# 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

National Center for Chronic Disease Prevention and Health Promotion

Division of Cancer Prevention and Control

# 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.


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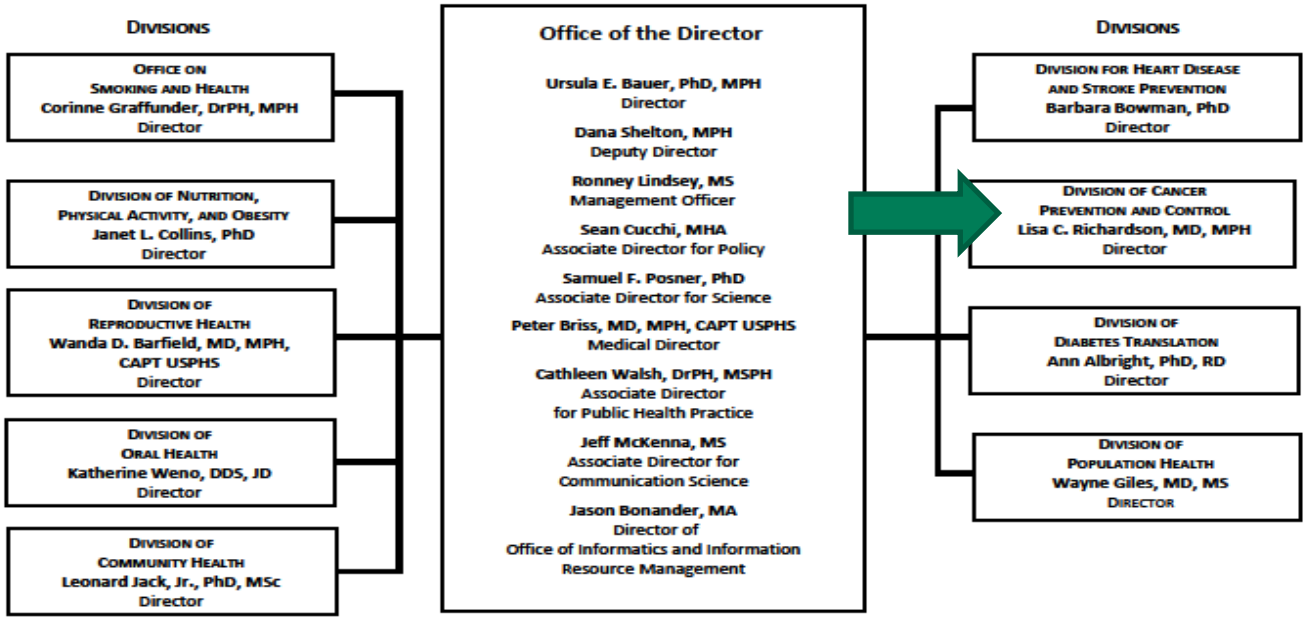
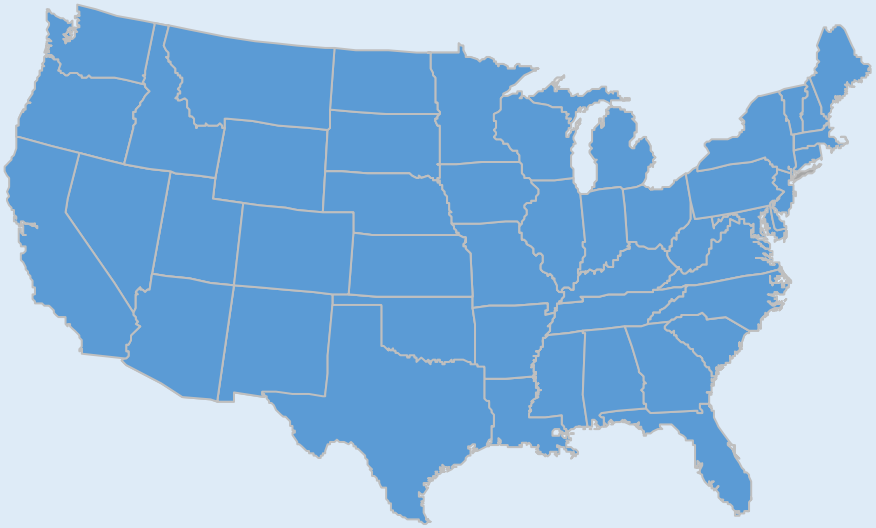



August 10, 2015

# 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.

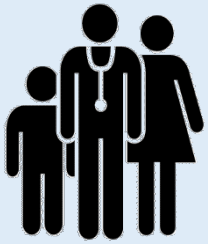
### Colorectal Cancer Control Program

CRCCP funds 24 state health departments, 6 universities, and one American Indian tribe.

# Cancer Prevention and Control in States, Territories and Tribes

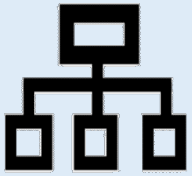
**The National Breast and Cervical Cancer Early Detection Program**

**The Colorectal Cancer Control Program**



**The Comprehensive Cancer Control Program**

**The National Program of Cancer Registries**



# Breast and Cervical Cancer Screening

The National Breast and Cervical Cancer Early Detection Program began in 1991.

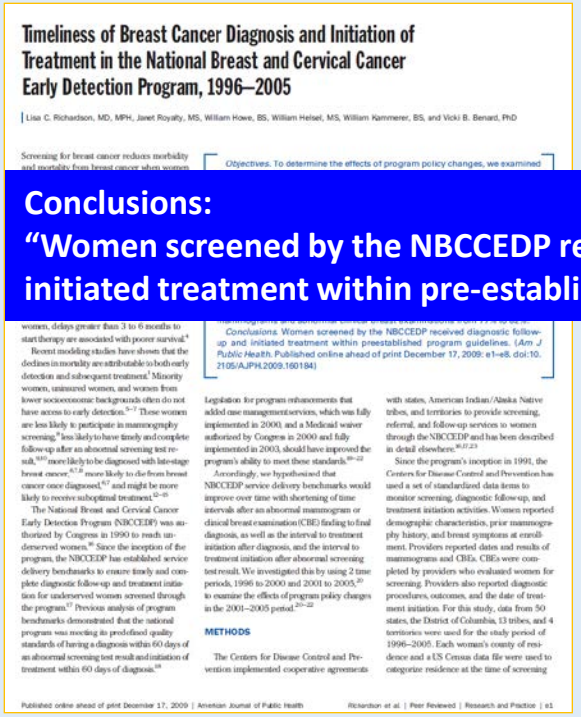
- **Important safety net that has provided >12M screening exams**
- **ACA increases access to screening exams**
- **Expanding program to meet needs of new public health roles**
- ***CDC's vision: increase population level screening rates***

20 YEARS

NATIONAL Breast & Cervical Cancer Early Detection Program

SCREENING WOMEN, SAVING LIVES

# Program Performance (Quality)



Timeliness of Breast Cancer Diagnosis and Initiation of Treatment in the National Breast and Cervical Cancer Early Detection Program, 1996–2005

Lisa C. Richardson, MD, MPH, Janet Royalty, MS, William Howe, BS, William Helsel, MS, William Kammerer, BS, and Vicki B. Benard, PhD

Screening for breast cancer reduces morbidity and mortality from breast cancer when women

*Objectives.* To determine the effects of program policy changes, we examined

*Conclusions.* Women screened by the NBCCEDP received diagnostic follow-up and initiated treatment within preestablished program guidelines. (*Am J Public Health*. Published online ahead of print December 17, 2009: e1–e8. doi:10.2105/AJPH.2009.160184)

women, delays greater than 3 to 6 months to start therapy are associated with poorer survival.[4]

