

Cervical Cancer Screening and Treatment in a rural hospital in Malawi: A four-year comprehensive review

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Dr. Mai-Linh Tran, Dr. Mary Perry, Dr. Casey Graybill, Dr. Karen Studer, and Dr. Marc Debay have indicated they have no relevant financial relationships to disclose.

Introductions



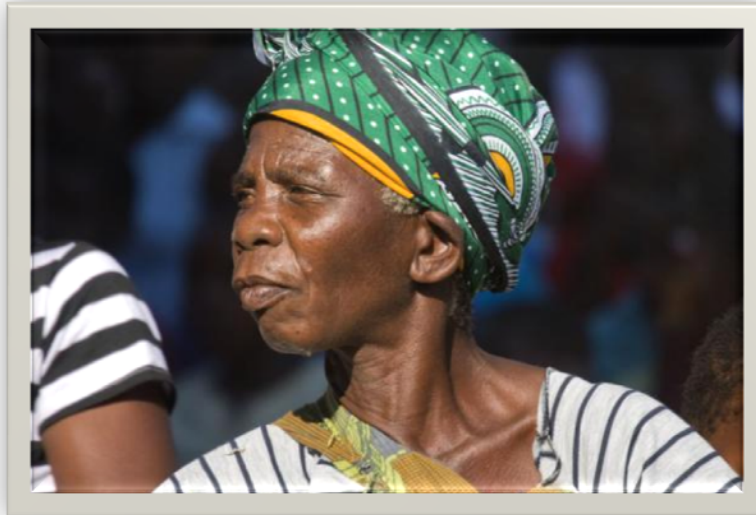
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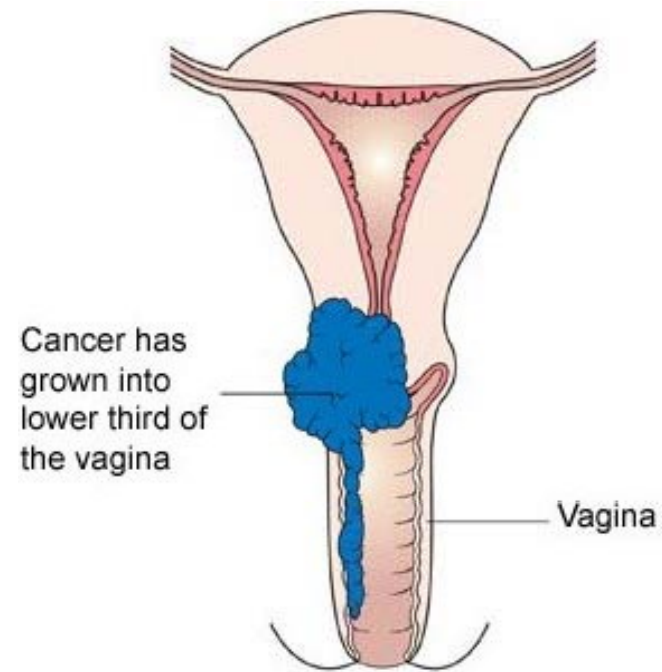
Case Study Mrs. A

- 65 year old female, translator required
- Heavy vaginal bleeding (chitenje)
- Biopsy of cervix: squamous cell carcinoma



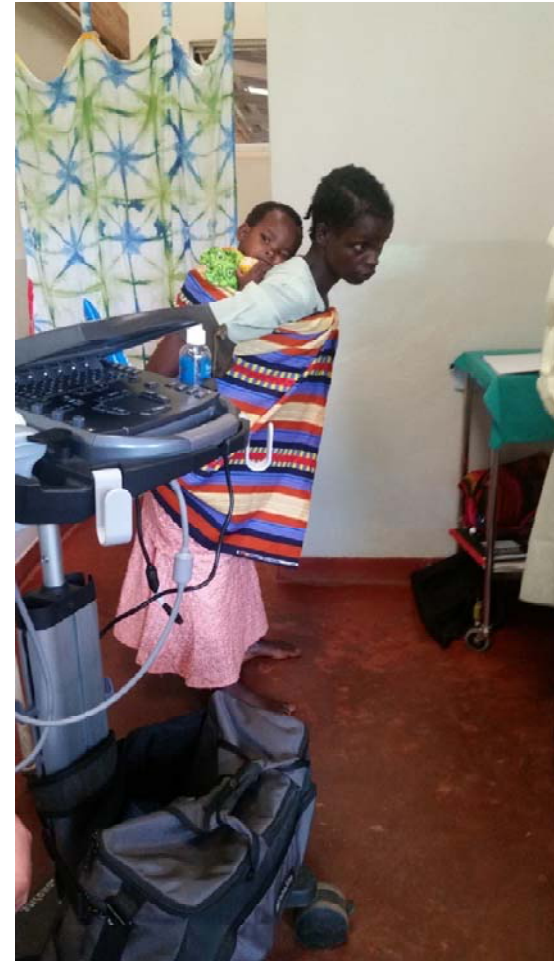
Case Study Mrs. A (Continued)

- Palpable mass extended to lower 1/3 of vagina – Stage 3 Cervical Cancer
- Non-operable, no radiation therapy in Malawi
- Palliative Care – tramadol
- Prayer



Case Study Mrs. B

- 37 year old female coming in for routine pap smear
- Returns 1 week later, results show LSIL
- Colposcopy done with cervical biopsy & endometrial curettage
- Focal CIN 3
- LEEP done – fully excised cancer



Learning Objectives

- Understand the prevalence and outcomes of cervical cancer screening in a rural hospital in Malawi
- Identify the successes and challenges in maintaining and expanding a cytology-based cervical cancer screening program in a rural hospital in sub-Saharan Africa
- Appreciate how residents of a U.S. Family and Preventive Medicine residency program may contribute to the documentation and development of a new program at the training site of a curricular international rotation

Overview

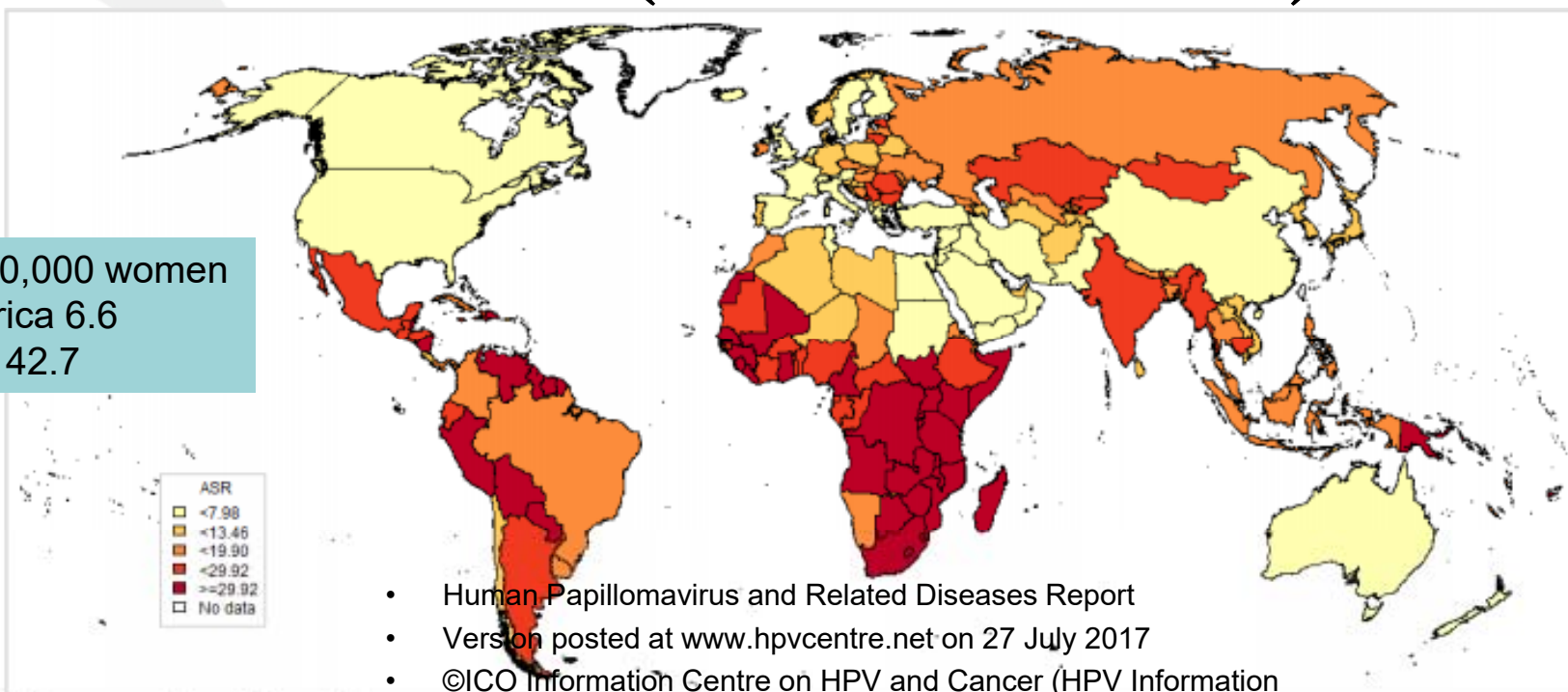
- Burden of cervical cancer
- Prevention and treatment strategies
- Malamulo Adventist Hospital Cervical Cancer Screening Program (MAH CCS)
- Results from the data collection
- Successes and challenges of program implementation
- Resident's roles

Global Burden of Cervical Cancer

- 2012: ~530,000 new cases, 270,000 deaths worldwide every year
- World population: 2,784 million women aged 15 years and older who are at risk of developing cervical cancer.
- **2nd** most common female cancer in the women aged 15 to 44 years in World
- **4th** most frequent cause of cancer in women
- 90% of deaths in 2015 occurred in low-middle income countries

Age-standardized **incidence** rates of cervical cancer in the World (estimates for 2012)

Rate per 100,000 women
• North America 6.6
• East Africa 42.7



- Human Papillomavirus and Related Diseases Report
- Version posted at www.hpvcentre.net on 27 July 2017
- ©ICO Information Centre on HPV and Cancer (HPV Information Centre), 2017

