

# **A Cost-Effectiveness Analysis of the Penn Colorectal Cancer Screening Navigation Program**

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**Leonard Davis Institute of Health Economics  
Summer Undergraduate Minority Research Program**

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**Penn Medicine**

# Outline

- ◆ **Discuss the disparities in colorectal cancer screenings between populations**
- ◆ **Define patient navigation and its effectiveness**
- ◆ **Describe Penn Colorectal Cancer Screening Navigation Program**
- ◆ **Determine cost-effectiveness of the program**
- ◆ **Elaborate on lessons learned**

# Colorectal Cancer (CRC) Background

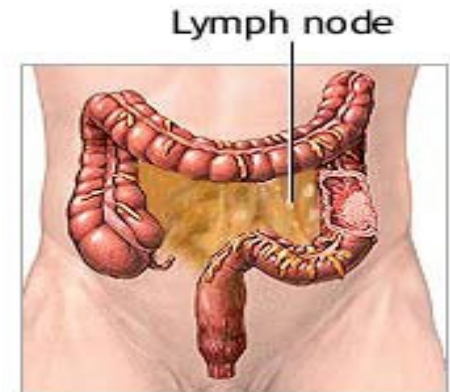
- ◆ **Third most commonly diagnosed cancer in the U.S. (ACS 2011)**
- ◆ **Usually develops slowly over 10-15 years**
- ◆ **Screening is universally recommended by guidelines for all age  $\geq 50$  (ACS 2018).**
- ◆ **Racial/ethnic minorities, non-English speakers and low income individuals have lower rates of screening and present with more advanced stage cancer.**



Stage I



Stage II



Stage III

Source: <http://medicineworld.org/>

# Cancer Disparities in African Americans

- ◆ **African Americans are more likely to be diagnosed and die from colorectal cancer than whites**
  - ◆ 19% higher mortality rate

Source: American Cancer Society. Cancer Facts and Figures for African Americans 2013-14. Atlanta: American Cancer Society, 2019-21

# Stage and mortality are closely linked

- ◆ At 5 years, survival for
  - ◆ CRC: Stage I – 90% vs. Stage IV – 10%
- ◆ Thus, early detection of cancer through screening is critical to improving survival
- ◆ Yet screening is underutilized
  - ◆ PA CRCS rate: 66.8%

Source: BRFSS 2014

## Why were you unable to complete your previous CRCS appointment?

- ◆ **“I don’t have medical insurance.”**
- ◆ **“I was a little scared.”**
- ◆ **“I don’t have a family history, so I don’t feel it is highly urgent.”**
- ◆ **“There is a possibility that they will puncture my intestine.”**
- ◆ **“I just never did it.”**

# What is a Patient Navigator?

- ◆ **An individual that guides patients through procedures or treatments**
- ◆ **Meets with patients directly and/or communicates via telephone**
- ◆ **Identifies and addresses barriers to care**
- ◆ **Mitigates patient concerns**
- ◆ **Goal: to ensure completion of screening, timely diagnosis, and treatment**

# History of Patient Navigation



Dr. Harold Freeman

- ◆ **Started in Harlem Hospital in New York City in 1990 by Dr. Harold Freeman**
- ◆ **Aimed at helping poor Hispanic and African-American patients**
- ◆ **Targeted increasing breast cancer survival rates**



# Navigation Project Aims

## ◆ Clinical Goal

- Launch and evaluate a Patient Navigation Program at the University of Pennsylvania Health System (UPHS) specifically related to Colorectal Cancer Screening (CRCS) of West Philadelphia Patients

## ◆ Research Goals

- Better understand the barriers to CRCS in the West Philadelphia population
- Improve CRCS rates in West Philadelphia, especially among African- Americans
- Determine patients' levels of satisfaction with the navigation program

# Project Population

## ◆ Inclusion Criteria

- West Philadelphia resident
- Over 50 years old
- Doctor had to order CRCS for patient
- Appointment was never scheduled or patient failed to show up for his/her appointment



Source: <http://westphillydata.library.upenn.edu/>

## **West Philadelphia CRCS Patient Navigation Program**

- ◆ **Hired an MA to serve as patient navigator**
- ◆ **Training at the Harold Freeman Patient Navigation Institute, Bronx, NY**
- ◆ **Used grant funding for program implementation, patient care costs, MA salary and training**
- ◆ **Created low literacy version of prep instructions and video**

## West Philadelphia Colorectal Cancer Screening Navigation Program Results

- **90% of patients screened were African American**
- **Completed 763 Screening Colonoscopies**
- **327 colonoscopies resulted in at least one adenomatous polyp (42.9%)**
- **Detection of 5 cancer cases**