Recent modeling studies have shown that the declines in mortality are attributable to both early detection and subsequent treatment.[5] Minority women, uninsured women, and women from lower socioeconomic backgrounds often do not have access to early detection.[5–7] These women are less likely to participate in mammography screening,[8] less likely to have timely and complete follow-up after an abnormal screening test result,[9,10] more likely to be diagnosed with late-stage breast cancer,[6,7,9] more likely to die from breast cancer once diagnosed,[9,11] and might be more likely to receive suboptimal treatment.[12–15]

The National Breast and Cervical Cancer Early Detection Program (NBCCEDP) was authorized by Congress in 1990 to reach underserved women.[16] Since the inception of the program, the NBCCEDP has established service delivery benchmarks to ensure timely and complete diagnostic follow-up and treatment initiation for underserved women screened through the program.[17] Previous analysis of program benchmarks demonstrated that the national program was meeting its predefined quality standards of having a diagnosis within 60 days of an abnormal screening test result and initiation of treatment within 60 days of diagnosis.[18]

Legislation for program enhancements that added case management services, which was fully implemented in 2000, and a Medicaid waiver authorized by Congress in 2000 and fully implemented in 2003, should have improved the program's ability to meet these standards.[19–22]

Accordingly, we hypothesized that NBCCEDP service delivery benchmarks would improve over time with shortening of time intervals after an abnormal mammogram or clinical breast examination (CBE) finding to final diagnosis, as well as the interval to treatment initiation after diagnosis, and the interval to treatment initiation after abnormal screening test result. We investigated this by using 2 time periods, 1996 to 2000 and 2001 to 2005,[20] to examine the effects of program policy changes in the 2001–2005 period.[20–22]

## METHODS

The Centers for Disease Control and Prevention implemented cooperative agreements with states, American Indian/Alaska Native tribes, and territories to provide screening, referral, and follow-up services to women through the NBCCEDP and has been described in detail elsewhere.[16,17,23]

Since the program's inception in 1991, the Centers for Disease Control and Prevention has used a set of standardized data items to monitor screening, diagnostic follow-up, and treatment initiation activities. Women reported demographic characteristics, prior mammography history, and breast symptoms at enrollment. Providers reported dates and results of mammograms and CBEs. CBEs were completed by providers who evaluated women for screening. Providers also reported diagnostic procedures, outcomes, and the date of treatment initiation. For this study, data from 50 states, the District of Columbia, 13 tribes, and 4 territories were used for the study period of 1996–2005. Each woman's county of residence and a US Census data file were used to categorize residence at the time of screening

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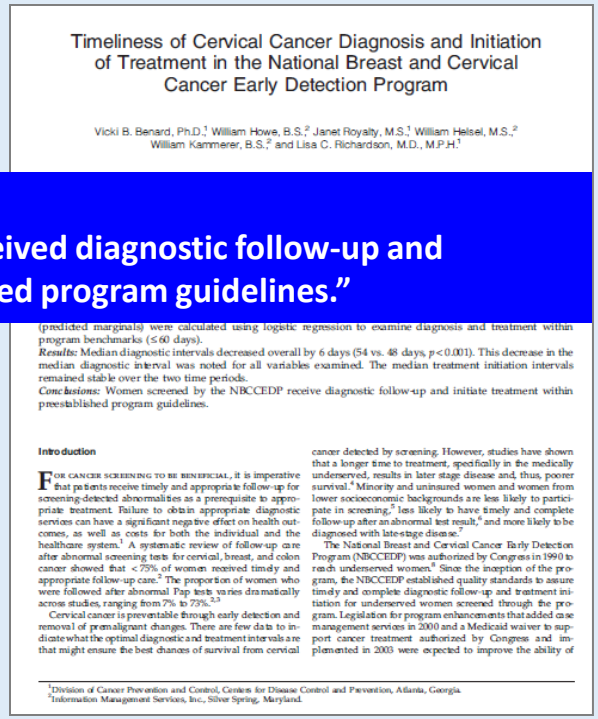
Richardson et al. | Peer Reviewed | Research and Practice | e1

**Conclusions:**
**"Women screened by the NBCCEDP received diagnostic follow-up and initiated treatment within pre-established program guidelines."**



Timeliness of Cervical Cancer Diagnosis and Initiation of Treatment in the National Breast and Cervical Cancer Early Detection Program

Vicki B. Benard, Ph.D.,[1] William Howe, B.S.,[2] Janet Royalty, M.S.,[1] William Helsel, M.S.,[2] William Kammerer, B.S.,[2] and Lisa C. Richardson, M.D., M.P.H.[1]

(predicted marginals) were calculated using logistic regression to examine diagnosis and treatment within program benchmarks (≤ 60 days).

*Results:* Median diagnostic intervals decreased overall by 6 days (54 vs. 48 days, $p < 0.001$). This decrease in the median diagnostic interval was noted for all variables examined. The median treatment initiation intervals remained stable over the two time periods.

*Conclusions:* Women screened by the NBCCEDP receive diagnostic follow-up and initiate treatment within preestablished program guidelines.

**Introduction**

For cancer screening to be beneficial, it is imperative that patients receive timely and appropriate follow-up for screening-detected abnormalities as a prerequisite to appropriate treatment. Failure to obtain appropriate diagnostic services can have a significant negative effect on health outcomes, as well as costs for both the individual and the healthcare system.[1] A systematic review of follow-up care after abnormal screening tests for cervical, breast, and colon cancer showed that < 75% of women received timely and appropriate follow-up care.[2] The proportion of women who were followed after abnormal Pap tests varies dramatically across studies, ranging from 7% to 73%.[2,3]

Cervical cancer is preventable through early detection and removal of premalignant changes. There are few data to indicate what the optimal diagnostic and treatment intervals are that might ensure the best chances of survival from cervical cancer detected by screening. However, studies have shown that a longer time to treatment, specifically in the medically underserved, results in later stage disease and, thus, poorer survival.[4] Minority and uninsured women and women from lower socioeconomic backgrounds are less likely to participate in screening,[5] less likely to have timely and complete follow-up after an abnormal test result,[6] and more likely to be diagnosed with late-stage disease.[7]

The National Breast and Cervical Cancer Early Detection Program (NBCCEDP) was authorized by Congress in 1990 to reach underserved women.[8] Since the inception of the program, the NBCCEDP established quality standards to assure timely and complete diagnostic follow-up and treatment initiation for underserved women screened through the program. Legislation for program enhancements that added case management services in 2000 and a Medicaid waiver to support cancer treatment authorized by Congress and implemented in 2003 were expected to improve the ability of

[1]Division of Cancer Prevention and Control, Centers for Disease Control and Prevention, Atlanta, Georgia.
[2]Information Management Services, Inc., Silver Spring, Maryland.

