**Cancer incidence and mortality in Northeast Ohio: a comparative regional profile and potential preventive health opportunities**

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**Objectives:** The diverse nature of population in Northeast Ohio warrants consideration of variations in the region’s cancer prevalence. We conducted a preliminary epidemiological study to better understanding the incidence and mortality of major cancers in Northeast Ohio (with comparison to the Ohio state and to the U.S.). We sought to identify counties in the region where greater public health initiatives in cancer prevention may be warranted, namely where the following preventable cancers (those that can be averted through lifestyle modifications or early diagnosis and management) have the most potential of diminished incidence with appropriate public health efforts: breast, cervical, colon and rectum, prostate, testicular. To our knowledge, this is the first study that reports the epidemiology of cancer in Northeast Ohio as an entire region.

**ABSTRACT**

**Introduction:** While Ohio state-wide data of cancer incidence and mortality is available through publicly-accessible databases, no reports have examined the incidence and mortality in Northeast Ohio as a region. Regional epidemiological data within Ohio suggest variances in cancer incidence. For instance, incidence and mortality of cervical cancer are reported to be significantly greater in Appalachia Ohio, a region of 32 counties (5 of which are in Northeast Ohio). Knowledge of cancer predominance in certain counties can help direct public health efforts to decrease cancer burden in Northeast Ohio.

**Methods:** Epidemiological data was obtained from the *Healthy Ohio* reports, 2015 Ohio Department of Health reports, and 2017 county-specific reports from the Ohio Department of Health. County-specific reports were individually analyzed and compared across all counties of the region. Data on prevalence of cancer risk factors (i.e. obesity and smoking) amenable for risk stratification were analyzed to determine areas of targeted prevention. Northeast Ohio was defined as comprising 18 counties (Ashland, Ashtabula, Columbiana, Cuyahoga, Erie, Geauga, Huron, Lake, Lorain, Mahoning, Medina, Portage, Richland, Stark, Summit, Trumbull, Tuscarawas, Wayne). County-specific profiles on cancer incidence, mortality, and risk factors were created using aggregate data (age-adjusted figures) from the database reports. To identify areas of targeted prevention, two sets of data were assessed for cancers that are often preventable based on stage of diagnosis (breast cancer, cervical cancer, and colon & rectal cancer) per county: 1) stage of diagnosis 2) mortality rates. Prevalence of cancer risk factors per county were also considered and identified as the following: 1) Current smoker 2) Obesity 3) Physical inactivity. Counties with concerning patterns in high late stage of diagnosis and high mortality rates for preventable cancers were identified as “high priority” for public health efforts.

**Results:** Northeast Ohio has slightly less average yearly incidence and mortality of invasive cancer compared to Ohio as a state, but higher incidence and mortality than the national U.S. average (based on 2010-2014 rates). The highest number of cancer deaths occur in the Ashtabula and Trumbull counties. The following counties have both higher percentage of late-stage diagnosis of new cases and greater mortality rates than the Ohio average, per cancer type: CERVICAL (Huron, Cuyahoga, Erie, Lorain, Mahoning), PROSTATE (Geauga, Huron), COLON AND RECTUM (Ashland, Ashtabula, Lorain), BREAST (Cuyahoga, Erie, Richland). Northeast Ohio showed a relatively lower incidence of cervical cancer per 100,000 females in 1996-2006 compared to Ohio. However, in 2009-2013, 12 out of the 18 counties in Northeast Ohio had a higher late stage diagnosis of cervical cancer compared to the Ohio stage average. In terms of cancer risk factors, six counties had higher rates of both obesity and physical inactivity than Ohio in 2013: Trumbull, Richland, Erie, Columbiana, Ashtabula, Huron. Among the 18 Northeast Ohio counties, only Ashtabula has a higher adult smoker percentage than the Ohio average in 2015.

**Discussion:** Public health efforts should especially target counties such as Ashtabula and Trumbull, which see high rate of cancers compared to the rest of Northeast Ohio. Counties with high rates of late-stage diagnosis of the preventable cancers may especially benefit from campaigns that promote screening, early diagnosis, and lifestyle modification. Our study is a preliminary pilot investigation of cancer epidemiology in Northeast Ohio that provides a snapshot of current trends in cancer onset and mortality in the region. Further research is needed with more robust studies that examine regional behavioral facets and environmental factors to elucidate any underlying factors accounting for demographic variability of cancer incidence in Northeast Ohio. The results may help guide public health initiatives to decrease cancer incidence and mortality in the region.

**Conflict of interest:** The authors have no conflict of interest to declare.