Screening colonoscopy results	(n=763)
Normal/no pathology or hyperplastic polyp(s)	353 (46.3%)
At least one adenomatous polyp	327 (42.9%)
Adenocarcinoma	5 (0.7%)
Repeat	16 (2%)
Other	30 (4%)
Pending scheduling	32 (4%)

CRC Stage	N
Stage I	1
Stage II	0
Stage III	3
Stage IV	1
<b>Total</b>	<b>5</b>

# Patient Satisfaction

<b>Patient Satisfaction (n=180)</b>		
<b>Overall, I am satisfied with the navigation services I received from the navigator</b>		
<b>Strongly agree</b>	<b>168 (93.3)</b>	
<b>Agree</b>	<b>11 (6.1)</b>	
<b>Neither Agree or disagree</b>	<b>0</b>	
<b>Disagree</b>	<b>1 (0.6)</b>	
<b>Strongly disagree</b>	<b>0</b>	

# Conclusions about Navigation Program

- ◆ **A patient navigation program for CRCs for UPHS patients who are residents of West Philadelphia and have not previously been able to complete screening colonoscopy is**
  - ◆ **Feasible**
  - ◆ **Acceptable**
  - ◆ **Effective**
  - ◆ **Associated with high patient satisfaction**
  - ◆ **Reduced colonoscopy no shows**
  - ◆ **Builds Trust**

# SUMR Project Specific Aims

- ◆ **To determine if the navigation program is cost-effective relative to a 2010 control group**
- ◆ ***Hypothesis: A CRCS navigation program focused on the West Philadelphia population is Cost-Effective***

# Colonoscopy Data Collection and Categorization

- ◆ To gather colonoscopy data, I manually abstracted data from a cohort of patient colonoscopy and pathology results in EPIC who meet the inclusion criteria
- ◆ I then categorized the outcomes as normal, benign, or abnormal based on EPIC Report
- ◆ Notable outcome was that the navigated group had a higher adenoma detection rate (38%) vs. a control group (27%)

	Navigated Group (2012)	Control Group (2010)
Outcomes of Completed SCs	(n=134)	(n=366)
“Normal” SC	41%	48%
Benign Pathology <sup>i</sup>	19%	23%
“Abnormal” Pathology	40%	28%
-Adenoma Detection Rate <sup>ii</sup>	38%	27%
-Cancer Incidence	2%	1%
i. Includes colonic mucosal polyps and hyperplastic polyps		
ii. Includes serrated adenomas and tubular adenomas		



# Costs of Navigation Program

- ◆ Largest driver of costs is labor cost of patient navigator (\$64,531)
- ◆ Overall navigation program costs in 2012 totaled \$76,666
- ◆ The average total cost of each completed screening colonoscopy for a navigated patient was \$703.36
- ◆ These costs are not reimbursed by insurers despite proven effectiveness of patient navigation

Outputs	Average Total Cost <sup>i</sup> (USD)
Per Completed SC	
-Navigated patients (n=109)	\$703.36
-All patients (n=132)	\$580.80

i. Calculated based on 2012 program operating costs (including start-up costs).

# Cost-Effectiveness Analysis

- ◆ **Incremental Revenue range comes from Medicare data at UPHS**
- ◆ **Using a 2010 control group, we projected an additional 30 patients would be screened if navigated**
- ◆ **This resulted in a net benefit range of **(\$282.65)** to **\$138.06** per navigated patient screened**

Table 5: Cost-Effectiveness Analysis, Calendar Year 2012

	Control Group (2010)	Received Navigation (2012)
Incremental Revenue, Range	--	\$1,500.00 to \$3,000.00
Incremental Cost Per Completed SC		\$703.36
Patients Scheduled	644	138
Patients Screened	366	109
% Patients Screened	56.8%	79%
2012 Projections, Usual Care		
% Patients Screened (Proj.)		56.8%
Patients Screened (Proj.)		78
Additional Patients Screened		30.6
Total Additional Revenue, Range		\$45,857.14 to \$90,428.57
Total Additional Cost		\$76,666.24
Net Benefit, Range		-\$30,809.10 to \$15,048.05
Net Benefit, Range Per Patient Screened (n=109)		-\$282.65 to \$138.06

# Project Conclusions

- ◆ **In higher revenue ranges, the CRCS navigation program is cost effective**
- ◆ **Some limitations to consider are the use of a single hospital network and potential presence for self-selection bias**
- ◆ **Dissemination of project data must be presented to insurance companies to influence policy change for navigation reimbursement**

# Lessons Learned

- ◆ **Abstraction of data from EMR**
- ◆ **Categorization of colonoscopies based on EMR results**
- ◆ **The importance of patience and flexibility in research**
- ◆ **How to lead a project as a co-investigator**
- ◆ **The community impact of dedicated physician-researchers**

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