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

**Benard VB, et al. Timeliness of Cervical Cancer Diagnosis and Initiation of Treatment. JWH. 2012.**

# Supporting Organized Approaches to Colorectal Cancer Screening:

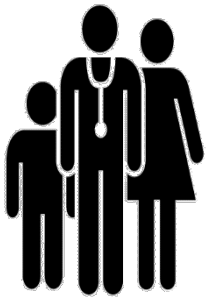
## Component 1: Health System Change to improve and increase CRC Screening

- 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



**The National Comprehensive Cancer Control Program began in 1998.**

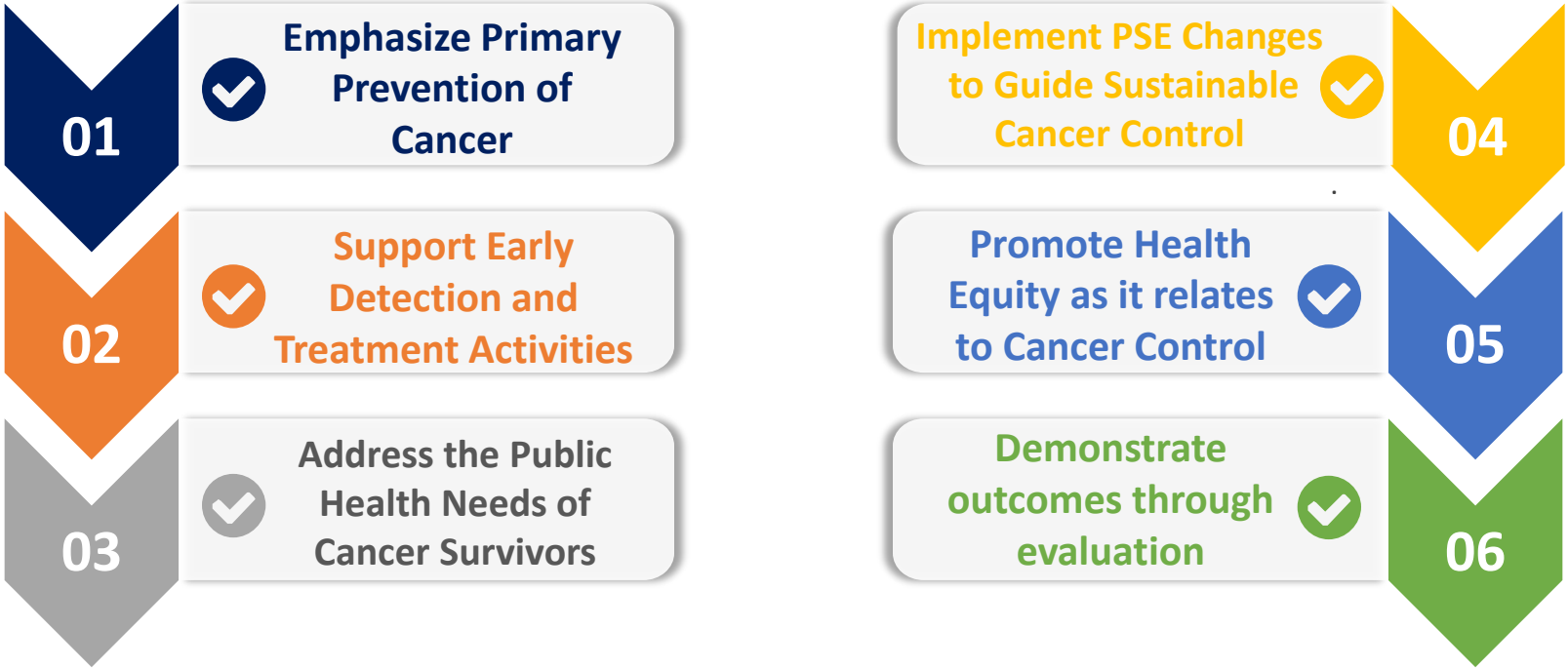
Comprehensive Cancer Control

*Collaborating to Conquer Cancer*

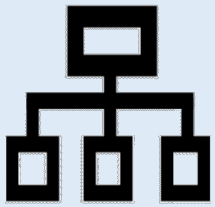
- Supports robust state-, tribal, territorial-wide coalitions
- Addresses public health needs of cancer survivors
- Plans and implements policy, systems, and environmental changes that emphasize primary prevention of cancer and supports early detection and treatment activities
- Promotes health equity

# National Comprehensive Cancer Control Program

## Program Priorities



# Population-based Cancer Registries



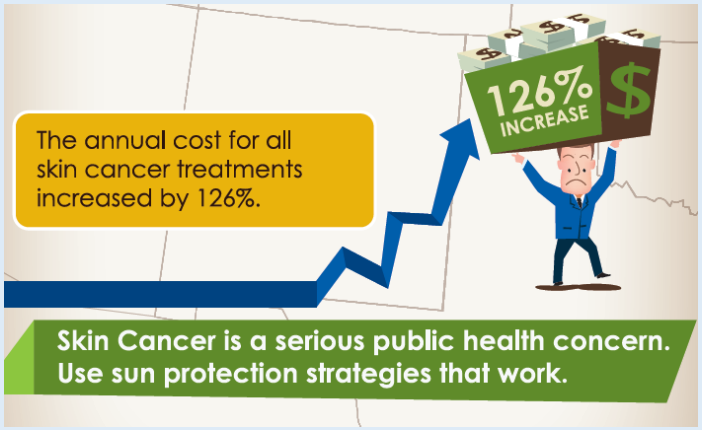
**The National Program of Cancer Registries began in 1992.**

- **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***

NPCR NATIONAL PROGRAM OF CANCER REGISTRIES

# Health Economics Research on Cancer






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

We can use ***health economics*** to inform cancer control planning by:

