global experiences in scaling up Cervical Cancer Screening

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Conflicts of Interest: None declared
Large scale organised and opportunistic *cervical cancer screening* programmes in the World
Cervical Cancer Screening Programs in the EU 2016

Basu P et al., Int J Cancer. 2018 Jan 1;142(1):44-56

First Report
Cervical cancer screening programmes in the EU
Participation rate to Screening
(30-59 yrs; screened/invited)
Cervical cancer screening programmes in the EU
Detection Rate of CIN2+ (/1,000)
(30-59 yrs; Initial + subsequent screening)
Ref: Basu P et al., Int J Cancer. 2018 Jan 1;142(1):44-56
Cervical cancer screening programmes in the EU

PPV of Positive Colposcopy to Detect CIN 2+
(All ages; Initial + Subsequent Screen)

Cervical screening in the post vaccination era in Netherlands

• A switch from cytological screening towards primary hrHPV screening with cytology triage in January 2017.
• The introduction of a self-sampling device for non-responders.
• Referral of women with mild dysplasia and worse lesions to gynaecologists.
• In case of a negative hrHPV test at the age of 40 and 50 years, women receive their next invitation in 10 years instead of 5 years.
• All screening tests for the population screening will be sent to five laboratories instead of 40.
• The second triage cytology at 6 months is now part of the population screening and therefore free of charge for the participating women.
Cervical screening in the post vaccination era in Australia

- As a result of HPV vaccination, the HPV rate among women aged 18 to 24 years dropped from 22.7% to 1.1% between 2005 and 2015.
- The two yearly Pap test for people aged 18 to 69 has been replaced by a five yearly human papillomavirus (HPV) test for people aged 25 to 74 in December 2017.
- People are due for their first Cervical Screening Test at the age of 25 or two years after their last Pap test.
Large scale opportunistic *cervical cancer screening* programmes in LMICs
District-level expansion across Zambia (2006-2014) and projected (2016) of the Cervical Cancer Prevention Program in Zambia (CCPPZ)

Program process and outcome indicators of the Cervical Cancer Prevention Program in Zambia

Rates of screening positivity, cryotherapy eligibility and cryotherapy-ineligibility by age categories and overall

Trends in rates of screening positivity and cryotherapy rates over calendar years 2006–2013

Trends in rates of ‘same day-services’ and rates of ‘appropriate referral’ over calendar years 2006–2013

Bangladesh National Cervical Screening Program (2005-2017)

- Aims to provide VIA screening to >70% of 30-59 year old women
- Women are screened by 1499 providers in 373 VIA screening centers
- 334 trained doctors provide colposcopy and treatment services in 25 colposcopy/treatment centres
- **1.39 million women** have been screened; 5.1% were VIA+ve
- 90% of screen positives have been further investigated and treated
First study to show impact of VIA screening on cervical cancer mortality

Sankaranarayanan et al. Lancet 2007
## Cervical screening using VIA: Coverage and detection rates

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Target population</strong></td>
<td>14,392,034</td>
<td>34,074</td>
<td>49,320</td>
</tr>
<tr>
<td><strong>Screened (%)</strong></td>
<td>7,420,556 (52%)</td>
<td>26,275 (78.5%)</td>
<td>31,343 (63.6%)</td>
</tr>
<tr>
<td><strong>VIA positive (%)</strong></td>
<td>279,711 (3.8%)</td>
<td>3,733 (13.9%)</td>
<td>3,088 (9.9%)</td>
</tr>
<tr>
<td><strong>Compliance to colposcopy</strong></td>
<td>132,380 (47.3%)</td>
<td>3,684 (98.7%)</td>
<td>3,052 (98.8%)</td>
</tr>
<tr>
<td><strong>Biopsy</strong></td>
<td>45,743 (34.6%)</td>
<td></td>
<td>2,359 (82.2%)</td>
</tr>
<tr>
<td><strong>CIN 2+ detection rate</strong></td>
<td>0.5/1000 women screened</td>
<td>10/1000 women screened</td>
<td>9/1000 women screened</td>
</tr>
</tbody>
</table>
## VIA and cytology triage of HPV+ve women: IARC studies in India

<table>
<thead>
<tr>
<th>Basis for referral and CIN detection</th>
<th>No (%)</th>
<th>CIN 2/3 detected</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPV +ve</td>
<td>2469 (100%)</td>
<td>293</td>
</tr>
<tr>
<td>HPV +ve, cytology +ve</td>
<td>944 (38%)</td>
<td>246 (84%)</td>
</tr>
<tr>
<td>HPV +ve, VIA +ve</td>
<td>1016 (41%)</td>
<td>240 (82%)</td>
</tr>
<tr>
<td>HPV +ve, cytology +ve, VIA +ve</td>
<td>581 (24%)</td>
<td>210 (72%)</td>
</tr>
</tbody>
</table>

Requirements for implementing screening through health services

• Policy and budget commitments from government
• A plan and an organization
• Enough providers of services for the screening continuum
• Training and quality assurance establishment
• Infrastructure: Screening outlets (primary care level) and diagnostic and treatment service (secondary and tertiary care level)
• Information system to monitor and evaluate inputs and outcomes
• Annual progress reporting
Evolution of cervical cancer screening programme
- learnings from five decades

Tytti Sarkeala
PhD, Director of screening
Outline

• Basics on cancer screening
  – Aim and key elements

• Cervical cancer screening
  – Essentials on cervical cancer
  – Existing programmes in Europe
  – Case Finland
    • a success story with challenges

