

Sociodemographic Predictors of Non-Receipt of Guidelines-Concordant Chemotherapy
- among Locoregional Breast Cancer Patients Under Age 70 Years

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Background

- In 1999, Institute of Medicine (IOM) published the report *Ensuring Quality Cancer Care*

“... for many Americans with cancer, there is a wide gulf between what could be constructed as the ideal and the reality of their experience with cancer care...”



Background

- In the report, IOM recommended more research to measure and improve the quality of cancer care.
- In 2000, IOM further recommended enhancing cancer registries for assessing quality of cancer care.

Background

- Cancer registries do not have complete data on adjuvant chemotherapy from routine data collections due to the lack of adequate resources.
- Assessing the quality of cancer care has relied on data from
 - National Cancer Database
 - Medical claims such as Medicare, Medicaid
 - Patterns of Care (PoC) studies

Background

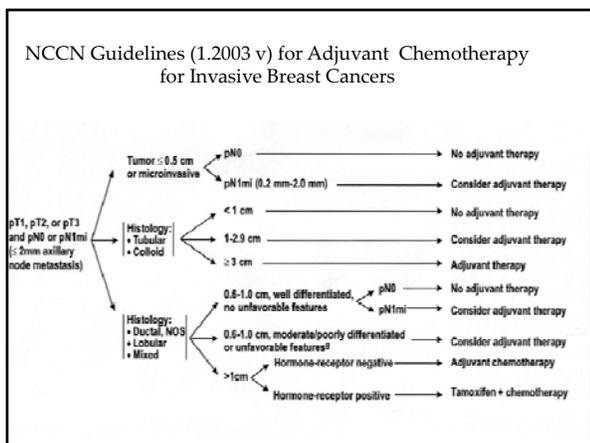
- Publications on the dissemination of guidelines-recommended adjuvant chemotherapy for breast cancer are scarce.
- Most publications focus on racial differences. The impact of socioeconomic factors on receipt of adjuvant chemotherapy has not been studied thoroughly.

Methods

- Data sources:
 - CDC-NPCR PoC study
 - 7 cancer registries (CA, GA, KT, LA, NC, MN, and WI)
- Medical record abstraction:
 - hospitals
 - non-hospital settings such as free-standing ambulatory centers, radiation facilities
- Physician verification:

Methods

- Eligibility criteria
 - women aged 20-69 years
 - localized or regional breast cancer diagnosed in 2004
 - microscopically confirmed
 - received surgery
 - no autopsy or death certificate case
 - excluded Paget's disease, mesothelioma, Kaposi' sarcoma, lymphoma cases as well as histologies that were not specified in the NCCN guidelines such as inflammatory breast cancer.



<u>Guidelines-Concordant Chemotherapy</u>			
<ul style="list-style-type: none"> Received or not received adjuvant chemotherapy (Yes/No) according to the NCCN guidelines 			
Guidelines-Recommended			
Received	Chemotherapy	No chemotherapy	Consider
Yes	Guideline care	Over treated	Excluded
No	Under treated	Guideline care	

<u>Explanatory Variables of Interest</u>
<ul style="list-style-type: none"> Race/ethnicity: non-Hispanic White, Black, AI/AN, and API Hispanic Insurance: <ul style="list-style-type: none"> - Private incl. Medicare plus private insurance - Medicare/other public (TRICARE, other military insurance, Veterans Affairs, Indian Health Services) - Medicaid - None - Unknown

<u>Explanatory Variables of Interest</u>
<ul style="list-style-type: none"> Census-tract poverty <ul style="list-style-type: none"> - low: <20% of persons with income below the federal poverty level - high: ≥20% Census-tract education <ul style="list-style-type: none"> - high: <25% of adults (≥ 25 years old) with less than a high-school education - low: ≥25%

Explanatory Variables of Interest

- Hospital CoC status
 - Yes, CoC-accredited cancer program
 - No
 - Others (which CoC status does not apply)
- CoC status was grouped based on the facility where the patient received breast cancer surgery; most referrals made by surgeon.
- Received surgery at a non-CoC hospital or surgical center, but receiving adjuvant therapy or consultations at CoC hospitals were grouped in the CoC group.

