

# CHILDHOOD CANCER IN EASTERN SANDUSKY COUNTY, 1996-2010: A PROFILE OF 21 CASES

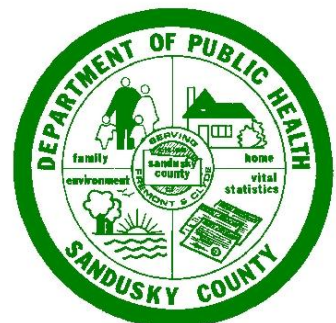
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**Sandusky County Health Department**

*And*

**Comprehensive Cancer Control Program  
Bureau of Health Promotion and Risk Reduction  
Ohio Department of Health**

**FINAL REPORT  
May 26, 2011**



## EXECUTIVE SUMMARY

### Background

- The Sandusky County Health Department (SCHD) and the Ohio Department of Health (ODH) completed an analysis of cancer incidence among residents aged 0-19 years of the city of Clyde and Green Creek Township for the years 1996-2006. This analysis revealed a higher than expected number of childhood cancers for the 11-year time period 1996-2006 (10 cases observed, 5.32 expected). Cancers of the brain and other central nervous system were found to be significantly higher than the number of expected cases (4 cases observed, 0.92 expected).
- A 2007 profile of 14 children with cancer using an instrument developed by the ODH – *Cancer Risk Factor Questionnaire for Cases 19 Years of Age and Younger* – did not reveal any common factors among the 14 children that participated in the profile.
- In 2009 the ODH, in partnership with the Comprehensive Cancer Center and James Cancer Hospital and Solove Research Institute at Ohio State University, conducted a spatial (geographic) analysis of the residential addresses at diagnosis of children with cancer in Sandusky County and the surrounding area for the years 1996-2006. The results indicated a cluster of 31 children with cancer in Sandusky County that included Clyde, Green Creek Township, and most of Fremont. This cluster had a radius of 6.7 miles and a p-value of less than 0.05, indicating statistical significance, i.e. this clustering could have occurred by chance alone less than five times out of 100.
- There were no new diagnoses of children with cancer in the eastern Sandusky County cluster area reported to the SCHD during 2007. However, there were two new diagnoses in 2008, another in 2009, and another in 2010 reported to the SCHD. The SCHD verified the diagnoses through physician consultation and medical record review. Thus, there was a total of 35 known children with verified cancer among residents 19 years and younger in the eastern Sandusky County cluster area diagnosed during the years 1996-2010.
- Consultation with the parents of the children with cancer, SCHD, and the Ohio Environmental Protection Agency (EPA) resulted in a decision to expand the 2007 profile to all 35 households of children with cancer.
- It was also decided that it would be advantageous to include more questions pursuing possible environmental exposures in the interview instrument. A supplemental questionnaire – *Supplemental Environmental Cancer Risk Factor Questionnaire for Cancer Cases 19 Years of Age and Younger* – was developed for the expanded profile.

## **Known and Suspect Risk Factors for Childhood Cancer: A Brief Review**

- The causes and risk factors for childhood cancer are largely unknown.
- Extensive exposure to ionizing radiation and some chemicals, e.g. benzene, increase the risk of developing some types of childhood cancers.
- Several inherited genetic syndromes, e.g. Li-Fraumeni, and acquired conditions, e.g. aplastic anemia, increase the risk of developing some types of childhood cancer.
- Viruses that are thought to increase childhood cancer risk include the Epstein-Barr and the human lymphotropic viruses I and II.

## **Objective**

The objective of this profile of cases in this “cluster” of childhood cancer in eastern Sandusky County was to identify factors that may have contributed to the increased burden. It needs to be understood that the nature of such a profile does not provide sufficient information to determine individual cause and effect.

## **Methods**

- The SCHED attempted to contact the parents of the 35 children with cancer to invite them to participate in the profile. Twenty-one (60%) agreed to participate. The remaining 14 households either declined to participate or the SCHED was unable to establish contact.
- The parents were interviewed using two instruments: (1) *Cancer Risk Factor Questionnaire for Cases 19 Years of Age and Younger* and, (2) *Supplemental Environmental Risk Factor Questionnaire for Cases 19 Years of Age and Younger*. The *Supplemental* questionnaire was administered to the households that participated in the first profile and both instruments were administered to the households in the expanded area.
- All interviews were conducted by SCHED Environmental Health and Nursing staff.

