Public Health Impact of Cancer Screening

Accessible version: https://youtu.be/5hsdb6xVZVc

Otis W. Brawley, MD, FACP, FASCO
Chief Medical and Scientific Officer
American Cancer Society
Professor of Hematology, Medical Oncology Medicine and Epidemiology
Emory University, Atlanta, GA
Disclosures

- Consulting agreements with:
  - National Institutes of Health
  - Centers for Disease Control and Prevention
  - Department of Defense
  - Turner Broadcasting (CNN)

- Author of *How We Do Harm: A Doctor Breaks Ranks About Being Sick in America*

- I do not accept money from drug and device manufacturers
Outline

- Define screening
  - Purpose
  - Benefits and harms
- Define the principles of screening
  - Lead-time bias
  - Length bias and overdiagnosis
- Give real examples
Cancer Screening: Balancing Benefits and Risks

- The aims of screening are
  - Primarily: Reduction in cancer-related mortality
  - Secondarily: Reduction in cancer-related morbidity

- Screening can cause interventions (both diagnostic and therapeutic) that can harm patients

- Always important in assessing a screening test is the benefit/harm ratio in a specific population
  - There are tests with a significant net benefit
  - There are tests in which the harms outweigh any benefit
Proof of Screening Benefit

- **Prospective randomized trial**
  - Bias is most reduced through randomization after enrollment
    - Healthy volunteer effect (e.g., volunteers for clinical trials are often healthier than the general population)
    - Drop-in vs. drop out
  - Randomization of “census rolls” or other lists as done in some recent European screening studies causes some biases in favor of the screening test
    - Unscreened population likely to have increased incidence of undetected disease

Prospective Randomized Trial: Enrollee Randomization

Group A (screened)

Group B (unscreened)

Compare mortality over time

Lead-Time Bias

Increased survival or increased proportion surviving a period of time (e.g., 5 year survival rates) is not a goal of cancer screening and is not proof of a screening benefit

Brawley OW. Cancer 1997;80(9):1857–63
Length Bias

Cancer diagnosis

Initial cancer screening

Periodic scheduled screenings (e.g., Pap smears, mammograms)

Refers to the concept that cancers diagnosed between scheduled screenings are more aggressive (i.e., faster growing and have a poorer prognosis) than those diagnosed at scheduled screenings.

Those diagnosed at the initial screening are the least aggressive of all.

Merrill RM, Brawley OW. Epidemiology 1997;8(2):126–31
Black WC. J Natl Cancer Inst 2001;1692(16):1280–2
Overdiagnosis: A Form of Length Bias

Cancer develops

Diagnosed, treated, and cured

Never diagnosed or treated

Death from cause other than cancer

Overdiagnosis: Implications and Importance

- Cancers that would not go on to cause symptoms or death
- Cancers that can be cured but do not need to be cured

- Estimates
  - 60% of PSA-detected prostate cancers
  - 50% of radiologically detected lung cancer
  - 25% of mammographically detected breast cancers

PSA, prostate specific antigen
The Definition of Cancer

- Currently based on morphology and histology defined in the mid-19th century by Rudolf Virchow, using biopsies done at autopsy and a light microscope—these cancers obviously killed
- Small, localized cancers found today morphologically look like cancers that kill
  - Analogous to “profiling”
- Advances in cancer diagnosis
  - X-ray-1895
  - Mammography-1960’s
  - CT scans-1970’s
  - MRI-1980’s
  - Stereotactic biopsy methods-2000’s to present

CT, computed tomography
MRI, magnetic resonance imaging
Virchow R. Vorlesungen über Cellularpathologie in ihrer Begründung auf physiologischer und pathologischer Gewebelehre, Berlin 1859 archive.org/details/diecellularpatho00virc
Cancer Screening: Weighing the Evidence

- **There are screening tests:**
  - Scientifically found to be of benefit at the population level, based on a net saving of lives
    - These are the focus of this Grand Rounds
  - Found to be beneficial for certain high-risk groups
    - But of a low benefit/risk ratio for normal-risk population
  - Where evidence indicates that population-wide harms outweigh benefits

- **U.S. Preventive Services Task Force**, an independent panel of non-federal experts in prevention and the scientific review of medical evidence, is the primary source of screening recommendations based on public health considerations

www.uspreventiveservicestaskforce.org/
Recommended Cancer Screening Tests: The Public Health View