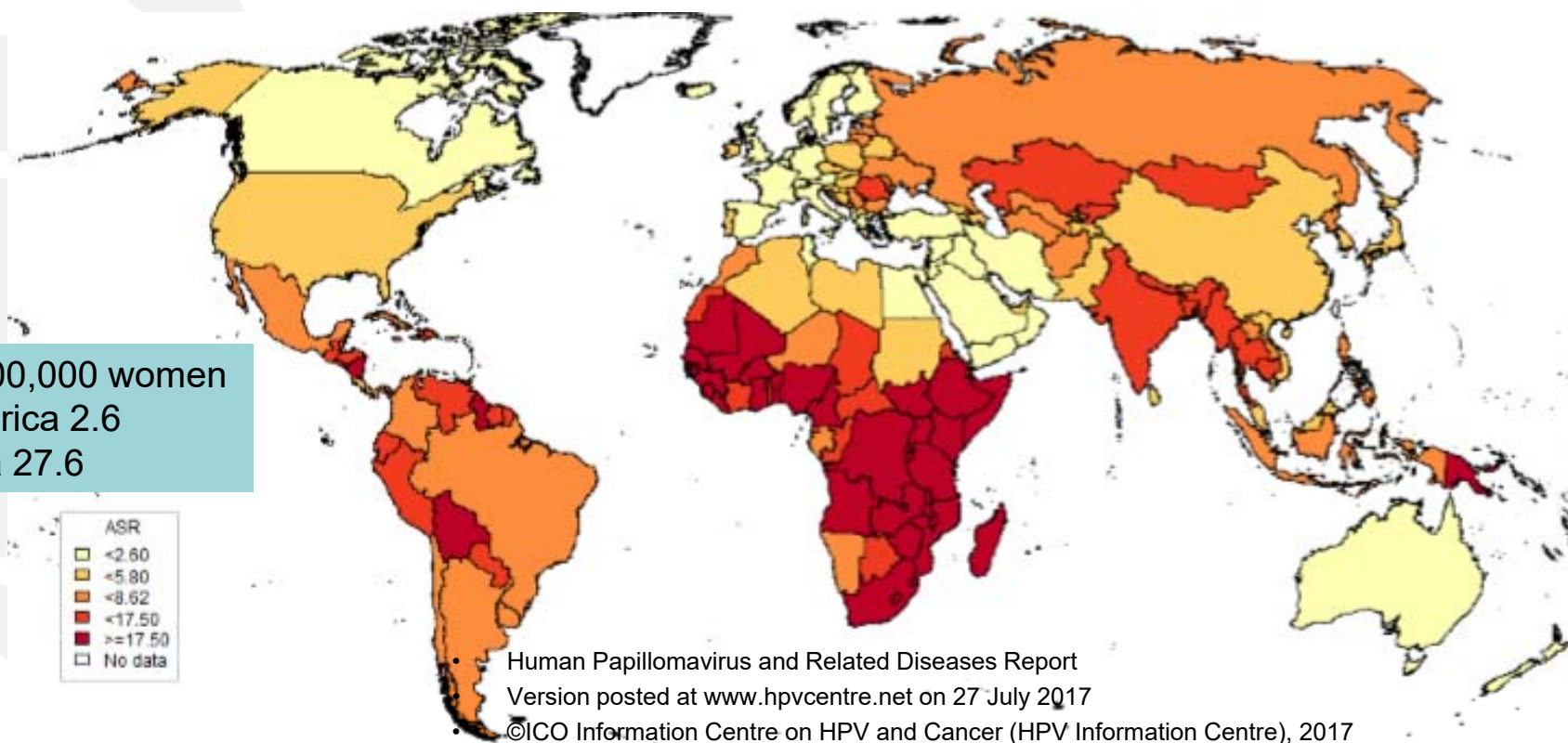
Data accessed on 15 Nov 2015.

Rates per 100,000 women per year.

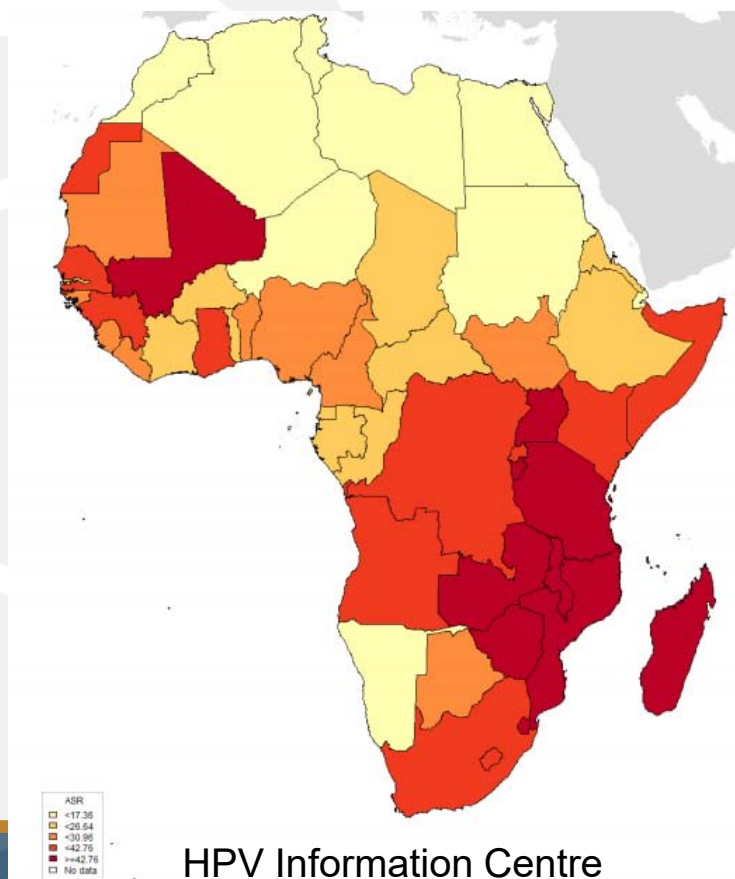
For Sudan, South Sudan: Estimate for Sudan and South Sudan

Data sources: Ferlay J, Soerjomataram I, Ervik M, Dikshit R, Eser S, Mathers C, Rebelo M, Parkin DM, Forman D, Bray F. GLOBOCAN 2012 v1.2, Cancer Incidence and Mortality Worldwide: IARC CancerBase No. 11 [Internet]. Lyon, France: International Agency for Research on Cancer; 2013. Available from: <http://globocan.iarc.fr>.

Age-standardized **mortality** rates of cervical cancer in the World (estimates for 2012)

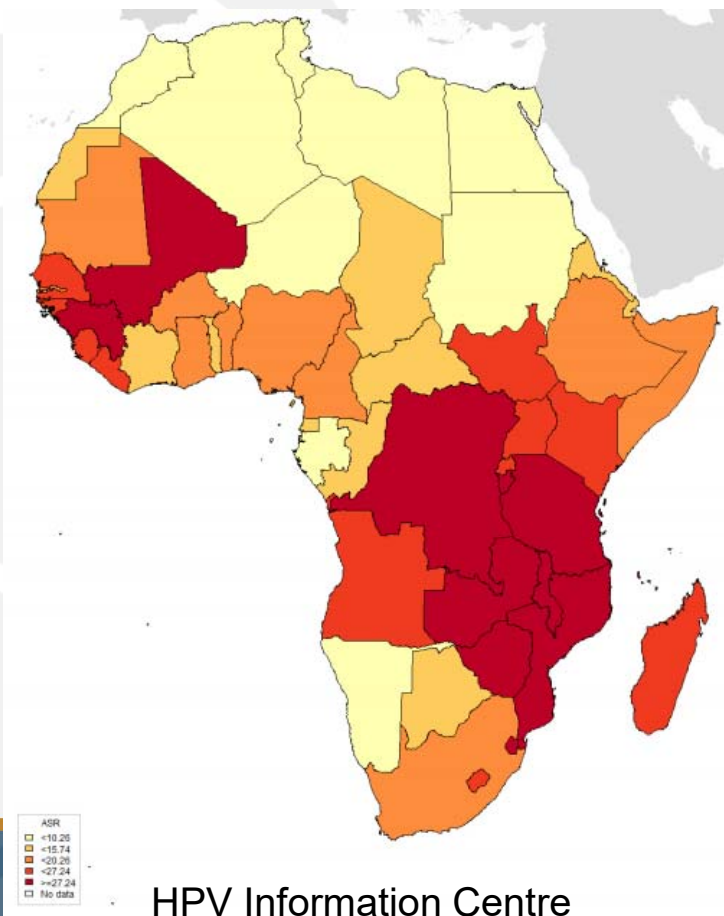


Age-standardized **incidence** rates of cervical cancer in Africa (estimates for 2012)



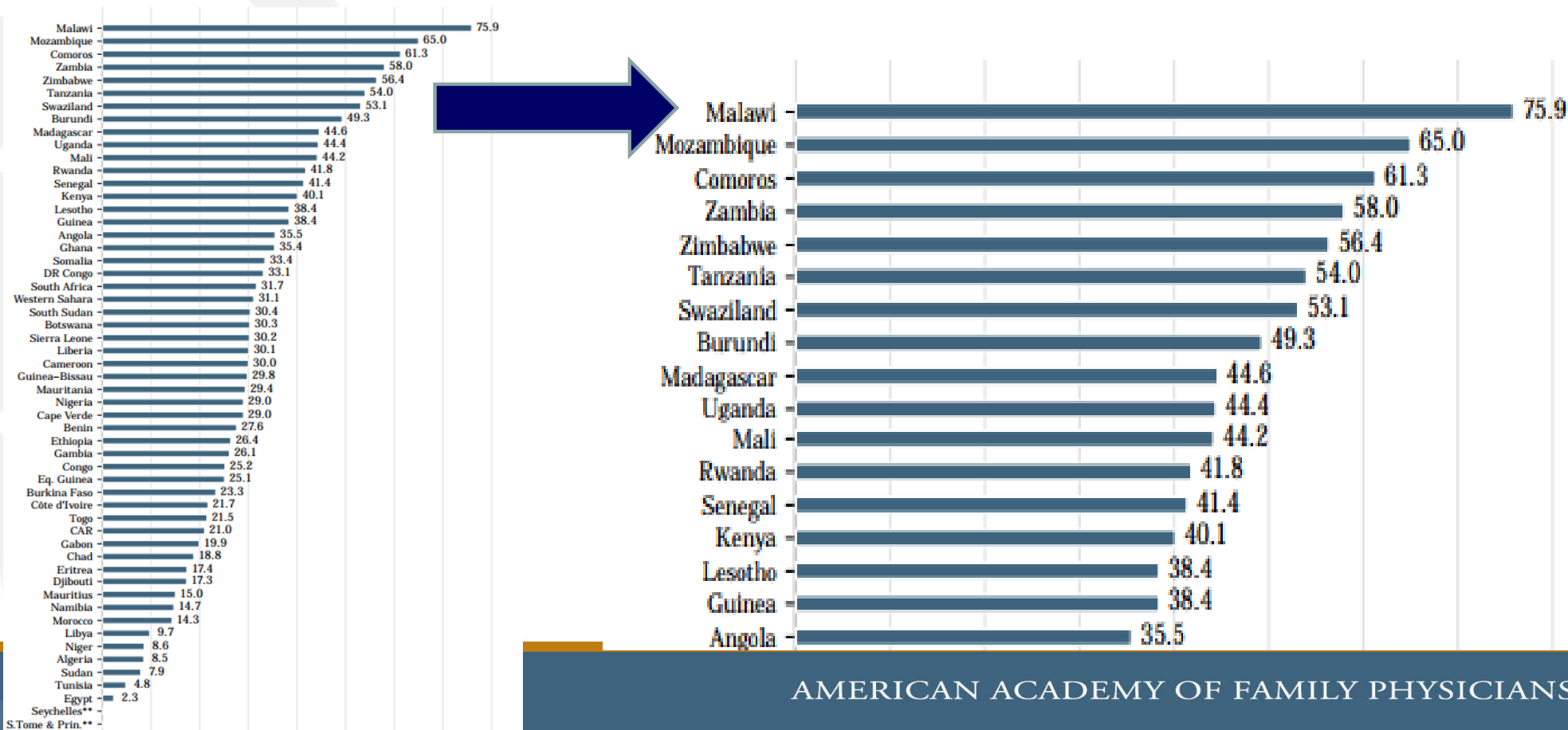
- ~99,038 new cases are diagnosed annually in Africa
- **2nd** leading cause of female cancer
- **2nd** most common female cancer in women aged 15-44 years