Clinical Explanatory Variables

- Clinical variables specified in the NCCN guidelines
 - regional lymph node status
 - histology type
 - tumor size
 - tumor grade
 - Estrogen/progesterone receptor status
- Comorbidity collected using ACE-27 by Piccirillo et al:
 - None, mild, moderate, severe, and unknown.

Date: _____ IF YOU HAVE QUESTIONS, PLEASE CALL 314-363-7568 AND ASK FOR ASSISTANCE.

Center's Initials: _____

Classification Center: _____

Accession #: _____

Sequence #: _____

Adult Comorbidity Evaluation-27

Identify the important medical comorbidities and grade severity using the index. (If a mild comorbidity score is defined according to the index, a mild comorbidity score is assigned to the case where two or more Grade 2 ailments occur in different organ systems. In this situation, the overall comorbidity score should be determined using 2.)

Organ System	Grade 1 Mild	Grade 2 Severe Decompensation	Grade 3 Moderate Decompensation	Grade 4 MIM Decompensation
Cardiovascular System	<input type="checkbox"/> Myocardial Infarct <input type="checkbox"/> Coronary Artery Disease	<input type="checkbox"/> MI ≤ 6 months <input type="checkbox"/> Unstable angina	<input type="checkbox"/> MI > 6 months ago <input type="checkbox"/> Chronic myocardial infarct <input type="checkbox"/> Recent (≤ 6 months) Coronary Artery Bypass Graft (CABG) or Percutaneous Transluminal Coronary Angioplasty (PTCA) <input type="checkbox"/> Recent (≤ 6 months) coronary stent	<input type="checkbox"/> MI for ICG only, age undetermined <input type="checkbox"/> ECG or stress test evidence or radiographic evidence of coronary disease without symptoms <input type="checkbox"/> Angina pectoris not requiring hospitalization <input type="checkbox"/> CABG or PTCA (> 6 mos.) <input type="checkbox"/> Coronary stent (> 6 mos.)
Respiratory System	<input type="checkbox"/> COPD <input type="checkbox"/> Asthma <input type="checkbox"/> Chronic Bronchitis	<input type="checkbox"/> Hospitalized for CHF within past 6 months <input type="checkbox"/> Ejection fraction < 20%	<input type="checkbox"/> Hospitalized for CHF > 6 months prior <input type="checkbox"/> CHF with dyspnea which limits activities <input type="checkbox"/> Ventricular arrhythmia ≥ 0 months <input type="checkbox"/> Chronic renal dysfunction or dialysis <input type="checkbox"/> Pericardial	<input type="checkbox"/> CHF with dyspnea which has responded to treatment <input type="checkbox"/> End-stage CHF <input type="checkbox"/> CHF with dyspnea which has responded to treatment <input type="checkbox"/> End-stage CHF <input type="checkbox"/> CHF with dyspnea which has responded to treatment <input type="checkbox"/> End-stage CHF
Neurological System	<input type="checkbox"/> Stroke <input type="checkbox"/> Seizure <input type="checkbox"/> Dementia	<input type="checkbox"/> Stroke (≤ 6 months) <input type="checkbox"/> Seizure (≤ 6 months) <input type="checkbox"/> Dementia (≤ 6 months)	<input type="checkbox"/> Stroke (> 6 months) <input type="checkbox"/> Seizure (> 6 months) <input type="checkbox"/> Dementia (> 6 months)	<input type="checkbox"/> Stroke (> 6 months) <input type="checkbox"/> Seizure (> 6 months) <input type="checkbox"/> Dementia (> 6 months)
Endocrine System	<input type="checkbox"/> Diabetes Mellitus <input type="checkbox"/> Hypertension <input type="checkbox"/> Hyperlipidemia	<input type="checkbox"/> Diabetes Mellitus (≤ 6 months) <input type="checkbox"/> Hypertension (≤ 6 months) <input type="checkbox"/> Hyperlipidemia (≤ 6 months)	<input type="checkbox"/> Diabetes Mellitus (> 6 months) <input type="checkbox"/> Hypertension (> 6 months) <input type="checkbox"/> Hyperlipidemia (> 6 months)	<input type="checkbox"/> Diabetes Mellitus (> 6 months) <input type="checkbox"/> Hypertension (> 6 months) <input type="checkbox"/> Hyperlipidemia (> 6 months)
Renal System	<input type="checkbox"/> Creatinine < 1.5 mg/dL <input type="checkbox"/> BUN < 20 mg/dL	<input type="checkbox"/> Creatinine 1.5-2.9 mg/dL <input type="checkbox"/> BUN 20-29 mg/dL	<input type="checkbox"/> Creatinine 3.0-5.9 mg/dL <input type="checkbox"/> BUN 30-49 mg/dL	<input type="checkbox"/> Creatinine ≥ 6.0 mg/dL <input type="checkbox"/> BUN ≥ 50 mg/dL
Other	<input type="checkbox"/> None <input type="checkbox"/> Mild <input type="checkbox"/> Moderate <input type="checkbox"/> Severe <input type="checkbox"/> Unknown			

