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Cancer Prevention and Control Research Network

Modeling Evidence-Based Interventions (EBI) Impact Workgroup Update

Stephanie B. Wheeler, PhD MPH
Health Policy & Management
Lineberger Comprehensive Cancer Center
Center for Health Promotion & Disease Prevention
University of North Carolina at Chapel Hill

PRC Prevention Research Centers

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Modeling EBI Impact Workgroup Objectives

- Inform cancer screening-focused EBI implementation planning, practice-level change, and policies at the state and national levels
- Use models to simulate and compare the health and economic impacts of alternate "what if" scenarios on:
  - Cancer screening and outcomes in a given region over time
  - The percent of sub-populations up-to-date with recommended screening, as well as changes in cancer incidence, cancer stage at diagnosis, cancer deaths and/or life-years lost due to cancer
  - Comparative costs and cost-effectiveness of cancer screening-focused interventions
- Integrate best available evidence to evaluate uncertainty

Our Team

Stephanie Wheeler, UNC

Kristen Hassmiller Lich, UNC

Leah Frerichs, UNC

Sarah Drier, UNC

Paul Shafer, UNC

(Not Shown): Meghan O'Leary, UNC

Melinda Davis, OHSU

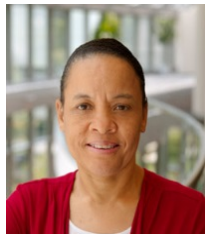
Stephanie Renfro, OHSU

Jackie Shannon, OHSU

John McConnell, OHSU

(Not Shown): Bonnie Lind, Yifan Gu, OHSU

Florence Tangka, CDC



Lisa Richardson, CDC

Maria Mayorga, NC State

Gloria Coronado, KPCHR, UW

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Current Research Foci

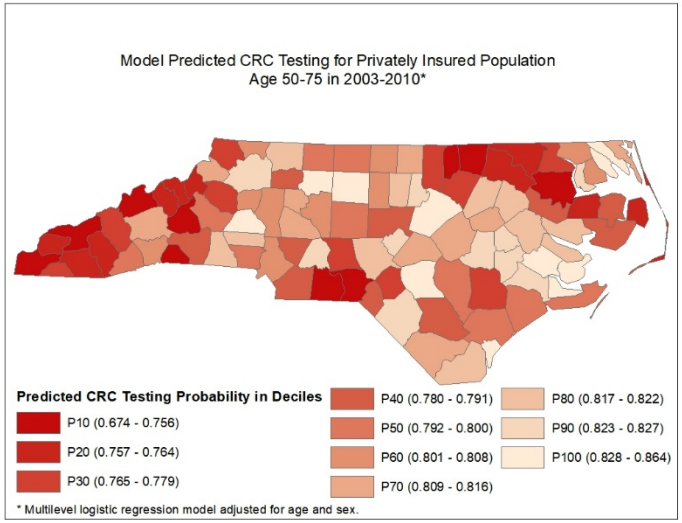
1. To estimate the impact of health insurance expansion in North Carolina on colorectal cancer (CRC) screening and outcomes (simulation)
2. To estimate the impact of health insurance expansion in Oregon on CRC screening and outcomes (simulation)
3. To estimate the impact of CRC screening EBIs in Oregon on CRC outcomes (simulation)
4. To understand variation in CRC screening within Oregon's Medicaid Coordinated Care Organizations (CCOs)
5. To understand how Oregon's CCOs have increased CRC screening and through what mechanisms