Age-standardized **mortality** rates of cervical cancer in Africa (estimates for 2012)



- ~60,098 cervical cancer deaths occur annually
- **2nd** leading cause of female cancer deaths
- **2nd** most common female cancer deaths aged 15 to 44 years

Age-standardized incidence rate of cervical cancer cases by country in Africa (estimates for 2012)



Cervical Cancer Incidence & Mortality in Malawi (estimates in 2012)

- 4.76 million women ages >15 years at risk of developing cervical cancer
- 3,684 diagnosed with cervical cancer annually
- 2,314 deaths from cervical cancer annually
- 1st most frequent cancer & cause of cancer deaths among women

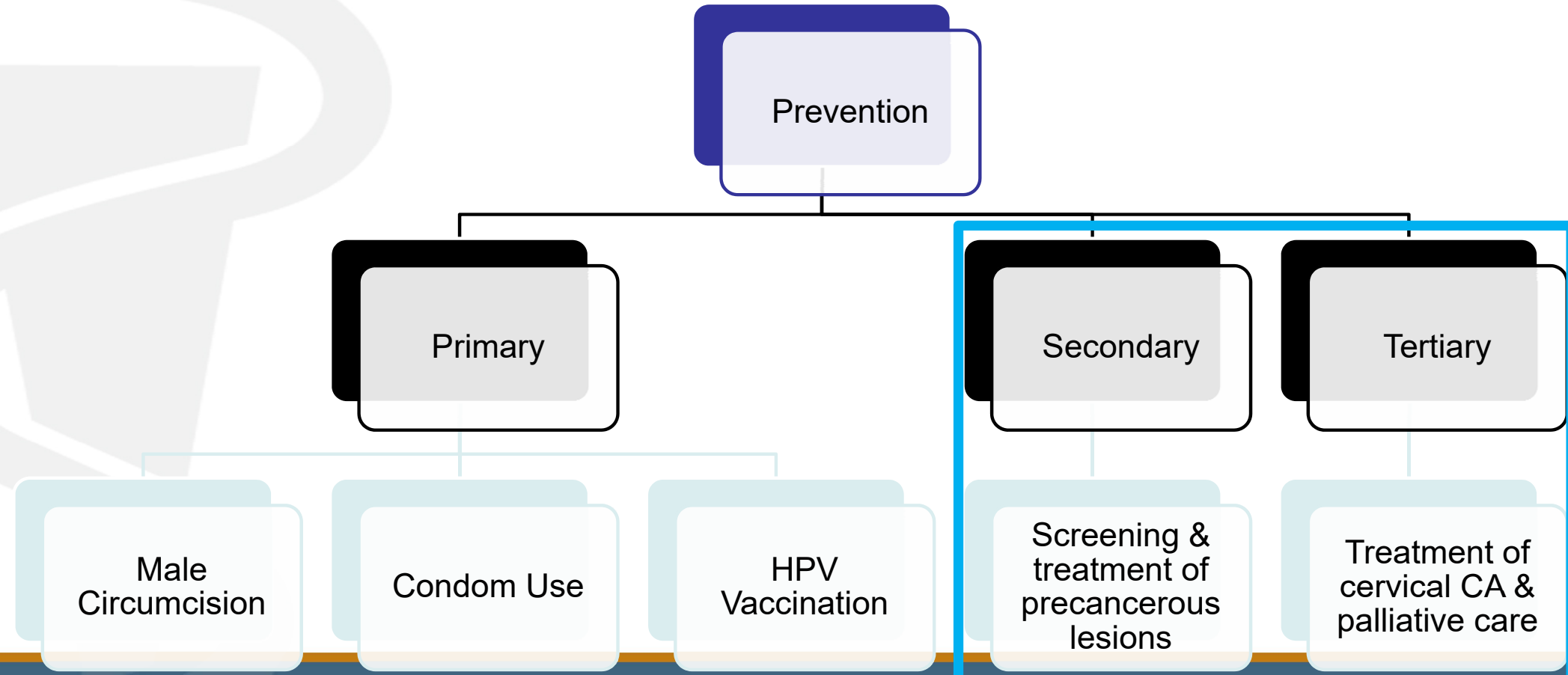


Perspective

- Malawi has **highest rates** of cervical cancer incidence and mortality in the world
- Limited information about cervical cancer, screening, and treatment programs in Malawi

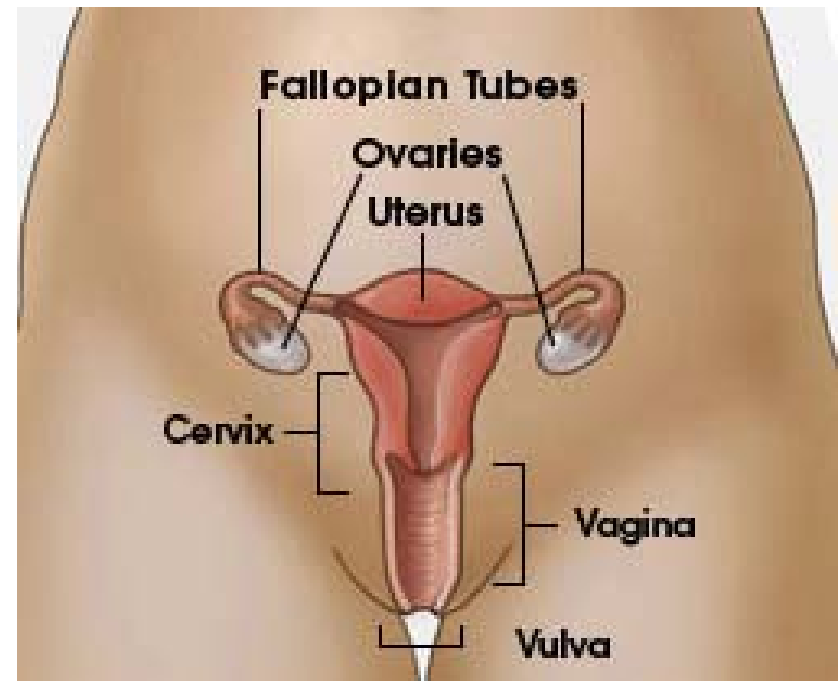
Cervical cancer	Incidence per 100,000	Mortality per 100,000
Malawi	74.9	49.8
United States	8.1	2.4

Overview of Prevention Strategies



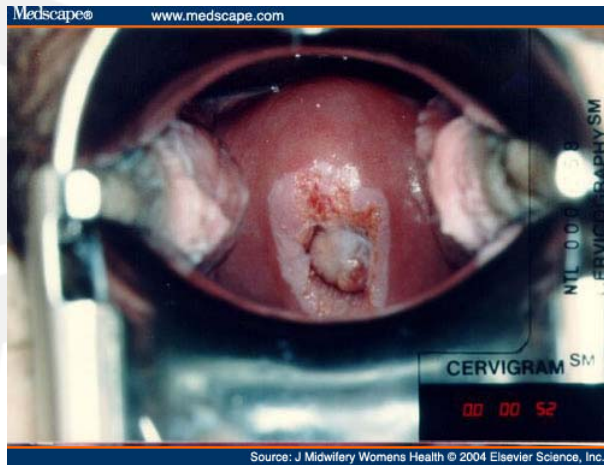
Cervical Cancer

- Highly preventable in most high income countries
 - **screening tests**
 - a **vaccine** to prevent human papillomavirus (HPV) infection
- Highly treatable when found early
 - associated with long survival & good quality of life



Factors Contributing to Developing Cervical Cancer

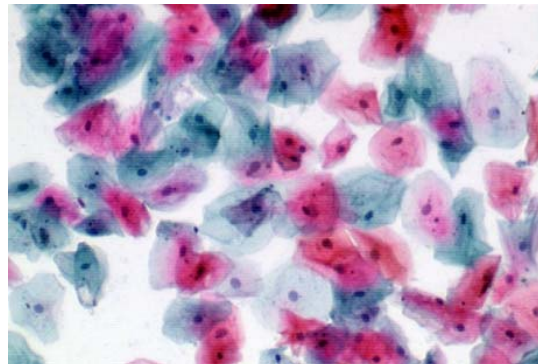
- **High Risk Types Human Papilloma Virus (HPV)**
- Risk factors
 - Tobacco smoking
 - High parity
 - Long-term hormonal contraceptive use
 - Co-infection with HIV
 - Co-infection with Chlamydia & Herpes Simplex Virus type 2
 - Immunosuppression



CERVICAL CANCER SCREENING IN LOW RESOURCE SETTINGS

Types of Cervical Cancer Screening

- Visual Inspection with Acetic Acid (VIA)
- Cytology based pap smear
- Human Papilloma Virus (HPV) testing
 - Not available in Malawi



VIA vs. Cytology-based screening

VIA

- Benefits:
 - Low cost, few resources
 - Limited infrastructure needed
 - Same-day treatment
 - Simple to learn
- Constraints:
 - Inter-user variability
 - Need for frequent re-training
 - Easy to miss lesions in post-menopausal women

Cytology-based screening

- Benefits:
 - Widely used in high-income countries
 - Proven effectiveness to decrease cervical cancer
 - Training and quality control methods well established
- Constraints:
 - Higher cost
 - More infrastructure needed: lab, equipment, supplies
 - Results not immediately available

VIA vs Cervical Cytology

Table 4. Characteristics of screening tests.

Test	Sensitivity		Specificity	
	Range (%)	Used in model (%)	Range (%)	Used in model (%)
VIA	60–90	76	66–96	81
HPV DNA	65–95	88	70–96	93
Cytology	45–85	63	80–98	94

Table 3. Results of once in a lifetime cervical screening in rural India.

Results	HPV testing	Cervical cytology	VIA	Controls
Positive screen (%)	10.3	7	13.9	N/A
Advanced cervical cancer ≥stage 2	39	58	86	82
Hazard ratio	0.47	0.75	1.04	1.00
Deaths	34	54	56	64
Hazard ratio	0.52	0.89	0.86	1.00
Negative screen cancers during FU	8	22	25	N/A

FU: Follow up; HPV: Human papillomavirus vaccine; N/A: Not applicable; VIA: Visual inspection with acetic acid.