- Well designed clinical studies have consistently demonstrated mortality reduction in the general population through use of:
  - Mammography and CBE for detection of breast cancer
  - Stool blood testing, Sigmoidoscopy* and Colonoscopy* to detect colorectal cancer
  - Pap test* and visual screening to detect cervical cancer

- **Recommended based on risk factor assessment:**
  - Low-dose spiral CT for those at high risk of lung cancer

*No randomized trial completed; recommendation for screening based on case-control or observational studies

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CBE, clinical breast exam
CT, computed tomography
Colorectal Cancer Screening: Gap Between Evidence and Implementation

- A substantial number of lives (perhaps 15 to 20,000 per year) could be saved in the US, if there was efficient colorectal cancer screening and treatment
  - 40%-45% of the US population 50-75 years old are not screened on time, according to current recommendations
  - A substantial proportion of those with health insurance are not up to date on screening

- Subsequent Grand Rounds speakers will address ways to address systemic barriers and to increase screening rates

healthmeasures.aspe.hhs.gov/measure/25
Prostate Cancer Screening: Harms Versus Benefits

- 11 out of 11 prospective randomized trials have shown the harms of prostate cancer screening
  - Considerable overdiagnosis
  - Overtreatment
  - Harms of treatment include
    - Fever and sepsis associated with diagnostic biopsies
    - Mental anguish
    - Poor quality of life after diagnosis and treatment (e.g., sexual dysfunction, urinary incontinence)

- 2 of 11 prospective randomized trials claim to have reduced mortality slightly

- All 11 trials have methodological flaws

The Lessons of Lung Cancer Screening

- **Chest X-ray screening in the 1960s resulted in**
  - Increased incidence of lung cancer
  - Finding disease at a more favorable stage
  - Increased survival due to both earlier stage diagnosis and overdiagnosis

- **In the Mayo Clinic’s randomized trial, the death rate from lung cancer and lung cancer diagnostic procedures was**
  - 4.4 per 1,000 per year among those screened annually
  - 3.9 per 1,000 per year in the control group

The National Lung Screening Trial

- **Nearly 54,000 at high risk enrolled in the trial**
  - Age 55 and older
  - 30 pack-year or greater history of smoking; if quit, did so less than 15 years before trial entry
  - Reasonable health

- **Subjects prospectively randomized to chest X-ray (sham) or low-dose spiral CT (LDCT) yearly for 3 years**
  - Done at 30 sites with lung cancer expertise
  - Analysis 10 years from start of screening showed LDCT associated with a 20% reduction in relative risk of death

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CT, computed tomography
The National Lung Screening Trial: A Closer Look

- **LDCT associated with a 20% mortality reduction**
  - 87 fewer deaths in the screened group
  - About 350 in the screened group still died of lung cancer
  - 16 died due to interventions caused by screening
    - 6 of 16 did not have cancer

- **In this high-risk group, the benefit/risk ratio of 5.4 lives saved for**
  - Every 1 life lost prematurely due to diagnostic procedures
    - 87 fewer cancer deaths due to lung cancer in screened group = 5.4
    - 16 deaths due to screening-related interventions

- **Benefit/risk even less favorable when considering all screening related complications; drops to 2.7 lives saved per complication**

LDCT, low-dose spiral CT
Cancer Screening: Present and Future

- The aims of screening are:
  - Primarily: Reduction in mortality
  - Secondarily: Reduction in morbidity

- Screening can cause harm; therefore, the benefit/harm ratio of a screening test is always important, as is the cancer risk of the population to be screened

- We need a 21st century definition of cancer!
  - Need to better understand and predict the varying biologic behaviors of different cancers
    - Distinguish cancers that need to be cured from those that do not
  - Genetic and genomic criteria for cancer beyond morphology?
Cancer Screening in International Settings: What Can We Learn?

Rachel Ballard-Barbash, MD, MPH
Associate Director
Applied Research Program
National Cancer Institute, Bethesda, MD
Breakdowns Can Occur at Multiple Points in the Cancer Screening Process

Cancer Control Continuum

- Risk Assessment
- Detection
- Diagnosis
- Cancer or Precursor Treatment
- Survivorship
- End-of-Life Care

Outcomes
- Risk Status
- Clinical Status
- Functional Status
- Quality of Life
- Satisfaction
- Mortality
- Quality of Death

Failure to Screen
Failure to Follow up
Failure to Treat

www.iom.edu/Reports/2012/Primary-Care-and-Public-Health.aspx
International Models of Innovation