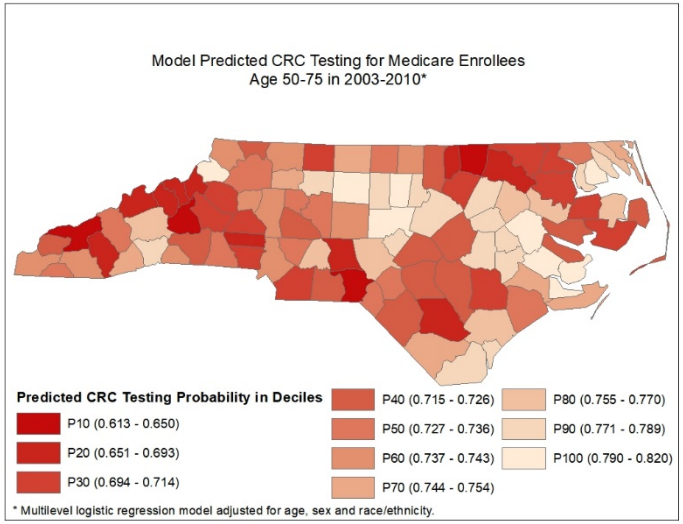
Research Activities: May 2017-Present

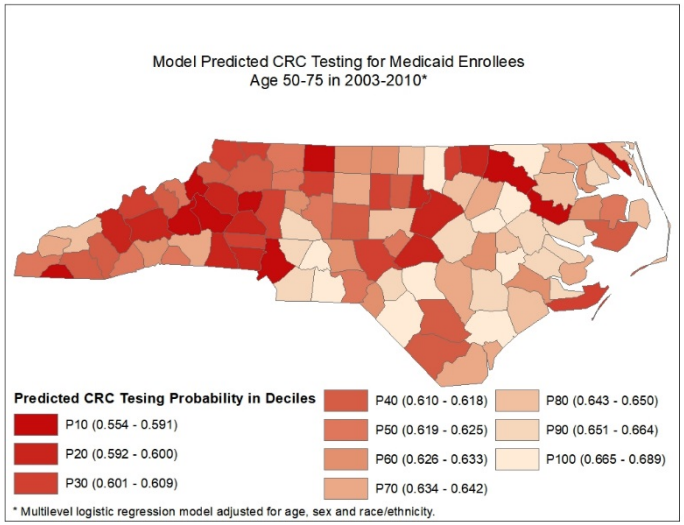
- Re-parameterized simulation model with updated input parameter estimates from claims data, BRFSS and other sources
- Troubleshooted preliminary outputs and re-evaluated modeling assumptions
- Consulted with the CISNET MISCAN-Colon modeling group about modeling approach and natural history parameters
- Analyzed Oregon claims data to isolate the effects of health insurance expansion
- Supported Oregon analyses of CCO patterns of care related to CRC screening initiatives

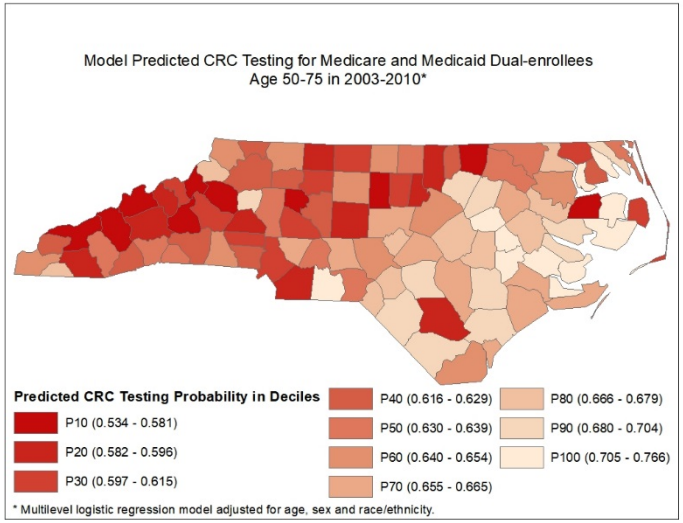
Colorectal cancer screening varies greatly by county in NC insured populations

(Wheeler et al, H&P, 2014)









North Carolina is not unique in its regional variation in CRC screening (*psst*: Oregon!)

(Davis et al, Prev Med, 2017)

Preventive Medicine 101 (2017) 44–52

Contents lists available at ScienceDirect

Preventive Medicine

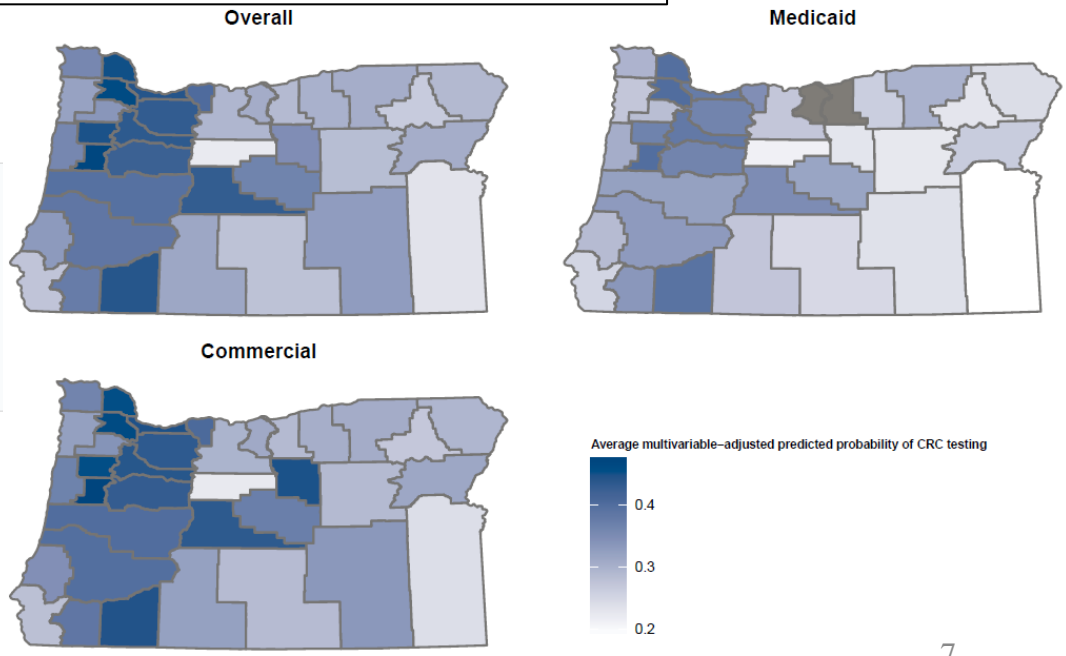
journal homepage: www.elsevier.com/locate/ypmed