- 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

# 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**

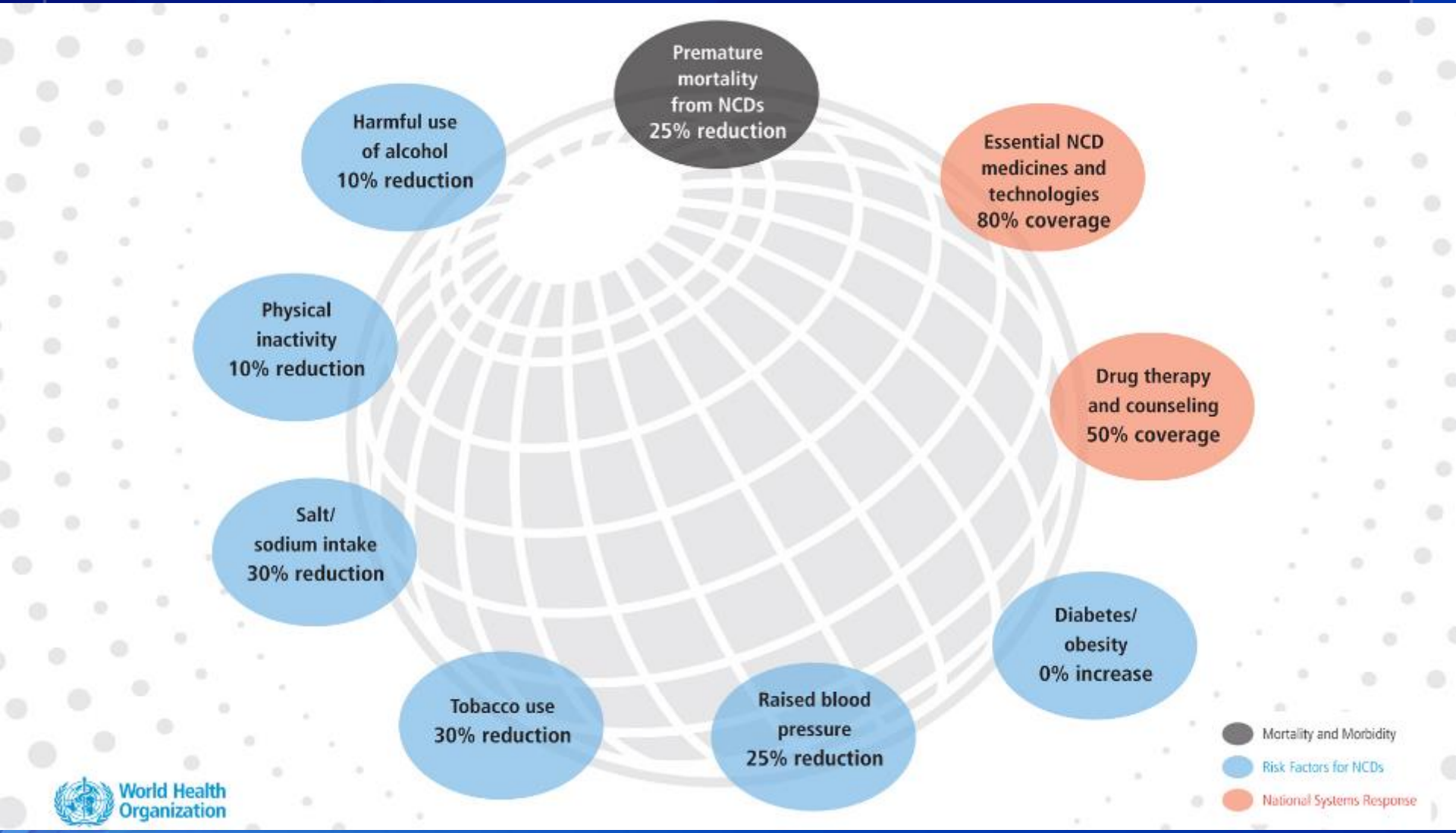
# Opportunities for the Future

- 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

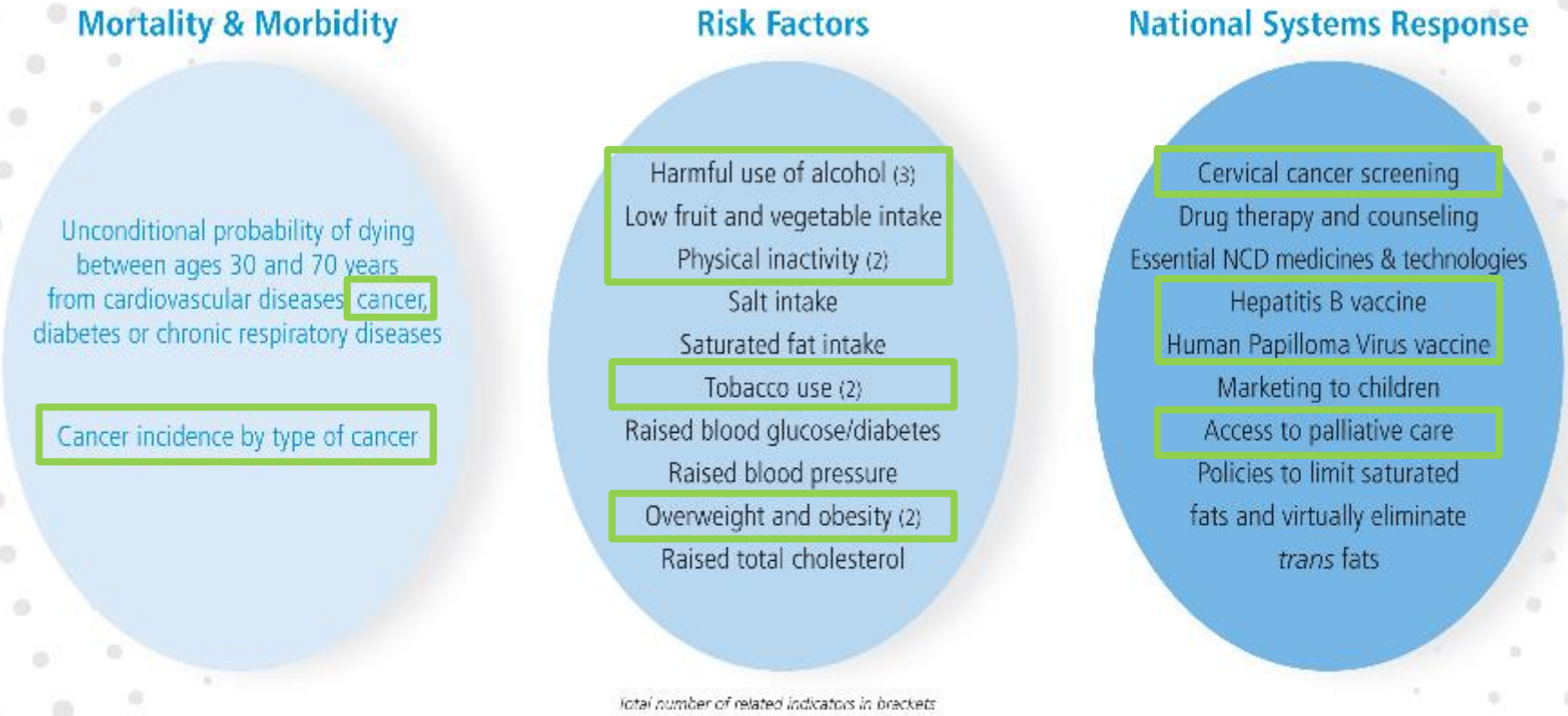
# Global Call to Action

- 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



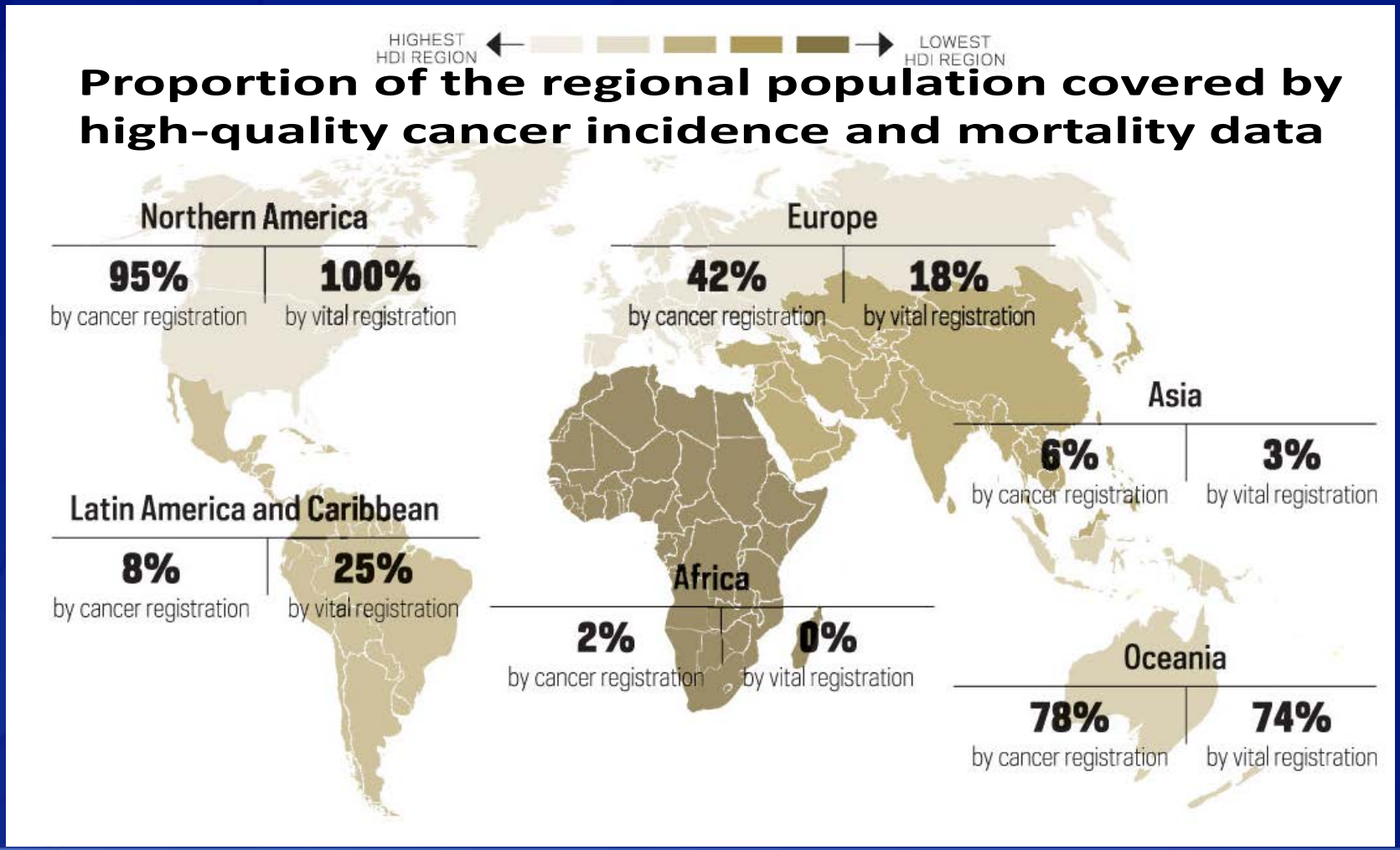
# WHO NCD Global Monitoring Framework
# Set of 25 Indicators




