Cancer Early Detection: Understanding the Impact

André Ilbawi, M.D.

Technical Office, Cancer Control
Department of Management of NCDs, Disability, Violence and Injury Prevention (NVI)
World Health Organization
Outline

• Comprehensive cancer control & definitions
• Assessing screening & its impact
• Current status of CRC screening in PAHO
• When to prioritize early diagnosis
• Factors for effective implementation
Early detection:
Aims to identify cancer in early stages or pre-cancerous lesions;
Process includes diagnosis & link to treatment
Objectives of Early Detection

- Prevention
- Early detection
- Treatment
- Palliative care

Goal = early identification → Improve survival
Objectives of Early Detection

Goal = early identification

→ Reduced costs of care

→ Less morbid treatment
Objectives of Early Detection

Goal (screening) =
early identification (pre-invasive)

→ 2º prevent cancer (eg, cervical, colorectal)
Comprehensive Cancer Control

- Prevention
- Early detection
- Treatment
- Palliative care

- Screening
  - Organized
  - Unorganized

Early diagnosis
Screening vs. Early Diagnosis

**Screening:**
- Presumptive identification of unrecognized disease in general population
- More than a test

**Early diagnosis:**
- Focuses on persons with disease
- More than symptoms awareness; link to health system

Awareness of symptoms

High quality, accurate, accessible screening test
Screening vs. Early Diagnosis

Healthy cells ↔ Abnormal cells ↔ Pre-invasive cancer

Symptom Onset

Cancer spread → Death

Screening

Test provided for an entire population

Test only for people with symptoms

Test only for people with symptoms
Organized Screening

WHO screening targets:

1. Organized:
   a. Greatest impact
   b. Fewest harms
   c. Equitable

2. >70% participation

Criteria for Organized Screening

- National program to make service available
- Coordination, centralized at national/regional level
- Protocol for screening frequency, target population
- Mechanism of inviting target population systematically
- Functioning health information system including registries
- Monitoring & Evaluation program
Building Blocks of Cancer Screening

Components of Organized Screening
- Coordinated service delivery
- Competent health professionals
- Adequately funded programme
- National programme to promote access
- Information system including quality assurance
- Organizational resources and capacity

Benchmarks
- High participation
- Quality assured
- Link to treatment

Goals
- Reduce mortality
- Identify precancerous lesion or early cancer
Understanding the Impact

- Sample screening programme
- Evaluate impact & cost-effectiveness

**Benchmarks**
- High participation
- Quality assured
- Link to treatment

**Objectives**
- Reduce mortality
- Identify precancerous lesion or early cancer

**Steps**
- Coordinated service delivery
- Competent health professionals
- Adequately funded programme
- National programme to promote access
- Information system including quality assurance
- Organizational resources and capacity

**Adequate Funding**
National programme to promote access
Cancer Screening

Population sensitized to screening test

High quality, accurate, accessible screening test

Confirmatory pathologic diagnosis & staging

Referral for definitive treatment

Treatment accessible, high quality

Sample population: 1 million
100,000 people screened with FIT annually
5,000 with abnormal screening test
350 with confirmed cancer found on colonoscopy
4,650 with no cancer on colonoscopy (~750 polyps)
450 require treatment

32 avoid death from CRC due to screening
260 survive without screening
200+ cancers prevented by colonoscopy

Cost: $200mil - $1 bil
Incidence

LMIC Incidence: 14 per 100,000

32 lives saved due to screen

$ 18,100 / LYS

HIC Incidence: 40 per 100,000

10 lives saved due to screen

$ 8,500 / LYS

FIT positive

5000 5000

Estimated cancers averted from screening

Source: GLOBCAN 2012 (IARC)
Test Quality

**Study Median**
- Sensitivity: 78%
- Specificity: 95%

**Low Quality**
- Sensitivity: 60%
- Specificity: 90%

- 32 lives saved due to screening
- $17,700 / LYS

- 20 lives saved due to screening
- $8,500 / LYS

<table>
<thead>
<tr>
<th>FIT positive</th>
<th>Receive C-scope</th>
<th>Cancer detected</th>
<th>Cancer deaths</th>
<th>Lives saved due to screening</th>
<th>Estimated cancers averted from screening</th>
</tr>
</thead>
<tbody>
<tr>
<td>5000</td>
<td>5000</td>
<td>350</td>
<td>160</td>
<td>32</td>
<td>20</td>
</tr>
<tr>
<td>10000</td>
<td>10000</td>
<td>300</td>
<td>180</td>
<td>20</td>
<td>150</td>
</tr>
</tbody>
</table>

