Oklahoma State Department of Health
Creating a State of Health

Summary Report of cancer incidence within Cleveland County, 1997-2013

Background:

This report is in response to a request from the City of Norman regarding concerns about elevated stomach cancer incidence in Cleveland County due to potential high levels of hexavalent chromium in drinking water. The Oklahoma Central Cancer Registry (OCCR) conducts these types of investigations of suspected cancer clusters upon request. The OCCR collects information on all reported cases of cancer diagnosed or treated among Oklahoma residents. Currently, there are seventeen years of complete data available for analysis: diagnosis years 1997-2013. This data can be used to determine if cancer is occurring at an unusually high rate in certain geographical areas throughout the state. This data cannot determine an increase in risk or assess exposure to a substance.

Methods

Four different populations were reviewed: Cleveland County, Oklahoma State, Tulsa County and five counties in central Oklahoma combined which included Cleveland, Lincoln, Logan, Oklahoma and Pottawatomie. In an assessment of cancer rates, the population of interest is compared to the state rate as the reference group. Since the drinking water in Cleveland County specifically the Garber Wellington aquifer is also the same source of water for surrounding counties Lincoln, Logan, Oklahoma, and Pottawatomie were also compared as reference groups. Tulsa County rates were included in this particular review as a reference group with a similar metropolitan population.

Age-adjusted incidence rates were calculated for Oklahoma residents diagnosed with stomach cancer between 1997 and 2013. Incidence is defined as the number of newly diagnosed cases in a population during a specific time period. These incidence rates are calculated as the number of cases per 100,000 persons. Age-adjustment helps account for variations in age distribution in the population and allows for comparison of rates in different populations.

Ninety-five percent confidence intervals (CI) were calculated for the age-adjusted stomach cancer incidence rates. CI is the range in which we are 95% confident that the real incidence rate occurs. The CI calculated around the age-adjusted stomach cancer incidence rate is used to determine how likely it is that the number of observed number of cases is high or low by chance.

Limitations of this investigation include the number of cancer cases being dependent on the accurate and timely cancer cases reporting from Oklahoma health care facilities to the OCCR.

Results

Table 1- Age-adjusted stomach cancer incidence rates, OCCR 1997-2013

	Observed # of cases	Age adjusted Incidence rate per 100,000 population	95% Confidence Interval
Cleveland County	181	5.4	(4.6-6.2)
Five County	999	5.8	(5.4-6.2)
Tulsa County	548	5.7	(5.2-6.2)
Oklahoma State	3591	5.5	(5.3-5.7)

Age-adjusted incidence rates were calculated for stomach cancer for Cleveland County, Five County (Cleveland, Logan, Lincoln, Oklahoma, and Pottawatomie), Tulsa County and state of Oklahoma. The incidence rates for Cleveland County and Five County are not elevated in comparison with Tulsa County (Table 1). The confidence intervals for Cleveland County rate are slightly wider because of the smaller number of cases in the county. There were no statistically significant differences between the Cleveland County and Five County with Tulsa County and Oklahoma State for stomach cancer based upon the review of their confidence intervals. These results suggest that there is no cluster of cancer, and further investigation into the situation is not warranted at this time.

References

1. Centers for Disease Control and Prevention (CDC), Division of Toxicology and Human Health Sciences, Agency for Toxic Substances and Disease Registry. (September 28, 2016). *Chromium-ToxFAQs*. Retrieved from https://www.atsdr.cdc.gov/toxfaqs/tfacts7.pdf
2. International Agency for Research on Cancer (IARC) Monographs on the Evaluation of Carcinogenic Risks to Humans. (2012). *Volume 100C. Arsenic, Metals, Fibres, and Dusts.* Lyon: IARC