✓ Similar everywhere?
CANCER SCREENING
Aim

✓ To reduce mortality from cancer by detecting tumours at an early phase

✓ To reduce incidence of cancer by detecting precancerous lesions
Screening is a chain

Target population:
- Sending invitations

Invitation:
- Sending reminders to non-participants

Test:
- Taking and analyzing the test
- Sending results of the test to participants
- Inviting test positives to further examinations

Further examinations

Treatment & follow-up

Collecting data from all phases and delivering them to national registers

Cancer Society of Finland
EXISTING SCREENING PROGRAMMES
- common features -
Key elements


1. Evidence-based, defined screening policy (test, interval, target population)

2. Centralized data system with linkage to other relevant registers

3. Constant monitoring and evaluation of performance and outcome
Defined screening policy

- **Target age**
  - starting at x years, stopping at y years

- **Test methods**
  - primary test(s) defined

- **Interval for repeated testing**
  - z years
Centralized data system

- Nationwide data collection with individual information on:
  - date of invitation
  - date and result of screening test
  - follow-up recommendations
  - date and result of histological verification and related treatments
  - opportunistic testing and related treatments

- Standard collection procedures utilizing electronic data
- Standard coding procedures

- Linkage to population, cancer, mortality, and to other relevant registers in health services

- Personal identifier
Monitoring and evaluation

• Monitoring of performance indicators
  – definitions and their appropriate levels derived from evidence-based guidelines
    • invitational coverage (% of target population)
    • compliance with invitation (attendance; % of invited)
    • recall rate for further examinations (% of those screened)

✓ Evaluation of incidence and mortality development
CERVICAL CANCER SCREENING
Cervical cancer

- 530 000 new cases, 270 000 deaths annually
  - third most common cancer among women worldwide
  - 80% of new cases in less developed regions

- Risk
  - affects fertile-age women: most cases in ages 35-50 years
  - is related to persistent high risk HPV-infection
    - sexual activity starting at young age
    - high total number of sexual partners
    - history of genital warts
    - smoking
Progression of HPV (5-15 years)

- HPV infection: Regression 90%
- CIN1: Regression 50-90%
- CIN2/3: Regression 40-90%
- Cancer: 10-60%
Cervical cancer prevention

- Changes in sexual patterns or lifestyle
  - A-B-C (abstain, be faithful, use condom)

- HPV vaccination
  - Programmes recently started in many European countries, effect on cancer incidence is to be evaluated later
  - Most vaccines targeted to HPV-types 16 and 18 (>70%)
  - Target population should be naive for HPV

- Population-based screening
European screening programmes

✓ First in 1960’s

• Target age 25–69 years
• Screening interval 3–5 years
• Pap or HPV (+Pap triage) the primary screening test
• Referral examinations
  – Colposcopy (diagnostic procedure to examine an illuminated, magnified view of the cervix)

✓ http://nordscreen.org/
Examples of national policies in Europe
(Basu et. al. IJC 2018)

<table>
<thead>
<tr>
<th>Country</th>
<th>Target age</th>
<th>Interval (yrs)</th>
<th>Tests lifetime</th>
<th>Organised</th>
<th>Opportunistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>25–64</td>
<td>3 or 5</td>
<td>10–16</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>15+</td>
<td>1</td>
<td>50+</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Finland</td>
<td>30–60 (25–65)</td>
<td>5</td>
<td>7 (9)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Germany¹</td>
<td>20+</td>
<td>1</td>
<td>50+</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Lithuania</td>
<td>25–69</td>
<td>3</td>
<td>11</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Netherlands</td>
<td>30–60</td>
<td>5</td>
<td>7</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Slovenia</td>
<td>20–64</td>
<td>2 or 3</td>
<td>15</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>UK (England)</td>
<td>25–64</td>
<td>3 or 5</td>
<td>10–16</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

¹ Planning phase
Case Finland: a success story
About 80% reduction of cervical cancer burden since the 1960’s.
Case Finland: challenges

- **Decreasing attendance** with increasing cancer incidence among women aged <40yrs
  - implementation of reminders and self-sampling devices (SMS?) into organised screening
    - attendance increased by 10% *(Virtanen et. al. 2013)*
  - improving communication strategies

**CERVICAL CANCER SCREENING VIDEO**
Case Finland: challenges

• Major part of the remaining cervical cancer burden occurs in ages beyond the current programme
  – invitational age should be expanded to 65+ years

• Vaccination for girls aged 11-12 years, 2013+
  – overall coverage still low (70 %)
  – new screening policy needed for the vaccinated cohorts
SIMILAR EVERYWHERE?
Similar everywhere?

✅ Obstacles of screening in less developed regions
  - incomplete reporting and registration
  - lack of infrastructure
    - obtaining, interpretation and storage of the specimens
  - marginal health care services
  - low cancer awareness
  - cultural barriers to care
  - genetic and biologic differences of the disease
    - wider variety of HPV types involved in the pathogenesis of cervical cancer?
Screening should be customized to a given set of conditions

- **Basic resource level:**
  - Education programmes about the value of early detection, risk factors and health awareness

- **Limited resource level:**
  - Visual inspection+cryotherapy or single HPV testing?

- **Enhanced resource level:**
  - Screening taking into consideration of age-specific incidence rates, longevity, available resources, and other relevant local conditions

- HPV vaccination for young (9–12 yrs) girls and boys
Take home messages

✓ Screening is a chain!