## **Results**

- The 21 participating children had cancers consisting of malignancies of the brain and other central nervous system (n=7), leukemia (n=3), Hodgkin’s lymphoma (n=2), melanoma of the skin (n=2), rhabdomyosarcoma (n=3), Ewing’s sarcoma (n=1), thyroid cancer (n=1), osteosarcoma (n=1), and cancer of the pancreas (n=1). The age at diagnosis ranged from less than one year to 19 years of age. The mean age at diagnosis was 10 years.
- All 21 children with cancer had at least one blood relative that reportedly was diagnosed with some type of cancer. There were a total of 76 blood relatives with cancer for the 21 children with a mean of 3.6 per case. Five (24%) of these reported histories included the same type of cancer as the child.

- An extensive review of possible environmental exposures did not reveal any exposures that were common to the children with cancer.

### **Conclusion**

- There were no exposures or variables that were common to the 21 children with cancer who participated in this profile.

### **Recommendations**

- Share the results of this profile with the parents of the children with cancer.
- Post this profile on the SCHED and ODH Web sites.

## **INTRODUCTION**

### **A. Background**

#### **1. 2007 Epidemiologic Assessment**

- The Sandusky County Health Department (SCHED) and the Ohio Department of Health (ODH) completed an analysis of cancer incidence among childhood residents aged 0-19 years of the city of Clyde and Green Creek Township for the years 1996-2006 and 2002-2006 in April 2007.<sup>1</sup> This analysis revealed a higher than expected number of childhood cancers for the 11-year time period 1996-2006 (10 cases observed, 5.32 expected, standardized incidence ratio [SIR] of 1.88 with 95% confidence interval [CI] of 0.90 -3.45). For the more recent years of 2002-2006, there were eight new diagnoses of cancer among residents 19 years and younger when only 2.47 would be expected, (SIR=3.24, 95% CI of 1.40-6.38). Cancers of the brain and other central nervous system [CNS] were found to be the most frequent type. Four diagnoses of brain and CNS cancer were observed which were significantly higher than the 0.92 expected (SIR=4.35, 95% CI of 1.18-11.13) based on national data.

#### **2. 2007 Profile**

- In April 2007 a discussion of the 2007 epidemiologic assessment with the families of the children diagnosed with cancer resulted in a decision to profile the cases and attempt to identify factors that the children may have in common.<sup>2</sup> It was also decided that the profile would include not only the 10 children that were diagnosed among Clyde and Green Creek Township residents but also include eight cases of childhood cancer diagnosed among residents of nearby Riley, Townsend, and York Townships during the years 1996-2006.<sup>1,2</sup>
- The SCHED sent letters to the parents of the 18 children with cancer inviting them to participate in the profile.<sup>2</sup> Fourteen (78%) of the 18 families agreed to participate in the 2007 profile.
- The parents were interviewed using an instrument developed by the ODH - *Cancer Risk Factor Questionnaire for Cases 19 Years of Age and Younger* – for childhood/young adult

cancer profiles such as this.<sup>3</sup> The questionnaire addresses a variety of topics including: personal and family medical and employment and residential histories; possible exposures to chemicals, radiation, and other environmental agents; home and workplace environments; and personal health behaviors such as tobacco use. All interviews were conducted by SCHED environmental health and nursing staff.

- The 2007 profile did not reveal any common factors among the 14 children that participated in the profile.

