Challenges and Opportunities in Prevention, Control, and Early Detection of Cancer in Low-Resource Settings

Mona Saraiya, MD, MPH
Associate Director, Office of International Cancer Control, CDC

Cancer Control in Low Resource Areas, Workshop 1
IOM Meeting
October 26, 2015
Mission-CDC Global Chronic (NCD)

To advance a coordinated global approach to NCD prevention and control by leveraging existing resources, programs and partnerships to build capacity and increase impact.
CDC Funds Cancer Programs Across the Nation

States, Territories, Tribes

- **National Breast and Cervical Cancer Early Detection Protection Program**
  NBCCEDP funds all 50 states, the District of Columbia, 5 U.S. territories, and 11 American Indian/Alaska Native tribes or tribal organizations.

- **National Comprehensive Cancer Control Program**
  NCCCP supports 50 states, the District of Columbia, 7 tribal groups, and 7 U.S. Associated Pacific Islands/territories.

- **National Program of Cancer Registries**
  NPCR supports central cancer registries in 45 states, the District of Columbia, Puerto Rico, and the U.S. Pacific Island Jurisdictions.

- **Colorectal Cancer Control Program**
  CRCCP funds 24 state health departments, 6 universities, and one American Indian tribe.
Cancer Prevention and Control in States, Territories and Tribes

- The National Breast and Cervical Cancer Early Detection Program
- The Comprehensive Cancer Control Program
- The Colorectal Cancer Control Program
- The National Program of Cancer Registries
Breast and Cervical Cancer Screening

- Important safety net that has provided >12M screening exams
- ACA increases access to screening exams
- Expanding program to meet needs of new public health roles
- CDC’s vision: increase population level screening rates

Richardson L, et al. Timeliness of Breast Cancer Diagnosis and Initiation of Treatment. AJPH. 2010

Supporting Organized Approaches to Colorectal Cancer Screening:

Component 1: Health System Change to improve and increase CRC Screening
• All 31 grantees are partnering with health systems to implement priority strategies

Component 2: Direct Screening
• 6 grantees are also being funded to support direct screening for low-income adults age 50-64.

Comprehensive Cancer Control

- Supports robust state-, tribal, territorial-wide coalitions
- Addresses public health needs of cancer survivors
- Plans and implements policy, systems, and environmental changes that emphasize primary prevention of cancer and supports early detection and treatment activities
- Promotes health equity
National Comprehensive Cancer Control Program
Program Priorities

01. Emphasize Primary Prevention of Cancer
02. Support Early Detection and Treatment Activities
03. Address the Public Health Needs of Cancer Survivors
04. Implement PSE Changes to Guide Sustainable Cancer Control
05. Promote Health Equity as it relates to Cancer Control
06. Demonstrate outcomes through evaluation

Emphasize Primary Prevention of Cancer
Support Early Detection and Treatment Activities
Address the Public Health Needs of Cancer Survivors
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Promote Health Equity as it relates to Cancer Control
Demonstrate outcomes through evaluation
Population-based Cancer Registries

- 45 states, Puerto Rico, Pac. Islands
- NPCR U.S. population coverage: 96% percent
- 1.2 million new invasive cancer cases submitted to CDC each year
- CDC’s Vision: Increase completeness, timeliness and usefulness of registry data

Health Economics Research on Cancer

**Health economics** is the study of the human behaviors and decision-making that affect health

- Estimating the cost of cancer to society
- Evaluating the value of cancer interventions and programs
- Projecting future costs of cancer treatment and care

For more information on published manuscripts: [http://www.cdc.gov/cancer/survivorship/what_cdc_is_doing/meps.htm](http://www.cdc.gov/cancer/survivorship/what_cdc_is_doing/meps.htm)
Challenges and Opportunities for Cancer Control-Themes

- Surveillance-limited systems for cancer and NCDs
- Primary prevention-more emphasis on strategies that have large attributable fraction
- Early Detection/Screening
  - Limited evidence in certain approaches, why are we promoting?
  - Organized approach
  - No linkage to treatment (including invasive cancer)-
- Economic and behavioral approaches integral
- Emerging technologies in isolation
- Capacity
- Politics
Opportunities for the Future

• Complexity of screening modalities and patient-centered communication
• New and increased use of technology
  – Used for population-based approaches rather just individual based approaches
• Aging population
  – As baby-boomers age, cancer cases will increase
  – Growing number of cancer survivors are living longer
  – Multiple chronic conditions
• Importance of primary prevention
  – Obesity prevention
  – Tobacco cessation
  – Vaccines
Global Call to Action

