Cancer Cluster Investigation– Grainger County

Sylvie Muhimpundu; Martin Whiteside, PhD
Tennessee Cancer Registry - Tennessee Department of Health
MPH Program - Vanderbilt University

Introduction

Cancer is the second leading cause of death in both the United States and Tennessee(TN). TN ranks 16th highest in cancer incidence and 6th highest in cancer deaths among all U.S. states and the District of Columbia for the diagnosis period; therefore, cancer is far too common in TN.

The Office of Cancer Surveillance was established to track cancer, as well as increase the awareness of cancer in TN. The TN Cancer Registry (TCR) collects nearly 100% of expected new cancer cases diagnosed among TN residents each year.

The TCR periodically receives calls and correspondence from residents regarding apparent excesses of cancer observed in their community. Using the collected information on cancer patients, the TCR performs cancer cluster investigations.

Objectives

- **Learn all aspects of performing a cancer cluster investigation.**
- **Learn the basic operations of a cancer registry and how these principles could be applied to underserved areas of the world.**
- **Learn how to use Geographic Information Systems (GIS) technology and its application to a cancer cluster investigation.**
- **Complete a report of findings using both quantitative and qualitative data collected during the cluster investigation.**

Methods and Materials

Gather
- TCR receives an inquiry from a concerned Grainger resident
- Gather identifying info and potential source of contaminants in the neighborhood

Assess
- Extract cancer cases, 2009-2014, for Grainger and Unicoi
- Perform a Chi-square analysis per county and census tract
- Stratify cancer cases per type
- Perform a Chi-square analysis per cancer type
- Calculate age-adjusted rates per county/census tract per cancer type and p –values
- Hot spot analysis

Conclude & Report
- Determine if there is a statistically significant excess of cancer
- Prepare a report and respond to the resident

Results

- **1261 cancer cases in Grainger County and 1096 in Unicoi County**
- **p-value for chi-square of Unicoi compare to Grainger cancer rate is 43.9 (41.5, 46.3) and 41.7(39.2, 44.2) for Unicoi, the rate difference p value was 0.3**

Table 1. Age-adjusted rates

	500100	500200	500300	500401	500402	Grainger	Unicoi	Rate Diff (%)	p-value
All cancer	404.2	499.1	420.8	484.4	443.1	439.1	417.2	0.22	0.27
Cervix Uteri	0.0	21.2	3.4	5.6	4.8	6.3	3.4	0.029	0.2
Kidney & Renal Pelvis	20.1	29.8	20.2	17.1	19.9	21.2	13.4	0.08	0.054
Liver & Intrahepatic Bile Duct	1.8	14	5.9	2.1	1.9	5.5	6.1	0.063	0.4
Miscellaneous	12.9	45.3	11.9	10.2	28.2	21.4	16.0	0.053	0.22
Myeloma	0.0	10.1	3.1	6.9	5.6	4.8	6.3	0.15	0.046
Prostate	89.5	147.2	85.4	80.8	121.2	50	81.7	3.17	1E-04
Thyroid	17.6	12.3	13.3	10.7	12.6	13.3	13.1	0.0014	0.97
Urinary Bladder	124.6	37.4	15.4	31.3	14.2	20.6	17.2	0.033	0.45

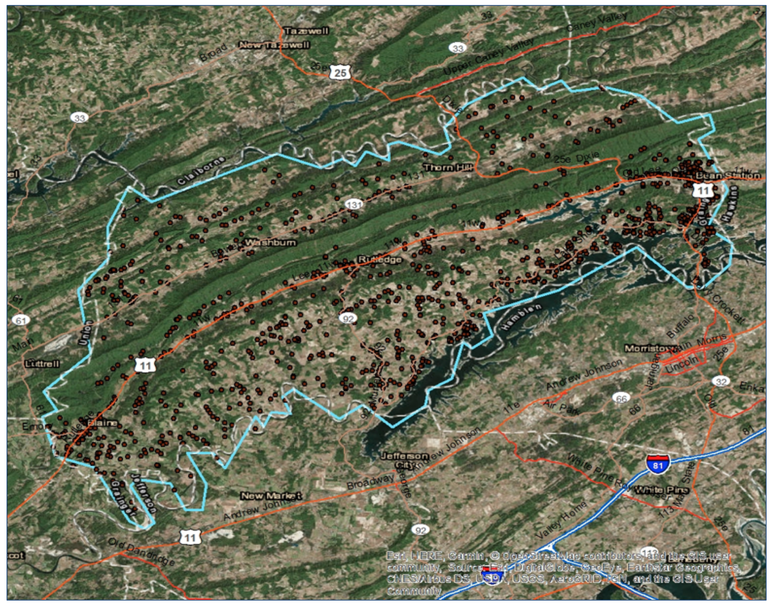

Figure 1. All types of cancer, Grainger County. 2009 - 20014.

Discussion

- **There did not appear to be an increased risk of cancer in persons living in Grainger County.**
- **Grainger County residents had an overall lower age-adjusted cancer rate than the statewide rate and higher than the comparison county, p-value is insignificant.**
- **The observed number of cases in Grainger County/census tract of interest, 500200, was not significantly above the expected number calculated using the chi-square distribution.**

Conclusions

- **Much of the observed cancer disparity in Tennessee compared to the U.S. states is likely explained by poor lifestyle habits rather than environmental contaminants, like smoking and a poor diet.**
- **Efforts should be put in educating Tennesseans about cancer preventive measures.**
- **Cancer registries (CR) are very important for cancer control and epidemiological research, public health program planning, and patient care improvement.**
- **All countries should plan and establish CRs, it can be simple.**

Contact

Sylvie Muhimpundu
Vanderbilt University
sylvie.muhimpundu@vanderbilt.edu

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