

APPENDIX

The Influence of Social Determinants on Cancer Screening in a Medicaid Sample

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Supplemental Table 1. Definitions for Inclusion and Exclusion Criteria, and Cancer Screening Services.

Conditions	Definitions
A. Colorectal Cancer Screening	
Inclusion Criteria	Age between 50 and 75 years at beginning of study period (i.e. two years prior to study enrollment)
Exclusion Criteria*	History of a diagnosis of colorectal cancer (any of the following): 1. ICD-10 codes: C18.0-C18.9, C19, C20, C21.2, C21.8, C78.5, Z85.038, Z85.048 2. HCPCS codes: G0213, G0214, G0215, G0231
	History of total colectomy (any of the following): 1. CPT codes: 44150-44153, 44155-44158, 44210-44212 2. ICD-10-CM procedure codes: 0DTE0ZZ, 0DTE4ZZ, 0DTE7ZZ, 0DTE8ZZ
Colorectal Cancer Screening Services*	Any of the following CPT/HCPCS codes: 1. Colonoscopy: 44388-44394, 44397, 44401-44408, 45355, 45378-45393, 45398 2. Flexible Sigmoidoscopy: 45330-45335, 45337-45342, 45345-45347, 45349, 45350 3. FOBT: 82270, 82274, G0328 4. FIT: 81528 5. CT colonography: 74261-74263
B. Breast Cancer Screening	
Inclusion Criteria*	Female sex Age between 50 and 74 years at beginning of study period (i.e. two years prior to study enrollment)
Exclusion Criteria*	History of bilateral mastectomy (any of the following): 1. ICD-10 codes: Z90.13 or Z90.11(left) and Z90.12 (right) 2. ICD-10-CM procedure codes: 0HTV0ZZ or 0HTU0ZZ (left) and 0HTT0ZZ (right) 3. CPT codes: 19180, 19200, 19220, 19240, 19303-19307 with Modifiers bilateral (50, 09950) or tight (RT) and left (LT)
Mammogram Screening Services*	CPT/HCPCS codes: 77055-77057, 77061-77063, 77065-77067, G0202-G0204, G0206

Supplemental Table 1 Continued.

Conditions	Definitions
C. Cervical Cancer Screening	
Inclusion Criteria*	Female sex Age between 21 and 64 years at beginning of study period (i.e. two years prior to study enrollment)
Exclusion Criteria*	History of hysterectomy (any of the following): 1. ICD-10 codes: Q51.5, Z90.710, Z90.712 2. ICD-10-CM procedure codes: 0UTC0ZZ, 0UTC4ZZ, 0UTC7ZZ, 0UTC8ZZ 3. CPT codes: 51925, 56308, 57540, 57545, 57550, 57555, 57556, 58150, 58152, 58200, 58210, 58240, 58260, 58262, 58263, 58267, 58270, 58275, 58280, 58285, 58290-58294, 58548, 58550, 58552-58554, 58570-58573, 58951, 58953, 58954, 58956, 59135
Cervical Cancer Screening Services*	Cervical Cytology CPT/HCPCS codes: 88141-88143, 88147, 88148, 88150, 88152, 88153, 88154, 88164-88167, 88174, 88175, G0123, G0124, G0141, G0143-G0145, G0147, G0148, P3000, P3001, Q0091

*According to 2018 HEDIS guidelines.

Supplemental Table 2. Distribution Of Social Risk Group By Other Risk Factors For Breast and Cervical Cancer.