Geographic and population-level disparities in colorectal cancer testing: A multilevel analysis of Medicaid and commercial claims data

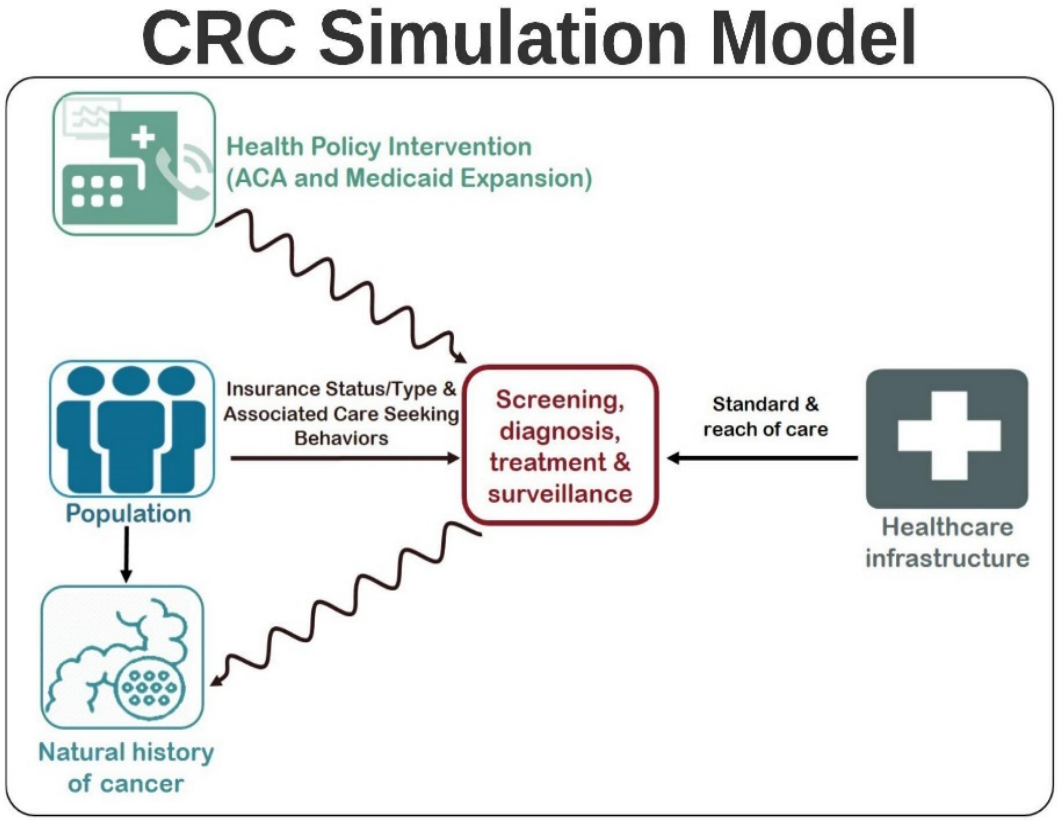
Melinda M. Davis [a,b,e,*], Stephanie Renfro [c], Robyn Pham [b], Kristen Hassmiller Lich [d], Jackilen Shannon [e], Gloria D. Coronado [f], Stephanie B. Wheeler [d,g,h]