• UN High-Level Meeting (HLM) on NCDs, 2011
  – 2nd disease-specific UN General Assembly Meeting (1st was called for HIV/AIDS, 2001)
  – Focused on the 4 primary NCDs and the 4 modifiable risk factors

• Political Declaration adopted
  – Whole-of-government / whole-of-society approach
  – Reduce risk factors / increase health-promoting environments
  – Strengthen national policies and health systems
  – International cooperation and collaborative partnerships
  – Research and development
  – Monitoring and evaluation
WHO NCD Global Monitoring Framework
Set of 9 Voluntary Global NCD Targets for 2025

Principles of Cancer Prevention and Control
WHO NCD Global Monitoring Framework
Set of 25 Indicators

Mortality & Morbidity
- Unconditional probability of dying between ages 30 and 70 years from cardiovascular diseases, cancer, diabetes or chronic respiratory diseases
- Cancer incidence by type of cancer

Risk Factors
- Harmful use of alcohol (3)
- Low fruit and vegetable intake
- Physical inactivity (2)
- Salt intake
- Saturated fat intake
- Tobacco use (2)
- Raised blood glucose/diabetes
- Raised blood pressure
- Overweight and obesity (2)
- Raised total cholesterol

National Systems Response
- Cervical cancer screening
- Drug therapy and counseling
- Essential NCD medicines & technologies
- Hepatitis B vaccine
- Human Papilloma Virus vaccine
- Marketing to children
- Access to palliative care
- Policies to limit saturated fats and virtually eliminate trans fats

25 Indicators
Global Status of Cancer Registration and Vital Registration

Proportion of the regional population covered by high-quality cancer incidence and mortality data

- **Northern America**: 95% by cancer registration, 100% by vital registration
- **Latin America and Caribbean**: 8% by cancer registration, 25% by vital registration
- **Africa**: 2% by cancer registration, 0% by vital registration
- **Europe**: 42% by cancer registration, 18% by vital registration
- **Asia**: 6% by cancer registration, 3% by vital registration
- **Oceania**: 78% by cancer registration, 74% by vital registration

The Cancer Atlas, 2015
Global Initiative for Cancer Registry Development in Low- and Middle-Income Countries

- Regional Hubs
  - Technical Support
  - Research
  - Training
  - Advocacy

- CDC support
  - Africa hub
  - Asia hub
  - Caribbean hub

Source: IARC
Global Initiative for Cancer Registry Development

- Problem: Not enough investment in cancer surveillance?
- Problem: Striving for 100% population coverage
- Question: How much will this cost to start a cancer registry, add more cancer registries?

→ Need standardized method to conduct cost assessments of cancer registries in international settings

→ US Economic Analysis of NPCR provided the foundation
Project Goal

Develop an open-access, standardized registry Cost Assessment Tool (CAT) that can:

1. Assess the current cost to maintain a cancer registry in a variety of country contexts
2. Estimate the resources needed to improve, expand, establish a cancer registry

This information can be used to advocate for, and effectively allocate resources to improve and sustain cancer surveillance
Kenya: Nairobi, Eldoret
India: Barshi, Mumbai, Chennai
Colombia: Barranquilla, Bucaramanga, Pasto, Manizales, Cali
Uganda: Kampala, Gulu
Barbados: Barbados Nation
Approach

- Build on experience with CAT in the U.S.
- Assess registries in a variety of contexts
- Adapt the CAT to country setting using a standard pre-visit questionnaire and input from registry staff

Pilots, 2012–2015

<table>
<thead>
<tr>
<th>Country</th>
<th>Registries</th>
<th>Round 1</th>
<th>Round 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenya</td>
<td>2</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>India</td>
<td>3</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Colombia</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uganda</td>
<td>2</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Barbados</td>
<td>1</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Approach

- Visit collaborating registries in each country
- Develop data collection tool and User’s Guide
- Provide training prior to data collection
- Provide on-going support during data collection
- Analyze and report data back to registry and Ministry of Health (MOH)
International Cancer Registries: Percentage Funded by Host Institution

Gulu, Uganda
Nairobi, Kenya
Bucaramanga, Colombia
Mumbai, India
Cali, Colombia
Manizales, Colombia
Eldoret, Kenya
Pasto, Colombia
Kampala, Uganda
Barranquilla, Colombia
Barbados

Note: Preliminary Comparative Results

Tangka et al, IACR 2015, India
International Cancer Registries: Percentage Expenditure towards Budget Categories