### **3. 2009 Spatial Analysis**

- As a follow-up to the 2007 epidemiologic assessment and the 2007 profile, the ODH, in partnership with the Comprehensive Cancer Center and James Cancer Hospital and Solove Research Institute at The Ohio State University, conducted a spatial (geographic) analysis of the residential addresses at diagnosis of the children with cancer in Sandusky County and the surrounding area for the years 1996-2006.<sup>4</sup> There were two primary objectives of this analysis: (1) To determine the geographic regions in Sandusky County and the surrounding area where the most likely clusters of cancer among children have occurred; and, (2) To determine the probability (p-value), or likelihood, that the cluster occurred by chance. A p-value of less than 0.05 was considered statistically significant, i.e. the cluster could have occurred by chance alone less than five times out of a 100.
- The analysis used the exact longitude and latitude of the child's residence at diagnosis.
- The results from the spatial analysis indicated a cluster of cases in Sandusky County that included Clyde, Green Creek Township, and most of Fremont. This cluster had a radius of 6.7 miles and a p-value of less than 0.05, indicating statistical significance, i.e. this clustering could have occurred by chance alone less than five times out of 100.
- This eastern Sandusky County cluster included 31 known cases of cancer diagnosed among residents 19 years and younger during the years 1996-2006.
- The results of the 2009 cluster analysis were shared with the parents of the children with cancer and the news media in May 2009.

### **4. 2007-2010 Additional Cancer Diagnoses among Children**

- There were no new diagnoses of cancer among children in the eastern Sandusky County cluster area reported to the SCHED during 2007. However there were two new childhood diagnoses in 2008, another in 2009, and another in 2010 reported to the SCHED. The SCHED obtained signed medical release forms from the parents of the cases and contacted the relevant physicians. The diagnoses were verified by anatomical site and type. Between 1996-2006 there were 31 children in the cluster area with cancer, and four more children were diagnosed with cancer in 2008-2010, thus, 35 childhood cancer cases were diagnosed in the cluster area from 1996-2010.

- After consultation with parents of the children with cancer, SCHED, and the Ohio Environmental Protection Agency (Ohio EPA), a decision was made to expand the profile to include all 35 cases.
- It was also decided that it would be advantageous to include more questions pursuing possible environmental exposures in the case-review instrument.<sup>4</sup> ODH and SCHED staff worked directly with Ohio EPA colleagues to develop a supplemental questionnaire – *Supplemental Environmental Cancer Risk Factor Questionnaire for Cancer Cases 19 Years of Age and Younger* – for the expanded profile.<sup>5</sup>

### **B. Known and Suspect Risk Factors for Childhood Cancer: A Brief Review**

The causes and risk factors for childhood cancer are relatively unknown. It may be helpful to briefly review what is known about risk factors for the types of childhood cancer included in the eastern Sandusky County profile. These are discussed below.

Please keep in mind that the vast majority of childhood cancer cases appear to occur spontaneously with no apparent cause or risk factor present. The discussion of risk factors presented below doesn't necessarily mean that these factors played a common role in these eastern Sandusky County childhood cancers.

#### **Brain and other Central Nervous System Tumors**

- Very few risk factors for brain and other CNS tumors have been found.<sup>6,7</sup> There is no clear cause for most brain and other CNS cancers.<sup>6,7</sup> Only two factors are consistently noted to place a child at increased risk for a brain and CNS malignancy: various genetic disorders and exposure to ionizing radiation.<sup>6,7</sup>
- The inherited syndromes associated with brain tumors are: (a) Cowden; (b) Li-Fraumeni; (c) Neurofibromatosis type 1 and type 2; (d) Nevroid basal cell carcinoma; (e) Tuberous sclerosis; (f) Turcot; and (g) non Hippel-Lindau.<sup>6,7</sup> Although these syndromes are rare, they place the child at a markedly high risk for developing brain and other CNS cancers and other malignancies as well.<sup>6,7</sup>
- Exposure to ionizing radiation is a well-documented cause of brain tumors.<sup>6,7</sup> Children treated with radiotherapy for tinea capitis (a fungal infection) during the 1940s and 1950s were found to have increased risk for developing gliomas, meningiomas, and nerve sheath tumors up to 20 to 30 years later.
- In various immunosuppression syndromes, such as Wiskott-Aldrich, ataxia-telangiectasia, and acquired immunodeficiency, and after solid-organ transplantation, lymphoma of the brain occurs at a frequency higher than that in the normal population.<sup>6,7</sup>

