Cancer Screening Programmes Basic Principles

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Screening Definition

- Screening is the presumptive identification of unrecognized disease or defect by means of tests, examinations, or other procedures that can be applied rapidly.

The **AIM** of screening is to provide a pre-invasive diagnosis of the disease

The **OBJECTIVE** of screening is to reduce risk of death from the disease

Decision to implement a screening programme

- Evidence that a cancer is a major health problem (situation analysis)
- Characteristics of individuals and population at risk
- An appropriate health service infrastructure
- Technical resources for diagnosis and treatment

Characteristics of an Organized Screening Program

- Identification of target Population
- Measures for high coverage and attendance-call and recall
- Clear screening protocol: health objectives
- Adequate field facilities for collecting screen material and analysis
- Adequate facilities for diagnosis, treatment and follow up

Characteristics *cont'd*

- Clear referral system: an agreed link between the screenee, laboratory, clinical facility, patient for test results
- Information system (cancer registry)
- Evaluation and monitoring
    - -Process quality indicators
    - -Outcome quality indicators

Opportunistic
Vs
Organized Screening

Characteristics of Failing Screening Programme;
in order of importance

- **Failure to reach the women at risk (opportunistic screening)**
- **Inadequate follow-up of abnormal results**
- **Long screening intervals**
- **False negative results**

ANNUAL ESTIMATES OF NEW CASES GLOBALLY

	Incidence	Mortality
• Breast Cancer	795 000	313 000
• Cervical Cancer	450 000	200 000
• Ovarian Cancer	165 000	101 000
• Endometrial Cancer	142 000	42 000

State-of-the-Art & Experience from the two most widely Screened Sites for Cancer-Worldwide

- ***namely:***

1. Uterine Cervix

2. Breast

Cervical Cancer

- **Pap-Smear:**
  - -Target population: 35-60 years (25-69)
  - -Frequency of screening: 5 years
  - -Reduction in mortality: 90%
- **Clinical Downstaging:**
  - -Target population: 35-60 years
  - -Frequency of screening: 2-3 years
  - -Reduction in Mortality: 30%

Pap smears: Advantages, Limitations and Optimization

- **Its true screening performance has never been tested in a double blind prospective study.**

- **> 70% decrease in mortality from Cx Ca in past 50 years**

Pap Smears cont'd

- Sensitivity: 11 to 99%
- Specificity: 14 to 97%
- False negative: 5 to 55%
  - **-Errors of Commission: laboratory errors-1/3**
  - **-Errors of Ommission: sampling errors-2/3**
- Costs

Pap Smear-*Potential Solutions*

- Accept the drawbacks at face value
- Improve the performance of cervical cytology

Cx Ca Screening-Potential Solutions

- **Unaided Visual Inspection- "Clinical Downstaging"**
- **Aided Visual Inspection- "Acetic Acid Test" Cervicography**
- **Gynoscopy**
- **Speculoscopy**
- **Infrared Spectroscopy**
- **Automated Cytology Screening**
- **HPV DNA Test & HPV Vaccines**

Human Papilomavirus(HPV)

- ***In general population***
- Incidence: condyloma/warts - 0.24-13%

(Data not available)

- Prevalence: 4-44% (Data not comparable)

- ***In cervical cancer***
- Squamous carcinoma: 95% association
- Adenocarcinoma: 60% association

HPV and Cervical Cancer

- 77 human genotypes
- 10 - 15 oncogenic types
  - -high risk : 16, 18, 45, 56
  - -intermdiate risk : 31, 33, 35
  - -low risk: 6, 11, 41, 44

Breast Cancer

- **Breast Self Examination (BSE)**:

  -target age: 40 + years (all ages)

  -reduction in mortality: 25%

- **Clinical Breast Examination (CBE)**:

  -target age: 40+ years

  -not very effective: although cumulative incidence is high; prevalence of palpable cancer at a given time is low.

Breast Cancer *cont'd*

- Mammography (alone or with CBE)
  - -target age: 50-69 years (40-69)
  - -frequency: 1-3 years
  - - high risk: yearly (post-op, +family/H)
  - -reduction in mortality: 30-40% in 50+
    20% in 40+

"EUROTRIAL 40"

Breast Cancer *cont'd*

- **Other methodologies:**
  - **-thermography**
  - **-ultrasonography**
  - **-diaphanoscopy**
  - **-CT-scan**
  - **-MRI**

Breast Ca Screening: Limitations

- **Low sensitivity esp. young women**
- **High false positive: anxiety and costs of supplementary diagnostic tests**
- **Costs**

Screening for other cancer sites

- **Not recommended as public health policy**
- **Experimental (presently)**
- **Only research/demonstration project to evaluate effectiveness**
- **e.g.: Oesophagus, stomach, colorectal, liver, lung, ovary, bladder & prostate, mouth/oropharynx**

To Screen or Not to Screen

Balancing the effect on;

- **Length of Life - screening experts**

(relatively well known, easy to establish)

- **Quality of life - women**

(poorly known, difficult to measure)

- **Cost - administrative officials**

(relatively poorly known, relatively easy to measure)

Conclusion

- **The decision to establish and continue screening programmes depends not only on the factual evidence but also on whose values of benefits, harms & costs prevail**

- **A compromise has to be reached between longevity, quality of life and cost**