- How have public health approaches been used in other countries?
  - Most have screening programs organized as public health programs outside context of routine clinical care
  - Active comprehensive data collection and evaluation systems
    - Quality improvement and quality assessment of the screening process
    - Identification and invitation of population for screening, quality control of processes and outcomes
    - Evaluation of long-term changes in processes and outcomes
  - Feedback systems to personnel and facilities to improve quality
Background and History of International Cancer Screening Network (ICSN)

- **1998: Established as the International Breast Cancer Screening Database Project with 11 countries**
  - Sponsored by the U.S. National Cancer Institute
- **2006: Changed to International Cancer Screening Network (ICSN) to reflect expansion to screening for other cancers**
  - Network expanded to include 35 countries

**Purpose**
- Use and compare data from organized screening programs or national data on screening that may be opportunistic
- Develop methods for evaluating impact of these programs

http://appliedresearch.cancer.gov/icsn/
The US does not have a nationally organized program of screening, but it does have nationally organized data on screening in practice.
Lessons from Organized Cervical and Colon Cancer Screening Programs

- Cervical: Public health model of screening (organized) in the Netherlands compared to medical services model of screening (opportunistic) in the United States
- Colon: Organized, using program data to identify populations that required enhanced efforts to improve uptake of screening in the NHS (United Kingdom)
### “Cervical Cancer Screening in the U.S. and the Netherlands: A Tale of Two Countries”

<table>
<thead>
<tr>
<th></th>
<th>United States</th>
<th>Netherlands</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organization</strong></td>
<td>Medical screening Opportunistic</td>
<td>Public health Organized</td>
</tr>
<tr>
<td><strong>Age Group and % Screened</strong></td>
<td>21–no clear upper limit until 2012</td>
<td>30–53 Later expanded 35–60</td>
</tr>
<tr>
<td><strong>Interval</strong></td>
<td>Annual or every 2 years</td>
<td>Every 3 years Later every 5 years</td>
</tr>
<tr>
<td><strong>Reimbursement</strong></td>
<td>Medicare, since 1990 No age cut off</td>
<td>Only within organized program</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Guideline</th>
<th>Number of Pap Smears</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Age &lt; 30</td>
<td>Age 30 to 60</td>
<td>Age &gt; 60</td>
<td>Total</td>
</tr>
<tr>
<td>Netherlands 1993a</td>
<td>0</td>
<td>7</td>
<td>0</td>
<td></td>
<td>7</td>
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<tr>
<td>ACS 2002b</td>
<td>6–11</td>
<td>11–16</td>
<td>3–6</td>
<td></td>
<td>20–33</td>
</tr>
<tr>
<td>ACOG 2003c</td>
<td>11</td>
<td>11–16</td>
<td>3–6</td>
<td></td>
<td>25–33</td>
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<tr>
<td>USPSTF 2003d</td>
<td>4–11</td>
<td>11–31</td>
<td>2–5</td>
<td></td>
<td>16–47</td>
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<tr>
<td>Kaiser 2006e</td>
<td>4</td>
<td>11</td>
<td>2</td>
<td></td>
<td>17</td>
</tr>
<tr>
<td>ACOG 2009f</td>
<td>5</td>
<td>11</td>
<td>2–5</td>
<td></td>
<td>18–21</td>
</tr>
</tbody>
</table>

Number of Pap smears 3 of 4 fold higher in the U.S. vs. the Netherlands; decreases in cervical cancer mortality are nearly identical (75-78%) from 1960-2007

ACS, American Cancer Society
ACOG, American College of Obstetrics and Gynecology
USPSTF, United States Preventive Services Task Force
Organization and Structure of the United Kingdom Bowel Cancer Screening Program

- Public health model was implemented based on RCTs and formal CEA of bowel screening
  - Examined 5 options and selected FOBT of 60–69 year olds with colonoscopy following abnormal FOBT
- Program planning to ensure sufficient resources were available to screen all relevant groups
- Organization reflects public health model
  - 5 program hubs; 20 local screening centers; 10 million people
  - Hubs manage call and recall, process FOBT and nurse appts
  - Screening centers provide nurse screening clinics and endoscopy
- Data collection for quality assurance of all processes and outcomes

RCT, randomized controlled trials
CEA, cost-effectiveness analysis
FOBT, Fecal Occult Blood Test
Data are Key to Tracking Uptake in the English Bowel Cancer Screening Pilot Program