**25 Indicators**

World Health Organization

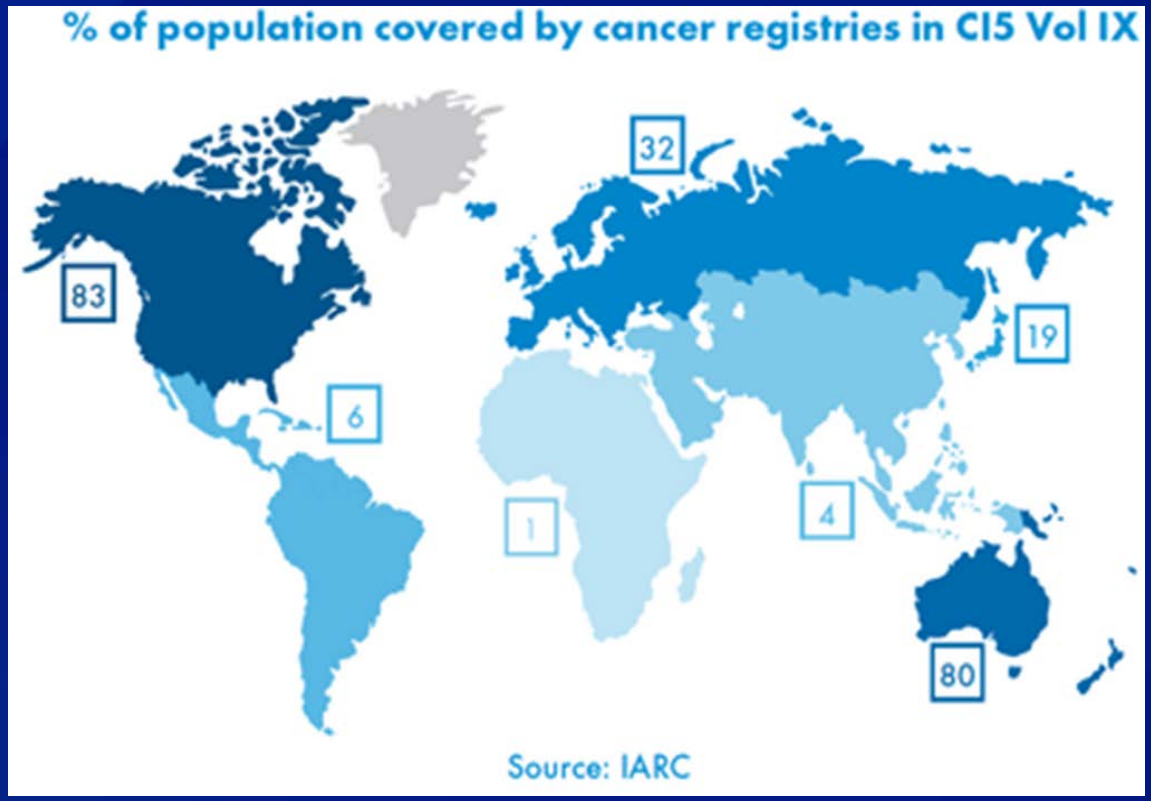
# Global Status of Cancer Registration and Vital Registration




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



# 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**

# Registries Piloting the CAT

**Kenya:** Nairobi, Eldoret
**India:** Barshi, Mumbai, Chennai
**Colombia:** Barranquilla, Bucaramanga, Pasto, Manizales, Cali
**Uganda:** Kampala, Gulu
**Barbados:** Barbados Nation

# Approach

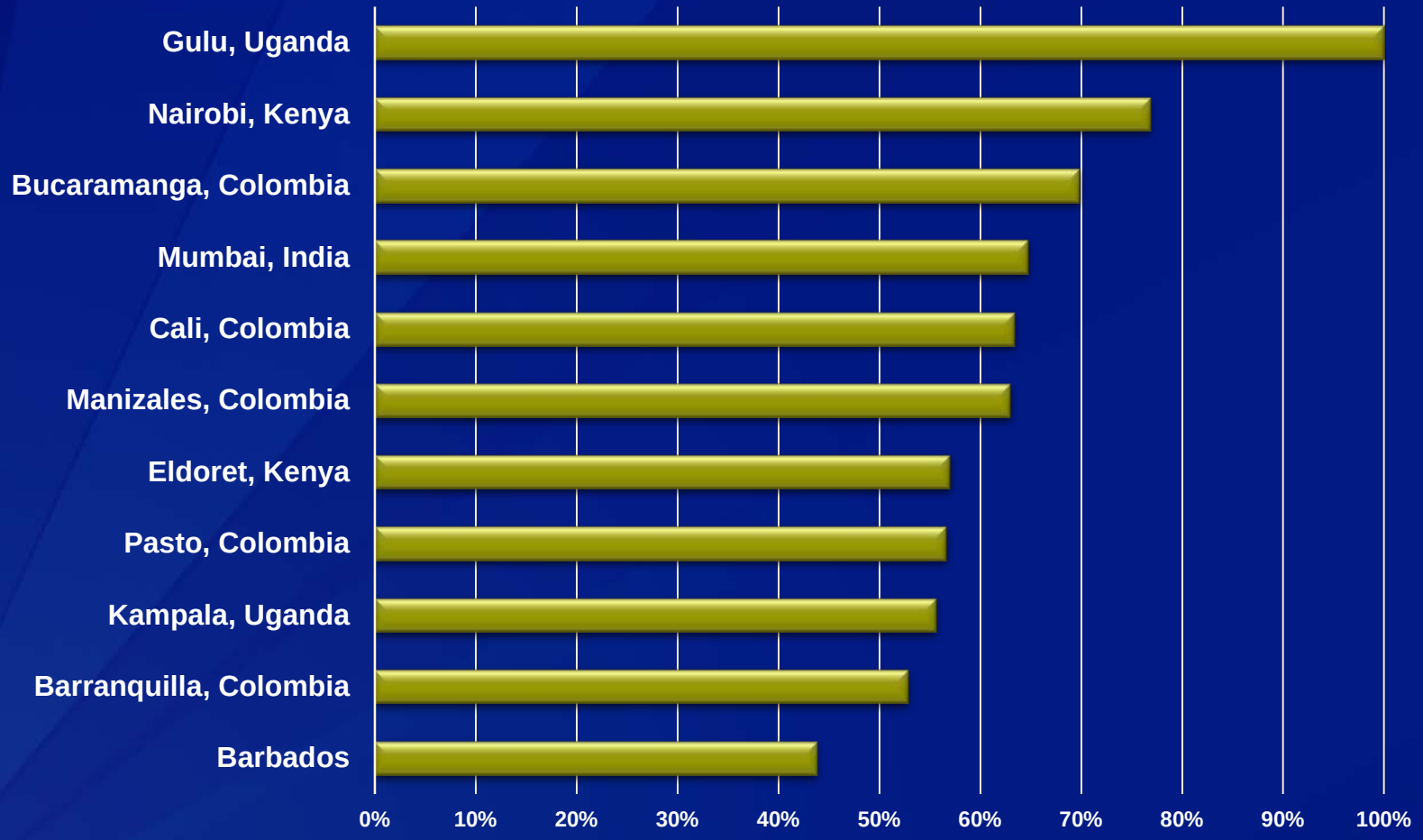
- Build on experience with CAT in the U.S.
- Assess registries in a variety of contexts
- Adapt the CAT to country setting using a standard pre-visit questionnaire and input from registry staff
- Pilots, 2012–2015

| Country | Registries | Round 1 | Round 2 |
|---|---|---|---|
| **Kenya** | 2 | X | X |
| **India** | 3 | X | |
| **Colombia** | 5 | X | |
| **Uganda** | 2 | X | |
| **Barbados** | 1 | X | |

