



Usefulness of Collaborative Stage (CS) Site Specific Factors (SSF) 3, 4, 5 and 6 in describing Short-term Mortality Risk Disparities for Type II Endometrial Cancers in Metropolitan Detroit (2010-2011) and SEER-18 (2010)

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BACKGROUND AND PURPOSE

SEER began collecting Site Specific Factors (SSF) 3-6 for Endometrial Cancers in 2010:

- SSF 3: # of positive pelvic nodes (PNP)
- SSF 4: # of pelvic nodes examined (PNE)
- SSF 5: # of positive para-aortic nodes (PANP)
- SSF 6: # of para-aortic nodes examined (PANE)

SEER also collects:

- # regional lymph nodes examined (RLNE)
- # regional lymph nodes positive (RLNP)

This investigation implemented due to:

- Continuing budget cuts in the face of additional required data items to collect
- Paucity of data found in the medical chart for some new SSF with Collaborative Stage v.2

Type II Endometrial Cancer:

- Worse prognosis
- Amenable for short term mortality risk analysis

METHODS

Criteria:

- Incident Type II endometrial cancers
- Caucasian (C) and AA women
- Primary Site=C54.1
- Histology Type: 8310, 8441, 8460, 8461, 8050, 8070, 8071, 8072, 8560, 8041 and 8323
- Caucasian (C) and AA women
- in Metropolitan Detroit
 - diagnosed 2010-2011
- in SEER-18
 - diagnosed 2010

Statistical Analyses:

- Frequencies for each SSF, RLNE and RLNP were performed to examine whether each variable had a defined value.
 - Chi-squares evaluating the association between each variable and race were generated.
 - For each data type (Metropolitan Detroit, SEER-18), two Cox proportional hazards modeling risk of death were generated:
 - **Model 1:** adjusted by Race, Age, SEER Summary Stage, Surgery (Yes/No), Radiation (Yes/No), Chemotherapy (Yes/No), RLNE (Yes/No) and RLNP (Yes/No)
 - **Model 2:** adjusted by Race, Age, SEER Summary Stage, Surgery (Yes/No), Radiation (Yes/No), Chemotherapy (Yes/No), RLNE (Yes/No) and RLNP (Yes/No) – and by PNE, PNP, PANE and PANP
- Note: SEER-18 model did not include Chemo, as not available

DEMOGRAPHIC, HISTOLOGIC, TREATMENT CHARACTERISTICS

Table 1. Demographic and Histologic Characteristics of Type II Endometrial Cancers in Caucasians and African-Americans, Metropolitan Detroit, 2010-2011 and SEER-18, 2010

	Metropolitan Detroit 2010-2011	Chi-Sq P Value	SEER-18 2010	Chi-Sq P Value
	N, %	Statistical	N, %	Statistical
Total	234 100%		1,432 100%	
Race				
Caucasian	166 71%		1,224 86%	
African-American	68 29%		208 14%	
Age at Diagnosis (mean years)				
Caucasian	67 (95%CI: 65-69)		66 (95%CI: 65-66)	
African-American	66 (95%CI: 64-69)		65 (95%CI: 64-67)	
Marital Status		p=0.0015		p<0.0001
Married	93 40%		678 47%	
Never married (single)	49 21%		342 24%	
Divorced/Separated	32 14%		156 11%	
Widowed	41 18%		291 20%	
Unknown	17 7%		65 5%	
Insurance		p=0.7645		p<0.0001
Insured	83 35%		947 66%	
Uninsured, no specific	0 0%		225 16%	
Any Medicaid*	139 59%		170 12%	
Uninsured	1 0%		54 4%	
Unknown	1 0%		36 3%	
*For Detroit includes Medicare				
SEER Registry				p=0.0001
San Francisco/Oakland			85 6%	
Connecticut			84 6%	
Detroit Metropolitan	234 100%		76 5%	
Hawaii			1 0%	
Iowa			87 6%	
New Mexico			29 2%	
Seattle/Puget Sound			79 6%	
Utah			35 2%	
Atlanta Metropolitan			44 3%	
San Jose/Monterey			37 3%	
Los Angeles			174 12%	
Rural Georgia			1 0%	
Greater California			288 20%	
Kentucky			76 5%	
Louisiana			52 4%	
New Jersey			185 13%	
Greater Georgia			72 5%	
Sequence Number		p=0.5873		p=0.3217
0 (Only cancer)	189 81%		1,124 79%	
1	8 3%		62 4%	
2	30 13%		205 14%	
3+	7 3%		41 3%	
SEER Summary Stage		p=0.2327		p=0.4535
Local	108 46%		676 47%	
Regional	81 35%		495 35%	
Distant	33 14%		231 16%	
Unknown	12 5%		30 2%	
AJCC Stage, v.7		p=0.2539		p=0.1549
IA	87 37%		528 37%	
IB	19 8%		151 11%	
IIB	16 7%		68 5%	
II	186 80%		913 64%	
IIIA	6 3%		67 5%	
IIIB	1 0%		32 2%	
IIIC1	22 9%		114 8%	
IIIC2	16 7%		96 7%	
IIIC3	1 0%		7 0%	
IVA	1 0%		28 2%	
IVB	33 14%		203 14%	
Unknown	13 5%		45 3%	
Grade		p=0.0251		p=0.0752
Grade I	21 9%		140 10%	
Grade II	23 10%		203 14%	
Grade III	76 33%		375 26%	
Grade IV	54 23%		289 20%	
Unknown	60 26%		275 19%	
Regional Lymph Nodes Examined		p=0.8484		p=0.0550
Yes	157 67%		977 68%	
No	77 33%		455 32%	
Regional Lymph Nodes Positive		p=0.0549		p=0.2251
Yes	47 20%		260 18%	
No	187 80%		1,172 82%	
Pelvic Nodes Examined (SSF)		p=0.8889		p=0.0219
Yes	153 65%		953 67%	
No	81 35%		479 33%	
Pelvic Nodes Positive (SSF3)		p=0.1205		p=0.1952
Yes	44 19%		238 17%	
No	190 81%		1,194 83%	
Para-Aortic Nodes Examined (SSF4)		p=0.3814		p=0.3709
Yes	110 47%		619 43%	
No	124 53%		813 57%	
Para-Aortic Nodes Positive (SSF5)		p=0.0182		p=0.1834
Yes	19 8%		124 9%	
No	215 92%		1,308 91%	
Surgery		p=0.3111		p=0.0003
Yes	198 85%		1,295 90%	
No	36 15%		137 10%	
Radiation		p=0.1033		p=0.5702
Yes	78 33%		472 33%	
No	156 67%		960 67%	
Chemotherapy		p=0.0128	NA	
Yes	108 46%			
No	126 54%			
Vital Status		p=0.2086		p=0.0211
Alive	178 76%		1,334 93%	
Deceased	56 24%		98 7%	