<table>
<thead>
<tr>
<th></th>
<th>1st Round*</th>
<th>2nd Round</th>
<th>3rd Round</th>
</tr>
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<tbody>
<tr>
<td>Men</td>
<td>57.7</td>
<td>53.4</td>
<td>55.8</td>
</tr>
<tr>
<td>Women</td>
<td>65.9</td>
<td>60.5</td>
<td>61.6</td>
</tr>
<tr>
<td>Social Deprivation Score**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 - 2</td>
<td>70.2</td>
<td>65.3</td>
<td>66.7</td>
</tr>
<tr>
<td>3 - 4</td>
<td>61.6</td>
<td>55.8</td>
<td>57.8</td>
</tr>
<tr>
<td>5</td>
<td>45.8</td>
<td>42.0</td>
<td>42.6</td>
</tr>
<tr>
<td>% Indian subcontinent origin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 - 4</td>
<td>64.5</td>
<td>59.3</td>
<td>61.1</td>
</tr>
<tr>
<td>5</td>
<td>49.3</td>
<td>45.5</td>
<td>46.1</td>
</tr>
<tr>
<td>Screening history</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Invitation, previous nonresponder</td>
<td>0</td>
<td>13.5</td>
<td>10.2</td>
</tr>
</tbody>
</table>

*Each round is a separate cohort of patients
** Higher social deprivation scores correlate with greater social deprivation
Participant, Provider, Systems, and Organizational Factors Can Improve Uptake

- **Who attends CRC screening?**
  - Higher SES and education, white, older age, men, married

- **What works to increase uptake**
  - System
    - Specialized screening services or staff focused on increasing uptake
    - Resources that fit the anticipated demand (equipment, staff)
  - Healthcare providers-including nurse practitioners for endoscopy
    - Cues to action-including targeting noncompliance
    - Provider training and feedback
  - Healthcare users
    - Reminder systems
    - Intensive and personalized outreach and education
The Affordable Care Act: Opportunities to Improve Population-Based Cancer Screening

Ned Calonge, MD, MPH
President and CEO, The Colorado Trust
Associate Professor, Family Medicine, University of Colorado
Associate Professor, Epidemiology, Colorado School of Public Health
The Affordable Care Act (ACA) and Public Health Integration with Primary Care

- The report identified ACA provisions that could support primary care and public health integration.

www.iom.edu/Reports/2012/Primary-Care-and-Public-Health.aspx
ACA Provisions that Support Integration of Primary Care and Public Health

- Community transformation grants
- Community health needs assessments
- Medicaid preventive services
- Accountable care organizations
- Patient-centered medical homes
- Primary care extension program
- Community health centers
Additional Provisions of the ACA important for Population-based Cancer Screening

- **First-dollar coverage** (i.e., no additional out-of-pocket costs) for evidence-based cancer screening (breast, cervical, colorectal) primarily based on U.S. Preventive Services Task Force recommendations
  - Coverage for screenings graded A (highly recommended) or B (recommended) by Task Force

- **Authorization of the Community Preventive Services Task Force**

- **Direction for both task forces** to examine “how each task force’s recommendations interact at the nexus of clinic and community”

ACA, Affordable Care Act
http://www.thecommunityguide.org/cancer/index.html
Guide to Community Preventive Services

- Publishes recommendations made by the Community Preventive Services Task Force
  - Independent, nonfederal, volunteer body of experts in public health and prevention research, practice, and policy
- Recommendations issued based on strength of scientific evidence
- The Community Guide has issued recommendations on 11 community-level interventions to increase participation in effective cancer screening
  - Example: Reminder systems

www.thecommunityguide.org/index.html
Why a Public Health Approach to Clinical Preventive Services?

- The U.S. healthcare system is fragmented with little coordination
- Quality measurements—such as the National Committee on Quality Assurance (NCQA) Healthcare Effectiveness Data and Information Set (HEDIS)—improve screening rates in stable subscribers but have little population impact
  - Breast cancer screening rates have not changed since 2000
Why Cancer Screening?

- Cancer screening identifies preclinical disease
- Compared to other recommended screenings (e.g., screening for cardiovascular disease risk factors), early detection of cancer is more time critical
- There are significant health disparities, especially in colorectal cancer screening
Cancer Screening Disparities, U.S. National Health Interview Survey, 2010

- Breast:
  - White
  - Black
  - AI/AN
  - Hispanic

- Cervical:
  - White
  - Black
  - AI/AN
  - Hispanic

- Colorectal:
  - White
  - Black
  - AI/AN
  - Hispanic

MMWR 61(03):41–5
AI/AN, American Indian/Alaskan Native
Why Public-health Supported, Population-based Cancer Screening?