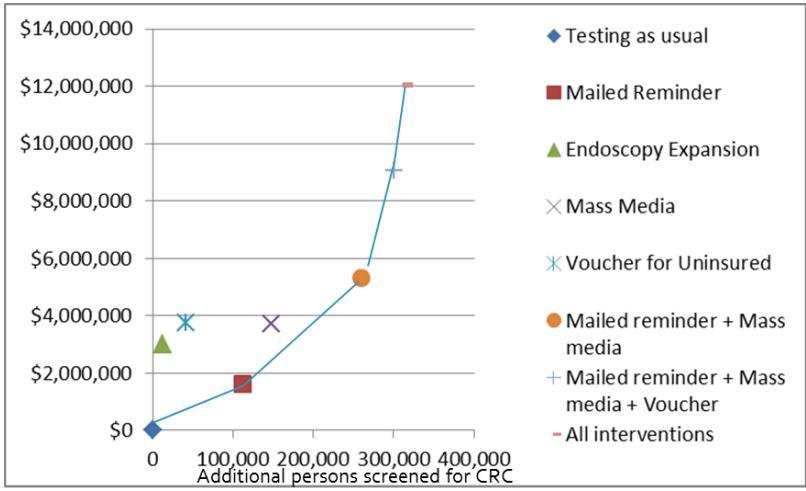
Highlights

- Despite insurance, 58% had not received colorectal cancer (CRC) testing.
- CRC testing varied from 22.4% to 46.8% across Oregon's 36 counties.
- Individual, community, and health system-level factors impacted CRC testing.
- Counties with higher socioeconomic deprivation displayed lower CRC testing.
- Work to increase CRC testing in targeted counties and populations is needed.

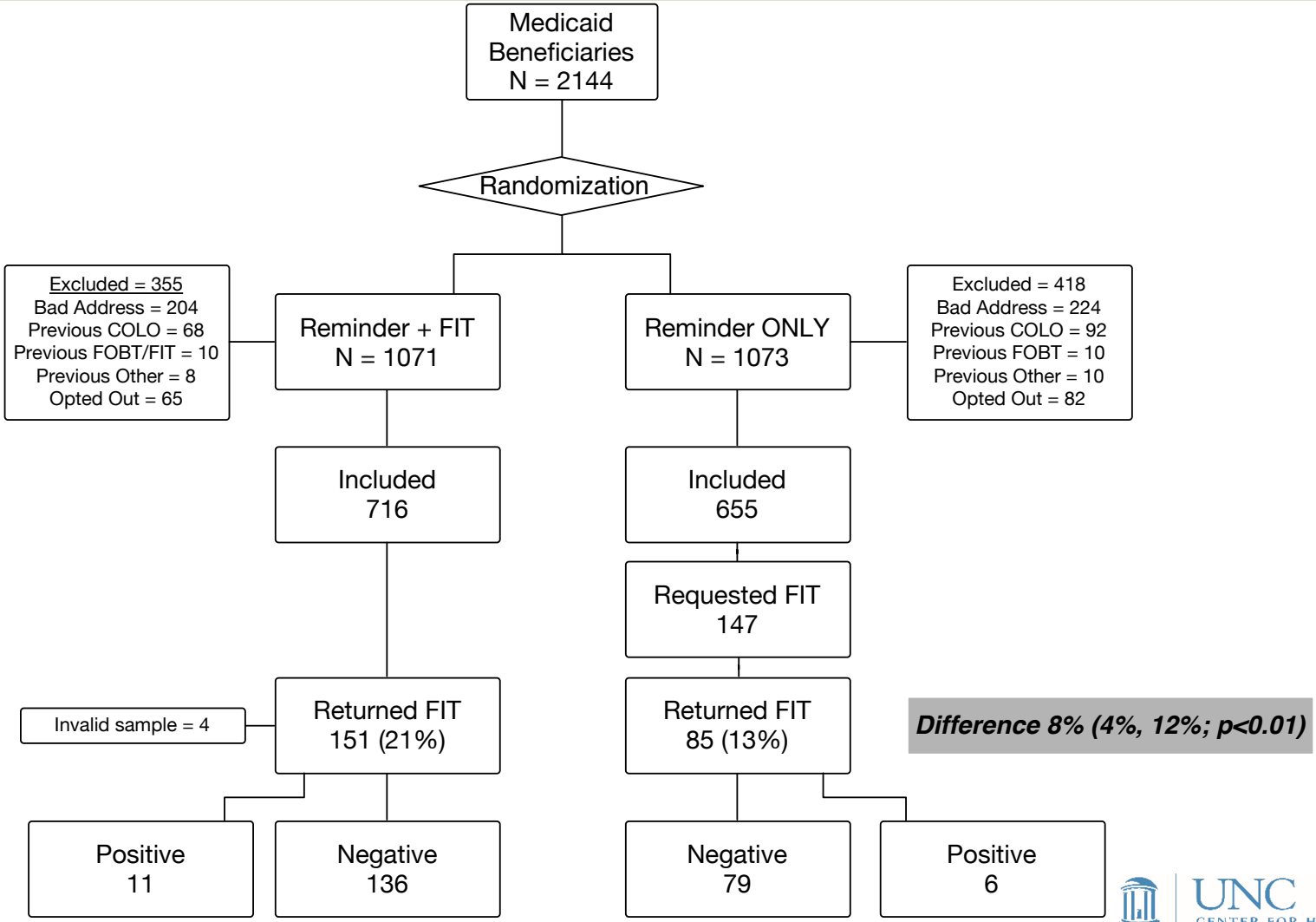


Mathematical simulations can help us understand which strategies are expected to be most cost-effective, where and for whom (Hassmiller Lich et al, PCD, 2017)