Data Analysis

- Chi-square test: the association of individual variables with non-receipt of guidelines-concordant chemotherapy.
- Multiple logistic regression: the association of sociodemographic factors with non-receipt of guidelines-concordant chemotherapy adjusting for other factors.
- All statistics were weighted to reflect the populations from which the sample was drawn.
- SAS Procedures for survey data analysis

Results

- 4,452 cases included
- Most cases were white (73%), privately insured (72%), 82% residing in low poverty areas, 68% in high education areas, and 53% treated at CoC hospitals.

Receipt of Guidelines-Concordant Chemotherapy

Received	Guidelines Recommended	
	Chemotherapy	No chemotherapy
Yes	62.6%	0.67%
No	22.8%	13.9%

**% of Women Not Receiving Guidelines-Concordant
Chemotherapy**

	Total case count	Weighted % not receiving
All patients	4,452	23.5
Age (yr)		p<0.01
<40	436	9.8
40-49	1,348	14.6
50-64	2,125	25.9
65-69	543	42.5

**% of Women Not Receiving Guidelines-Concordant
Chemotherapy**

	Total case count	Weighted % not receiving
Race		P<0.01
White	2,361	23.9
Black	1,320	21.0
Hispanic	447	21.3
API	276	30.2
AI/AN	48	11.8
Insurance		P<0.01
Private	2,999	21.6
Medicare/other public	481	33.1
Medicaid only	654	27.4
None	169	20.6
Unknown	149	22.1

**% of Women Not Receiving Guidelines-Concordant
Chemotherapy**

	Total case count	Weighted % not receiving
Census poverty		P < 0.01
Low	3,304	22.2
High	1,148	29.2
Census education		P < 0.01
High	2,689	22.0
Low	1,763	26.7
CoC hospital		P<0.01
Yes	2,430	21.1
No	1,562	27.7
Other	460	21.1

Multiple logistic regression - chemotherapy

- After adjusting for age and clinical factors and/or other variables, race/ethnicity was not associated with receipt of guidelines-concordant chemotherapy significantly.

Odd Ratio and 95% CI - Not Receiving of Guidelines-Concordant Chemotherapy

	Adj. Model I ¹	Adj. Model II ²
Insurance		
Private	1.00	1.00
Medicare/other public	1.08 (0.75-1.56)	1.14 (0.80-1.63)
Medicaid only	1.56 (1.14-2.13)	1.56 (1.12-2.16)
None	1.38 (0.67-2.81)	1.30 (0.64-2.63)
Unknown	0.88 (0.53-1.48)	0.92 (0.54-1.57)

¹ Adjusting for age, registry, and clinical variables (i.e., lymph node, histology, tumor size, grade, Estrogen/progesterone receptor status, and comorbidity).
² Adjusting for all other socio-demographic variables listed in addition to age, registry, and clinical variables above.