- The benefits of screening are maximized when provided to everyone in the community
- Preventable late stage disease is more prevalent in the unscreened population
  - Late-stage cervical cancers are found primarily in women who do not get screened, not in women getting every 3-year screening
- Public health services can make major contributions to community-level prevention programs
  - 73.5% of Coloradans > 64 years old are immunized against influenza (2009-2010, CDPHE)
  - 80% of these vaccines are given outside the medical care system (e.g., public health clinics)
10 local public health departments in Colorado provide breast and cervical cancer screening services funded by the state and by the National Breast and Cervical Cancer Early Detection Program

The state-funded Colorectal Cancer Control Program in Colorado supports CRC screening through a university-coordinated, community-located, population-based program
A Vision for the Future of Cancer Screening

- The public utility model works to provide core services to a geographically defined population
- Vermont’s healthcare reform, through the new Department of Vermont Health Access, is an example
  - Chronic disease management
  - Behavioral health
  - Wellness and preventive services
- Supported by provisions of the ACA, the future of cancer screening may well see the development of screening as a public utility that provides population-based services
Organized Cancer Screening in a U.S. Healthcare Setting: What Works

Theodore R. Levin, MD
Clinical Lead for Colorectal Cancer Screening,
The Permanente Medical Group, Inc.
Chief of Gastroenterology
Kaiser Permanente Medical Center
Walnut Creek and Antioch, CA
Overview

- Colorectal cancer screening: The value of fecal immunochemical testing (FIT)
- Organized CRC screening at Kaiser Permanente Northern California
- Patient outcomes and lessons learned
<table>
<thead>
<tr>
<th>Study</th>
<th>FIT</th>
<th>Guaiac (FOBT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hoffman (2010)</td>
<td>61.4%</td>
<td>50.5%</td>
</tr>
<tr>
<td>Hol (2009)</td>
<td>61.5%</td>
<td>49.5%</td>
</tr>
<tr>
<td>van Rossum (2008)</td>
<td>59.6%</td>
<td>49.6%</td>
</tr>
<tr>
<td>Cole (2003)</td>
<td>39.6%</td>
<td>23.4%</td>
</tr>
</tbody>
</table>

FOBT, Fecal Occult Blood Test
van Rossum, et al. 2008;135:82–90
**Participant results after first round of screening:**

<table>
<thead>
<tr>
<th>Colorectal Lesion</th>
<th>Colonoscopy (N = 26,703)</th>
<th>FIT (N = 26,599)</th>
<th>Odds Ratio (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Subjects</td>
<td>Rate</td>
<td>Subjects</td>
<td>Rate</td>
</tr>
<tr>
<td>Cancer</td>
<td>30</td>
<td>0.1</td>
<td>33</td>
<td>0.1</td>
</tr>
<tr>
<td>Advanced adenoma(\wedge)</td>
<td>514</td>
<td>1.9</td>
<td>231</td>
<td>0.9</td>
</tr>
<tr>
<td>Advanced neoplasia$</td>
<td>544</td>
<td>2.0</td>
<td>264</td>
<td>1.0</td>
</tr>
<tr>
<td>Nonadvanced adenoma</td>
<td>1109</td>
<td>4.2</td>
<td>119</td>
<td>0.4</td>
</tr>
<tr>
<td>Any neoplasia</td>
<td>1653</td>
<td>6.2</td>
<td>383</td>
<td>1.4</td>
</tr>
</tbody>
</table>

Colonoscopy: 24.6% adherence; FIT: 34.2% adherence
1,628 participants in the colonoscopy arm were screened with FIT

Quintero E. NEJM 2012;366:697–706
ClinicalTrials.gov Identifier: NCT00906997
FIT, Fecal Immunochemical Test
CRC, colorectal cancer
gFOBT Compared to Colonoscopy

gFOBT, guaiac Fecal Occult Blood Test
Kaiser Permanente Northern California

Kaiser Permanente (KP)
- Kaiser Foundation Health Plan
- Kaiser Foundation Hospitals
- The Permanente Medical Group

KP Northern California Region
- 3.4 million members
- 19 medical centers
- 8,000 physicians
- 54,000 employees
- 46% market share
Overview of Colorectal Cancer Screening at KPNC

**CRC Screening Program**

- **Outreach**
  - Mailed test kits to everyone due for CRC Screening

- **Inreach**
  - Electronic record-based reminders, leveraging support staff

**Tracking to ensure patients who screen positive by FIT have timely follow-up colonoscopy**

KPNC, Kaiser Permanente Northern California
CRC, colorectal cancer
FIT, Fecal Immunochemical Test
Outreach Details