✓ Establishing a full-scale screening programme is complex

✓ Prerequisites for a successful programme are evidence-based policy, centralised data collection, regular monitoring and evaluation, and appropriate resourcing throughout all phases

✓ Screening programme needs to be customized to local settings
Thank you!

https://cancerregistry.fi/screening/
Cervical Cancer Screening in Malaysia: Challenges and Way Forward

CERVICAL CANCER SCREENING PROGRAMS IN HIGH AND LOW RESOURCE SETTINGS

Nor Saleha Ibrahim Tamin (MD. MPH)
Ministry of Health Malaysia
**Introduction**

Area: 330,803 km²

Total population of 31.19 million (2016) [World Bank]

Male Female ratio = 1.07 : 1

3 major ethnic groups: Malay, Chinese, Indian

Female population 30-65 years of age = 7 million (50% of female population)

Life expectancy: 74.5 years
The statistics of Cervical Cancer in Malaysia

- Cervical cancer ranked no 3 among females in Malaysia
- 7.7% of all cancers among female (4.2% overall)
- ASR 7.6/100,000
- Decreased (8.3/100,000 to 6.5/100,000)
- Lifetime risk is 1 in 116
- ASR differ by state (highest in Sarawak, lowest in Kelantan)
The statistics of Cervical Cancer in Malaysia

Incidence higher in Chinese compared to Indian and Malay
40% diagnosed at late stages (III & IV)
Cervical cancer screening program in Malaysia

- **1969**: Introduction of Pap Smear
- **1995**: Expansion of Pap Smear screening
- **1996**: Introduction of Health Management System - manage screening data
- **2001**: Establishment of TECHNICAL COMMITTEE ON PAP SMEAR SCREENING
- **2009**: Vaccination of 13yrs old girls
- **2010**: Liquid based cytology
- **2011**: Population Based Cervical Cancer Screening Program Through Call-recall-System Pilot Study – feasibility study in Klang and Mersing
- **2014**: Review on age group: From 20-65 to 30-65
- **2017**: Working towards HPVDNA as screening method
- **2018**:
**GOAL:** To reduce the incidence of Cervical Cancer related to HPV type 16 and 18 infection among immunized 13 years old girls over next 20 years.

**OPERATIONAL POLICY:** Free Voluntary School Based HPV Vaccination to Form 1 Malaysian girls

**STRATEGY:** delivered as part of the Cervical Cancer Prevention and Control Program and the Expanded Program of Immunization (EPI)

**POLICY:** Free HPV immunization to 13 year old Malaysian girls starting 2010

Single type of vaccine utilization during one procurement cycle
- 2010/11: Cervarix
- 2012 – 2016: Gardasil
- Schedule: 0, 1, 6 month
- Shifted to 2 doses in 2015 (0, 6 month)

- High school attendants in Malaysia
- HPV vaccine as an additional vaccination to existing EPI program
- Availability of structured comprehensive school health program
- Strong commitment and support from Ministry of Education

Acknowledgement to Dr Saidatul Norbaya Buang, MOH Malaysia
# HPV Immunisation Program in Malaysia
## – The Communication strategy

### Theme: HPV Vaccine as Cervical Cancer Vaccine

<table>
<thead>
<tr>
<th>Media Campaign Based on Health Belief Model</th>
<th>Public Access to Interactive Information</th>
<th>Rumours Surveillance and Program Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cervical cancer is preventable</td>
<td>1. Social Media</td>
<td>1. Response to media and public queries</td>
</tr>
<tr>
<td>2. Parental awareness on voluntary vaccination</td>
<td>- HPV Facebook</td>
<td>2. Provide guideline to implementers</td>
</tr>
<tr>
<td>3. Persuade girls to complete 2 doses of vaccination as scheduled</td>
<td>- HPV twitter</td>
<td>3. Monitor potential program threat and proposed counter measures</td>
</tr>
</tbody>
</table>

### Public Access to Interactive Information
- Social Media
  - HPV Facebook
  - HPV twitter
- Phone Hot line
- Email
- Print and electronic advertisement

### Rumours Surveillance and Program Monitoring
- Response to media and public queries
- Provide guideline to implementers
- Monitor potential program threat and proposed counter measures

### Addressing the religious and cultural aspect of the HPV vaccination
- Leading to establishment of Fatwa or religious ruling on HPV vaccination for the Muslim.

Acknowledgement to Dr Saidatul Norbaya Buang. MOH Malaysia
Barriers to Conventional Cervical Screening
- Low Coverage of Pap Smear

**Patient factors**
- Fear
- Embarrassment
- Shame
- Perceived benefits
- Inconvenience (no time) – is self sampling better?
- Negative experience
- Awareness

**Health-care factors**
- Screening done at primary care facilities (lack of space and privacy?)
- 3 yearly intervals – reduce compliance?
- Time taken from sampling to results too long (sent to Government lab or outsource)
- Human resources – cytopathologist

Prevalence of pap smear examination among women ≥ 20 years :-
- 26% (NHMS II, 1996)
- 43.7% (NHMS III, 2006)
What’s next? – the way forward

• Towards HPV DNA as screening method → Exploring the possibility
• Local study on HPV subtypes
• Local study on self sampling
Local study on HPV subtypes

- (Su Pei Khoo et al. 2017)
  The overall prevalence of HPV infection in this Malaysian multiethnic population was 7.2%, with 6.5% being high-risk genotypes. The top three most common high-risk HPV types were HPV 16, 52 and 58. This information is important for the planning of primary (HPV vaccination) and secondary (screening) cervical cancer prevention programmes in Malaysia.

