Geospatial Analysis of Women with Cervical Pre-cancer in Davidson County, Tennessee, 2008– 2017

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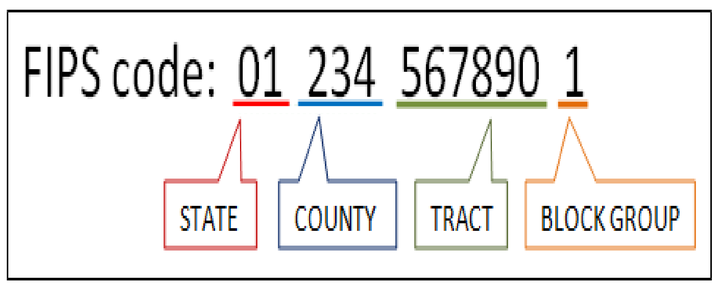
Introduction

- Moderate to high-grade cervical intraepithelial neoplasia (CIN2+ i.e. CIN grades 2, 2/3, 3 and adenocarcinoma in-situ (AIS)) are reportable conditions in Tennessee (TN).
- Information on new cases of CIN2+ is collected as part of public health surveillance.
- HPV-IMPACT, a collaborative multicenter population-based pre-cervical cancer/invasive cancer surveillance project gathers socio-demographic and clinical information on women diagnosed with CIN2+.
- **Objective:** To determine if age, race/ethnicity, insurance, diagnosis year, and area-level characteristics are associated with more advanced presentation of CIN2+ (CIN3 and AIS versus CIN2 and CIN2/3).

Methods

Population	Data	Outcome & Analysis

• Age ≥18 years
• CIN2+ diagnosis
• Year 2008-2017
• Davidson County, TN resident
	Individual-level characteristics
	• Age group
	• Race/ethnicity
	• Insurance
	• Diagnosis year
	
	Area-level characteristics
	• Patient addresses imported to IPUMS (Integrated Public Use Microdata Series) GeoMarker database to generate FIPS (Federal Information Processing Standards) codes
	
	• FIPS codes were linked to Davidson county census tract data to obtain the following proportions within each FIPS code:
	  • People living below poverty level
	  • Single woman households
	  • Adults who completed high school
		• Proportion of all pre-cancer that was CIN3 and AIS
		
		• Compared women with CIN3 and AIS vs other pre-cancer using multivariable logistic regression



Figure[1]: Breakdown of a Federal Information Processing Standards (FIPS) code
[1] https://www.policymap.com/2012/08/tips-on-fips-a-quick-guide-to-geographic-place-codes-part-iii/

Results

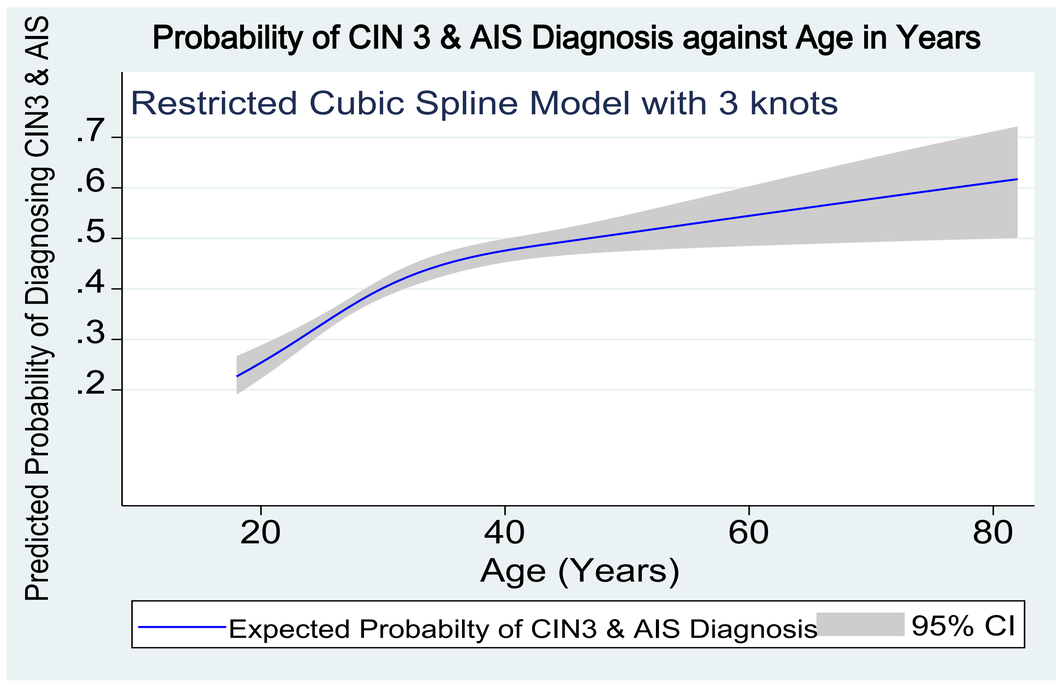
Patient and Area-level characteristics by cervical precancer (CIN3&AIS vs. CIN2&CIN2/3