- The effect of other environmental exposures, including diet, on the occurrence of brain tumors has been studied by numerous investigations.<sup>6,7</sup> The results of these studies are inconclusive.
- There is suggestive evidence that prenatal and postnatal exposure to secondhand tobacco smoke may increase the risk of childhood brain tumors.<sup>8</sup>

### **Acute Lymphoblastic Leukemia**

- Genetic factors are thought to play a significant role in the cause of acute leukemia including acute lymphoblastic leukemia (ALL).<sup>9,10</sup> Evidence for this is based on several observations, including the association between various chromosomal abnormalities and childhood ALL, the occurrence of familial leukemia, and molecular epidemiologic evidence that highlights the importance of various alleles of specific genes.<sup>9</sup>
- Several chromosomal abnormalities are associated with ALL.<sup>9,10</sup> Children with trisomy 21, i.e. Down syndrome, are up to 15 times more likely to develop ALL than are children without this abnormality. Other less common preexisting chromosomal abnormalities have also been linked to ALL. These include Klinefelter's syndrome, neurofibromatosis, Shwachman syndrome, Bloom syndrome, Fanconi's anemia, and ataxia-telangiectasia.<sup>9,10</sup>
- A higher risk of childhood ALL has been associated with increasing maternal age at conception.<sup>9</sup>
- Multiple cases of ALL within families have been reported, including aggregates among siblings and groups within the same generation or in several generations.<sup>9</sup> The frequency of ALL is higher than expected in families of leukemia patients.<sup>9</sup> Siblings of children with leukemia, including ALL, have about twofold to fourfold greater risk of developing leukemia than do unrelated children in the general population.<sup>9</sup>
- Exposure to ionizing radiation, certain toxic chemicals, and environmental tobacco smoke can facilitate the development of ALL.<sup>9,10</sup> The high incidence of ALL in survivors of atomic bomb explosions in Japan during World War II is well documented. The risk of ALL was greatest for those closest to the explosions. Although the potential of ionizing radiation for causing ALL is accepted, the actual percentage of ALL cases attributed to radiation is thought to be small. Controversy persists about the risks from exposure to ionizing radiation from routine emissions from nuclear power plants or as a result of fallout from atmospheric nuclear testing. Controversy also surrounds the possibility that exposure to electromagnetic fields (EMF) may be causally related to the development of childhood ALL.<sup>9,10</sup>
- Chronic chemical exposure, e.g. to benzene, has been associated with acute leukemia in adults, but direct evidence linking such exposure to ALL in children has been elusive.<sup>9</sup>

- There has been great interest in the possible role of viral infections in the pathogenesis of human leukemia.<sup>9</sup> This has been due in part to the fact that the young age of onset distribution of ALL corresponds with a time when the immune system is developing and is perhaps more vulnerable to the oncogenic effects of particular viruses. Viruses of interest include the Epstein-Barr virus (EBV), human lymphotropic viruses I and II, and human immunodeficiency virus (HIV).<sup>9</sup>
- Children with various congenital immunodeficiency conditions, including Wiskott-Aldrich syndrome and ataxia-telangiectasia have an increased risk of developing lymphoid malignancies, including ALL.<sup>9,10</sup>