# 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

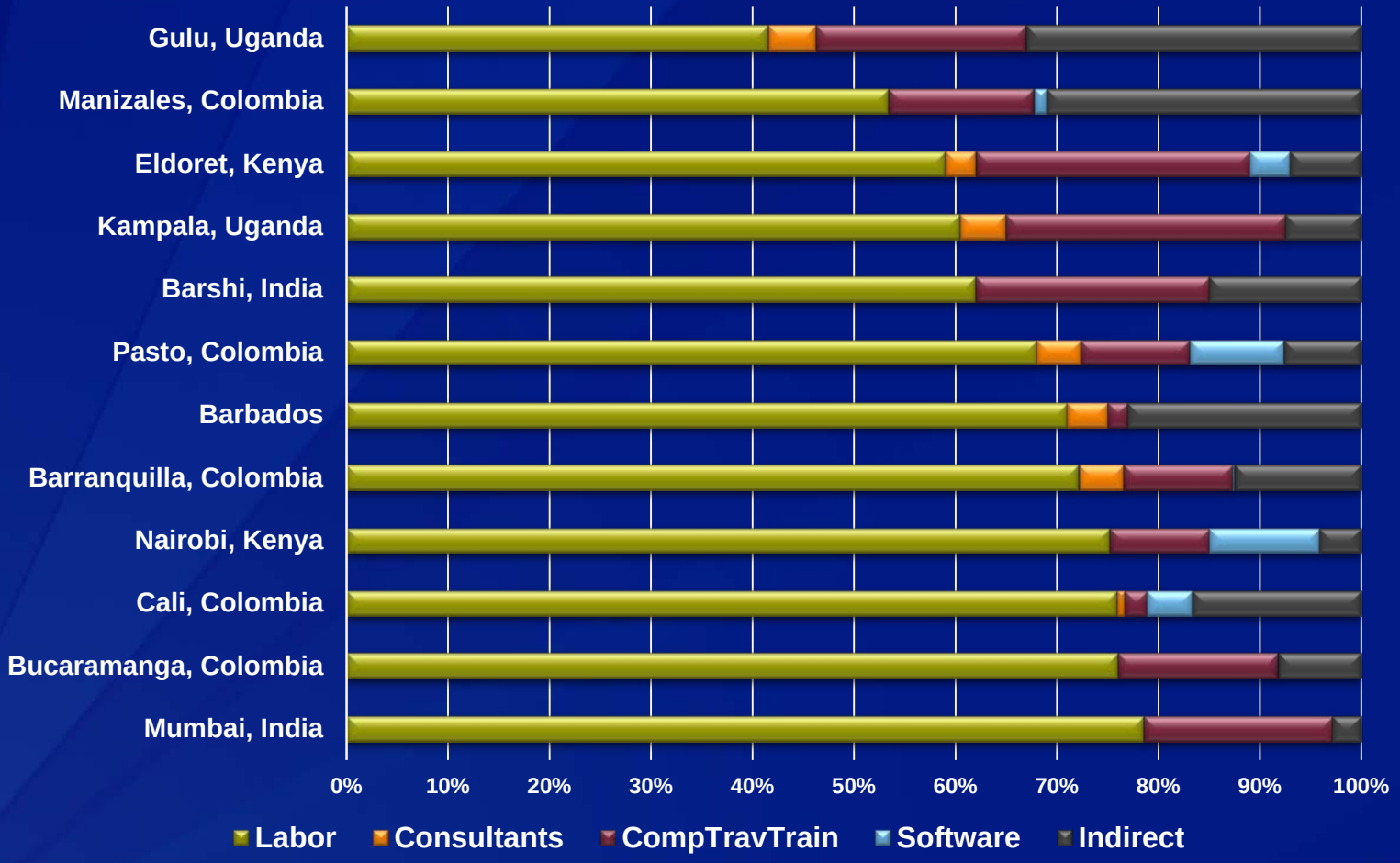



Note: Preliminary Comparative Results



Tangka et al, IACR 2015, India

# International Cancer Registries: Percentage Expenditure towards Budget Categories




Note: Preliminary Comparative Results

# 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)

  } Prospective, paper-based

  - **Cancer (July 2010)** → **Retrospective, electronic**

# Barbados National Registry: Cost per Case of Variable and Fixed Activities (USD)

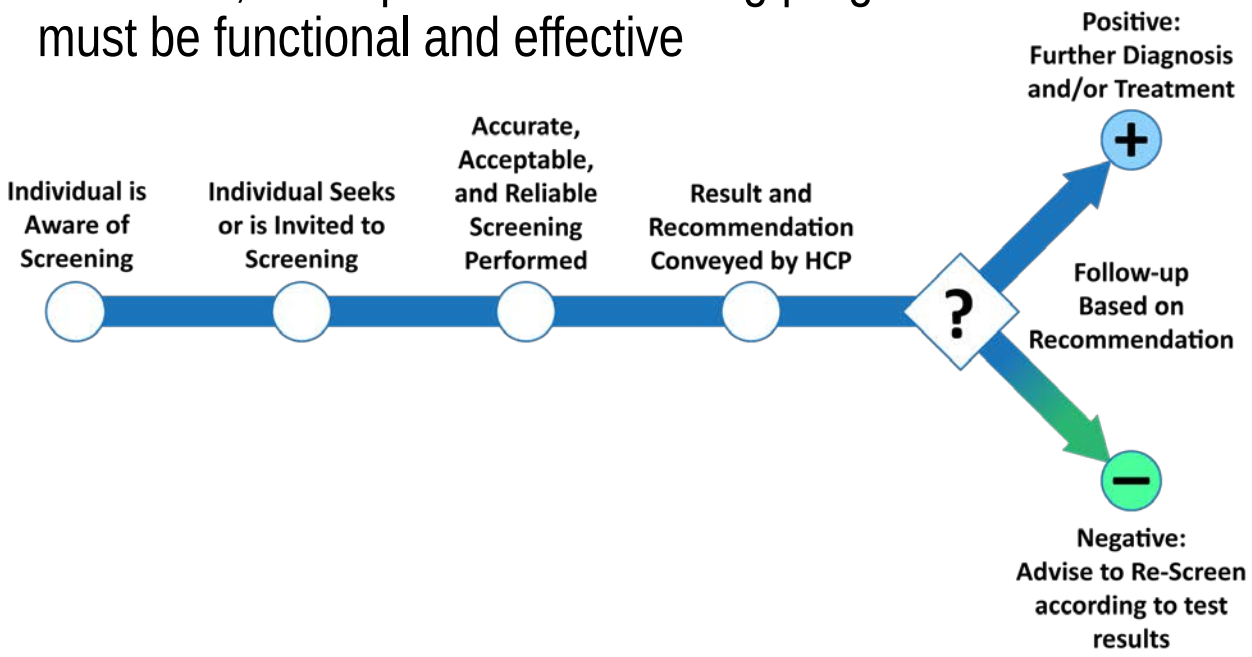
| | Cancer Registry | CVD Registry | Comments |
|---|---|---|---|
| **Incident Cases** | 1,204 | 1,051 | Cancers - 2008; CVD (Stroke and Acute Myocardial Infarction) - 2013 |
| **Variable Cost per Case ($)** | 90 | 185 | Cost of collecting one additional case |
| **Semi-Variable/Fixed Cost per Case ($)** | 101 | 134 | Shared fixed cost reduces overall cost for each registry |
| Note: Preliminary analysis of Barbados cost and resource use data | | | |