	CIN3 & AIS N=1,607 (%)	CIN2 & CIN2/3 N=2,491 (%)
Mean Age (Years) ± SD	33 ± 10	30 ± 9
Race		
White	964 (60)	1,390 (56)
Black	344 (21)	638 (26)
Hispanic	129 (8)	172 (7)
Other/Unknown[b]	170 (11)	291 (12)
Insurance		
Private	780 (49)	1,390 (56)
Public	603 (38)	839 (34)
Uninsured	46 (3)	57 (2)
Unknown	178 (11)	205 (8)
Area-level Characteristics[a] (Mean % ± SD)		
Living below poverty level	19 ± 13	19 ± 13
Single woman household	28 ± 16	28 ± 16
Education level	87 ± 9	87 ± 9

Association between patient and area-level characteristic and pre-cancer (CIN3&AIS vs. CIN2&CIN2/3

Characteristic	Odds Ratio[c]	95% Confidence Interval		p-value
		Lower	Upper	
Age (as a continuous variable)	1.70	1.52	1.90	<.001
Year (reference year = 2008)	0.93	0.84	1.04	0.2
Area-Level Characteristics[a]				
Living below Poverty level (Median =17%)	1.11	0.94	1.31	0.23
Single woman household (Median =24%)	1.00	0.86	1.16	0.96
Education level (Median =88%)	1.13	0.96	1.33	0.15
Race/Ethnicity				
White (reference)	1.00			
Black	0.70	0.60	0.82	<.001
Hispanic	0.92	0.73	1.17	
Other/Unknown[b]	0.79	0.64	0.98	
Insurance				
Private (reference)	1.00			
Public	1.41	1.19	1.66	<.001
Uninsured	1.40	0.98	1.99	
Unknown	1.46	1.16	1.84	

[a] Proportion of population living below poverty level, with single woman households, and adults who completed high school
[b] Includes: Asian, American Indian/Alaskan Native, Native Hawaiian or Other Pacific Islander, Mixed race, and Unknown
[c] Adjusted Odds Ratios



Limitations

- Low grade neoplasia (CIN1) and invasive cervical cancer events were not evaluated in this study.
- There may be little difference in patient factors within the CIN2+ spectrum.
- The study is limited to Davidson county, TN, residents and thus not generalizable to population groups elsewhere.

Conclusions

- The proportion of women with CIN3 and AIS was significantly associated with increasing age, race/ethnicity, and insurance.
- White race, older age, and public insurance were associated with a higher odds of CIN3 and AIS.
- Overall, the proportion of women with pre-cancer presenting with more advanced CIN2+ was not associated with diagnosis year or area-level characteristics.

Acknowledgements

- The authors would like to acknowledge and thank Martin Whiteside (Tennessee Cancer Registry), Julia Gargano, and Lauri Markowitz (Centers for Disease Control and Prevention National Center for STD Prevention) for their guidance and support of the TN HPV-IMPACT study.
- This project was funded through Emerging Infections Cooperative Agreement 5U01C10003 and received a Non-Research determination by Vanderbilt Human Research Protection Program under 45 CFR 164.512.

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