- The Malaysian Human Papillomavirus Prevalence (MyHPV)
  - Multi-institutional collaborative effort
  - Determine the prevalence and socio-demographic correlates of HPV carriage among healthy Malaysian women
  - Pre-vaccination cross sectional cohort
  - n male : 1202; n female 1288; total 2490

Woo et al : Prevalence of Human Papilloma Virus Infection Among Males and Females in Malaysia (submitted for publication)
Malaysians subjects aged 18 to 60 provided a self-collected cervicovaginal swab and oral samples, where DNA was extracted and HPV genotyped using new generation sequencer-base sequencer after a multiplex PCR based assay.

<table>
<thead>
<tr>
<th>HPV Subtypes*</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPV 16</td>
<td>18.6</td>
</tr>
<tr>
<td>HPV 52</td>
<td>14.0</td>
</tr>
<tr>
<td>HPV 58</td>
<td>12.8</td>
</tr>
<tr>
<td>HPV 51</td>
<td>11.6</td>
</tr>
<tr>
<td>HPV 68</td>
<td>10.5</td>
</tr>
<tr>
<td>HPV 45</td>
<td>9.3</td>
</tr>
<tr>
<td>HPV 31</td>
<td>8.1</td>
</tr>
<tr>
<td>HPV 18</td>
<td>8.1</td>
</tr>
<tr>
<td>HPV 11</td>
<td>7.0</td>
</tr>
<tr>
<td>HPV 66</td>
<td>5.8</td>
</tr>
<tr>
<td>HPV 59</td>
<td>4.7</td>
</tr>
<tr>
<td>HPV 33</td>
<td>3.5</td>
</tr>
<tr>
<td>HPV 56</td>
<td>1.2</td>
</tr>
<tr>
<td>HPV 11</td>
<td></td>
</tr>
</tbody>
</table>

*HPV Subtypes: High-risk strains (red) and Low-risk strains (blue)
HPV subtype prevalence in males - Malaysia

<table>
<thead>
<tr>
<th>HPV subtypes</th>
<th>Multiple HPV</th>
<th>HPV 16</th>
<th>HPV 18</th>
<th>HPV 31</th>
<th>HPV 45</th>
<th>HPV 52</th>
<th>HPV 58</th>
<th>HPV6/11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penile</td>
<td>20 (23.3%)</td>
<td>8 (9.3%)</td>
<td>14 (16.3%)</td>
<td>2 (2.3%)</td>
<td>1 (1.2%)</td>
<td>7 (8.1%)</td>
<td>3 (3.5%)</td>
<td>9 (10.5%)</td>
</tr>
<tr>
<td>Anal</td>
<td>17 (34%)</td>
<td>2 (4%)</td>
<td>15 (30%)</td>
<td>0</td>
<td>1 (2%)</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Oral</td>
<td>0</td>
<td>6 (37.5%)</td>
<td>0</td>
<td>1 (6.2%)</td>
<td>1 (6.2%)</td>
<td>2 (12.5%)</td>
<td>1 (6.2%)</td>
<td></td>
</tr>
</tbody>
</table>

Woo et al
Local studies on HPV DNA screening, self sampling
e.g. Ma’som M et al. Attitudes and factors affecting acceptability of self administered cervicovaginal sampling for human papilloma virus (HPV) genotyping as an alternative to Pap testing among multi-ethnic Malaysian Women. BMJ Open 2016:

→Overall, urban Malaysian women from multiethnic backgrounds found self sampling to be an acceptable alternative to Pap smear
Preliminary Results from Pilot Project ROSE:

- High acceptability rates with more than 95% women screened indicating they prefer self-sampling
- 35% of the 2000 screened had never been screened before
- 5.5% of the 30-65 year old screened was positive for HR HPV
- 70% made appointments for colposcopy follow up when receiving abnormal screening test
- So far 2/2000 women screened had invasive cervical cancer diagnosed

Pilot Project ROSE is an innovation that aims to create more efficient screening, improvement of quality and lower total cost: a study lead by UM.

Local studies on HPV DNA screening, self sampling
Challenges in implementing HPV DNA as primary screening tool

• Major paradigm change
• Financial resources
• Shift from pathology-> molecular biology
• Monitoring and follow-up (public and private)
• HPV test is expensive and so important to have a register to monitor who has had what
• Determining the target group and policy
• Clear messaging so as not to confuse public that this is a STD but screening
## Conclusion

- Uptake for Pap smear is not as it should be
- Patient factor and service factor exist
- Plan to move from conventional Pap smear to HPV DNA for cervical cancer screening
- When is still a question mark....
- Malaysia committed to elimination of cervical cancer

‘During my campaign in 2016, I made a commitment to support the global elimination of cervical cancer. I reiterated that commitment when I was elected as Director-General a year ago. We have the tools to turn that commitment into a reality.