*On behalf of the Barbados Ministry of Health*

# CANCER SCREENING

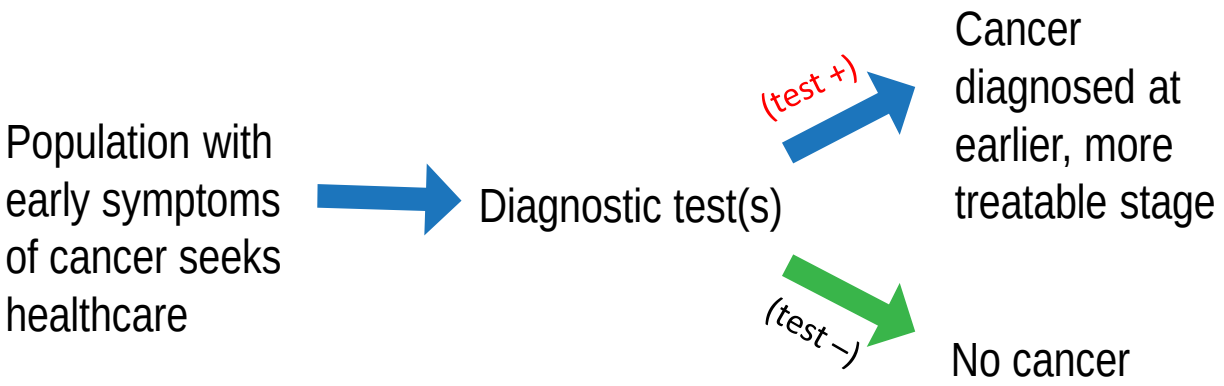
# Goal of Cancer Screening Programs

- 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



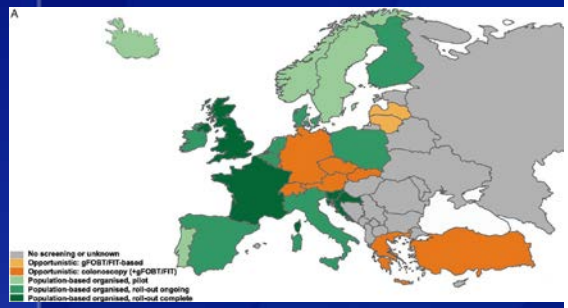
# Best Buys for Cancer Screening in Low and Middle Income Countries

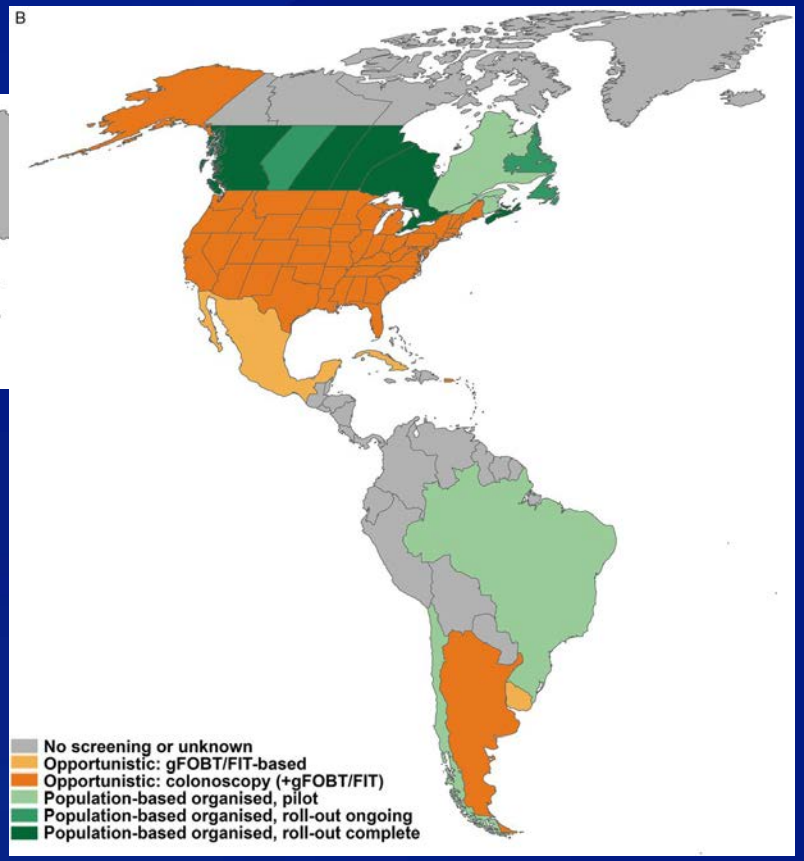
- Cervical
- Breast  (still debate)
- Colorectal
- Stomach (Asia)
- Oral (among heavy tobacco smokers and those with other risk factors)
- Generally,
  - Prostate cancer is not considered a best buy
  - Lung cancer-is emerging topic area but still not established in Europe

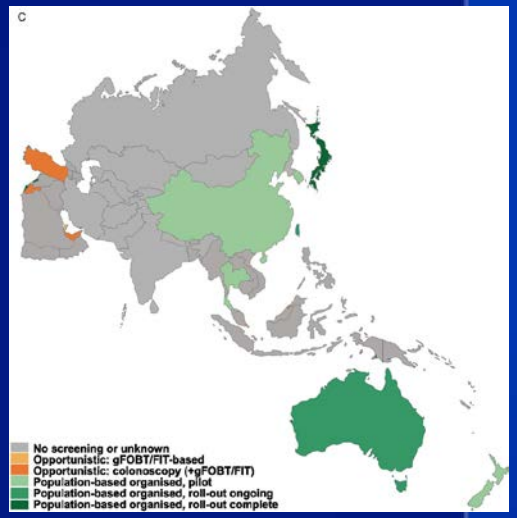
# Fundamental Elements of a Cancer Screening Program

- 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 Eurpoean 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

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Global Health and Cancer

## Current Cervical Cancer Screening Knowledge, Awareness, and Practices Among U.S. Affiliated Pacific Island Providers: Opportunities and Challenges

Julie S. Townsend,[a] Analía Romina Stormo,[a] Katherine B. Roland,[a] Lee Buenconsejo-Lum,[b] Susan White,[a] Mona Saraiya[a]