CRC FIT-based outreach partnerships with state Medicaid coordinated care organizations and health departments can reach unscreened people (Brenner et al, Cancer, 2018)



CDC National Cancer Conference (August 2017)

USING INDIVIDUAL-BASED SIMULATION MODELING TO INTEGRATE BIG DATA AND INTERVENTION EVIDENCE TO INFORM INTERVENTION SELECTION, ADAPTATION, AND EVALUATION: AN EXAMPLE ON COLORECTAL CANCER SCREENING

PRESENTED BY: KRISTEN HASSMILLER LICH, PHD MHSA
ASSISTANT PROFESSOR, UNIV OF NORTH CAROLINA AT CHAPEL HILL

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Data-powered decision making:

One state's approach to improving colorectal cancer screening in underserved populations

Stephanie B Wheeler, PhD MPH
Associate Professor
University of North Carolina at Chapel Hill

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Technical Considerations: the past, present and future of simulation modeling of colorectal cancer

ISE EDWARD P. FITTS DEPARTMENT OF INDUSTRIAL AND SYSTEMS ENGINEERING

Siddhartha Nambiar, Rachel Townsley, Maria Mayorga
North Carolina State University

Kristen Hassmiller Lich, Stephanie Wheeler
University of North Carolina-Chapel Hill