*N obscured due to small cell size.

RESULTS

Characteristics, Association Analysis

- Higher proportion of African-Americans in Metropolitan Detroit data-set
- Overall and race-specific mean ages similar
- Missing:
 - M.D.: RLNE (3%), RLNP (2%, if add no nodes examined = 34%), PNE (5%), PNP (4%, if add no nodes exam=34%), PANE (6%), PANP (4%, if add no nodes exam = 53%)
 - SEER-18: RLNE (2%), RLNP (2%, if add no nodes examined = 41%), PNE (6%), PNP (3%, if add no nodes exam=40%), PANE (7%), PANP (3%, if add no nodes exam = 63%)
- Within each data-set:
 - Race **was** associated with: Marital Status, Insurance (SEER-18 only), SEER registry (SEER-18 only), Grade (M.D. only), Pelvic Nodes Examined (SEER-18 only), Para-aortic Nodes Positive (M.D. only), Surgery (SEER-18 only), Chemotherapy (M.D. only avail.), Vital Status (SEER-18 only)
 - Race **not** associated with: Insurance (M.D. only), Sequence, SEER Summary Stage, AJCC Stage, Grade (SEER-18 only), RLNE, RLNP, PNE (M.D. only), PNP, PANE, PANP (SEER-18 only), Surgery (M.D. only), Radiation and Vital Status (M.D. only)

Proportional Hazards

SEER-18:

- Mortality risk for Type II Endometrial Cancer was greater in African-Americans in the crude model (HR=1.74, p=0.02).
- When adjusted by age, stage, surgery, radiation, regional lymph nodes examined (RLNE) and regional lymph nodes positive (RLNP):
 - African-Americans mortality risk decreased (HR=1.45) but was still greater than Caucasians, however
 - The risk was not statistically significant (p=0.13).
- When further adjusted by SSF 3-6, i.e. pelvic nodes examined (PNE), pelvic nodes positive (PNP), para-aortic nodes examined (PANE) and para-aortic nodes positive (PANP), mortality risk in African-Americans was unchanged (HR=1.45, p=0.13).
- Limitations:
 - High proportion of censored cases (93%)
 - Small amount of follow-up time (only 2010 diagnosed cases available and follow-up truncated at the end of 2010).