Please join us in making cervical cancer history’
THANK YOU

drnorsaleha@moh.gov.my
Implementation of self-sampling for HPV screening in Indigenous populations in Guatemala: lessons learned

Rafael Meza, University of Michigan
rmeza@umich.edu; @meza_rafa
Guatemala

- Central America country

- Population: 17 million
  - > 40% indigenous – Mayan (multiple groups)
  - 49% rural

- Language
  - Spanish
  - 21 Mayan languages

- > 50% of the women get healthcare from NGOs, private hospitals, traditional medicine
30-35% of annual female cancers at the National Cancerology Hospital (INCAN) in 2013

Source: INCAN cancer registry
Cervical cancer screening in Guatemala

DHS 2014-2015, women ages 15-49

Ever Pap - 49.8%

Ethnicity

- Non-indigenous women - 54.2%
- Indigenous women - 43.5%

Urbanicity

- Urban - 52.8%
- Rural - 46.9%
Cervical cancer screening in Guatemala

• Access is only part of the equation

• Quality

• Follow-up

• Treatment
HPV self-sampling

- Pap smears and VIA may not be the most effective method for preventing cervical cancer in indigenous and rural populations in Guatemala.

- Is HPV self-collection an acceptable, and perhaps more effective, alternative to universal Pap or VIA screening in this setting?
  - A priori answer: Yes, but we “need” local evidence.
HPV testing and self-collection

• >90% of cervical cancer is caused by HPV – around 70% by types 16 and 18

• Sensitivity: >90% for HPV

• HPV tests have been shown to have higher sensitivity than Pap for CIN II, III, and cancerous lesions (relative detection rate of 1.3-2)
  • HPV Focal study (Ogilvie, JAMA 2018)

• Specificity: Negative results signify minimal risk of disease in next 10 years

• Self-collection as effective and clinician collection

• Limitations: cost and infrastructure requirements → CareHPV, Hibribio, Genexpert
Why more studies of self-collection

• Self-testing works! Widely acceptable.

But,
• Few studies among rural/indigenous communities in Latin America – context matters

• Skepticism about acceptability
• STD, stigma, privacy
Pilot summer 2015

Santiago Atitlan, Guatemala
Approximately 40,000 residents
Primary language: Tz’utujil
Average daily income: 4 USD
Over 80% have at most primary education
Community-based study

- Cross sectional design, women proportionately sampled from 6 urban and 3 rural neighborhoods
- Women ages 18-60 recruited by community health workers
- 87% of interviews conducted in Tz’utujil, 13% in Spanish
Data collection

- Interview data collected through Qualtrics app
- HPV samples collected using HerSwab kits
- Samples shipped to Guatemala City bi-weekly for testing
- Women called 10 days after collection to receive results
- All women encouraged to attend local VIA screening clinic
HPV testing

• Testing done at independent, non-profit lab (Asociacion de Salud Integral)

• Tested for 28 types of HPV
  • 13 high risk types (known cervical cancer risk factors): 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 68
  • 15 low risk types

• Expensive
Results: self-collection

- 202 women completed survey
  - 95% of women who began the survey completed the survey (no major issues answering sensitive questions)
- 93% of women surveyed wanted to take self-swab test
  - 88% eligible (179 women)
- 100% of the women who took the test were willing to take it again
- 91% of women tested called to get their results

Gotschlich et al, JGO 2017
Results: HPV testing

21% tested positive for HPV
17% tested positive for high-risk HPV
Discussion/Conclusions

• < 15% of women had previously heard of HPV

• The self-swab test was found to be highly acceptable:
  - 78% of women found it comfortable
  - 90% found it easy
  - 100% were willing to use as CC screening method

• Over 80% of women said that they preferred to be screened in their home with a self-swab kit over being screened at a doctor’s office
Multi-Ethnic Longitudinal Study 2016-2018

• Does the HPV test result affect follow-up rates?

• Two communities: Santiago Atitlan and Livingston Izabal

• Implemented low-cost test (Hybribio) at local lab

• Follow women
Livingston, Izabal

- Approximately 60,000 residents
- Mix of Garifuna, Ladino and Q’eqchi’ ethnicities
- Average income: 10 USD
- 50% have completed at least some secondary school
Multi-Ethnic Longitudinal Study 2016-2018

Santiago Atitlan
500 women
10 semi-structured surveys
Surveys/interviews in Spanish and Tz’utujil

Livingston Izabal
449 women
40% Indigenous, 30% Garifuna, 30% Ladino
11 semi-structured surveys
Surveys/interviews conducted in Spanish, Garifuna, and Q’eqchi’

Murchland et al, under review
## Results: self-sampling

<table>
<thead>
<tr>
<th></th>
<th>Santiago 2015</th>
<th>Santiago 2016</th>
<th>Livingston</th>
</tr>
</thead>
<tbody>
<tr>
<td>Willing to self-collect*</td>
<td>93%</td>
<td>94%</td>
<td>53%</td>
</tr>
<tr>
<td>Collected sample</td>
<td>179</td>
<td>497</td>
<td>169</td>
</tr>
<tr>
<td>Comfortable</td>
<td>78%</td>
<td>81%</td>
<td>87%</td>
</tr>
<tr>
<td>Easy</td>
<td>90%</td>
<td>85%</td>
<td>87%</td>
</tr>
<tr>
<td>Would prefer self-sampling over pap**</td>
<td>91%</td>
<td>97%</td>
<td>91%</td>
</tr>
<tr>
<td><strong>Willingness to self-collect as regular screening</strong></td>
<td><strong>100%</strong></td>
<td><strong>99%</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

* Age eligible women; ** among women who collected sample

Murchland et al, under review
Results: willingness to self-collect

• Lower willingness to self-collect in Livingston

• Literacy was significantly higher in women willing to self-collect
  • adjusted prevalence ratio, 1.45 [1.07-1.95]

• Neither ethnicity, history of screening, nor reproductive history were associated with the willingness to self-collect
Results: HPV testing