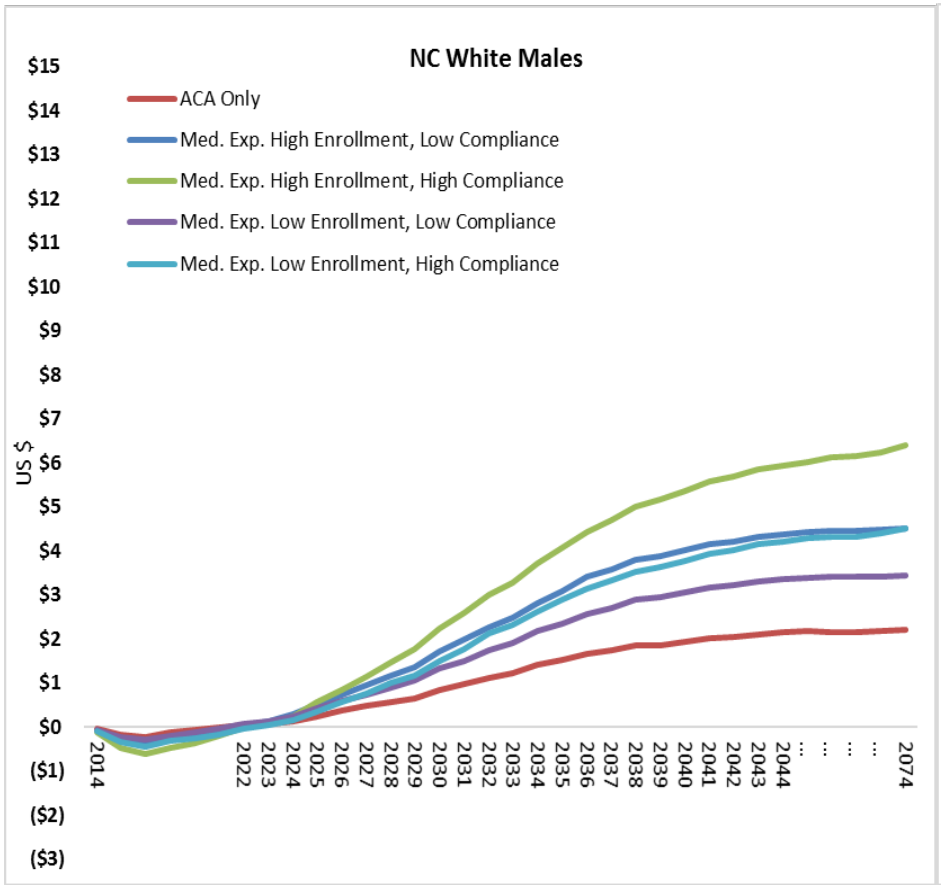
UNC GILLINGS SCHOOL OF GLOBAL PUBLIC HEALTH

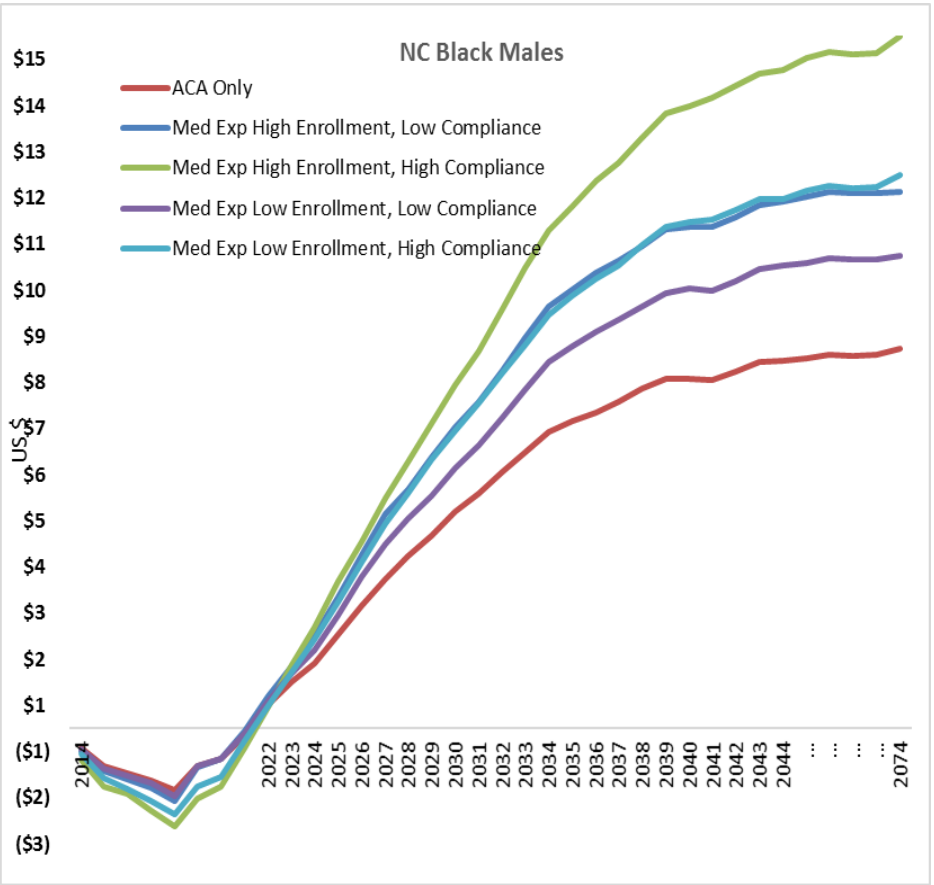
North Carolina CRC Simulation Model

Simulated age-eligible NC population up to date with CRC screening on January 1, 2023

Variable	No ACA	Percentage point change in percent up-to-date on CRC screening compared with the removal of ACA	
		ACA	ACA + Medicaid Expansion
Overall	48.65%	+1.03%	+1.74%
By sex			
Male	46.13%	+0.94%	+1.55%
Female	51.00%	+1.11%	+1.92%
By race			
White	49.92%	+0.73%	+1.29%
Black	45.92%	+2.01%	+2.88%
Hispanic	42.22%	+0.05%	+2.90%
Other	42.36%	+1.40%	+3.40%
By insurance			
Private	53.87%	+0.01%	+0.03%
Dual	58.02%	+0.02%	+0.99%
Medicare	59.85%	+0.09%	+0.15%
Medicaid	42.63%	+0.07%	+0.02%
Uninsured	17.84%	-0.04%	-0.04%

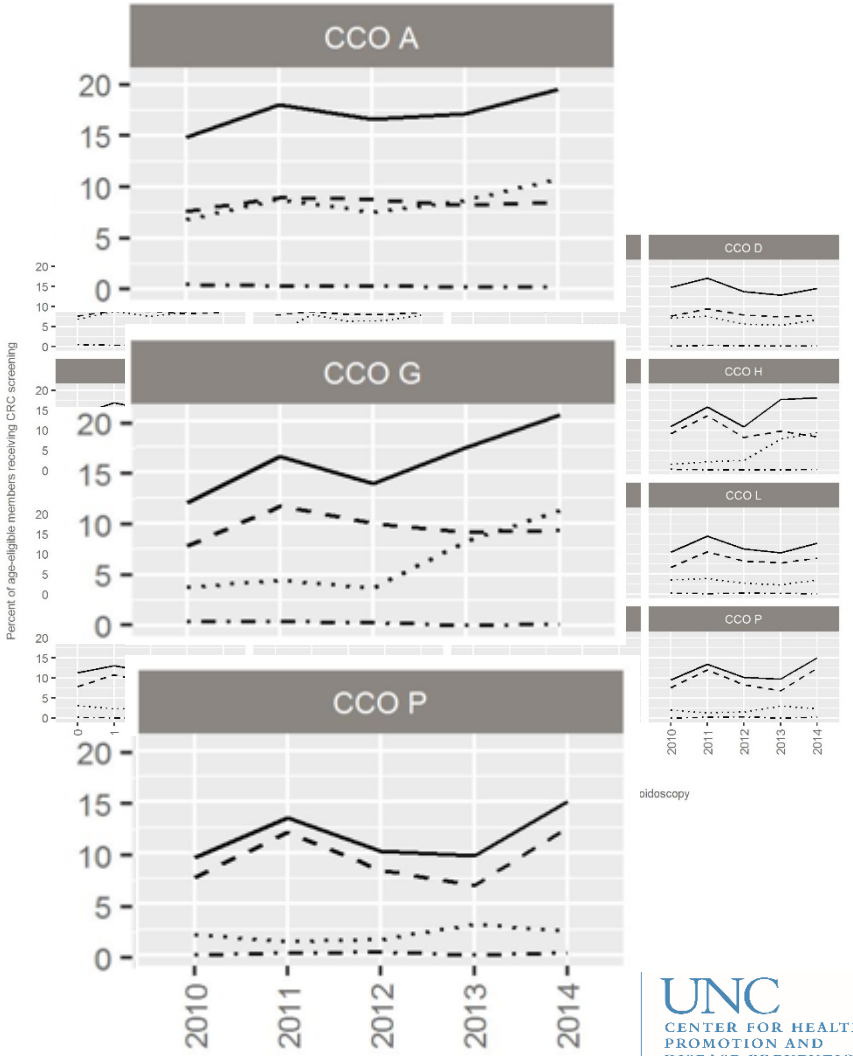
Medicaid expansion is expected to be cost-saving in terms of CRC screening and outcomes over time