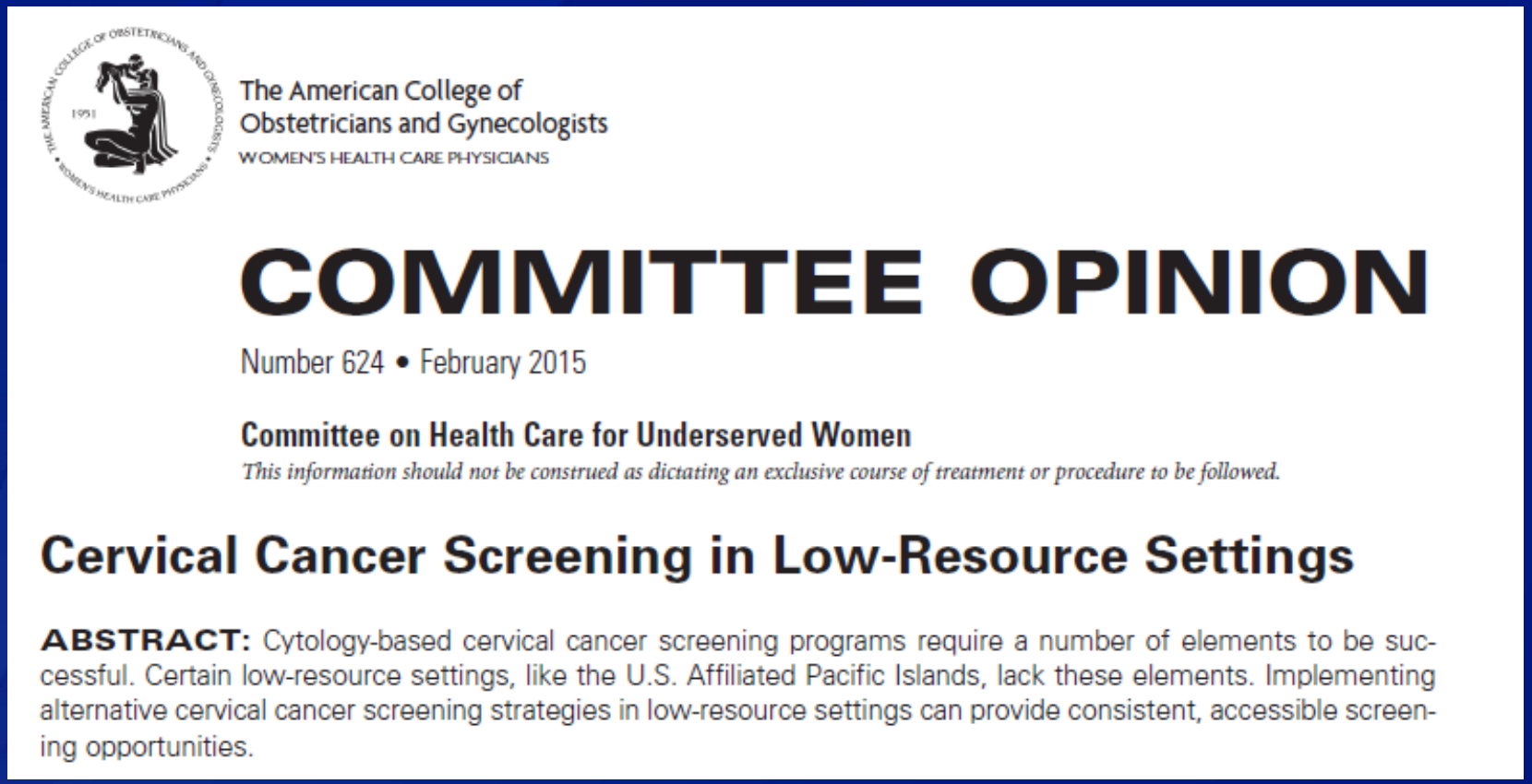
[a]Centers for Disease Control and Prevention, Division of Cancer Prevention and Control, Atlanta, Georgia, USA; [b]Department of Family Medicine and Community Health, John A. Burns School of Medicine, University of Hawaii, Honolulu, Hawaii, USA

*Disclosures of potential conflicts of interest may be found at the end of this article.*

**Key Words.** Uterine cervical neoplasms • Cancer screening • Pacific Islands • Female • Early detection of cancer • Papillomavirus infections • Diagnosis • Prevention and control

# 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



The American College of Obstetricians and Gynecologists
WOMEN'S HEALTH CARE PHYSICIANS

COMMITTEE OPINION

Number 624 • February 2015

Committee on Health Care for Underserved Women

*This information should not be construed as dictating an exclusive course of treatment or procedure to be followed.*

## Cervical Cancer Screening in Low-Resource Settings

**ABSTRACT:** Cytology-based cervical cancer screening programs require a number of elements to be successful. Certain low-resource settings, like the U.S. Affiliated Pacific Islands, lack these elements. Implementing alternative cervical cancer screening strategies in low-resource settings can provide consistent, accessible screening opportunities.

# 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

# CAPACITY

# CDC's Epidemic Intelligence Service

Center for Surveillance, Epidemiology, and Laboratory Services

Division of Scientific Education and Professional Development

# 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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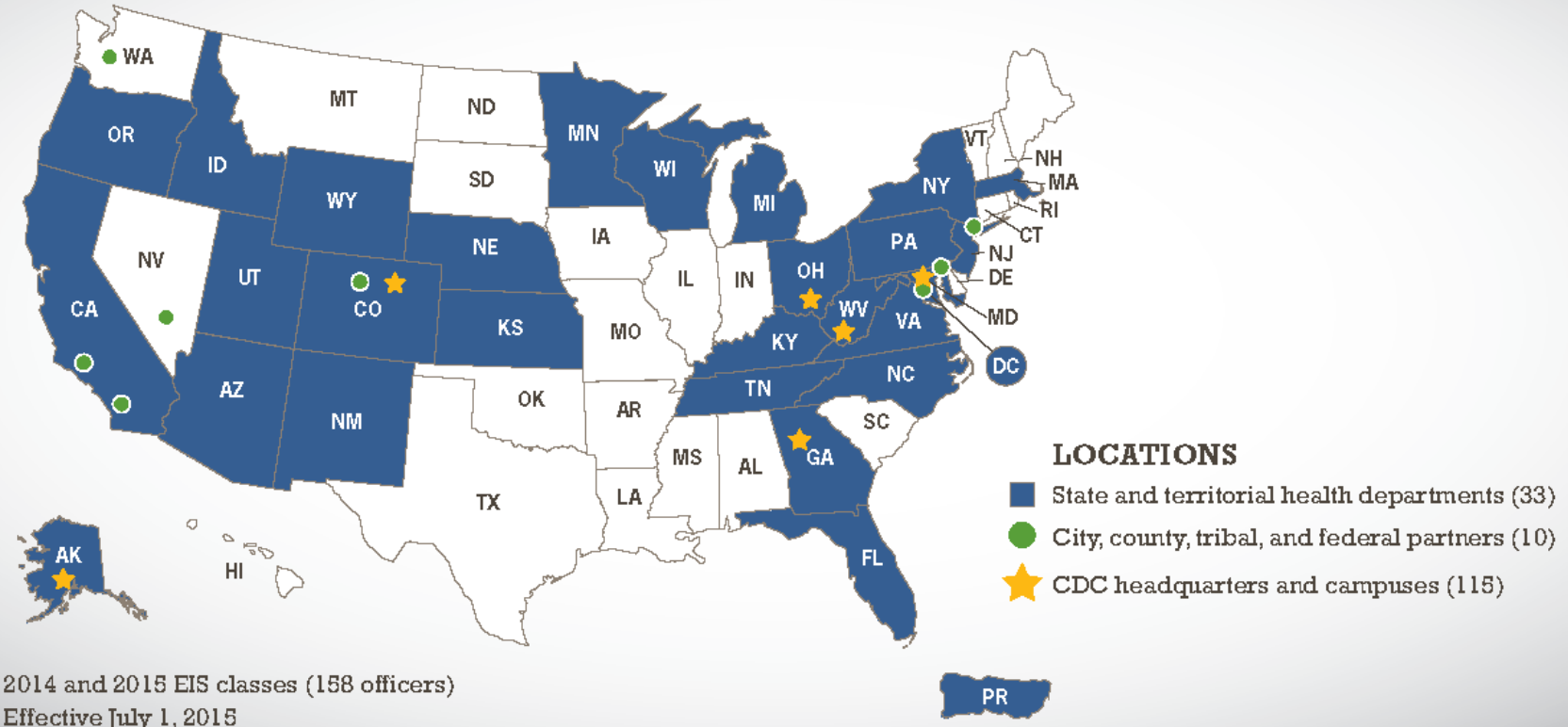
# EIS Officer Assignments

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 (158 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

# Thank you

**For more information please contact Centers for Disease Control and Prevention**
1600 Clifton Road NE, Atlanta, GA 30333
Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
E-mail: cdcinfo@cdc.gov  Web: www.cdc.gov