

Investigation Summary Report

Wilms Tumor Cluster

St. Clair County Health Department

July 2012

SUMMARY

The St. Clair County Health Department (SCCHD), with support from the Michigan Department of Community Health (MDCH), is investigating concerns about the number of Wilms tumor cancer cases in St. Clair County, Michigan. Presented here is a summary of the findings of the investigation to date.

I. Background

In 2009, a diagnosis of Wilms tumor, a rare type of kidney cancer, in a young child was reported to the SCCHD. Shortly thereafter, a local newspaper reported that three children in the Marine City area in St. Clair County had been diagnosed with Wilms tumor since 2007. An initial assessment by the MDCH determined that too few cases had been reported to indicate whether or not the rate of the disease was elevated. In 2011, SCCHD was contacted about another case of Wilms tumor in the county. A follow-up inquiry revealed two other cases in St. Clair County and a third in a city that spans both St. Clair and Macomb counties. These new cases caused considerable attention from the public and the media, and concern from community members.

2. Wilms Tumor Case Finding and Surveillance

SCCHD interviewed family contacts to confirm addresses and dates of diagnoses. The team also confirmed that an increase in the number of cases had not been observed in a neighboring jurisdiction in Canada. In addition, the SCCHD team reviewed the literature for any suggestions about a common and consistent exposure.

At the request of SCCHD, MDCH cancer surveillance staff used data from the Michigan Cancer Registry to determine the number of cases of Wilms tumor in St. Clair County and whether the number of Wilms tumor cases in St. Clair County was different than the number expected if county residents had the same cancer experience as the rest of Michigan. We looked at the Wilms tumor experience first among all age groups and then among children younger than 5 years. Nationally, children younger than 5 years comprise the age group in which most of the Wilms tumors occur.

3. Methods

We used the Michigan Cancer Registry data to determine the number of physician-diagnosed cases of Wilms tumor in St. Clair County between 1990 and 2009. Wilms tumor was defined by ICD- 10 code 189 (malignant neoplasm of kidney and other unspecified urinary organs). Cancer registry data for Michigan and St. Clair County was considered complete through 2009.

We calculated a standardized incidence ratio (SIR) to determine whether or not there was an excessive cancer incidence in St. Clair County. This technique allows us to compare the cancer experience of St. Clair County with that of a comparison population. In this case we used the rest of Michigan as the comparison population. This method also allows us to account for age and sex differences between St. Clair County and the comparison population.

The population under investigation, St. Clair County, supplied the “observed” number of cancers. We calculated the expected numbers of cases by applying the age- and sex-specific Wilms tumor incidence rates for Michigan, minus St. Clair County residents, to the age- and sex-specific population estimates of St. Clair County. Age was restricted to younger than 5 years for both observed and expected numbers of cases when calculating the SIR for this group. For state and county populations, we used annual intercensal estimates produced by the state demographer's office.

4. Results

From the Michigan Cancer Registry, we identified 11 cases of Wilms tumor in St. Clair County between 1990 and 2009, seven of which were diagnosed in children younger than 5 years. Two of the seven cases in children younger than 5 years were diagnosed between 1990 and 1999, and five were diagnosed between 2000 and 2009. Three Wilms tumor cases occurred in St. Clair County between 1990 and 1999, and eight occurred between 2000 and 2009. During both periods (1990 to 1999 and 2000 to 2009), most of the cases (67% and 63%, respectively) occurred in children younger than 5 years, the age when most cases of Wilms tumor are diagnosed.

When comparing St. Clair County observed-to-expected numbers of Wilms tumor cases for persons of all ages between 2000 and 2009 the SIR was 2.86 (1.45-5.25). The numbers in brackets are the confidence intervals. If the confidence interval contains 1, the SIR is not significant. Since the confidence interval did not contain 1, the SIR was significant. This is reflected in the p value which was also significant at the $p < .05$ level. Therefore, the occurrence of new Wilms tumor cases in St. Clair County was nearly three times higher than expected based on

the incidence rate of the rest of Michigan. Between 1990 and 1999 for all age groups and for children younger than 5 years the SIRs were .97 and .91, respectively, and neither was statistically significant.

The p-value of $< .05$ means that if we determined SIRs for Wilms tumor cases in 100 similar counties, and if the cases were occurring at similar comparison rates, we should expect to find fewer than five counties with a statistically significant elevation (at the .05 level) of its SIR for Wilms tumor. In other words, we expect to find a significant association in less than 5% of the counties examined. That the SIR showed a statistically significant elevation does not prove a causal link between the Wilms cancer cases and something in the environment in St. Clair County.

The SIR between 2000 and 2009 for children younger than 5 years was 2.63 (0.99-5.42) and was not statistically significant since the confidence interval included 1, even though the number of Wilms tumor cases in St. Clair County in this age group was about two and a half times greater than that of other Michigan children in the same age group.

5. Conclusions and Next Steps

The MDCH Cancer Registry confirmed a statistically excessive number of Wilms tumor in St. Clair County between 2000 and 2009 for all age groups. However, this excess was not confirmed in a separate analysis of children younger than 5 years. The cancer registry will continue to monitor the incidence of Wilms tumor in St. Clair County and provide any updates to SCCHD. To improve the timeliness of surveillance data and identification of new Wilms tumor cases, MDCH cancer surveillance is currently working with SCCHD to accelerate Wilms tumor case findings.

Despite a significant amount of research on risk factors for Wilm's tumor, there are few consistent results. Age of less than 2 years old is a risk factor as is gender with girls having a higher incidence than boys. A small proportion of cases appear to be heritable (1-3%), especially those occurring with bilateral tumors or in conjunction with a variety of inherited syndromes and birth defects. Other risk factors that have been reported in studies on Wilms tumor but not confirmed in subsequent studies include occupation of father (welder or mechanic), high birth weight, and maternal consumption of coffee and tea and use of hair dye or various medications.

The SCCHD continues to provide support for families of children with Wilms tumor. They have begun a study to obtain more in-depth information regarding the families and children with Wilms tumor. Questionnaires have been developed

concerning demographics, pregnancy, pregnancy outcomes including infant health, health of parents and child, maternal medications, maternal and paternal exposures, including pesticides and occupation. The SCCHD is also discussing future collaborations with the University of Michigan. MDCH has hired a cancer-cluster investigator who has been helping the SCCHD develop and design their questionnaire-based study.