CRC Testing among Oregon Medicaid Enrollees, 2010-2014

- **Objective:** To assess CRC testing patterns statewide and by Medicaid coordinated care organizations (CCOs)
- **Population:** 134,424 Oregon Medicaid members ages 50-64
- **Results:**
  - Probability of CRC testing increased by 0.7 percentage points in 2011 and 1.4 percentage points in 2014 (versus 2010)
  - 3-fold increase in fecal testing in 2014 compared to earlier years
  - Modality patterns vary by CCO



CRC Screening Among 50-Year-Old Oregon Medicaid Enrollees

- **Objective:** To determine if Medicaid members are differentially likely to get screened based on the year in which they turn 50 and/or enroll in Medicaid, and to map these patterns onto state and federal policies
- **Population:** 14,576 Oregon Medicaid enrollees who turned 50 from 2010 to 2014
- **Results:**
  - Individuals who enrolled in Medicaid for the first time in 2013 (RR: 1.58; 95% CI=1.20, 2.09) or 2014 (RR: 1.31; 95% CI=1.15, 1.49) were more likely to get screened than those enrolled in 2010
  - Having a primary care visit in the calendar year, chronic disease, and being Hispanic were also significantly more likely to be screened

Oregon Medicaid and Clinic Partnerships

- **Method:** qualitative comparative study of 14 Oregon CCOs and their regional primary care clinics
- **Data Sources:** public performance data, key informant interviews, consultation field notes
- **Themes:**
  - **3 key partnership dimensions:**
    - Establishing relationships and building partnerships
    - Producing and sharing performance data
    - Developing a process and infrastructure to support quality improvement
  - **2 unintended consequences:**
    - Potential exclusion of smaller clinics
    - Metric fatigue