- Hybribio 13 (low-cost test)
- 19% positive samples for high-risk HPV*
- No significant differences between the two communities
- Women were called to return their results
- Provided free access to follow-up pap/VIA to all

* Genotyping pending
Discussion

• Generating evidence to inform local and regional cervical cancer prevention and control planning

• Enabling cervical cancer screening for indigenous/rural women
  - Make HPV self-collection a reality
  - Set up community programs to help facilitate self-swab HPV screening

• Follow-up and access to treatment remain the main challenge independently of screening modality
Challenges for CC screening in Guatemala

- Access for indigenous and rural communities remains limited
- Issues with the processing of samples/tests
- Infrastructure, expertise, organization
- Need for a low-cost widely available test
- Challenges with returning results, and follow-up of positive test
- Complicated landscape with many small NGOs, plus a few large ones and the government providing care—>50% of care from non-government sources
- No screening modality will be effective unless these issues are addressed
Status of CC prevention in Guatemala

• National Cervical Cancer Prevention Plan - 2014

• CareHPV Guatemala Scale-Up trial
  • MSPAS, Instancia por la Salud, PATH
  • ~80K HPV tests in four urban districts
  • HPV -> VIA -> Thermocoagulation  (Poli et al, JGO 2018)
  • MSPAS will continue, but no major plans for expansion yet
    – Need to lobby the MSPAS

• HPV vaccination
  • Starting
Acknowledgments

- Anna Gottschlich
- Audrey Murchland and Kristin Bevilacqua
- Carlos Mendoza & Alvaro Rivera, INCAP
- Michael Dean, NCI
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  - UM Office of Global Public Health
  - M-Cubed
  - CIHR
- WCC, Laura Rozek, Katie Rentschler

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EFFORTS TO ADDRESS BARRIERS TO CERVICAL CANCER SCREENING IN ETHIOPIA

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Research Investigator and Lecturer
St. Paul’s Hospital Millennium Medical College (SPHMMC)
Addis Ababa, Ethiopia

Presented by Katie Zarins, MPH
University of Michigan School of Public Health
Estimated age-standardized incidence rates (World) in 2018, cervix uteri, all ages

ASR (World) per 100 000

- ≥ 26.0
- 18.1–26.0
- 11.5–18.1
- 7.3–11.5
- < 7.3
- Not applicable
- No data

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Data source: GLOBOCAN 2018
Graph production: IARC (http://gco.iarc.fr/today)
World Health Organization

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Estimated number of new cases in 2018, Ethiopia, all cancers, females, all ages

Total: 46,373

- Breast: 15,244 (32.9%)
- Colorectum: 2,510 (5.4%)
- Ovary: 2,872 (6.2%)
- Leukaemia: 2,190 (4.7%)
- Cervix uteri: 6,294 (13.6%)
- Other cancers: 14,414 (31.1%)
- NHL: 1,421 (3.1%)
- Thyroid: 1,428 (3.1%)

Estimated number of deaths in 2018, Ethiopia, all cancers, females, all ages

Total: 31,342

- Breast: 9,159 (29.3%)
- Colorectum: 1,810 (5.8%)
- Ovary: 2,313 (7.4%)
- Leukaemia: 1,986 (6.3%)
- Cervix uteri: 4,884 (15.9%)
- Other cancers: 9,996 (31.9%)
- Lung: 1,037 (3.3%)
- Oesophagus: 1,157 (3.7%)

Globocan, 2018
In 2002, >90% of women reported that they had never had a pelvic exam.

Gakidou E et al, PLOS Medicine. 2008
**Screening protocol - SPHMMC**

- **Cervical cancer screening**
  - SCJ
    - PAP smear
      - Negative
        - Re-test in 5 years
      - Positive
        - LEEP
        - cryotherapy
        - Re-screening
        - Follow-up after one year

30-49 y
VIA screening at SPHMMC

- Performed medical chart review from VIA clinic; July 2014-July 2017

- 191 (12%) of the women screened for VIA had positive results and 10 (0.6%) women with lesions suspicious for cancer.

- Gelibo et al., J Oncol Res Treat 2017
  - Higher education, urban residence more likely to be screened
  - Among 5,823 women, only 2.9% ever screened

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>VIA Result</th>
<th>Total</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive n=138(%)</td>
<td>Negative n=1121(%)</td>
<td>N=1259 (%)</td>
</tr>
<tr>
<td>Age (median, range in years (n=1255))</td>
<td>35.0 (20-57)</td>
<td>37.0 (16-70)</td>
<td>36.0 (16-70)</td>
</tr>
<tr>
<td>Educational status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No School</td>
<td>8 (5.8)</td>
<td>31 (2.8)</td>
<td>39 (3.1)</td>
</tr>
<tr>
<td>Elementary (1-8 grade)</td>
<td>41 (29.7)</td>
<td>268 (23.9)</td>
<td>309 (24.5)</td>
</tr>
<tr>
<td>High School</td>
<td>52 (37.7)</td>
<td>518 (46.2)</td>
<td>570 (45.3)</td>
</tr>
<tr>
<td>Diploma and above</td>
<td>21 (15.2)</td>
<td>241 (21.5)</td>
<td>262 (20.8)</td>
</tr>
<tr>
<td>Missing</td>
<td>16 (11.6)</td>
<td>63 (5.6)</td>
<td>79 (6.3)</td>
</tr>
<tr>
<td>Place of residence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Addis Ababa</td>
<td>97 (70.3)</td>
<td>884 (78.9)</td>
<td>981 (77.9)</td>
</tr>
<tr>
<td>Outside Addis Ababa</td>
<td>32 (23.2)</td>
<td>164 (14.6)</td>
<td>196 (15.6)</td>
</tr>
<tr>
<td>Missing</td>
<td>9 (6.5)</td>
<td>73 (6.5)</td>
<td>82 (6.5)</td>
</tr>
</tbody>
</table>
Self-collection?

