Impact and cost-effectiveness of integrating cervical cancer screening and prevention into HIV-care in the Nyanza Province

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Integration for Impact
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Background

• HIV clinics represent high-impact sites for integration of cervical cancer screening and prevention (CCSP) services

• Designing CCSP programs requires identification of
  – Resource-appropriate screening techniques
  – Optimal screening intervals
  – Effective treatment techniques

• Scale-up and sustainability depend on costs, potential population impact and cost-effectiveness
Cost-Effectiveness Analysis

- Societal perspective
- Define screening strategies and probabilities of diagnosis, treatment and recurrence
- Identify Quality Adjusted Life Years (QALYs) for various disease states
- Determine costs
- Outcomes:
  - Cost/QALY
  - Incremental Cost-Effectiveness Ratio (ICER)
Cost-effectiveness Threshold

• WHO/World Bank Definition of Cost-effectiveness (cost/QALY) for resource-limited settings
  – 3 * GNI per capita = cost-effective
  – GNI per capita extremely cost-effective

• Kenya GNI: $737

• Examples:
  – First-line HAART therapy: $556/DALY
  – HAART-Plus: $2010/DALY
  – VCT: $82/DALY
  – STI Prevention: $32/DALY

Decision-Analysis Tree

- Compares baseline policy of no cervical cancer screening with three strategies

1. Single Lifetime “See & Treat” with VIA and Cryotherapy

2. “See & Treat” every three years

3. Screen with VIA every three years with treatment for biopsy-confirmed precancer by LEEP
Screening with VIA within HIV programs every 3 years, treat with Cryotherapy

No CIN2/3 (True Negative)

- Normal survival

CIN2/3 (False Negative)

- Normal survival
- Spontaneous Regression 48%
- Death from Cervical Ca 0%
- Progression to Ca 80%
- Survival/Treatment 42%

CIN2/3 (False Positive)

- Normal survival w/ side effects and cost of cryotherapy
- Spontaneous Regression 58%
- Death from Cervical Ca 42%
- Progression to Cancer 80%
- Survival/Treatment 20%

Positive Screen

- Normal survival
- Spontaneous Regression 58%
- Death from Cervical Ca 42%
- Progression to Cancer 80%
- Survival/Treatment 20%

No treatment/LTFU 20%

Untreatable Lesions, Tx with LEEP

- Alive w/ effects of LEEP 80%

CIN2/3

- Tx with LEEP 80%
- Recurrent CIN2/3 20%
- No treatment/LTFU 20%
- Dead at 10-yr after appropriate treatment 20%

No further recurrence

Tx with Cryo

- Alive w/ effects of cryo and LEEP 80%

Recurrent CIN 2/3

- Alive w/ effects of multiple LEEPs 80%

No treatment/LTFU 20%
- Dead at 10-yr after appropriate treatment 20%

Recurrent CIN 2/3

- Alive w/ long term effects of cryotherapy 80%

LTFU 10%

No further recurrence
Model Inputs

• Epidemiologic and clinical parameters from:
  – Kenya DHS, 2009
  – Kenya Census Data, 2009
  – CCSP program in Kisumu
  – Published data from HIV-programs in Kenya and Uganda

• Health Utilities estimated from studies in resource-limited settings in Asia and Africa

• Cost-data
  – CCSP program costs
  – Estimates of MoH facility expenses and salaries
  – WHO-CHOICE unit cost for developing countries
Results

• Gain in QALYs in all three strategies similar
• All three strategies extremely cost-effective
• Screening with a single-lifetime “see & treat” visit with VIA and cryotherapy most cost-effective compared to no treatment
  – Single lifetime “see & treat”: $32.30/QALY
  – Every three year “see & treat”: $61.03/QALY
  – Every three year VIA/biopsy/LEEP: $101.12/QALY
• Costs per cancer prevented:
  – $3400 - $4757
• Costs per cancer-related death averted
  – $4273 - $6111
Cost-Effectiveness of CCSP at varying CIN2/3 Prevalence Rates

- Screening/3yrs - Cryo
- Screening/3yrs - LEEP
- Single Screen + Cryo

2% - 5% - 10% - 15% - 20% - 25% - 30% - 35%

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Cost per Cancer Death Averted by CIN2/3 Prevalence and % HIV-Infected Women Enrolled in Care

Cost/Cancer Death Averted (US$)

CIN2/3 Prevalence

- 13%
- 25%
- 50%
- 75%
- 100%
Next Steps

• Multi-variable analysis of cost-effectiveness
  – Various populations
  – Clinical characteristics
    • VIA + and CIN2/3 prevalence vary by CD4+ status and HAART status
    • Vary characteristics by population proportion in care and duration of HIV disease/care

• Test model robustness in other populations

• Disseminate to program planners
Conclusions

• Cervical cancer screening within HIV clinics is extremely cost-effective, regardless of the strategy

• A single-lifetime VIA coupled with cryotherapy is the most cost-effective

• Cost-effectiveness increases with
  – Increasing prevalence of CIN2/3
  – Increasing proportion of HIV-infected women enrolling into care

• This data may help district-level and national health care planning
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