Ideal vs. Low quality
Participation Rates

**Ideal:** 100%

- Low Range: 30%
- 32 lives saved due to screen
- $13,000 / LYS

**Ideal:**
- 15 lives saved due to screen
- $8,500 / LYS

**CRC Screening Participation >50%**

- AFRO: FIT positive: 5000, 5000, 900, 15
- PAHO: FIT positive: 5000, 5000, 900, 15
- EMRO: FIT positive: 5000, 5000, 900, 15
- EURO: FIT positive: 5000, 5000, 900, 15
- SEARO: FIT positive: 5000, 5000, 900, 15
- WPRO: FIT positive: 5000, 5000, 900, 15

- Estimated cancers averted from screening:
  - AFRO: 200, 100
  - PAHO: 200, 100
  - EMRO: 200, 100
  - EURO: 200, 100
  - SEARO: 200, 100
  - WPRO: 200, 100

- Cancer deaths:
  - AFRO: 32
  - PAHO: 15
  - EMRO: 16
  - EURO: 200
  - SEARO: 32
  - WPRO: 15

- Lives saved due to screening:
  - AFRO: 70
  - PAHO: 16
  - EMRO: 200
  - EURO: 32
  - SEARO: 15
  - WPRO: 200
Link to Diagnosis & Treatment

Ideal: 100%

Low Range: 60%

32 lives saved due to screen

$ 12,100 / LYS

15 lives saved due to screen

$ 8,500 / LYS

5000 5000

5000 3000

350 275

160 350

32 15

200 150

FIT positive Receive C-scope Cancer detected Cancer deaths Lives saved due to screening Estimated cancers averted from screening

Ideal Poor f/u with treatment
Putting it all together...

- **60% link to treatment**
  - 80,000 / LYS
  - 5 lives saved due to screen
  - 32 lives saved due to screen
  - $ 80,000 / LYS
  - $ 8,500 / LYS

- **LMIC Incidence**
- **Low quality**
- **30% participation**

<table>
<thead>
<tr>
<th></th>
<th>Ideal</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIT positive</td>
<td>5000</td>
<td>7500</td>
</tr>
<tr>
<td>Receive C-scope</td>
<td>5000</td>
<td></td>
</tr>
<tr>
<td>Cancer detected</td>
<td></td>
<td>350</td>
</tr>
<tr>
<td>Cancer deaths</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>Lives saved due to screening</td>
<td>160</td>
<td>250</td>
</tr>
<tr>
<td>Estimated cancers averted from screening</td>
<td>32</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>200</td>
<td>20</td>
</tr>
</tbody>
</table>
Where Are We Now?

• WHO 2015 NCD CCS
• PAHO
  – 9 / 26 countries perform CRC screening
    • 4 organized /
      5 unorganized
    • 5 FOBT/FIT & 2 endoscopy
  – 2 / 7 have participation rates >50%
Understanding the Building Blocks

- Preparedness for CRC control in PAHO
  - Referral mechanism: 17 / 30
  - Early diagnosis strategy: 12 / 32
  - Cancer diagnosis & treatment
    - Pathology: 28 / 33
    - Cancer treatment center: 23 / 33
    - Access to surgical oncology: 25 / 33
    - Access to subsidized chemotherapy: 22 / 32

Screening cannot succeed without basic cancer services & strong health system.
• Phased approach
• Utilize building blocks of health systems
• Prioritize demonstration projects before population level screening

Basic diagnostic & treatment services (Foundation)
Strengthen early diagnosis (Phase I)
Demonstration projects (Phase II)
Expand screening services (Phase III)
Early Diagnosis

- Building health system for cancer control

“Up to 50% of all premature NCD deaths are linked to weak health systems that don’t respond effectively and equitably to the needs of the people with NCDs”
CANCER EARLY DIAGNOSIS

Awareness & access to care

>80% of patients aware of symptoms

Clinical evaluation, diagnosis & staging

>80% of patients receive timely diagnosis

Access to treatment

>80% of patients initiate treatment

<90 days from symptom onset to initiating treatment
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Early diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human resources</td>
<td>Endoscopists - 2 Pathologist - 0.1</td>
</tr>
<tr>
<td>Basic devices &amp; medicines</td>
<td>Endoscopy units - 1</td>
</tr>
<tr>
<td>Service delivery</td>
<td>Awareness about CRC symptoms</td>
</tr>
<tr>
<td></td>
<td>Strong referral mechn</td>
</tr>
<tr>
<td>Adequate funding</td>
<td>Central funding</td>
</tr>
<tr>
<td>Monitor programme function</td>
<td>M&amp;E framework</td>
</tr>
</tbody>
</table>
Building the Health System

Basic diagnostic & treatment services (Foundation)
Strengthen early diagnosis (Phase I)
Demonstration projects (Phase II)
Expand screening services (Phase III)
Assessing Readiness & Priorities

- Perform SAT of early diagnosis & screening

1. Focus on early diagnosis
2. Provide basic diagnostic tests & treatment

1. Focus on improving coordination of services
2. Consider limiting screening activities to one demonstration project

1. Identify deficits in screening services
2. Devise programme to strengthen screening, focus on regional demonstration projects
THANK YOU

André M. Ilbawi
ilbawia@who.int