- Self-collection had never been tested in Ethiopia
- Screening services may not be available or, when available, are inaccessible or underused.
- Could be used in conjunction with VIA to increase the screening coverage
- Need to provide evidence to inform policy making
- Skepticism about acceptability, stigma for this new method
Pilot in Addis Ababa

- Cross sectional design, women sampled from 3 kebeles in St. Paul’s catchment area of Addis Ababa

- Women ages 20-60 recruited by health workers

- Structured interview
  - Understanding of HPV/cervical cancer
  - Health beliefs
  - Limited health history

- Interviews conducted in Amharic by trained nurses

- Women provided samples collected using HerSwab kits
  - Will be used to test for HPV (14 high risk types: 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 66, 68)

- Samples currently being tested at St. Paul’s; nurses will contact HPV+ women for referral to VIA screening clinic
Preliminary Results

• 206 women; Average age: 39.8 years (range 18 – 65)

• 16% Muslim, 73% Orthodox, 11% Protestant

• 11% had a previous Pap/VIA, 4% told they had an abnormal test
  • (40% “don’t remember”)

• Of those who did not have a Pap/VIA or did not remember:
  • 53% of the women reported no reason/never thought about it
  • 34% said they did not know or did not think they needed the test
Preliminary Results

- Majority (81%) of women believe cervical cancer is “very” or “extremely” serious, 78% think cervical cancer is curable with early detection and treatment (14% did not know)

- Only 40% of the women preferred to do the test at home prior to the self-swab

POST test

- Majority (80.6%) reported the self-test “comfortable” and “very comfortable”, and 90.3 % said it was easy and very easy to do the swab.

- Majority (82%) preferred to test at home after the self-swab
Challenges for CC Screening in Ethiopia

• Limited infrastructure and expertise
  • processing of samples/tests
  • Treatment – only one cancer hospital in Ethiopia currently
• Challenges with returning results and follow-up for HPV positive women
• Need for multi-faceted programs including education
• Need to address current barriers to screening
  • Availability and convenience
  • Embarrassment or shame about having a pelvic exam, as well as fear of the screening procedure
  • Previous bad experience
Opportunities

- **Health Extension Program, 2004**
  - Deeply rooted in communities, providing primary level preventive activities to household members

- **15 existing packages**
  - Maternal health, sanitation, etc.

- **Key players:**
  - Health extension workers (HEW)
    - 2 per health post
  - Model families
  - Women focused Health Development Army (HDA)

---

**Source:** FMOH 2010c.
Future directions

- Strengthen infrastructure and support for these programs
- Coordinate large scale promotional/educational activities
- Plan phased approach, with focus on program evaluation
  - Mobile service then move to integrated services
Thank you!

**Partners:**
St. Paul’s Hospital Millennium Medical College  
- Mesrach Ayalew Kebede  
- Dr. Bereket Berhane Woldeab  
- Nurse team

University of Michigan School of Public Health  
- Laura Rozek  
- Rafael Meza  
- Kali Defever

**Funding:** African Studies Center, University of Michigan
Beliefs and attitudes about district-level HPV screening in a multi-religion study in Songkhla province, Thailand

Comparing HPV self-sampling acceptability between Buddhist and Muslim women in Songkhla

Rafael Meza, University of Michigan School of Public Health
Hutcha Sriplung, Prince of Songkla University

Cervical cancer screening programs in high and low resources settings

Track 2 – Advances in screening and early detection

Disclosure of interest: None declared
Songkhla, Thailand

- Population:
  - Approximately 1.5 million

- Religion:
  - Majority Buddhist (~75%)
  - Minority Muslim (~25%)

- Prince of Songkhla University:
  - Located in Hat Yai
  - Collaborating institution with University of Michigan
Cervical Cancer in Songkhla

- Declining incidence since 2000
- Voluntary and systematic screening programs organized by the National Health Security office began in 2002
- As of 2018, age-standardized incidence rate is 16.2 per 100,000 women, compared to 6.6 in the United States

- Why the difference when screening is available to all women in the country?
  - Access to screening locations?
  - Confidence in health system?
Study sites: Ranot and Na Thawi

- Data collected in 2017-2018, convenience sample of women attending clinics
- Ranot is predominantly Buddhist, while Na Thawi is predominantly Muslim
Data collection