### **Acute Myelogenous Leukemia**

- Risk factors associated with the development of acute myelogenous leukemia (AML) can be either environmental or secondary to inherited or acquired predisposing conditions.<sup>10,11</sup>
- Significant exposure to ionizing radiation results in a 10-to-20-fold increase in the incidence of AML.<sup>10,11</sup> For example, individuals who were exposed to radiation from the atomic bombs dropped in Hiroshima and Nagasaki during World War II developed a 20-fold increase in AML.<sup>10,11</sup>
- Exposure to environmental chemical toxins and increased risk for leukemia has been of interest, especially concerning the development of AML.<sup>10,11</sup> Prenatal exposure to maternal cigarette smoke increases the risk of developing AML.<sup>10,11</sup> Maternal use of marijuana and alcohol during pregnancy increases risk of the child developing AML.<sup>10,11</sup> A variety of chemical exposures including petroleum products, benzene, herbicides, and insecticides have been closely linked to the development of AML.<sup>10,11</sup>
- Several genetic risk factors have been identified that predispose individuals to develop AML.<sup>10,11</sup> These factors may be inherited or acquired. The increased frequency of leukemia (both AML and ALL) in siblings of patients with leukemia as well as the relatively rare occurrences of familial leukemia strongly suggest an important hereditary contribution.<sup>10,11</sup>
- Inherited predisposing conditions include Down syndrome, Fanconi's anemia, Kostmann's syndrome, Shwachman-Diamond syndrome, Diamond-Blackfan syndrome, Neurofibromatosis-type I, Ataxia-telangiectasia, Klinefelter's syndrome, Li-Fraumeni syndrome, and Bloom syndrome.<sup>10,11</sup> In general these inherited disorders result in altering the regulation of cell-cycle progression and DNA repair.
- Acquired conditions such as aplastic anemia, myelodysplastic syndrome and paroxysmal nocturnal hemoglobinuria can also predispose to the development of AML.<sup>11</sup>

- However, most cases of AML arise in children for whom there is no known genetic predisposition.<sup>11</sup> Most children with AML do not have a family history of cancer or clinical abnormality that suggests a predisposing risk for development of AML.

### **Cancer of the Pancreas**

- Cancer of the pancreas in children is rare.<sup>12</sup> The causes of pancreatic cancer in children are unknown. There are no recognized genetic syndromes associated with pancreatic carcinoma in children or adolescents.<sup>12</sup>

### **Rhabdomyosarcoma**

- The overwhelming majority of rhabdomyosarcoma (RMS) cases appear to occur sporadically.<sup>13</sup> The development of RMS has been associated with certain familial syndromes such as neurofibromatosis and the Li-Fraumeni syndrome.<sup>13,14</sup> The Li-Fraumeni syndrome has been associated with germline mutations of the P53 tumor suppressor gene.<sup>13,14</sup> This suggests that at least some very young children with seemingly sporadic RMS may have a hereditary predisposition to cancer or, possibly, an increased susceptibility to potentially toxic environmental agents.<sup>13,14</sup>
- The use of marijuana by a mother in the year before a child's birth was associated with a three-fold increased risk of RMS in the child, and maternal cocaine use was associated with a five-fold increased risk.<sup>13</sup> Use of marijuana, cocaine, or any recreational drug by a father was also associated with an approximately two-fold increased risk.<sup>13</sup>

### **Ewing's Sarcoma**

- The causes of Ewing's sarcoma are unknown.<sup>15,16</sup> These sarcomas are not commonly associated with other congenital diseases of childhood.<sup>15,16</sup> No important environment or familial risk factors have been identified for the development of this neoplasm. Radiation exposure does not appear to be a common cause of Ewing's sarcoma.<sup>15,16</sup>

### **Osteosarcoma**

- The peak incidence of osteosarcoma occurs in the second decade of life during the adolescent growth spurt, a feature that suggests a relationship between rapid bone growth and the development of this malignancy.<sup>17</sup> The tumor appears to occur most frequently at sites where the greatest increase in length and size of bone occurs.<sup>17</sup> This has led to the speculation that bone tumors arise from an aberration of the normal process of bone growth and remodeling.<sup>17</sup> Rapidly proliferating cells may be particularly susceptible to oncogenic agents, mitotic errors, or other events leading to neoplastic transformation.<sup>17</sup>
- The causes of osteosarcoma are unknown.<sup>17,18</sup> A viral etiology was long suggested but no convincing data have emerged from the laboratory to demonstrate a causative infectious agent.<sup>17</sup> Antecedent trauma to the bone has also been associated with the development of bone tumors, but little evidence exists to demonstrate a causal relationship.<sup>17</sup>