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Tangka et al, IACR 2015, India
Being part of the NCD surveillance team

How can surveillance across NCDs be raised?
The Barbados National Registry: Overview

- Operated by the Chronic Disease Research Centre of The University of the West Indies
- on behalf of the Barbados Ministry of Health (MOH)
- Population-based, multi non-communicable disease (NCD) registry

- Stroke (July 2008)  
- Heart (July 2009)  
- Cancer (July 2010)

Prospective, paper-based  
Retrospective, electronic
Barbados National Registry: Cost per Case of Variable and Fixed Activities (USD)

<table>
<thead>
<tr>
<th></th>
<th>Cancer Registry</th>
<th>CVD Registry</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incident Cases</td>
<td>1,204</td>
<td>1,051</td>
<td>Cancers - 2008; CVD (Stroke and Acute Myocardial Infarction) - 2013</td>
</tr>
<tr>
<td>Variable Cost per Case ($)</td>
<td>90</td>
<td>185</td>
<td>Cost of collecting one additional case</td>
</tr>
<tr>
<td>Semi-Variable/Fixed Cost per Case ($)</td>
<td>101</td>
<td>134</td>
<td>Shared fixed cost reduces overall cost for each registry</td>
</tr>
</tbody>
</table>

Note: Preliminary analysis of Barbados cost and resource use data

On behalf of the Barbados Ministry of Health
CANCER SCREENING
Goal of Cancer Screening Programs

• Decrease morbidity and deaths from cancer
• To do this, all steps of the screening program must be functional and effective
Early Diagnosis

- Diagnosing cancer soon after symptoms develop (i.e. at an earlier stage of disease) when the chance of a cure is more likely

Population with early symptoms of cancer seeks healthcare → Diagnostic test(s) → Cancer diagnosed at earlier, more treatable stage

(test +)

(test -) → No cancer
Best Buys for Cancer Screening in Low and Middle Income Countries

• Cervical
• Breast (still debate)
• Colorectal
• Stomach (Asia)
• Oral (among heavy tobacco smokers and those with other risk factors)

Generally,
  – Prostate cancer is not considered a best buy
  – Lung cancer-is emerging topic area but still not established in Europe
Fundamental Elements of a Cancer Screening Program

• A stable budget sufficient for ongoing costs of all of the services required to deliver the program
• A central administration with responsibility for screening, policy and coordinating all elements in the screening process, including recall, f/u and monitoring, and quality assurance
• A central screening registry or linked registries to record screening and diagnostic tests for call, recall, tracking, and screen positive and quality assurance
• Access to cancer registry for quality assurance and audits
• Evidence-based training standards, clinical guidelines, and performance indicators
• A comprehensive policy for quality assurance to cover the entire range of screening process
• Education programs for the general public and health care professionals
• Mechanisms to identify and recruit disadvantaged persons among target population
Overview of Colorectal cancer Screening programs

X et al, Gut 2015
Important Patterns

- **Europe**
  - Most countries with organized screening program use non-invasive CRC tests
  - Many eastern European countries have no organized screening programs
  - Even some organized screening programs like France have poor uptake rates
Role of front line providers

• Most organized programs are successful because they can use primary care health system rather than specialists

• Allied professionals such as community health care workers can increase awareness, coverage
HPV Vaccination

- HPV vaccination available
  - Low coverage in the United States
  - High coverage in Australia
    - Early impact on high grade lesions
    - Might change the way we look at screening in Australia

- GAVI-eligible countries most likely to benefit
  - Rwanda - has shown high coverage

- Middle-income countries – in pilot phase
  - Waiting for cost to come down

- Investment in infrastructure of screening vs. vaccination?
Technical Assistance: Thailand

Thai Partners/ Collaborators:
- National Cancer Institute
- Ministry of Public Health
- BRFSS team

Projects:
- Demonstration project of HPV testing for primary cervical cancer screening in one province
- Examination of efficiency of follow-up/treatment in women with abnormal Pap smear results in one province
- Analyses of Thai BRFSS 2005 and 2010 data on cervical and breast cancer awareness/screening
Increasing Cervical Cancer Screening in US Pacific Islands

- Cervical cancer screening and prevention efforts in USAPI are supported by:
  - CDC’s National Breast and Cervical Cancer Early Detection Program (American Samoa, CNMI, Guam and Palau)
  - Title X Family Planning – all 6 USAPI
  - Community Health Centers (HRSA) – all 6 USAPI
  - Maternal and Child Health Block Grant – all 6 USAPI

