

Distribution of overall and top four cancers in Washington DC: A spatial analysis using 2016 incidence data

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Introduction

- There is growing evidence linking social and environmental determinants with cancer disparities.
- Studies show spatial differences in cancer rates at national and state levels; an overlap in social and environmental determinants of cancer, specifically in District of Columbia (DC), need further exploration using most current data.
- To better understand cancer health disparities for targeted cancer prevention efforts, up-to-date geographic information about cancer among DC residents is needed.

Aims

- To examine spatial variations in the incidence of overall and top four cancers across the District of Columbia.

Methods

Data Source, Study Design, and Sample

- **Data Source:** 2016 cancer incidence data from District of Columbia Cancer Registry (DCCR)
- **Study Design:** Cross-sectional
- **Sample Size:** 2889 incident cancer cases

Measures and associated definitions

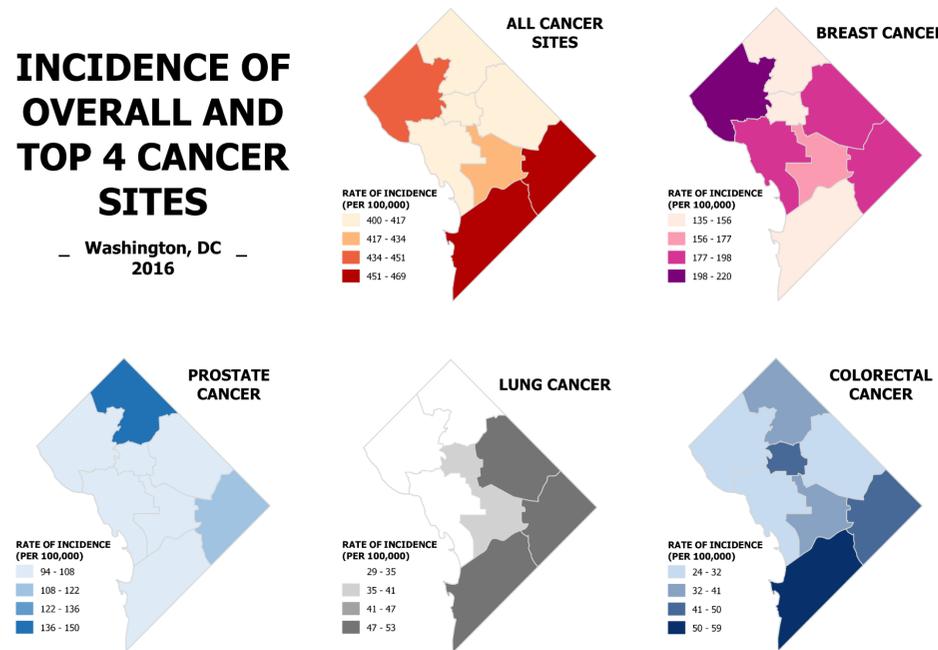
- **Primary Outcomes, per ICD-O-3 codes:**
 - Overall cancer incidence in DC (all newly diagnosed cancers)
 - Top four cancers in 2016
 1. Breast cancer (C50.0-C50.9)
 2. Prostate cancer (C61.9)
 3. Lung & bronchus cancer (C34.0-C34.9)
 4. Colon & rectum cancer (C18.0-C20.9)
- **Main Independent Variable:** Ward (land parcel decimation of eight, approximately equal population regions in DC)

Statistical Analyses

- Age-adjusted incidence rates (AIR) (per 100,000 persons, 2000 US Standard Population using 19 age groups with 95% Confidence Intervals) were computed for each outcome by ward
- MAR Geocoder, SAS version 9.4, QGIS 2.18 were used for data management and data analysis activities

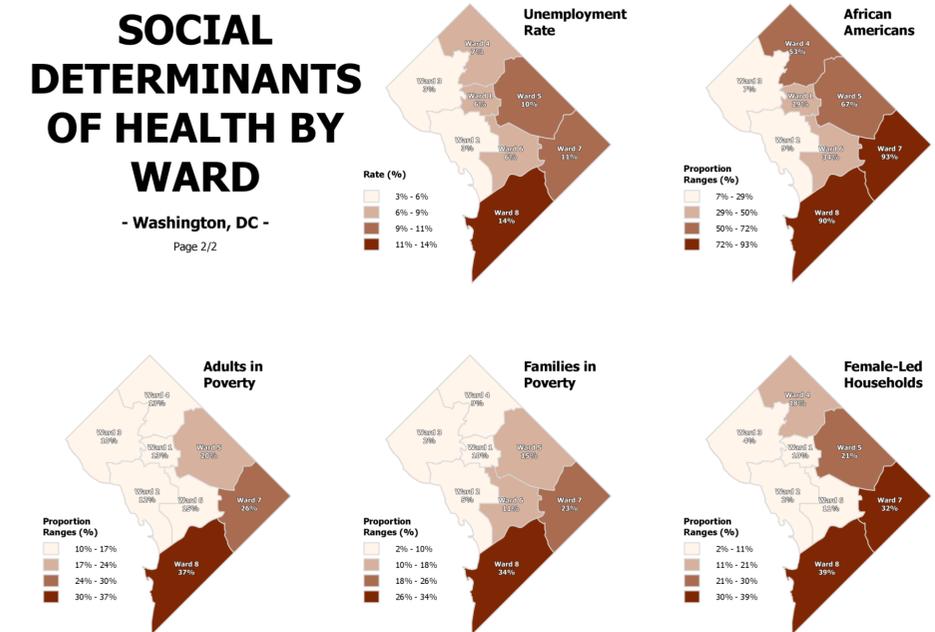
Results

Figure I: Spatial distribution of age-adjusted incidence rates for all and top four cancer in the District of Columbia



Source: District of Columbia Cancer Registry (DCCR)

Figure II: Spatial distribution of key social determinants of health in the District of Columbia



Source: unemployment, families in poverty – District of Columbia, Office of Planning; all other indicators – U.S. Census Bureau, American Community Survey

Conclusions

Summary of key finding:

- Overall cancer incidence was highest in Wards 7 and 8.
- Breast cancer incidence was highest in Wards 2 and 3.
- Prostate cancer incidence was highest in Wards 4 and 7.
- Lung & bronchus cancer incidence was highest in Wards 7 and 8.
- Colon & rectum cancer incidence was highest in Wards 7 and 8.
- Notably, cancer burden tends to be higher in Wards with greater economic disadvantage and higher proportion of non-Hispanic Blacks.

Implications

- Socioeconomic differences across wards, such as poverty, may partially explain ward differences in cancer incidence. Prior research identifies discriminatory housing policies, such as residential segregation, as a root cause of spatial differences in ethnic/racial density and health disparities. Future studies should aim to explore cancer disparities in light of historical antecedents of ward-level racial distributions.
- Cancer control and prevention efforts should consider these complex array of interacting structural factors for policies or programs addressing cancer incidence. Future research should investigate further differences in risk and protective factors, such as behaviors and social capital, across Wards.

Limitations

- Approximately 2.4% (~69) of cancer data failed manual geocoding, which represents an underestimation of true cancer burden across wards.
- Zoning effects (i.e. level of aggregation) pose a challenge in interpretation, and our cross-sectional study design prohibits any causal inference.

Strengths

- This analysis generates new hypotheses for the strategic development of priority Wards in DC for cancer prevention and control efforts.
- Almost all DC cancer incidents are captured in the data used for analysis (specifically, 91.2% of expected cases as defined by CDC).

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