- The only environmental agent known to produce bone sarcomas in humans is ionizing radiation.<sup>17</sup> Radiation is implicated in about three percent of osteosarcomas.<sup>17</sup>
- Children with certain inherited syndromes have an increased risk of developing osteosarcoma.<sup>17,18</sup> These syndromes include Li-Fraumeni Syndrome, Rothmund-Thomson Syndrome, and hereditary retinoblastoma.<sup>17,18</sup>
- Other investigators have implicated a recessive oncogene, p53, in the etiology or progression of osteosarcoma.<sup>17</sup> The p53 gene appears to be critical in maintaining the integrity of the genome.<sup>17</sup> In normal cells, the presence of DNA damage results in accumulation of p53, which switches off replication to allow time for DNA repair.<sup>17</sup> If repair of DNA damage is unsuccessful, p53 may trigger apoptosis, thus inducing cellular suicide.<sup>17</sup> Thus, cells with mutant or inactivated p53 cannot respond appropriately to DNA-damaging agents and accumulate mutations at an increased rate, leading to malignant transformation.<sup>17</sup> Mutation of the p53 gene are detectable in almost 25 percent of osteosarcomas.<sup>17</sup>

### **Hodgkin's Lymphoma**

- The EBV has been implicated in the causation of Hodgkin's lymphoma by both epidemiologic and serologic studies.<sup>19,20</sup>
- Clusters of cases of Hodgkin's lymphoma suggest a genetic predisposition to the disease or a common exposure to an etiologic agent.<sup>19</sup> Studies of affected families have suggested an association of Hodgkin's lymphoma with specific human lymphocytic antigens.<sup>19</sup>
- Hodgkin's lymphoma is diagnosed more commonly in persons whose immune system is abnormal.<sup>19</sup> This finding may reflect the slight increase in familial incidence. The etiologic factors underlying the immune deficiency include genetic (e.g. ataxia telangiectasia), infectious (e.g. human immunodeficiency virus) and complications of medical treatment.<sup>19</sup>
- There is suggestive evidence that prenatal and postnatal exposure to secondhand smoke may increase the risk of childhood lymphomas.<sup>8</sup>

### **Thyroid Cancer**

- The most significant known risk factors for thyroid cancer are ionizing radiation, a diet low in iodine, and certain genetic syndromes.<sup>21,22</sup>
- The tumorigenic effect of radiation is more severe in a child's thyroid than in an adult.<sup>21,22</sup> The causative role of neck irradiation in the development of thyroid cancer is well established.<sup>21,22</sup>
- Follicular thyroid cancers are more common among populations with diets that are low in iodine.<sup>21,22</sup> In the United States, dietary iodine is plentiful because iodine is added to table

salt and other foods.<sup>21,22</sup> A diet low in iodine may also increase the risk of papillary thyroid cancer if the person is also exposed to radioactivity.<sup>21,22</sup>

- Genetic factors also play a significant role in the development of thyroid cancer.<sup>21, 22</sup> Children with Pendred, Gardner, Cowden, familial polyposis syndromes, and Carney complex have increased risk of thyroid cancer when compared to children without these conditions.<sup>21,22</sup> Familial clusters of papillary thyroid cancer have also been reported.<sup>21</sup>

### **Melanoma of the Skin**

- Childhood melanoma is rare.<sup>12,23</sup> While increased sun exposure has long been associated with adult onset basal and squamous cell carcinoma, and sunburns, particularly, in childhood, with the more deadly melanoma, this model does not appear to apply to pediatric melanoma.<sup>12,23</sup>
- Congenital melanoma may develop *in utero* in the absence of melanoma in the mother.<sup>12</sup>
- Giant congenital melanocytic nevi affect fewer than one in 20,000 newborns, but are precursor lesions of melanoma.<sup>12,23</sup>
- Xeroderma pigmentosum is a rare (1:500,000 births) inherited DNA repair disorder characterized by photosensitivity and a greater than 1000-fold increased risk of skin cancer in patients younger than 20 years.<sup>12,23</sup> Malignant neoplasms of the skin develop in 70 percent of these patients.<sup>12,23</sup>
- Children with immunodeficiencies have a three-to-six-fold increased risk of developing melanoma.<sup>12,23</sup>
- Neurocutaneous melanosis is a rare syndrome characterized by large or multiple congenital nevi associated with meningeal melanosis or melanoma.<sup>12,23</sup>
- It is estimated that about 44 percent of melanomas in persons younger than 30 years arise in small nevis that were present at birth or developed during early childhood.<sup>12,23</sup>

### **C. Objective**

The objective of this profile of cases in this “cluster” of childhood cancer in eastern Sandusky County was to identify factors that may have contributed to the increased burden. It needs to be understood that the nature of such a profile does not provide sufficient information to determine individual cause and effect.

