

International Federation of Gynecology and Obstetrics



SCREENING AND EARLY DETECTION OF CERVICAL CANCER





What is the optimum screening method for cervical cancer in developing countries?

- Target population
- Screening test
- Frequency of screening
- Triage/diagnosis
- Treatment
- Follow-up care
- Evaluation of program impact
- Quality assurance





Screening

- Cervical cytology
- Visual inspection with acetic acid (VIA) / Visual inspection with Lugol's iodine (VILI)
- HPV testing
- Organized Program vs. Unorganized/ opportunistic/sporadic initiatives



Performance characteristics of different screening methods

Screening test	Sensitivity	Specificity	Characteristics
Conventional cytology	Moderate (44-78%)	High (91-96%)	Requires adequate healthcare infrastructure; laboratory based; stringent training and quality control
HPV DNA testing	High (66-100%)	Moderate (61- 96%)	Laboratory-based; high throughput; objective, reproducible and robust; currently expensive
Visual inspection method			Low technology; low cost
VIA	Moderate (67-79%)	Low (49-86%)	Linkage to immediate treatment
VIAM	Moderate (62-73%)	Low (86-87%)	possible; suitable for low- resource settings
VILI	Moderate to high (78-98%)	Low (73-93%)	



Link between screening (testing), diagnosis and treatment is critical for success of cervix cancer screening



Management of screen positive women

- Screen and treat in a single visit approach
- Colposcopy/ biopsies/ treatment based on colposcopy findings/ a posterori histologies confirmation
- Colposcopy/ directed biopsies/ histology confirmation/ treatment

Cluster Randomized trial of Visual Screening for Cervical Cancer in Rural South India: Dindigul District Cervical Screening Study, Tamil Nadu, India







Final outcome in the randomized controlled trial of VIA in Mumbai

Outcome	Intervention	Control	RR (95% CI)
Person years	602,152	603,812	
Cervical cancer cases	161	166	
ASR	29.0/100,000	29.4/100,000	0.9 (0.8- 1.2)
Cervical cancer deaths	67	98	
Cervical cancer mortality rates	11.1/100,000	16.2/100,000	0.7 (0.5- 0.9)

Shastri et al., J Natl Cancer Inst. 2014;106(3):dju009



The Cape Town Study: Magnitude of reduction in CIN 2 and 3 lesions at 36 months after HPV DNA or VIA based 'screen and treat' approach in South Africa

Characteristic	HPV screen- and-treat (N= 2163)	VIA screen- and-treat (N=2227)	Delayed evaluation control group (N=2165)
Cumulative frequency of CIN 2 and 3 lesions	29 (1.5%)	71 (3.8%)	105 (5.6%)
Rate ratio (95% CI)	0.27 (0.17-0.43)	0.68 (0.50-0.92)	1.0
Percentage of CIN 2 and 3 prevented (95% CI)	73 (60-85)	32 (11-53)	-

Denny et al., J Natl Cancer Inst. 2010;102(20):1557-67



Comparative efficacy of visual inspection with acetic acid, HPV testing and conventional cytology in cervical cancer screening: a randomized intervention trial in Osmanabad District, Maharashtra State, India

Hazard ratios of incidence of stage II+ cervical cancer and cervical cancer mortality in the study groups (2000-2007)

Group	Cases	Person years of follow-up	Hazard ratio* (95% CI)	
Stage II+ cervical cancer incidence				
Control	82	247,895	1.00	
HPV	39	268,185	0.47 (0.32-0.69)	
Cytology	58	250,523	0.75 (0.51-1.10)	
VIA	86	267,326	1.04 (0.72-1.49)	
Cervical cancer mortality				
Control	64	248,175	1.00	
HPV	34	268,674	0.52 (0.33-0.83)	
Cytology	54	251,144	0.89 (0.62-1.27)	
VIA	56	267,917	0.86 (0.60-1.25)	
CI: confidence interval	* Age-adjusted			

Sankaranarayanan *et al*., N Engl J Med 2009;360:1385-1394

In collaboration with TMC, Mumbai and NDMCH, Barshi, India





Comparative efficacy of visual inspection with acetic acid, HPV testing and conventional cytology in cervical cancer screening: a randomized intervention trial in Osmanabad District, Maharashtra State, India