Risk Factors ^a	Social Risk Group				
	Overall	Group 1 (least risks)	Group 2	Group 3	Group 4 (Most risks)
A. Breast Cancer (N=1,156)					
Age ^b					
50-54 years old	530 (46%)	161 (46%)	107 (47%)	199 (43%)	63 (53%)
55-59 years old	450 (39%)	127 (36%)	84 (37%)	193 (42%)	46 (38%)
60 - 62 years old	176 (15%)	62 (18%)	36 (16%)	67 (15%)	11 (9%)
Medicaid Coverage During Study Period					
< 4 years	299 (26%)	84 (24%)	71 (31%)	113 (25%)	31 (26%)
4 years	857 (74%)	266 (76%)	156 (69%)	346 (75%)	89 (74%)
Regular Medical Provider					
No	114 (10%)	24 (7%)	29 (13%)	43 (9%)	18 (15%)
Yes	1037 (90%)	325 (93%)	197 (87%)	413 (90%)	102 (85%)
Adjusted Clinical Groups					
1st quartile (healthiest)	111 (10%)	48 (14%)	23 (10%)	35 (8%)	5 (4%)
2nd quartile	197 (17%)	79 (23%)	42 (19%)	62 (14%)	14 (12%)
3rd quartile	320 (28%)	111 (32%)	77 (34%)	106 (23%)	26 (22%)
4th quartile (sickest)	528 (46%)	112 (32%)	85 (37%)	256 (56%)	75 (63%)
Area Deprivation Index (ADI) ^c					
1st quartile	277 (24%)	104 (30%)	37 (16%)	106 (23%)	30 (25%)
2nd quartile	249 (22%)	63 (18%)	59 (26%)	100 (22%)	27 (23%)
3rd quartile	283 (24%)	87 (25%)	59 (26%)	106 (23%)	31 (26%)
4th quartile	283 (24%)	78 (22%)	58 (26%)	123 (27%)	24 (20%)

Supplemental Table 2 Continued.

	Social Risk Group				
	Overall	Group 1 (least risks)	Group 2	Group 3	Group 4 (Most risks)
B. Cervical Cancer (N=5,068)					
Age ^b					
21 - 29 years old	2018 (40%)	1162 (49%)	453 (38%)	299 (27%)	104 (28%)
30 - 39 years old	1179 (23%)	577 (24%)	315 (26%)	197 (18%)	90 (24%)
40 - 49 years old	793 (16%)	336 (14%)	208 (17%)	185 (17%)	64 (17%)
50 - 62 years old	1078 (21%)	321 (13%)	214 (18%)	429 (39%)	114 (31%)
Medicaid Coverage During Study Period					
< 4 years	1467 (29%)	683 (29%)	363 (31%)	300 (27%)	121 (33%)
4 years	3601 (71%)	1713 (71%)	827 (70%)	810 (73%)	251 (67%)
Regular Medical Provider					
No	884 (17%)	361 (15%)	228 (19%)	201 (18%)	94 (25%)
Yes	4165 (82%)	2030 (85%)	955 (80%)	905 (82%)	275 (74%)
Adjusted Clinical Groups					
1st quartile (healthiest)	1192 (24%)	720 (30%)	261 (22%)	169 (15%)	42 (11%)
2nd quartile	1380 (27%)	720 (30%)	348 (29%)	230 (21%)	82 (22%)
3rd quartile	1372 (27%)	626 (26%)	353 (30%)	303 (27%)	90 (24%)
4th quartile (sickest)	1124 (22%)	330 (14%)	228 (19%)	408 (37%)	158 (42%)
Area Deprivation Index (ADI) ^c					
1st quartile	1084 (21%)	569 (24%)	224 (19%)	215 (19%)	76 (20%)
2nd quartile	1144 (23%)	534 (22%)	264 (22%)	261 (24%)	85 (23%)
3rd quartile	1350 (27%)	622 (26%)	347 (29%)	274 (25%)	107 (29%)
4th quartile	1305 (26%)	599 (25%)	310 (26%)	309 (28%)	87 (23%)

^a Boldface indicates statistical significance ($p < 0.05$) between each risk factor and social risk Group.

^b Age measured 2 years prior to study enrollment.

^c The Area Deprivation Index (ADI) is missing on 4-6% of the sample.

Supplemental Figure 1. Baseline Social Determinants of Health Assessment

1. Which racial or ethnic group do you *most* identify with?
 African American (non-Hispanic) American Indian or Aleut Asian/Pacific Islanders
 Latino or Hispanic White (non-Hispanic) Other (specify _____)
2. What is your marital status?
 Married Single/never married Separated
 Divorced Unmarried couple Widowed
- 2a. Do you consider yourself: straight gay or lesbian bisexual other
3. What is the highest level of school or degree you have completed?
 Less than 9th grade 9th – 12th grade, **no diploma** 12th grade **with diploma**
 GED Vocational certificate Some college
 Associate's degree (AA, AS) Bachelor's degree (BA, BS) or higher
- 3a. Are you currently a student?
 Full-time student Part-time Student Not currently a student

4. At the place where you live, do you use a computer/laptop or smartphone to access the Internet?
 A) Computer/laptop/tablet Yes No B) Smartphone Yes No