### **METHODS**

- In January 2010 the SCHED attempted to contact the parents of the 35 children with cancer by telephone and/or letters to invite them to participate in the profile. Twenty-one (60%) of the

households agreed to participate. The remaining 14 households either declined to participate or the SCHED was unable to establish contact with them.

- The parents were interviewed using the two instruments: (1) *Cancer Risk Factor Questionnaire for Cases 19 Years of Age and Younger* (developed by ODH)<sup>3</sup>; and, (2) *Supplemental Environmental Cancer Risk Factor Questionnaire for Cases 19 Years and Younger* (developed by ODH, SCHED, and Ohio EPA)<sup>5</sup>. Please note that the two interview instruments include an extensive array of questions that attempt to clarify the patients' developmental histories and personal environments. It should not be construed that all questions pertain to known or suspect risk factors for childhood cancer.
- Thirteen of the 14 households that participated in the 2007 profile agreed to participate in the 2010 profile. These 13 households were interviewed using only the *Supplemental Environmental Cancer Risk Factor Questionnaire for Cancer Cases 19 Years and Younger*.<sup>5</sup>
- Eight of the households were administered the *Cancer Risk Factor Questionnaire for Cases 19 Years of Age and Younger*<sup>3</sup> and the *Supplemental Environmental Cancer Risk Factor Questionnaire for Cancer Cases 19 Years of Age and Younger*<sup>5</sup>.
- All interviews were conducted by SCHED Environmental Health and Nursing staff.
- The data were tabulated and results presented as simple percentages.

## RESULTS

### 1. Cancer Site Type, Age at Diagnosis, Year of Diagnosis, and Gender

- The 21 participating children by cancer site/type, age at diagnosis, year of diagnosis, and sex are presented in Table 1. Seven of the children had malignancies of the brain and other CNS; and five children had leukemia or lymphoma. There were two children with melanoma of the skin, three with rhabdomyosarcoma, one with Ewing's sarcoma, one with thyroid cancer, one with osteosarcoma, and one with cancer of the pancreas. The age at diagnosis ranged from less than one year to 19 years of age. The mean age at diagnosis was 10 years. Two of the children were diagnosed with cancer in 1996, one in 1997, three in 2001, one in 2003, one in 2004, three in 2005, six in 2006, two in 2008, and one each in 2009 and 2010. Nine (43%) were male and 12 (57%) were female.
- For comparison the 14 non-participating children by cancer site/type, age at diagnosis, year of diagnosis, and sex are also presented in Table 1. Overall, the non-participating cases do not differ from the participating cases by demographics. Six of the children had leukemia or lymphoma, and one child had oral cancer, osteosarcoma, soft tissue cancer, liver cancer, ovarian cancer, testicular cancer, and Ewing's sarcoma. The age at diagnosis ranged from less than one to 19 years and the mean age was 11 years. Three of the children were

diagnosed in 1998, two each in 2000, 2001, and 2003, one in 2005, and four in 2006. Six (43%) were male and eight (57%) were female.

## **2. Estimated Years of Life and Percent of Total Life of Residence in Eastern Sandusky County Prior to Cancer Diagnosis**

There is strong evidence that most of the children had lived the vast majority of their lives in Eastern Sandusky County prior to diagnosis as presented in Table 2:

- Thirteen (62%) children had lived all of their lives in Sandusky County and 19 children (91%) had lived at least half of their lives in Sandusky County prior to diagnoses.