Cervical cancer incidence rates among screen-negative women by study group (2000-2007)

Group	Number of women	Cancer cases	Age-Standardized Incidence rate (per 100 000)
HPV	24 380	8	3.7
Cytology	23 762	22	15.5
VIA	23 032	25	16.0

Sankaranarayanan et al., N Engl J Med 2009;360:1385-1394



Comparative efficacy of visual inspection with acetic acid, HPV testing and conventional cytology in cervical cancer screening: a randomized intervention trial in Osmanabad District, Maharashtra State, India

Cumulative incidence and mortality among women screen-negative in the cervical cancer screening study in Osmanabad District, India during 2000-2009



In collaboration with TMC, Mumbai and NDMCH, Barshi, India



Accuracy of different screening approaches to detect CIN 2/3 in 1128 HIV infected women in Pune, India

Screening test	Sensitivity	Specificity
VIA	83.6	88.8
VILI	89.1	89.3
Cytology at ASCUS threshold	63.3	94.5
HC2 test	94.6	77.4
VIA and VILI Sequential	81.8	93.2
HC2 and VIA Sequential	80.0	96.0
HC2 and VILI Sequential	83.6	96.9
HC2 and VIA/VILI Sequential	85.5	95.3
HC2 and cytology Sequential	63.3	96.6



Low- and middle-income countries/provinces with large scale VIA screening and HPV screening programs



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Low- and middle-income countries/provinces with large scale Cytology screening programs



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Pap smear screening coverage in Uruguay, October 2008 – October 2011

- Total target population: 667 102
- Target population coverage: 228 386 (34.7%)
- Unsatisfactory smears: 1.9% (n = 16081)
- Negative smears: 90.8% (n = 191 128)
- ASCUS and worse: 6.3% (n = 13267)
- LSIL and worse: 3.0% (n = 6218)



Cervical cancer mortality in selected Latin American Countries (1955-2012)



World Health Organization, mortality database http://www.who.int/healthinfo/statistics/mortality_rawdata/en/index.html (accessed on 02/03/2015)



Programmatic introduction of HPV testing in Jujuy Province, Argentina

- 270 public health centres in Jujuy province offered HPV testing in 2012
- 22,515 women (30+) have been HPV tested
- 2861 (12.7%) of women HPV +ve
- 807 (28.2%) HPV +ve women were cytology positive and 627 complied with colposcopy/diagnosis referral
- 171 CIN 1, 47 CIN 2, 214 CIN 3 and 20 invasive cancers detected
- 251 of 281 CIN 2+ women received treatment



Thailand national cytology screening programme

- 3.13 million women aged 35-60 years in 75 provinces were screened during 2005-2009 in the organized program
- Infrastructure : 145 cytology labs, 299 cytotechnologists
- 0.7% (N=20 991) inadequate smears
- 1.5% (N=45 879) had LSIL or worse lesions
- Information capture on colposcopy, treatment of lesions incomplete
- Around 2.5 million smears were taken in the private sector during 2005-2009
- National sample survey in 2007 indicated that 38-72% of women aged 35-60 years had a Pap smear in the preceding 5-years.



Distribution of the



+Colposcopy clinics

MA

Bangladesh National Cervical Screening Programme (BNCSP) (2005-ongoing)

Aims to provide VIA screening to >70% of 30-49 year old women during 2010-2014

- Women are screened by 1429 providers in 644 VIA screening centers; CBE also provided
- 256 trained doctors provide colposcopy and treatment services in 15 colposcopy/treatment centres
- 1 million women have been screened; 46000 were VIA+ve, 90% of screen positives have been further investigated and treated



2006

District-level expansion across Zambia (2006-2014) and projected (2016) of the Cervical Cancer Prevention Program in Zambia (CCPPZ)

2014

2016





Estimated Annual Percentage Change (EAPC) for six common cancer types and for all other cancer sites, by sex, in selected registry populations





A pragmatic policy to dramatically control or eliminate cervix cancer in vaccinated cohorts of women

- Vaccinate girls aged 11-12 years
- If resources permit, provide catch up vaccination for girls aged 13-18 years
- To begin with, at minimum, provide at least a single VIA or preferably HPV screen at age 35 or 39 years
- Repeat screens at 5 (VIA) or 10-year (HPV screen) intervals maybe considered depending on resources



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