- The US Affiliated Pacific Islands / Jurisdictions have lower cervical cancer screening coverage than US mainland (~30-55% vs 83%) and higher cervical cancer incidence (~20.6 vs 9.9 cases/100,000)\(^1\)

\(^1\) ACOG Committee Opinion, 2015
Cervical Cancer Screening in USAPI

- Cervical cancer screening programs in USAPI adopt the same guidelines as used on US mainland:
  - Pap-smear screening every 3 years for women aged 21-65
  - For women aged 30-65, co-testing with Pap smear and HPV test every 5 years

- Pap smear-based testing in USAPI has limitations:
  - High costs for testing, particularly shipment costs of Pap smears for processing outside the islands
  - Delays in receiving Pap test results
  - Lack of transportation to clinics for multiple screening/follow-up visits

These challenges are magnified in remote outer islands
Previous CDC work in USAPI

In 2010, we examined knowledge, awareness and practices for cervical cancer screening among health care providers in the USAPI.
Previous CDC work in USAPI -(2)

An Expert Panel Meeting was held in 2013 to examine cervical cancer screening strategies in low-resource settings like the USAPI.
Goals for Demonstration Project

- To examine the feasibility, acceptability and cost-effectiveness of implementing additional cervical cancer screening strategies (primary HPV or Visual inspection) in the USAPI
- To improve data systems for tracking cervical cancer screening and prevention efforts
- Develop protocols and policy standards for additional screening strategies

August 2015 - July 2016: Planning Phase for Demonstration Project
CDC’s Epidemic Intelligence Service
What is the Epidemic Intelligence Service?

2-year postgraduate fellowship in applied epidemiology for health professionals interested in public health

• Trains through hands-on assignments and mentoring
• Provides opportunity to gain applied, front-line public health experience
• Modeled on traditional medical residency program
EIS: Who is Eligible?

- **Physicians** with at least one year of clinical training
- Doctoral-level **scientists** with background in public health or one of its disciplines
- **Veterinarians** and other healthcare professionals with MPH or equivalent degree, including coursework in epidemiology or quantitative methods, or relevant public health experience
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EIS Officer Assignments

CDC headquarters and campuses

• Specialized disease or problem-specific experience (e.g. vaccine-preventable diseases, STDs, injury, ectopic pregnancy)

• Surveillance, investigation, and policy development
EIS Officers Across the Country

2014 and 2015 EIS classes (138 officers)
Effective July 1, 2015
Field Epidemiology Training Program (FETP)

- U.S. EIS (1951)
- Canadian FETP (1976)
- Thailand FETP (1980)
- CDC helped establish 65 FETPs, trained more than 3,100 graduates from 72 countries with 80% working in home government, many in leadership positions
FETP Objectives

- Train public health personnel in applied epidemiology to provide subject matter experts to the MOH to support epidemiologic services to national and sub-national levels

- Strengthen capacity to:
  - respond to public health emergencies
  - build and evaluate reliable surveillance systems
  - conduct research activities on priority public health problems
  - improve communications and networking within the country and throughout the region
  - eventually take ownership of FETP
FETP Structure

- **Trainees**
  - physicians, laboratorians, veterinarians, nurses, pharmacists, scientists, and sanitarians

- **Training Model**
  - Closely supervised, on-the-job, competency-based training
  - 25% classroom; 75% field
  - Some programs connected to School of Public, conferring an MSc Epi or MPH
  - All receive a certificate of completion

- **Career Path**
  - Trainees assigned to positions that provide epidemiologic and public health service to MOH
FETPS with Current CDC RA/ Sustained Technical Assistance: 2015

World map by www.freeworldmaps.net

April 15, 2015
Non-Communicable Disease (NCD)

- FETP-NCD focus started in 2010 in 5 countries
- Over 300 FETP residents trained in-country
- Curriculum developed
  - General NCD
  - Tobacco, Cancer, Road Traffic Injury, Toxicology, Tobacco, Disaster Response, Maternal and Child Health, Vital Statistics
- Minigrants support field work with SME mentorship
- Increasing interest in NCDs
  - ~500 NCD abstracts submitted (2010-2015)
Challenges

- Recruiting residents to focus on NCDs
- Identifying in-country NCD mentors for residents
- Some FETPs uninterested in NCDs
- Restrictions to use PEPFAR funding for NCDs
- Limited NCD career opportunities for residents in MoH
Politics

- Global Diplomacy
- Congress and CDC
- Limited resources for Noncommunicable disease globally-
  - Sustainable support?
  - A little goes a long way