AN Fiander. The prevention of cervical cancer in Africa. Women's Health (2011)

Malawi: General CCS Guidelines

- CCS program available
- Type: Visual Inspection with Acetic Acid (VIA)
- Screening age: >25 years old
- Frequency: 2-5 years
- No quality assurance or supervision to monitor screening process





THE CERVICAL CANCER SCREENING PROGRAM AT MALAMULO ADVENTIST HOSPITAL

Background: Malamulo Adventist Hospital (MAH)



- Founded in 1902
- 212-bed Christian mission hospital in the rural location of Makwasa, in Southern Thyolo District of Malawi

- Outpatient department
- Surgery
- Adult Medicine
- Maternity, Gynecology
- Pediatrics
- Radiology, and Laboratory
- **Women's Center for Cancer Screening**
- Community Department
- Dental Clinic, Eye Clinic
- several Satellite Clinics
- HIV/AIDS Treatment Center



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Cervical Cancer Screening Program: Beginnings

- PAPS Team International, non-profit organization based out of Redlands, CA
 - Sept. – Oct. 2012
 - 1350 patients
 - Cytology based
- Stella Nyirenda, RN and Mary Panulo, LVN
 - Free! Wednesday women's clinic
 - 5899 pap smears by Dec. 2016
 - Outreach to additional communities
 - Same day referrals to OB/GYN

Equipment Needed: Facilities



- Private room
- Exam table/bed
- Gloves
- Clean water / soap to wash hands
- Log books
- Patient record forms

Equipment Needed: Paps



- Speculums (method to clean/maintain), lubricant
- Glass microscope slides, fixatives
- Cytology brush/spatula
- Microscope to review slides



Equipment Needed: Follow-up

- Working electricity
- LEEP instruments
- Tenaculums
- Working colposcopy light
- Referral to surgery for hysterectomy
 - need facility that can manage

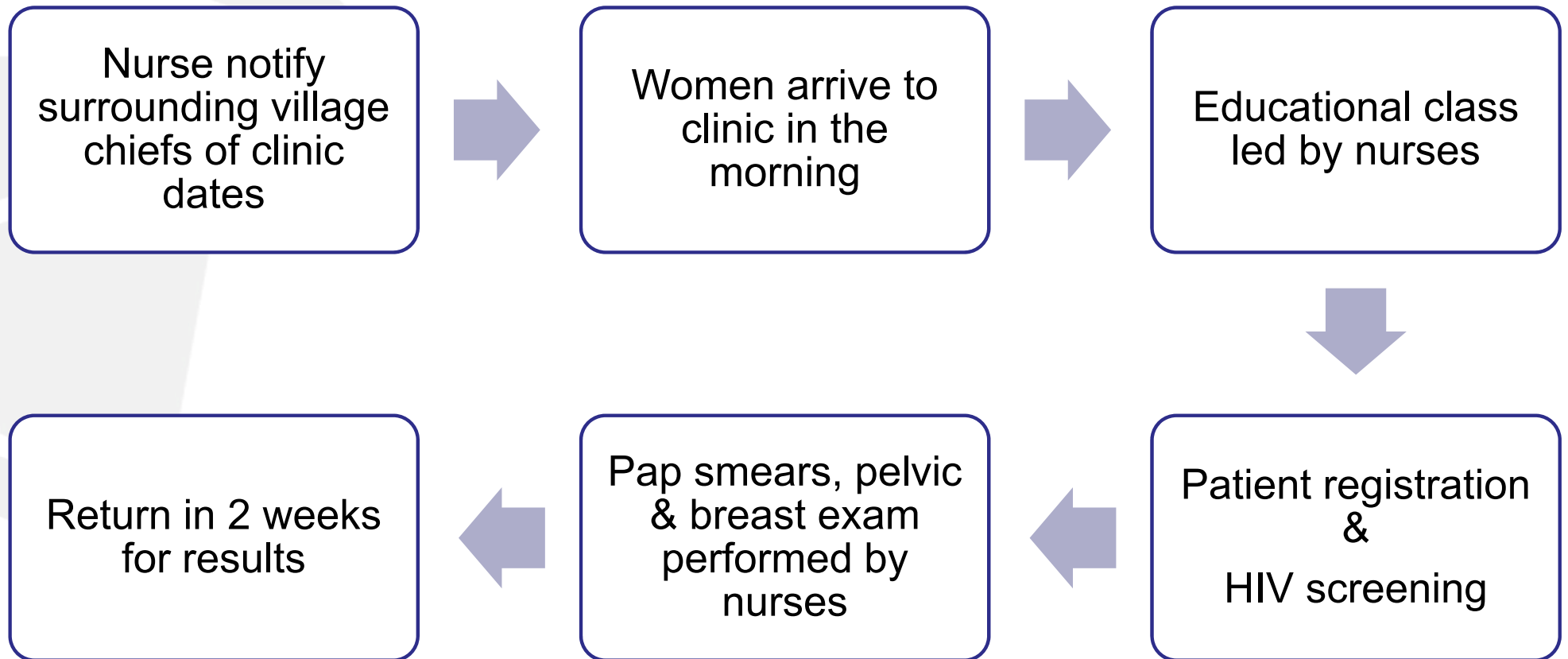


People needed

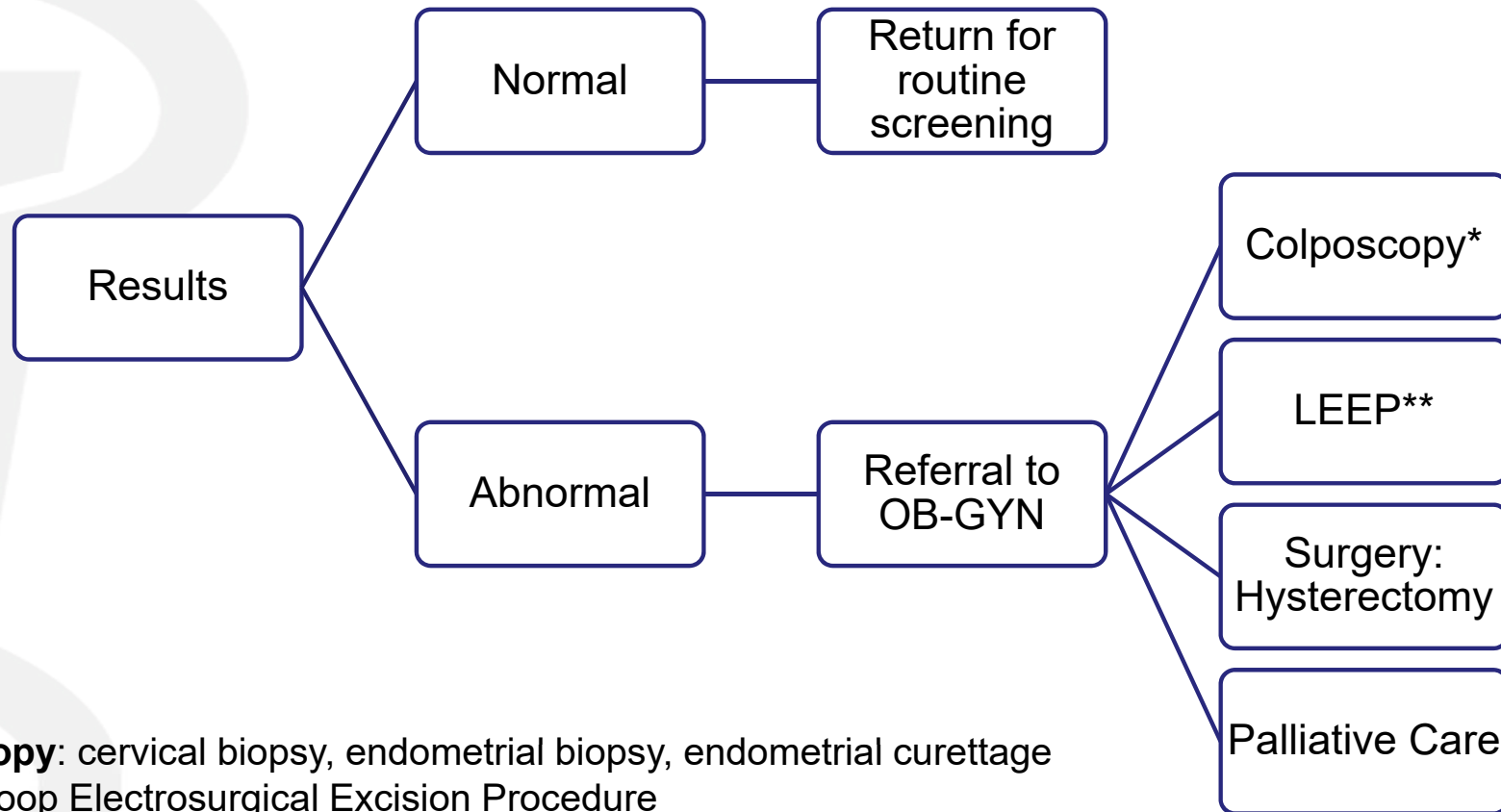
- Secretary, nurses, health workers
 - Enter demographics, intake data
 - Educate women about the process and importance of cervical cancer screening
 - Perform exam, collect pap smears
 - Record and disseminate results, coordinate follow-up
- Cytologist
 - Read pap smear slides
- OB-GYN
 - Follow-up abnormal pap smears
- Pathologist
 - Biopsy results



MAH Women's Health Clinic Program

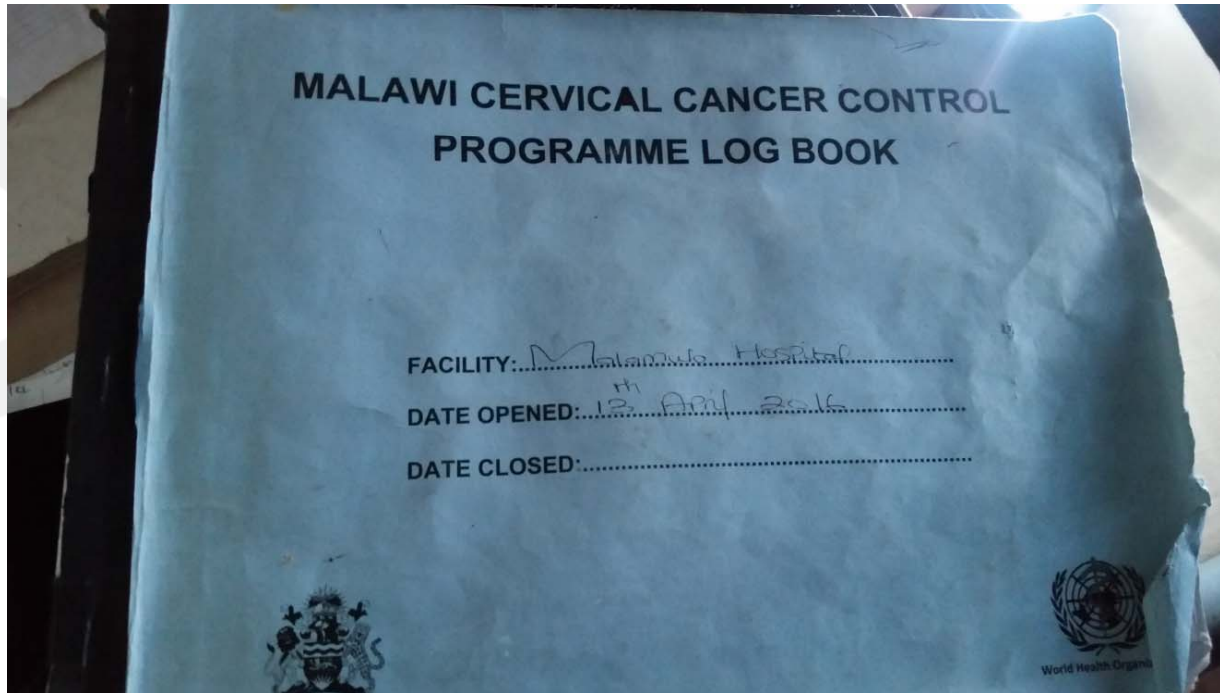


Pap Smear Results



***Colposcopy**: cervical biopsy, endometrial biopsy, endometrial curettage

****LEEP**: Loop Electrosurgical Excision Procedure



DATA COLLECTION

Cervical Cancer Screening Program

- Intake (2 forms)
 - Age
 - Village
 - Pregnancy history
 - LMP
 - Previous pap
 - STD's
 - Symptoms
 - Exam findings
 - Risk factors:
 - Smoking
 - Birth control method

