

Are Breast Cancer Navigation Programs Cost-Effective? Evidence from the Chicago Cancer Navigation Project

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Purpose for the Analysis

Specific Aim 1

- To evaluate the extent to which patient navigation for breast cancer has the potential of being cost-effective

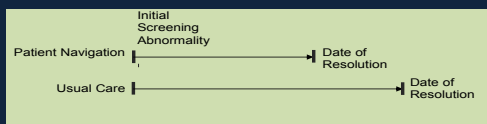
Specific Aim 2

- To explore the factors that determine the cost-effectiveness of breast cancer patient navigation

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Patient Navigation

- A new approach to overcome access barriers that prevent low-income ethnic minority women from receiving appropriate and timely cancer diagnosis and treatment
- Aims in reducing the interval of time (t) between an abnormal breast cancer screening and definitive diagnostic resolution in patients who are "Navigated" as compared to "Usual Care"



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Patient Navigation (cont'd)

- Guided by the principles of *Care Management* (Battaglia, Roloff, Posner, & Freund, 2006)

- Case identification
- Identification of individual barriers to care
- Implementation of a care plan
- Establishment of a system for tracking patients through completion

- The patient navigator

- Is a proactive patient advocate who helps in assisting patients overcome barriers to access to care (Dohan & Schrag, 2005)
- Is an individual with relatively low salary, limited medical training and experience, but whose presence within the system has been proven to be effective and affordable (Freeman, Muth, & Kerner, 1995)

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Chicago Cancer Navigation Project (CCNP)

- One of the nine major Patient Navigator Research Programs (PNRP) sponsored by the National Cancer Institute and the American Cancer Society
- Navigates men and women for cancers of the breast, cervix, colon, and prostate
- Based on an experimental research design
 - Patient Navigation sites
 - Usual Care control sites
- The sites for navigating women are chosen within one of the largest networks of community health centers operating in underserved, low-income neighborhoods throughout the Chicago region

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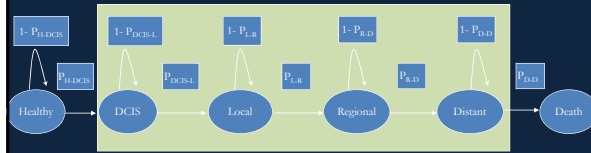
Chicago Cancer Navigation Project (cont'd)

- The breast and cervical cancer navigation team includes
 - 1 social worker navigator
 - 2 bilingual (English-Spanish) lay navigators
 - 1 English speaking lay navigator
- The effectiveness of the CCNP is not yet established
 - In the base-case analysis, it is hypothesized that women enrolled in the CCNP receive on average diagnostic resolution 6-months earlier as compared to women who receive the "Usual Care"

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The Natural History of Breast Cancer

- Using the Markov model, the natural history of breast cancer is constructed to simulate the progression of breast cancer in women who do not receive patient navigation
- The TreeAge Pro Software was used to construct the Markov model (TreeAge Pro, 2008)



Potential Future Benefits of Patient Navigation in Women who have Breast Cancer

	Patient Navigation (PN)	Usual Care (UC)	Potential benefits of PN	
			One woman	"p" women
Life-years (LY)	LY_{PN}	LY_{UC}	$LY_{PN} - LY_{UC}$	$p \times (LY_{PN} - LY_{UC})$
Lifetime breast cancer-attributable costs (LCC)	LCC_{PN}	LCC_{UC}	$LCC_{UC} - LCC_{PN}$	$p \times (LCC_{UC} - LCC_{PN})$

Data Sources

- Published literature
 - Breast cancer transition probabilities
 - Lifetime total and breast cancer-attributable costs
- Secondary data from the CDC's Surveillance Epidemiology and End Results (SEER) program
 - Breast cancer incidence and survival for Hispanic and African American women
- Primary data from CCNP
 - Number of program participants
 - Number of women who receive breast cancer diagnosis
 - Total program costs

Breast Cancer Program Participants

- From the date of program inception until the date of the evaluation
 - 97 women are navigated for breast cancer screening abnormality
 - Breast cancer detected in 7 patients
 - The mean age is 41.27 yrs (SD 10.7 and range 18-69)
 - 65 % Hispanic
 - 26 % African American
 - 2 % other
 - 7 % chose not to answer

Total Program Costs of CCNP

- Personnel time costs (hourly wages)
 - 1/4 Full-Time Equivalent (FTE) program director
 - 1 FTE social worker navigator
 - 3 FTE lay navigators
- Variable costs
 - Office supplies
 - Telephone and cell phone charges
 - Parking and transportation costs incurred by navigators
 - Transportation fees incurred for patients
- Fixed costs
 - Initial training and continuing education
 - Capital cost for navigator office setup
 - Associated overhead (indirect) cost of renting, taxes, and utilities for the navigation space

Total Costs of Breast CCNP

Cost components	Cost in dollars	Percent from total costs
Personnel time costs	\$ 71,426	58 %
Variable costs	\$ 5,658	5 %
Fixed costs	\$ 44,975	37 %
Total Costs	\$ 122,059	100%

Navigating a woman in CCNP for abnormal mammogram screening costs on average \$1,258 per program participant

The Incremental Cost-Effectiveness Ratio (ICER) of administering Patient Navigation (PN) versus Usual Care (UC)

$$ICER = \frac{\text{Net costs (in 2006 dollars)}}{\text{Total potential benefits (in life-years)}}$$

Net costs = Total program costs – Total savings in LCC
 Total savings in LCC = p (LCC_{UC} - LCC_{PN})
 Total potential benefits = p (LY_{PN} - LY_{UC})

p = the number of navigated women who have breast cancer
 LCC = Lifetime breast cancer-attributable costs
 LY = Life-years

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Results of the ICER and the Sensitivity Analysis

Variable	Range	\$/LY*
Base-case		95,625
I- Interval of time between screening and diagnosis	t=3-months t=9-months	194,644 62,657
II- Number of program participants	n=189 (25% less) n=315 (25% more)	127,118 76,728
III- Age of women and (IV) PPV varied simultaneously	Age=40-49/ PPV=0.04 Age=50-54/ PPV=0.09 Age=55-59/ PPV=0.09 Age=60-69/ PPV=0.17 Age=70+/ PPV=0.19	95,346 47,889 83,323 65,376 89,361
V- Percent change in number of women who receive cancer diagnosis and treatment	p=15% increase	36,052
VI- The methodological factor of accounting for total medical costs	LC=total medical costs	85,815**

* 2006 dollars, costs and effects are discounted by 3%
** undiscounted

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Limitations

- Analysis using the health system perspective, did not account for
 - Cost of productivity losses averted by the program
 - Participant time cost
- Potential future benefits not in QALYs
 - Few data on the utility that women place on life after breast cancer treatment (Salzman, Kerlikowske, and Phillips, 1997)
- Additional benefits of patient navigation
 - Use of secondary data to compute breast cancer prognosis in women who received navigation
 - Navigated patients might have better satisfaction

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Conclusions

- A patient navigation program for breast cancer that structurally resembles the CCNP is potentially cost-effective
- There are some factors that are within the control of the program planner and that affect the effectiveness and cost-effectiveness of patient navigation
 - Characteristics of the target population
 - Program eligibility criteria

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Funding Source

- Chicago Cancer Navigation Program is one of the nine major Patient Navigator Research Programs (PNRP) funded by the National Cancer Institute (NCI)

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