- **HEDIS population identified, follow USPSTF guidelines**
  - Aged 51-75
    - Screening adherence reviewed to identify those due this year:
      - Flexible sigmoidoscopy every 5 years, colonoscopy every 10 years, FOBT yearly

- **A sample selected each week**
  - >13,000 tests per week (January to September)
  - Date of mailing tied to patient’s prior screening or birthday

- **Demographic data uploaded to outside vendor**
- **Mailing kits assembled and sent by outside vendor**
- **Test used: Eiken FIT, machine read**
  - Single sample, positive cut off of 100 ng Hgb/mL buffer
KPNC CRC Screening Program

PCP Pre-letter Mailed → FIT Kit Mailed → Robo-call Reminder → Reminder Postcard → Secure Msg → MA Calls

One week before kit → 3 weeks after kit → 6 weeks after kit

Distribute kit at office visit or flu vaccine clinic

Regional Local

Region-wide mailing to nonresponders at end of year
Quality Assurance, Reminders, and Reporting

- **Medical Center Level Screening Rates and Access:**
  - Colonoscopy access reports—time to colonoscopy and backlogs
  - Colonoscopy productivity reports
  - Adenoma (precancerous lesion) detection rates

- **PHP→PROMPT**
- **FIT Follow-up reporting**
- **Population Management Tool (recording the outreach process)**
- **Cancer incidence/stage**

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PHP, Preventive Health Prompt
PROMPT, Population Reporting Outreach Management Patient Tracking
FIT, Fecal Immunochemical Test
Colorectal Cancer Screening:
HEDIS Performance, KPNC

Percent of eligible population screened

HEDIS, Healthcare Effectiveness Data and Information Set
KPNC, Kaiser Permanente Northern California
Key to Success: Strategy and Policy

- **Leadership Alignment and Clear Goal Setting**
  - Regional Medical Group leadership sets screening targets

- **Alignment of Incentives**
  - Performance-based allocation to medical centers

- **Collaboration between primary care providers and specialists**
Key to Success:
Operations and Coordination

- Colonoscopy capacity and access followed closely
- Reliance on multiple tests
  - 52% FIT, 28% colonoscopy, 20% flexible sigmoidoscopy
- Use of organized systems, plus leveraging support staff to provide education and encouragement
- Regular reporting of results to local executive leadership and quality management staff
- Identify “top performers” and disseminate best practices
- Ongoing performance improvement opportunity:
  - Closing disparity with Latino and African American members

FIT, Fecal Immunochemical Test
Source: Kaiser Permanente Northern California, 2011
The past: More than 20 years of organized screening provision
- 67 funded programs
- More than 4.3 million women served
- More than 10.7 million screening exams
- Diagnosed
  - 56,662 breast cancers
  - 3,206 cervical cancers
The present: a network of more than 22,000 clinical providers screening eligible women

- Community health centers and Federally qualified health centers
- Private practices
- Health plans
- Tribal health clinics
- Local health departments
- Minority health clinics
- “Safety net” hospitals

Cancer centers

The future: building upon current capacity and infrastructure to increase population-level breast and cervical cancer screening
Colorectal Cancer Control Program: A New Model for CDC

**Screening Promotion (Population-based)**
- Emphasize organizational, policy systems change
- Implement evidence-based strategies
- Ensure timely diagnosis and treatment referral

**Screening Provision (Clinical Services)**
- Screening for eligible low income, under- and uninsured men and women

Screen for Life
Colorectal Cancer Control Program
Funded by the Centers for Disease Control and Prevention
Collaboration between Minnesota Department of Health and State Medicaid Program

Medicaid identifies unscreened individuals through claims database

Invitations, reminders and incentives to complete cancer screenings
### Population-based Approaches to Organized Cancer Screening

<table>
<thead>
<tr>
<th>Patient-oriented</th>
<th>Population-oriented</th>
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</thead>
<tbody>
<tr>
<td>Patient and provider reminder systems</td>
<td>Community-based outreach and communication</td>
</tr>
<tr>
<td>Standing orders for screening</td>
<td>Enhanced use of electronic data</td>
</tr>
<tr>
<td>Screening registries</td>
<td>Population-level monitoring</td>
</tr>
<tr>
<td>Expedited screening referrals</td>
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The Future of Cancer Screening: Public Health Approaches