Odd Ratio and 95% CI - Not Receiving of Guidelines-Concordant Chemotherapy

	Adj. Model I ¹	Adj. Model II ²
Census poverty		
Low	1.00	1.00
High	1.43 (1.13-1.85)	1.46 (1.07-1.99)
Census education		
High	1.00	1.00
Low	1.15 (0.92-1.45)	0.92 (0.70-1.21)
CoC hospital		
Yes	1.00	1.00
No	1.42 (1.12-1.80)	1.43 (1.13-1.82)
Other	0.50 (0.15-1.63)	0.51 (0.15-1.74)

Discussion – Medicaid and guideline chemotherapy

- Medicaid insured women were less likely to receive guidelines-concordant chemotherapy.
- Poor, more likely to have comorbidities; the differences persisted adjusting for age and clinical and other sociodemographic factors.
- Other underlying factors pertaining to Medicaid status: transportation, family support, perspective of chemotherapy, communication issues, etc.

Discussion – Area SES and guideline chemotherapy

- Living in high poverty and low education areas was associated with a lower use of guidelines-concordant chemotherapy adjusting age and clinical variables.
- Low-income and less-educated women may not communicate well with physicians.
- Other contributing factors: family support, transportation, perspective of chemotherapy, etc.

Discussion – CoC status and guideline chemotherapy

- Women treated at CoC hospitals were more likely to receive guideline-concordant care.
 - Multispecialty approach
 - Comprehensive care
 - Commitment to ongoing monitoring and improvement of care
 - Fewer barriers to obtaining oncology consultations

Discussion

- Strengths
 - large sample size
 - population-based design
 - inclusion of major racial/ethnic groups
 - inclusion of NPCR registries

Discussion

- Limitations
 - diagnosis year: 2004
 - did not have detailed information on use of chemotherapy
 - non-individual level contextual binary SES covariates
 - small sample size for AI/AN, API, and Hispanic
 - no information for subgroups of API and Hispanic

Conclusions

- Guidelines-recommended adjuvant chemotherapy for breast cancer are not disseminated proportionally among women under age 70 years in the community.
- Socioeconomically disadvantaged and medically under-served women are less likely to receive guidelines-concordant adjuvant chemotherapy.
- Identifying the underlying causes for the lack of guidelines-concordant chemotherapy may lead to target interventions to reduce disparities and improve prognosis across all populations.

Future Directions

- IOM report in 2009 “Initial National Priorities for Comparative Effectiveness Research”
- Identifies what works best for which patients under what circumstances.
 - guidelines-concordant
 - survival
 - patient-reported health-related quality of life



References

1. Mariotto AB, Feuer EJ, Harlan LC, et al: Dissemination of adjuvant multiagent chemotherapy and tamoxifen for breast cancer in the United States using estrogen receptor information: 1975-1999. *J Natl Cancer Inst Monogr* 36:7-15, 2006.
2. Freedman RA, Virgo KS, He Y, et al: The association of race/ethnicity, insurance status, and socioeconomic factors with breast cancer care. *Cancer* 117:180-189, 2011.
3. Bhargava A, Du XL: Racial and socioeconomic disparities in adjuvant chemotherapy for older women with lymph node-positive, operable breast cancer. *Cancer* 115:2999-3008, 2009
4. Griggs JJ, Culakova E, Sorbero ME, et al: Social and racial differences in selection of breast cancer adjuvant chemotherapy regimens. *J Clin Oncol* 25:2522-2527, 2007
5. Piccirillo JF, Creech C, Zequeira R, et al: Inclusion of comorbidity into oncology data registries. *J Registry Manag* 26:66-70, 1999.
6. Worthington J, Waterbor JW, Funkhouser E, et al: Receipt of standard breast cancer treatment by African American and White women. *Int J Med Sci* 5:181-188, 2008.
7. Hewitt M, Simone J: *Ensuring Quality Cancer Care*. Washington, DC, National Academies Press, 1999, pp 58-63.
8. Wu X-C, Lund MJ, Kimmick GG, et al: Influence of race, socioeconomic status, insurance, and hospital type on receipt of guideline-concordant adjuvant systemic therapy for locoregional breast cancers. *J Clin Oncol* doi: 10.1200/JCO.2011.36.8399

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Thank You!

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