Fecal Testing Interventions in Rural and Low-Income Populations

Davis et al. BMC Cancer (2018) 18:40
DOI 10.1186/s12885-017-3813-4

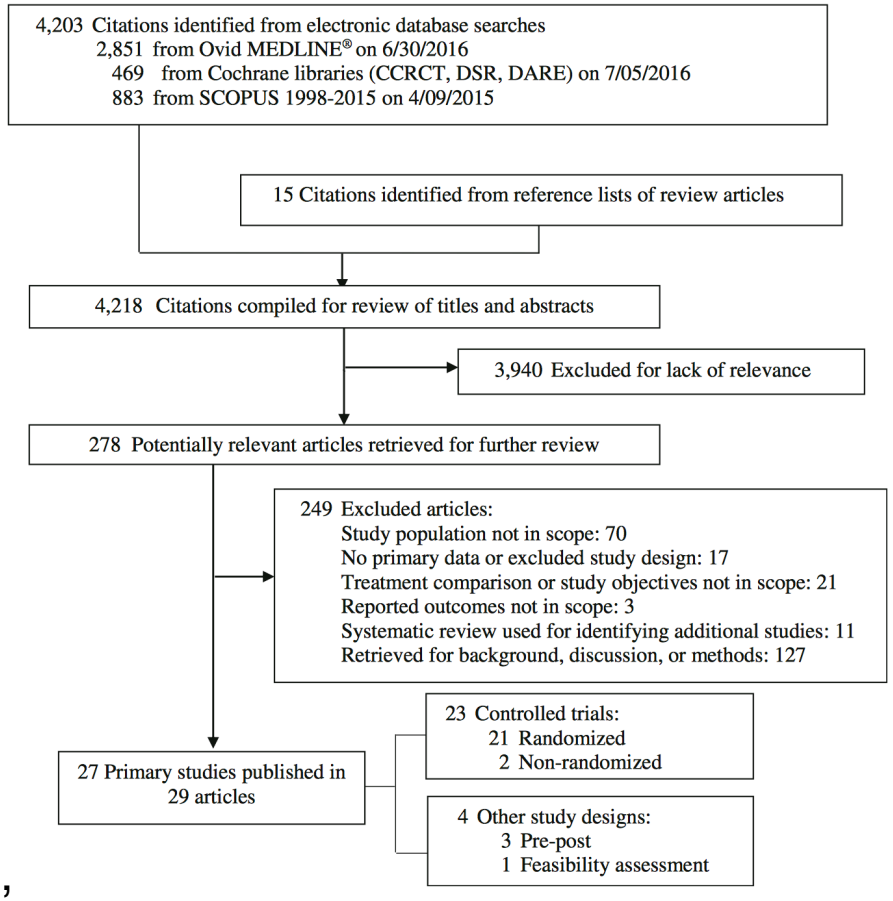
BMC Cancer

RESEARCH ARTICLE Open Access

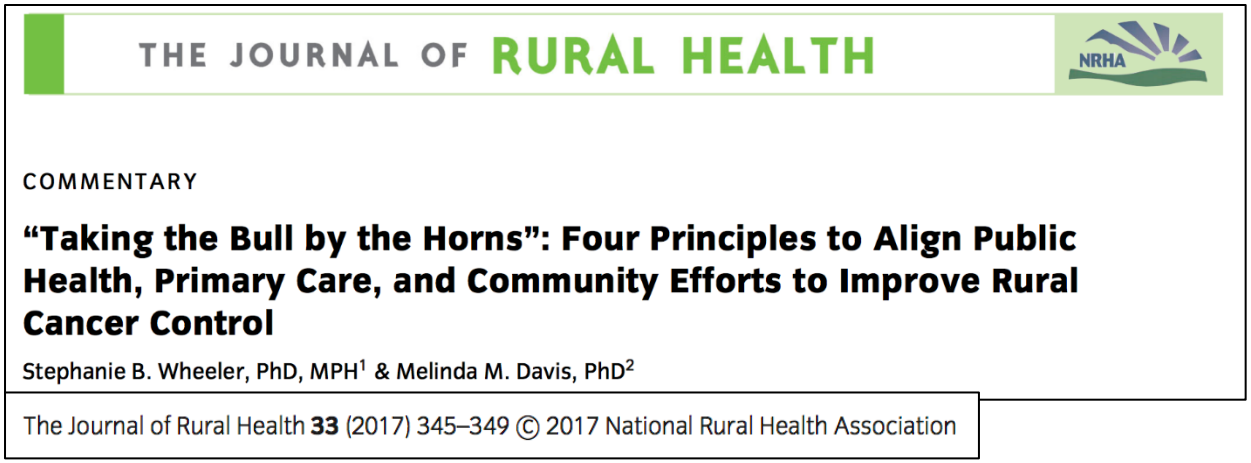
A systematic review of clinic and community intervention to increase fecal testing for colorectal cancer in rural and low-income populations in the United States – How, what and when?

Melinda M. Davis[1,2*], Michele Freeman[3], Jackilen Shannon[4], Gloria D. Coronado[5], Kurt C. Stange[6], Jeanne-Marie Guise[7], Stephanie B. Wheeler[8] and David I. Buckley[9]

- Effective study arms most commonly provided stool tests by direct mail, pre-addressed stamped envelopes, client reminders, and in-clinic distributions.
- More guidance is needed regarding which interventions work best for specific settings, populations, and community characteristics.



Opportunities to Improve Rural Cancer Control



THE JOURNAL OF RURAL HEALTH

NRHA

COMMENTARY

"Taking the Bull by the Horns": Four Principles to Align Public Health, Primary Care, and Community Efforts to Improve Rural Cancer Control

Stephanie B. Wheeler, PhD, MPH[1] & Melinda M. Davis, PhD[2]

The Journal of Rural Health **33** (2017) 345–349 © 2017 National Rural Health Association

1. Utilize existing data when possible and develop new methods for working with small sample sizes.
2. Prioritize efforts to evaluate, adapt, and expand EBIs to rural areas using multidisciplinary research strengths.
3. Weigh the pros and cons of rural definitions and consider the interaction of geography with individual-level and regional factors.
4. Utilize an equity-based participatory implementation science approach to improve and align research and quality improvement efforts.