The image shows a 'Cervical Cancer Screening Case Registration Form' with the following handwritten details:

- Patient Name:** KATHLEEN Mule (Machigala) THYLO
- Age:** 29
- DOB:** 3 October
- Previous Pap:** YES (circled)
- Current birth control:** IUD (circled)
- Have you had any of the following infections? (Circle all that apply):** NONE
- Have you had any of the following symptoms?** NO
- Bleeding after intercourse:** NO
- Bloody discharge:** NO
- Other symptoms:** YES
- Exam Results:** WNL (circled)
- Cervical Appearance:** normal
- Date:** 12/10/16
- Examiner:** [Signature]

Cervical Cancer Screening Program

- Result forms

Specimen Test Paper

Specimen Adequacy: Satisfactory ☒ Unsatisfactory: ☐ ASC-US ☐ ASC-H ☐ LNIL ☐ HSIL ☐ SCC

Results: WNL ☒ Abnormal: ☐ AGC ☐ AIS ☐ Adenocarcinoma

Other findings (Specify):

Date specimen received: 23/10/16

Physician: P. Chagwa

FOR OFFICE USE ONLY

Results given:

Follow-up plan:

Patient ID/Number: 5599 Registration Date: 19-10-16 Interviewer: Chagwa

Pathology results

Kamiza Pathology Lab

Private Bag 341, Chiswick, Blantyre 3
Cell: 0999 370 705

Lab Results for Pa

Lab No	2017-T-402145	Pay Method	and Malamulo
Requesting Doctor	Hayton	Age	49
Date Received	18-January-2017	Race	Black
Date Reported	21-January-2017	Sex	Female
Fee Code	ZT1	Site	Bladder + Cerv
Specimen Type	Bladder and cervical biopsy		
Procedure	Histology		

Brief Clinical Summary
Pelvic mass. Severe pain.

Macroscopic Findings
1. 4 fragments 2mm x 1TE.
2. 4 fragments x 1TE.

Microscopic Findings
Sections from the bladder mucosa show an invasive squamous cell carcinoma with associated schistosoma ova.
Sections from the cervix show chronic endocervicitis.

BLADDER BIOPSY : Invasive squamous cell carcinoma in background of schistosomiasis.
CERVICAL BIOPSY : Chronic endocervicitis.

Signed:
Dr. S. Kamiza, MB,BS (Mtw): FCPATH(SA)anet.

- Negative
- Positive
 - ASCUS, LSIL, ASC-H, HSIL, Cancer (SCC)
- Other: schistosomiasis, candida, cervicitis

Microscopic Findings
Sections from the bladder mucosa show an invasive squamous cell carcinoma with associated schistosoma ova.
Sections from the cervix show chronic endocervicitis.

Conclusion
BLADDER BIOPSY : Invasive squamous cell carcinoma in background of schistosomiasis.
CERVICAL BIOPSY : Chronic endocervicitis.

Malawian Patient Charts: Health Passports

LIKUNI HOSPITAL
MALAWI
HEALTH PASSPORT
WOMAN HEALTH PROFILE

NAM [REDACTED]
DZINA [REDACTED]

DATE OF BIRTH: 1/6/43
TSIKU LOBADWILA day / month / year

VILLAGE: MALILI
Mudzi

Please bring this book each time you come to see the nurse or doctor
Chonde bweletsani kabukuka podzani nani ndi doctolo kapena namwino

Signature of issuing person: _____
Issued date: _____

LIKUNI HOSPITAL
P.O. BOX 90, LIKUNI, LIKONGWE

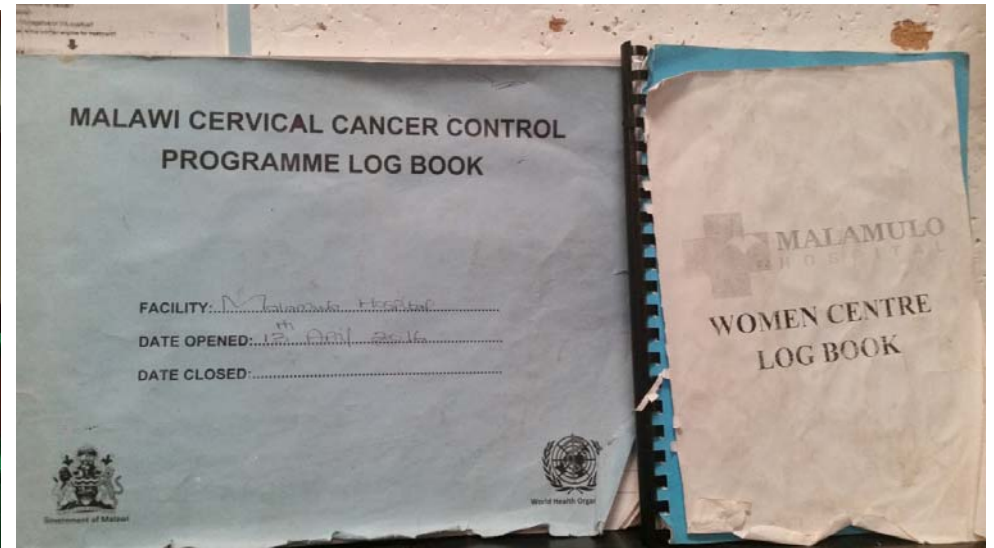
- Stays with patient
- Summary for each episode of care
- Record pap ID number, date, and results

Transferring Paper into Electronic Data



CERVICAL CANCER CONTROL PROGRAMME LOG BOOK										
HCCP		CODE 3111		MONTH MAY		YEAR 2016				
Address and Phone no.	Age	Marital status	WV status	Reason for visit	Result of screening	Reason for Referral	VIA provider Name	Management of VIA(s)	Clinical Notes	
M. M. M. M.	3	4	3	1	1					
H. H. H. H.	2	2	1	1	1					
P. P. P. P.	1	2	1	1	1					
M. M. M. M.	2	2	1	1	1					
M. M. M. M.	2	2	3	1	1					

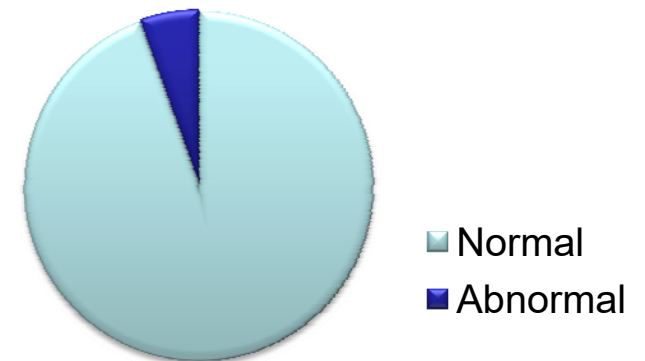




RESULTS FROM MAH

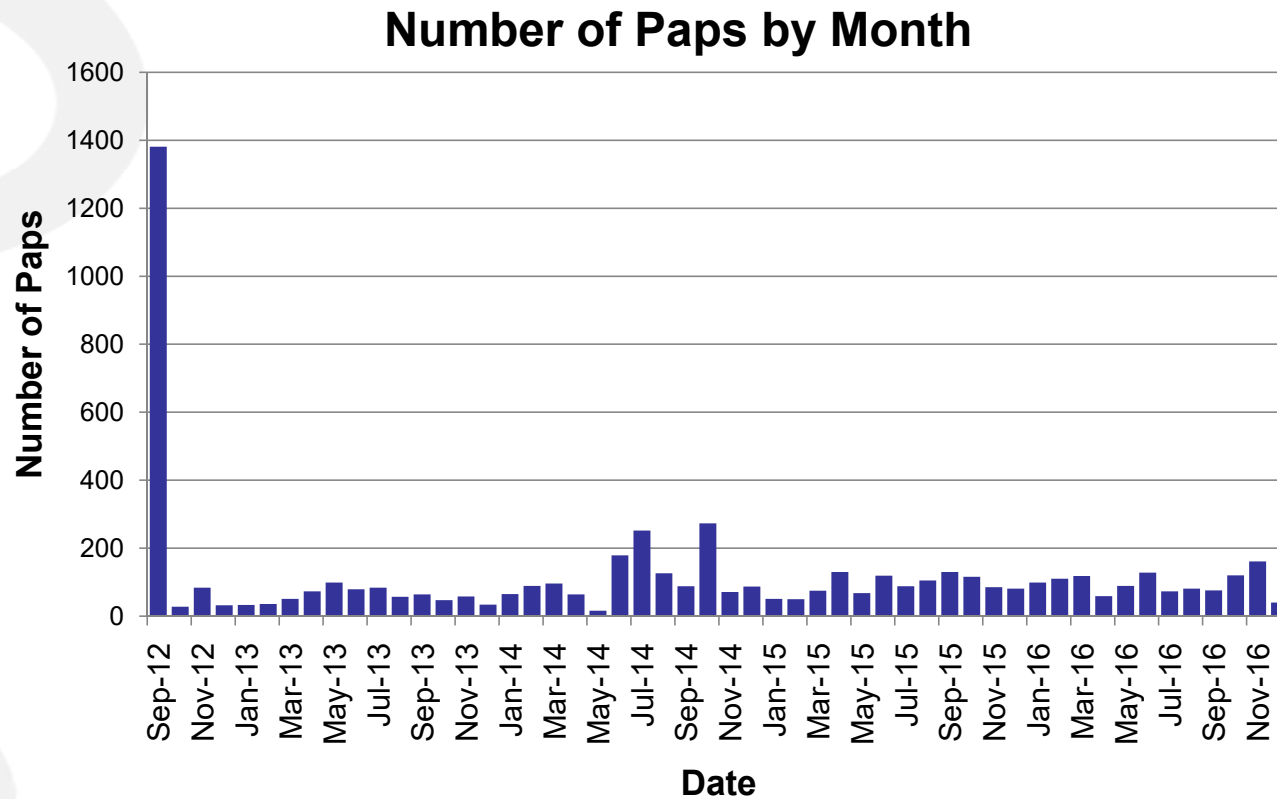
Overview: by the numbers

- Approximate population served by Malamulo Adventist Hospital:
 - Total population of catchment area: 38,713
 - Women of child-bearing age: 9,804
- Total number of recorded pap smears from 2012 – 2016: **5,899**
 - Normal pap smears: **5,577**
 - Abnormal pap smears: **322 (5.5%)**