5. Do you have a regular doctor that you see? (*annual physicals etc.*) Yes No

6. Do you, your family or a friend, own a car that you can use to go to the doctor? Yes No

7. Do you currently smoke tobacco on a daily basis, less than daily or not at all?
 Yes, daily Yes, less than daily No, not at all

8. In a typical week, how many drinks containing alcohol do you have? _____ drinks

9. Do you use any street drugs? (*not including marijuana*) Yes No Refuse/Don't know

10. How much of the time, during the **PAST MONTH**, have you... (*Check one box for each question, A – F*).

	All of the Time	Most of the Time	A Good Bit of the Time	Some of the Time	A Little of the Time	None of the Time
A. Been a very nervous person?						
B. Felt calm and peaceful?						
C. Felt downhearted and blue?						
D. Been a happy person?						
E. Felt so down in the dumps that nothing could cheer you up?						
F. Felt lonely or isolated from those around you						

11a. On average how many days per week do you do an activity that works up a sweat for at least 30 minutes? _____ days

12. Which do you usually eat more of: Meals cooked at Home OR Meals Out (Restaurant, fast-food, etc.)

13. Within the past 12 months, you worried whether your food would run out before you got money to buy more. How often is this true? Often true Sometimes true Never true

14. Within the past 12 months, the food you bought just didn't last and you didn't have money to buy more. How often is this true? Often true Sometimes true Never true

15. Within the past 12 months, has there been a time when you/your family have been unable to pay any of the following? Please check *all* that apply. **Gas**, electric or oil bill **Rent** or mortgage **Phone Bill** **N/A**

16. How many people live with you? (*not including you*) ___ ___ (less than 18) ___ ___ ___ (greater than/equal to 18)

16 a. Have you ever been in a relationship with someone who threatened or physically hurt you? Yes No

16 b. If yes, was it within the past two years? Yes No

17. What type of housing do you live in now?

- House Apartment Mobile home/trailer
- Single room Couch surfing Shelter/transitional housing
- Hotel or motel Homeless (**Skip to Q20**) Other (specify _____)

18. Do you presently have any of the following problems where you live now? Please check *all* that apply (**prompt**)

- No Rodents or bug infested Mold
- Overcrowded Plumbing problems/water leaks Broken/boarded up windows
- Inadequate heating Front door does not lock Other (specify _____)

20. How long have you been living at your present place?

- less than 6 months 6 – 12 months 1 – 2 years 2 – 4 years 5 or more years

21. Are you worried that in the next 2 months you may NOT have stable housing? Yes No

22. Are you working now?

- Working full-time (≥ 35 hours, 1 job) →
- Working full-time (≥ 35 hours, ≥ 2 jobs) →
- Working part-time (< 35 hours) →
- Not working

A) When did you last work for pay?

- < 6 months 6-12 months
- 1-2 years 2-4 years ≥ 5 years

A) Do you have any of the following problems at your current job? Please check *all* that apply. (prompt**)**

- No problems Difficulty getting to work
- Low Wages Don't get the support I need
- Want to work more hours Other (specify _____)
- No health insurance benefit No retirement benefit

B) How long have you been working at your current job? (*longest duration job*)

- < 6 months 6-12 months 1-2 years 2-4 years ≥ 5 years

23. Are you looking for work or new work?

- Yes
- No** →

A) Why not? Please check *all* that apply (prompt**)**

- Adequate income/ already employed Couldn't find work Ill health or disability
- Retired Can't arrange child care Transport problems
- Need training, schooling Other (specify _____)

23a. Have you ever spent time in jail or prison? Yes No b) If yes, was it within the past 2 years? Yes No

24. Do you presently receive money from any of the following sources? (Please check *all* that apply)

- SSDI** (Disability compensation/survivors benefits from Social Security) **Child** support
- SSI** (Supplemental Social Security for Aged, Blind and Disabled) **Unemployment** compensation
- Temporary** Assistance for Needy Families (**TANF**) **No**, none apply to me

25. Do you presently receive any of the following types of help? (Please check *all* that apply)

- Food** stamps (SNAP)? **Help** paying your utility bills (LIHEAP, discounted utility fees)?
- Temporary Help** paying your rent? (ERAP) (FRSP) **No**, none apply to me
- Housing (**Section 8 voucher/public housing/permanent supportive housing/targeted affordable housing**)
- Childcare assistance Emergency Shelter