Metropolitan Detroit:

- Mortality risk was greater in African-Americans (HR=1.43) in the crude model, but
 - This difference was not statistically significant (p=0.21).
- When adjusted by age, stage, surgery, radiation, chemotherapy, regional lymph nodes examined (RLNE) and regional lymph nodes positive (RLNP):
 - African-Americans exhibited **higher** increased mortality risk (HR=1.63) than the crude model, but
 - The risk was not statistically significant (p=0.12).
- When further adjusted by SSF 3-6, i.e. pelvic nodes examined (PNE), pelvic nodes positive (PNP), para-aortic nodes examined (PANE) and para-aortic nodes positive (PANP), mortality risk in African-Americans was unchanged (HR=1.62, p=0.12).
- Missing: RLNE (3%), RLNP (2%, if add no nodes examined = 34%), PNE (5%), PNP (4%, if add no nodes examined=34%), PANE (6%), PANP (4%, if add no nodes examined = 53%).
- Limitations:
 - High proportion of censored cases (76%), but fewer than SEER-18.
 - Small amount of follow-up time (only 2010 & 2011 diagnosed cases available, although follow-up was through the present).
 - Only n=19 para-aortic nodes positive and n=44 pelvic nodes positive.

Conclusions:

- Our analysis did not show evidence to support usefulness of pelvic nodes and para-aortic nodes examined and positive for short-term mortality risk disparities analyses in Type II endometrial cancers.
- However, small cell sizes and multiple adjusted co-variables resulted in our study being underpowered. Further investigations into the usefulness of these variables are recommended.

MORTALITY RISK DISPARITIES

Table 2. Proportional Hazards Models

	SEER-18	Referent	HR	95% CI	P-value
Censored: 93%					
Crude: Survival in Months = Race		Caucasian	1.74	(1.08, 2.79)	p=0.02
Model 1 Adjusted: Race, Age, SEER Summary Stage, Surgery, Radiation, RLNE Examined, RLN Positive		Caucasian	1.45	(0.90, 2.34)	p=0.13
		Age = continuous	1.04	(1.02, 1.06)	p<0.0001
		Stage = continuous	1.24	(1.13, 1.36)	p<0.0001
		No surgery	0.24	(0.15, 0.39)	p<0.0001
		No radiation	0.28	(0.15, 0.51)	p<0.0001
		No RLN Examined	0.53	(0.27, 1.04)	p=0.07
		No RLN Positive	2.41	(1.20, 4.85)	p=0.01
Model 2 Adjusted: Race, Age, SEER Summary Stage, Surgery, Radiation, RLNE Examined, RLN Positive, Pelvic Nodes Examined, PN Positive, Para-aortic Node Examined, PAN Positive		Caucasian	1.45	(0.89, 2.35)	p=0.13
		Age = continuous	1.04	(1.02, 1.06)	p<0.0001
		Stage = continuous	1.24	(1.12, 1.36)	p<0.0001
		No surgery	0.22	(0.13, 0.37)	p<0.0001
		No radiation	0.27	(0.15, 0.51)	p<0.0001
		No RLN Examined	0.38	(0.10, 1.47)	p=0.16
		No RLN Positive	1.18	(0.32, 4.37)	p=0.81
		No PN Examined	1.79	(0.47, 6.79)	p=0.39
		No PN Positive	2.36	(0.73, 7.59)	p=0.15
		No PAN Examined	0.73	(0.35, 1.54)	p=0.41
		No PAN Positive	0.83	(0.32, 2.16)	p=0.70
Censored: 76%	Metropolitan Detroit				
Crude: Survival in Months = Race		Caucasian	1.43	(0.82, 2.50)	P=0.21
Model 1 Adjusted: Race, Age, SEER Summary Stage, Surgery, Radiation, Chemo, RLNE Examined, RLN Positive		Caucasian	1.63	(0.89, 2.98)	p=0.12
		Age = continuous	1.05	(1.02, 1.08)	p=0.0002
		Stage = continuous	1.31	(1.15, 1.49)	p<0.0001
		No surgery	0.62	(0.26, 1.48)	p=0.28
		No radiation	0.72	(0.39, 1.30)	p=0.27
		No chemo	1.00	(0.55, 1.84)	p=0.99
		No RLN Examined	0.39	(0.15, 1.01)	p=0.05
		No RLN Positive	1.88	(0.79, 4.48)	p=0.15
Model 2 Adjusted: Race, Age, SEER Summary Stage, Surgery, Radiation, Chemo, RLNE Examined, RLN Positive, Pelvic Nodes Examined, PN Positive, Para-aortic Node Examined, PAN Positive		Caucasian	1.62	(0.89, 3.07)	p=0.12
		Age = continuous	1.05	(1.02, 1.08)	p=0.0002
		Stage = continuous	1.31	(1.15, 1.49)	p<0.0001
		No surgery	0.61	(0.24, 1.55)	p=0.30
		No radiation	0.68	(0.37, 1.25)	p=0.21
		No chemo	0.98	(0.52, 1.86)	p=0.96
		No RLN Examined	0.45	(0.05, 4.08)	p=0.48
		No RLN Positive	0.06	(0.00, 12.64)	p=0.30
		No PN Examined	1.88	(0.20, 17.56)	p=0.58
		No PN Positive	28.75	(0.14, 6028)	p=0.22
		No PAN Examined	0.27	(0.11, 0.70)	p=0.01
		No PAN Positive	2.34	(0.67, 8.12)	p=0.18