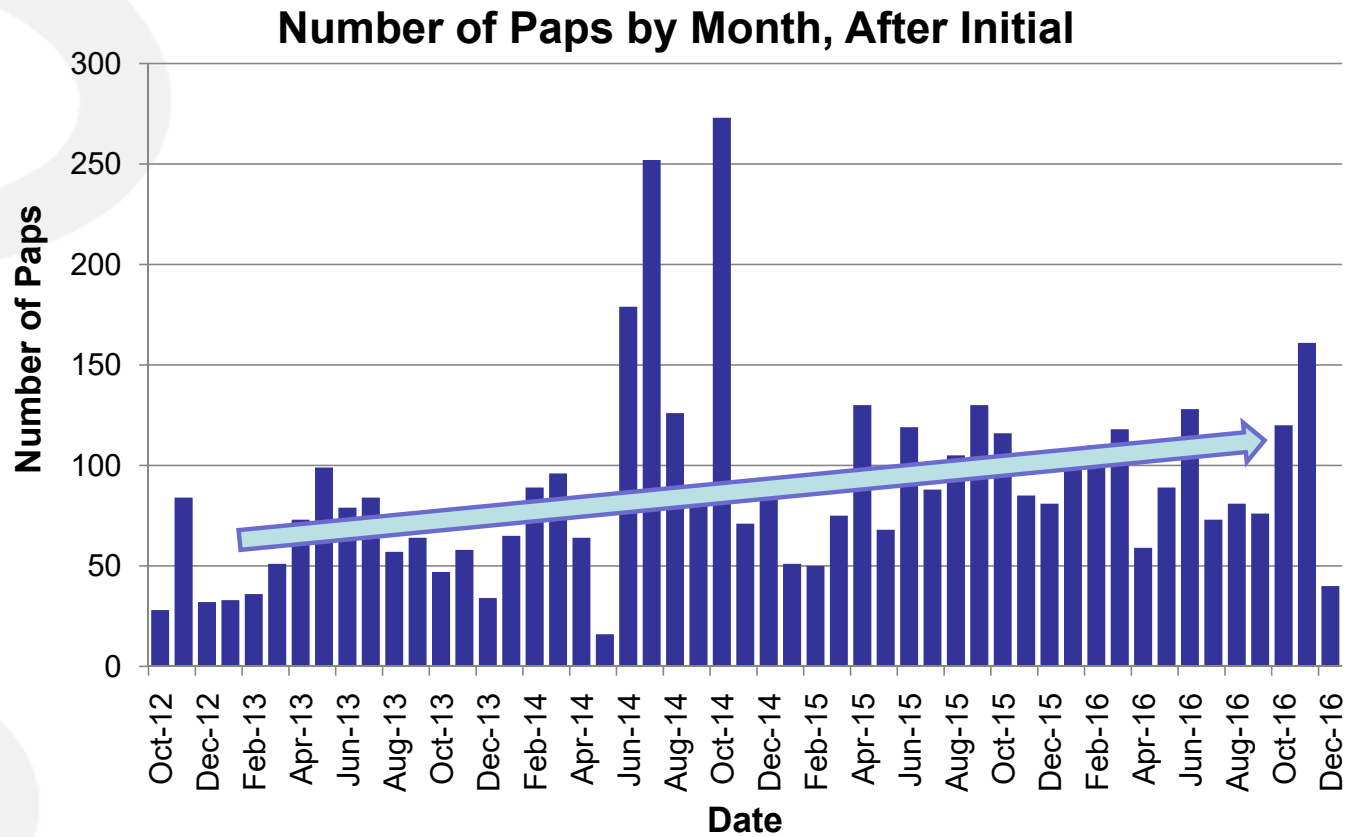


Pap results

Women getting pap smears by month of year

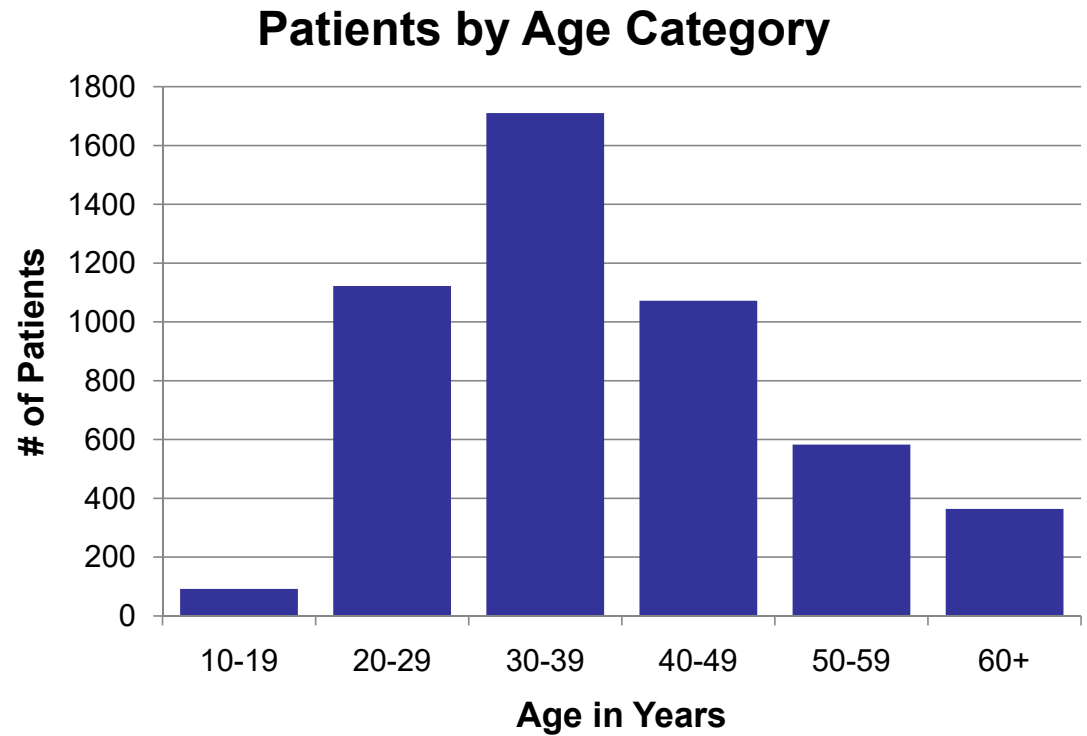


Women getting pap smears by month of year

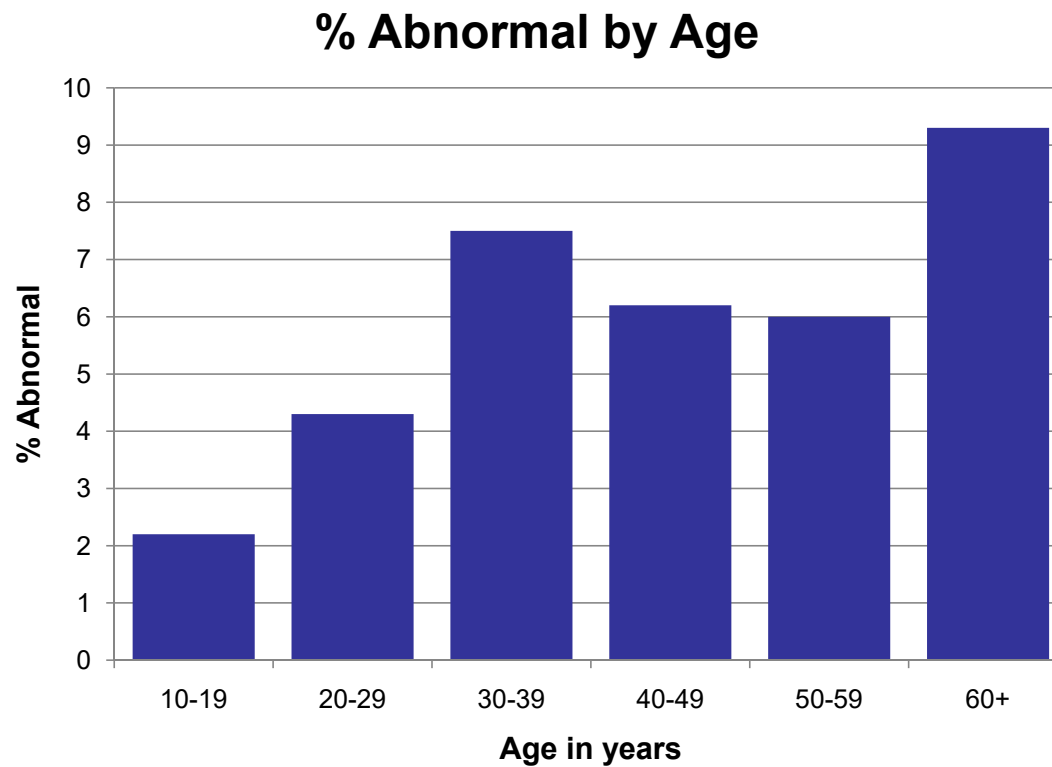


Women Screened by Age

- Average age: 38.5 years
- Range: 14-90 years old

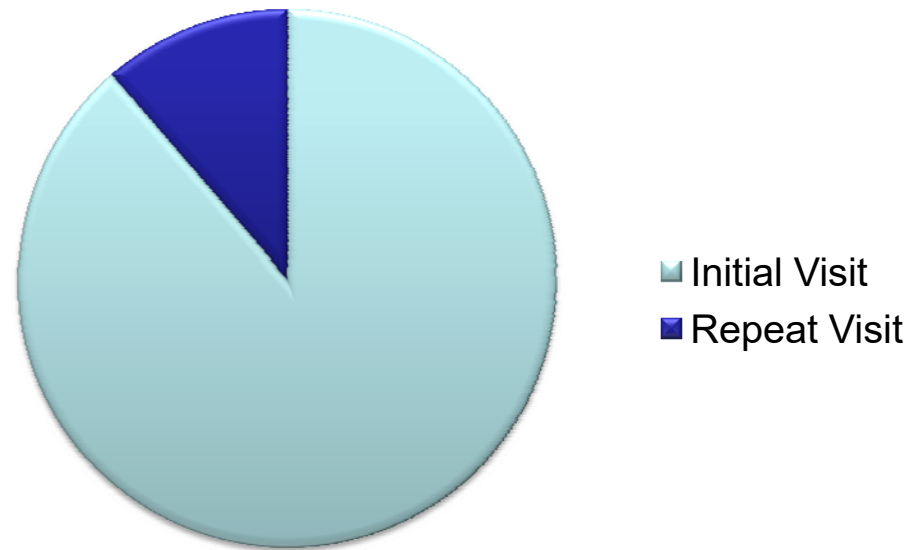


Abnormal Pap Smears by Age

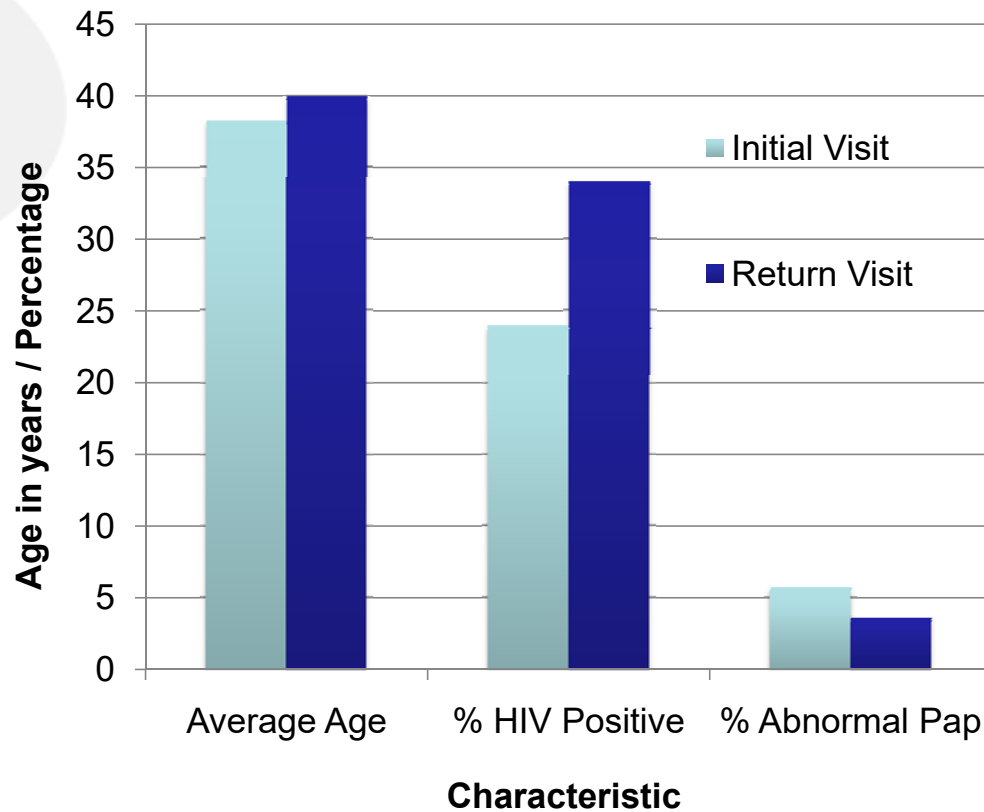


Number of Initial visit vs Return visits

- As program became more established, more women came for return visits and repeated pap smears
- Most given a new ID number, which was not linked to previous pap smears
- # of initial visits: **5,229**
- # of return visits: **668**