- Survey data collected through Redcap
- HPV samples collected using HerSwab kits
- Samples analyzed using the Hybribio H13C kit at PSU
- Will return results once laboratory analyses completed
# Population Characteristics: Ranot (Buddhist) vs Na Thawi (Muslim)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total N = 267</th>
<th>Ranot (Buddhist) N = 132</th>
<th>Na Thawi (Muslim) N = 135</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prop (N) / Mean (SD)</td>
<td>Prop (N) / Mean (SD)</td>
<td>Prop (N) / Mean (SD)</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>50.44 (5.83)</td>
<td>51.27 (6.08)</td>
<td>49.63 (5.48)</td>
<td>0.02*</td>
</tr>
<tr>
<td>Literate</td>
<td>0.88 (236)</td>
<td>0.96 (127)</td>
<td>0.81 (109)</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Marriage Age</td>
<td>21.26 (5.35)</td>
<td>22.85 (5.98)</td>
<td>19.72 (4.15)</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Yearly Income</td>
<td></td>
<td></td>
<td></td>
<td>0.27</td>
</tr>
<tr>
<td>0 – 79,999</td>
<td>0.33 (78)</td>
<td>0.34 (39)</td>
<td>0.31 (39)</td>
<td></td>
</tr>
<tr>
<td>80,000 – 119,999</td>
<td>0.28 (67)</td>
<td>0.31 (35)</td>
<td>0.25 (32)</td>
<td></td>
</tr>
<tr>
<td>120,000 – 179,999</td>
<td>0.18 (44)</td>
<td>0.19 (22)</td>
<td>0.17 (22)</td>
<td></td>
</tr>
<tr>
<td>180,000 or more</td>
<td>0.21 (51)</td>
<td>0.16 (18)</td>
<td>0.26 (33)</td>
<td></td>
</tr>
<tr>
<td>Ever Pap</td>
<td>0.82 (219)</td>
<td><strong>0.92</strong> (121)</td>
<td><strong>0.73</strong> (98)</td>
<td>&lt;0.001*</td>
</tr>
</tbody>
</table>
## Prior Cervical Cancer Screening

<table>
<thead>
<tr>
<th>Variable</th>
<th>Prior Screen N = 219 Prop (N) / Mean (SD)</th>
<th>No Screen N = 47 Prop (N) / Mean (SD)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>50.51 (5.84)</td>
<td>50.04 (5.90)</td>
<td>0.62</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Buddhist</td>
<td>0.55 (121)</td>
<td>0.21 (10)</td>
<td></td>
</tr>
<tr>
<td>Muslim</td>
<td>0.45 (98)</td>
<td>0.79 (37)</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td>0.03*</td>
</tr>
<tr>
<td>None</td>
<td>0.05 (10)</td>
<td>0.11 (5)</td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>0.64 (141)</td>
<td>0.79 (37)</td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>0.20 (44)</td>
<td>0.11 (5)</td>
<td></td>
</tr>
<tr>
<td>Vocational</td>
<td>0.06 (13)</td>
<td>0.00 (0)</td>
<td></td>
</tr>
<tr>
<td>Academic College</td>
<td>0.05 (11)</td>
<td>0.00 (0)</td>
<td></td>
</tr>
</tbody>
</table>

- Income, number of sexual partners, frequency of health visits NOT associated
- Marriage age, literacy, use of health services, number of pregnancy, and age at first pregnancy and sex were associated
<table>
<thead>
<tr>
<th>Variable</th>
<th>Total</th>
<th>Ranot (Buddhist)</th>
<th>Na Thawi (Muslim)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collected Sample</td>
<td>0.99 (264)</td>
<td>0.98 (130)</td>
<td>0.99 (134)</td>
<td>0.62</td>
</tr>
<tr>
<td>Comfort</td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>Comfortable</td>
<td>0.98 (259)</td>
<td>0.98 (128)</td>
<td>0.97 (131)</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>0.02 (5)</td>
<td>0.02 (2)</td>
<td>0.02 (3)</td>
<td></td>
</tr>
<tr>
<td>Uncomfortable</td>
<td>0.00 (0)</td>
<td>0.00 (0)</td>
<td>0.00 (0)</td>
<td></td>
</tr>
<tr>
<td>Ease</td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>Easy</td>
<td>0.98 (258)</td>
<td>0.98 (127)</td>
<td>0.97 (131)</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>0.02 (6)</td>
<td>0.02 (3)</td>
<td>0.02 (3)</td>
<td></td>
</tr>
<tr>
<td>Difficult</td>
<td>0.00 (0)</td>
<td>0.00 (0)</td>
<td>0.00 (0)</td>
<td></td>
</tr>
<tr>
<td>Willing to Retake</td>
<td>1.00 (264)</td>
<td>1.00 (130)</td>
<td>1.00 (134)</td>
<td>1.00</td>
</tr>
<tr>
<td>Preference</td>
<td></td>
<td></td>
<td></td>
<td>0.02*</td>
</tr>
<tr>
<td>Self-swab kit</td>
<td>0.72 (193)</td>
<td>0.66 (87)</td>
<td>0.79 (106)</td>
<td></td>
</tr>
<tr>
<td>Pap smear</td>
<td>0.03 (7)</td>
<td>0.02 (2)</td>
<td>0.04 (5)</td>
<td></td>
</tr>
<tr>
<td>Both</td>
<td>0.24 (65)</td>
<td>0.32 (42)</td>
<td>0.17 (23)</td>
<td></td>
</tr>
<tr>
<td>Neither</td>
<td>0.01 (2)</td>
<td>0.01 (1)</td>
<td>0.01 (1)</td>
<td></td>
</tr>
</tbody>
</table>
HPV Test Results

• 99% (264/267) chose to self-collect

• 5% positive, 70% negative, 25% inconclusive
  • 7% of conclusive tests were positive
  • Consistent with other studies in the area

• No statistically significant difference in prevalence between women from the two districts
Conclusions

- Self-collection testing appears to be acceptable in both religion/cultural groups
  - Preferred option, particularly among women with lower screening rates
  - Similar as in other studies

- HPV self-collection is likely a feasible option in this setting

- Further studies should investigate follow-up rates and impact on downstream outcomes in anticipation of national adoption of HPV testing
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• Manila Hada

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