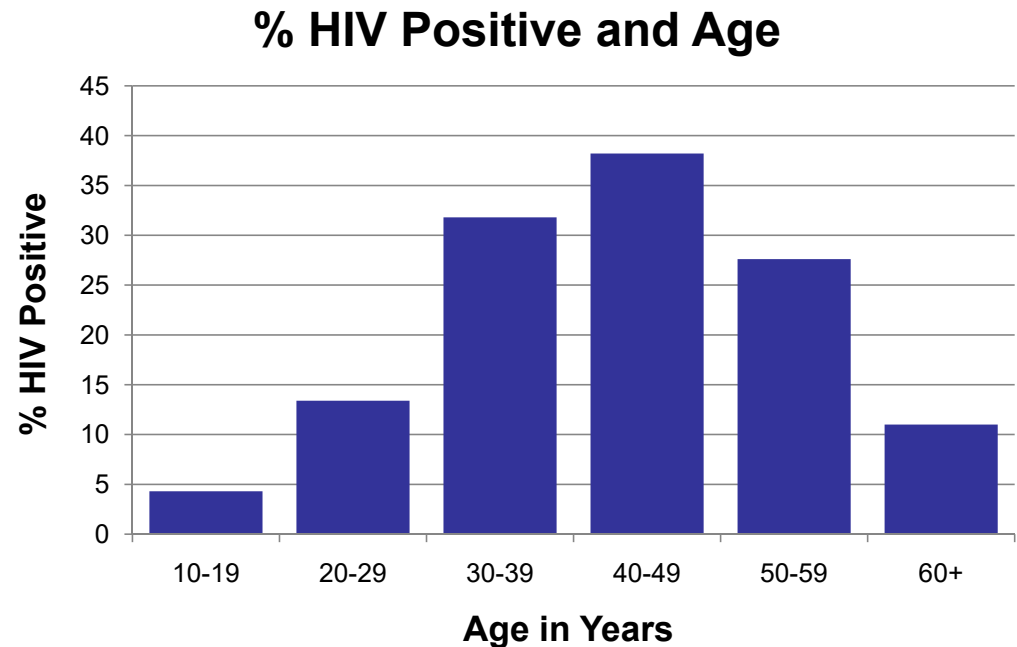


Return Visit Characteristics

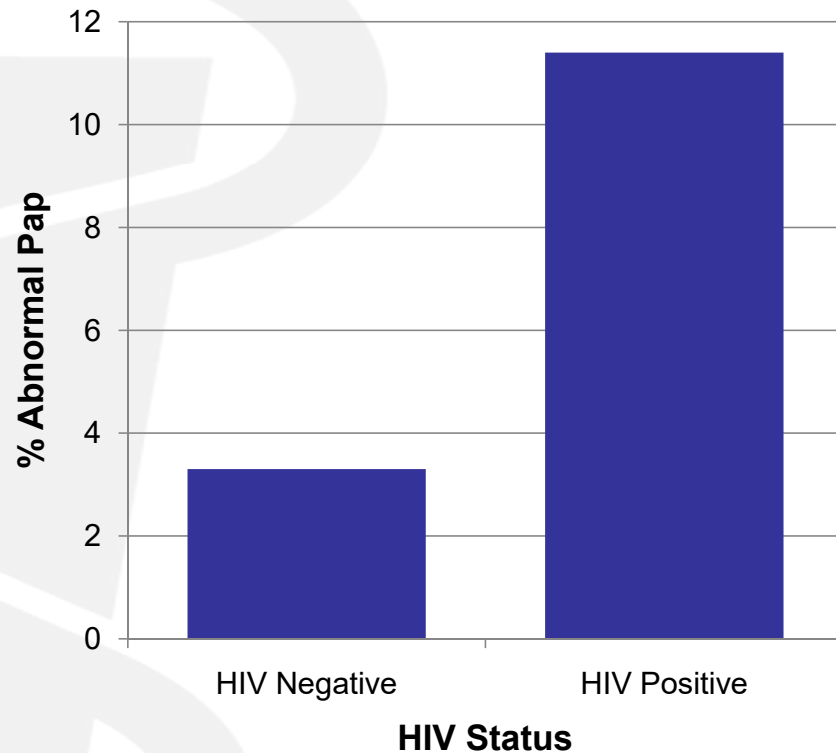


Women Screened by HIV status

- HIV by the numbers
 - Negative: 4,123
 - Positive: 1,479
- Positive HIV rate: **25.1%**
 - Previously reported HIV (+) rate: **26%**
 - Prevalence adult HIV (+) in area: **9%**
- Average age for HIV (+): **39.7 years**

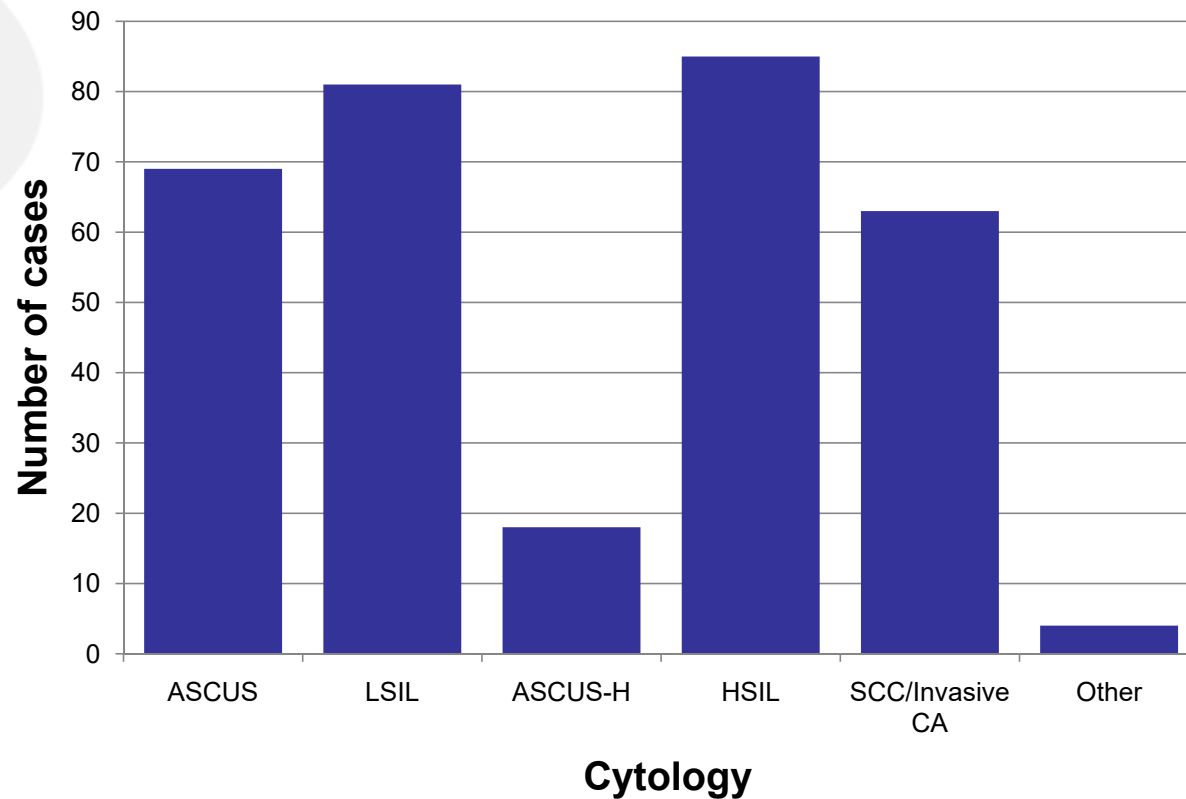


HIV and Abnormal Pap Results

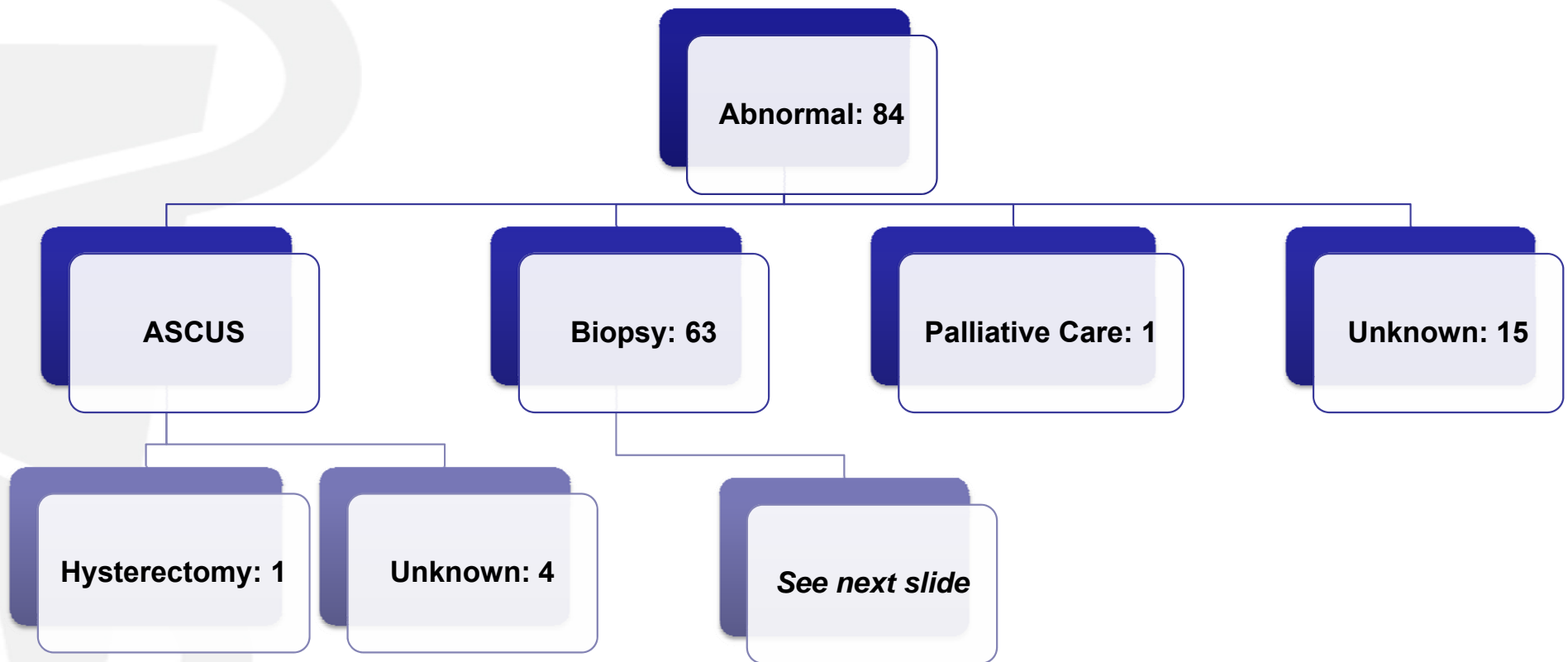


- Abnormal pap:
 - HIV positive: 11.4%
 - HIV negative: 3.3%
- Relative Risk: 3.46, $p=.000$
 - The risk of being HIV+ and having an abnormal pap result was 3.46 times that of being HIV+ and having a normal pap result
- Logistic Regression
 - Unadjusted OR 3.78, $p=.000$
 - Adjusted for age OR 3.57, $p=.000$
 - After controlling for age, the odds of being HIV+ and having an abnormal Pap was 3.57

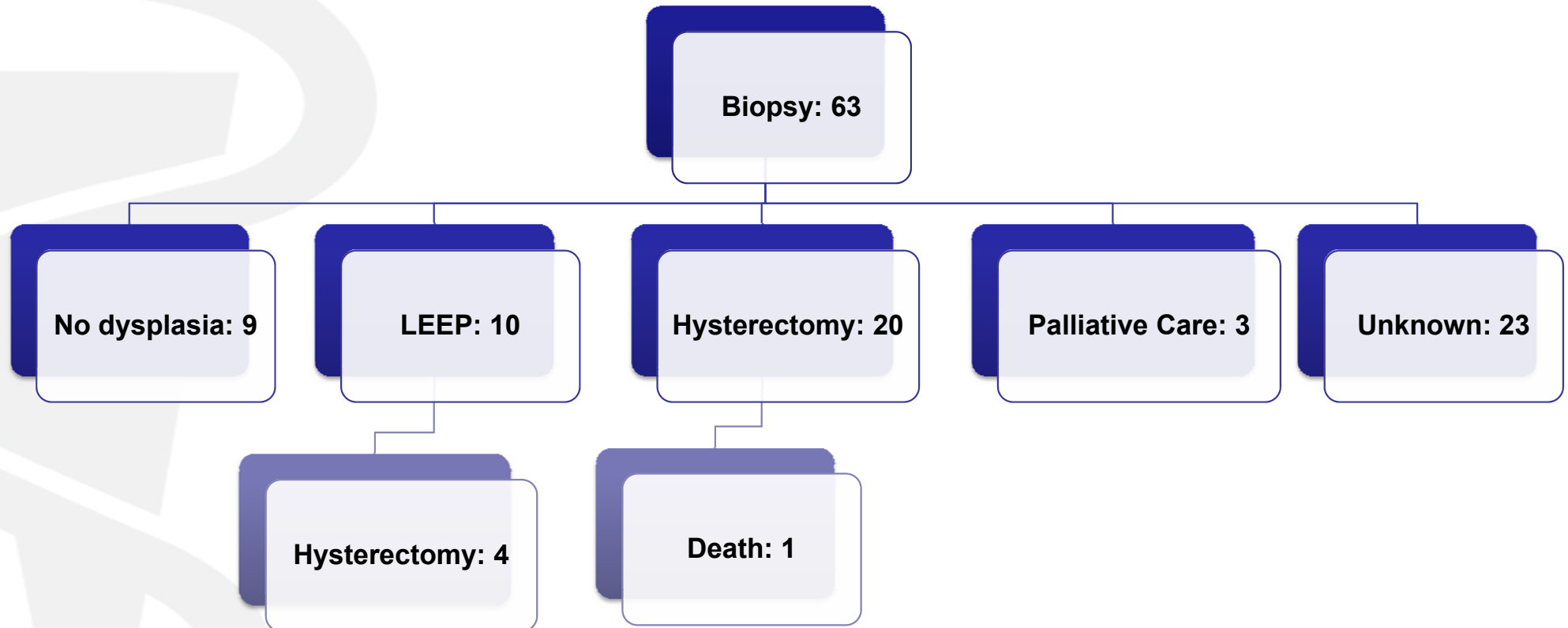
Abnormal pap smears: Cytology results



2015-2016 Abnormal Pap Smear Outcomes



2015-2016 Abnormal Pap Smear Outcomes



2015-2016 Abnormal Pap Smear Outcomes

Correlated Totals:

- Abnormal: 84
- Biopsy: 63
- No dysplasia: 9
- LEEP: 10
- Hysterectomy: 24
- Palliative Care: 4
- Death: 1

Log book totals:

- Biopsy: 138
- Hysterectomy: 43
- Palliative Care: 10



SUCSESSESS AND CHALLENGES

Successes

- Patient benefits
 - Over 6,000 paps completed
 - Screening for HIV
 - Referral for other health concerns
 - Education
 - Free of cost
 - Many life-saving procedures/operations completed
- Technique
 - Only cytology-based screening program in Malawi



Successes

- Facility
 - Dedicated location for Women's Health Clinic
 - Dedicated location for educational classes
 - Private rooms
 - “No structure” community outreach
 - Community education



Successes

- Partnerships
 - LLU Family/Preventive Medicine, OB-GYN, Internal Medicine, and Surgery residents, Medical students
 - Pan-African Academy of Christian Surgeons (PAACS) training site
- Staff
 - Dedicated, determined, community health workers actively track down patients with abnormal results
 - Outreach to village chiefs from distant villages
 - MAH sponsoring a clinical officer for additional OB/GYN training



Successes

- Sustainability
 - Ongoing donor support
 - 5-year family donor fund specifically for Women's Center
 - Number of pap smears performed has increased over the years
 - Women coming back for return visits
 - Community ownership: locals comprise majority of staff



Challenges

- Socio-cultural barriers
 - Travelling distance
 - Lack of transportation (most women walk)
 - Language barriers: Limited number of translators available
 - Cultural barriers
 - Outreach to women only with approval from village chief
 - Misconceptions and fear among women
- Treatment
 - Palliative care options limited to pain medication (Tramadol)
 - Limits to treatment, i.e. no radiation therapy
 - Loss to follow-up



Challenges

- Limited time and talent:
 - Secretary for intake and to enter the data into logbooks (borrow from another department), enter results
 - Dedicated pathologist / cytologist (volunteer time)
 - OB-GYN specialist
 - US trained OB-GYN, PAACS* surgical resident, Clinical officers
 - Nurses to collect pap smears, perform pelvic, breast exam
 - Clinic only open once a week
 - Under utilization of the clinic buildings

*Pan-African Academy of Christian Surgeons



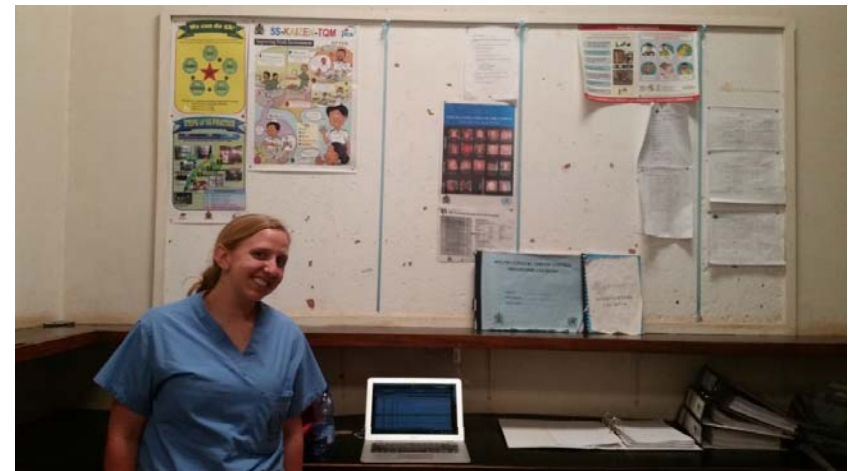
Challenges

- Data collection & Management
 - Duplicate patient ID numbers, i.e. new vs. return
 - Multiple locations for documentation:
 - Ministry of Health log book, binders, registries, etc.
 - Inconsistencies with documentation practices
 - Government requirements for data reporting
 - VIA forms
 - Transcribing paper data from various sources to a centralized electronic format



Challenges

- Sustainability:
 - Funding from US donors
 - Cost for the women (currently free)
 - Dedicated staffing (cytologist, OB-GYN)
 - Training health care workers
 - Transportation



Future

- Mobile clinics for women in distant villages
- Expand MAH's women's health clinic to more than one day a week
- Possible community needs assessment
- Hospital or community ownership and funding options
- HPV vaccine – coming soon
 - Clinical trials to implement vaccinations underway for 2-shot quadrivalent vaccine series



RESIDENT ROLES



Family & Preventive Medicine Residency Program

- Started in 2006
- 4-year program
- Dual board certification
 - Family Medicine
 - Preventive Medicine
- MPH in Population Medicine
- 4 residents/year



Malamulo Rotation

- PAPS Team International: Sept. 2012
- Site evaluation: May 2013
- Started data evaluation
 - Coded forms, started logging, trained local staff, donated a Macbook
- Became required international OB rotation for residents
- First FPM resident to go: Feb. 2014

Residency Project

- Required rotation x 1-2 years
- 10 residents over course of 4 years
- Assisting with clinic duties
 - Performing pap smears
- Collecting data
- Entering data into computer



Strengths of Resident Project

- Sustainability with consistent resident participation
- Application of statistical and population management principles learned in MPH course work
- Collaboration among residents



Barriers to Residents Participation



- Attendings have multiple clinical duties (limited time)
- Ability to find/access paper data
- Partnering with a person who knows about the project at MAH
- Interest in the project
- No longer required rotation

Opportunities for Future Endeavors



- Continue data analysis of follow-up for patients with abnormal results
- Log and analyze data on longer intake forms
- Expand cervical cancer screening beyond Thyolo district
- Duplicate cervical cancer screening program in other locations in the developing world

Conclusions

- Cervical cancer is a treatable and preventable disease that disproportionately affects those in low-middle income countries
- Cervical cancer screening programs, such as the one in Malawi, are challenging to initiate and maintain, but can be successful in detecting and treating pre-cancerous lesions
- Family Medicine residents can play an important role in data collection and community outreach programs

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- Dr. Marc Debay, Dr. N. Margarete Ezinwa, Dr. Karen Studer
- Stella Nyirenda, RN and Mary Panulo, LVN
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Questions?

Resources

- http://apps.who.int/iris/bitstream/10665/144785/1/9789241548953_eng.pdf?ua=1
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4989288/>
- <http://www.panafrican-med-journal.com/content/article/22/247/full/#.WRptCFTys1I>
- <https://bmcmwomenshealth.biomedcentral.com/articles/10.1186/s12905-016-0306-6>
- <http://www.who.int/reproductivehealth/publications/cancers/en/>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4989288/>
- <http://www.who.int/cancer/prevention/diagnosis-screening/cervical-cancer/en/>
- <http://www.asccp.org/asccp-guidelines>
- <https://report.nih.gov/nihfactsheets/viewfactsheet.aspx?csid=76>

Resources

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