## **3. History of Cancer among Blood Relatives of Case**

- All 21 children had at least one blood relative that reportedly was diagnosed with some site/type of cancer in their lifetime. There were a total of 76 blood relatives with cancer for the 21 children, with a mean of 3.6 blood relatives and a range from two to nine blood relatives as presented in Table 3.
- Five (24%) of these reported histories included the same site/type of cancer as the child while 14 (67%) of the family histories did not include the same site/type of cancer as the child. Two of the households related that there was a history of cancer among blood relatives but site/type was unknown.

## **4. Parental Work Histories and Potential Exposures**

- The information regarding parental work histories during fetal development and in the year prior to diagnosis is presented in Table 4. Ten (48%) of 21 households reported “none” or “none known” maternal exposures to chemicals, infectious agents, or radiation prior to diagnosis. Eleven (52%) of the households reported potential maternal exposures to environmental tobacco smoke, infectious agents, pesticides, black mold, cleaning solutions, dry cleaning products, paints, greases, formaldehyde, fiberglass, asbestos, hazardous waste, oils, formalin, and acetone. The vast majority of these potential exposures were reported in an occupational environment.
- Six (29%) of the 21 households reported “none” or “none known” paternal exposures to chemicals, infectious agents, or radiation in the year prior to diagnosis. Two households (10%) did not have knowledge regarding potential paternal exposures. Thirteen (62%) of the households reported potential paternal exposures to herbicides, insecticides, fungicides, ammonia, gasoline fumes, treated lumber, paint, paint thinners, acetone, lead, tar, petroleum products, molds, plastics, concrete dust, and unspecified plastics. Again, the vast majority of these potential exposures were reported in an occupational environment.

## **5. Estimated Month of Conception and Age of Mother at Conception**

- Four (19%) of the mothers with children diagnosed with cancer had an estimated date of conception during January – March, while nine (43%) had a conception date during April – June. Six (29%) had estimated conception dates during July – September, and two (10%) had

estimated conception dates during October – December. The nine children (43%) with estimated dates of conception during April – June included all three children with rhabdomyosarcoma, both children with melanoma of the skin, one of the children with leukemia, a child with pancreatic cancer, and two of the brain and CNS cancers. The little information that is available regarding known causes/risk factors for these childhood cancers makes it difficult to interpret these results. These data are presented in Table 4.

- The age of mother at conception ranged from 17 to 38 years with a mean age of 25 years. These data are also presented in Table 5.

#### **6. Maternal Infectious Disease/Illness and Medication Use during Pregnancy with Child**

- Six (29%) of the mothers reported having some type of infectious disease or illness during pregnancy with the patient (chest cold, toxemia, vaginal/uterine infection, pneumonia, and strep B+) as presented in Table 6.
- Seventeen (81%) of the mothers reported taking some type of medication during the pregnancy (prenatal vitamins, n=15, 71%; Tylenol, n=5, 24%; iron supplements, n=1, 5%; and prescription drugs, n=1, 5%). These data are presented in Table 5.

#### **7. Maternal Smoking and Exposure to Environmental Tobacco Smoke at Home/Work during Pregnancy with Patient**

- Three (14%) of these mothers reported smoking cigarettes during pregnancy with the child as presented in Table 7. Nine (43%) mothers reported having exposure to environmental tobacco smoke at home and/or at work.

#### **8. Maternal Use of Recreational Drugs, Alcoholic Beverages, and Home Extermination during Pregnancy with Child**

- All 21 mothers denied any use of recreational drugs, e.g. marijuana, or alcoholic beverages during pregnancy with the child as presented in Table 8.
- Two (10%) mothers related having their homes treated with “insect bombs” during the pregnancy as indicated in Table 8.

#### **9. Potential Maternal Exposure during Pregnancy with Child to Paints, Cleaning Supplies, Fuels, Solvents, or Other Chemicals**

- The data for potential maternal exposure during pregnancy to paints, cleaning supplies, or other chemicals are presented in Table 9. six (29%) reported exposures to paint, with four reporting the exposure to being household paint, and two to paints in a manufacturing plant.
- All mothers denied exposure to non-household cleaning supplies.
- Three (14%) mothers reported potential exposure to propane gas used to heat their homes.

- Two (10%) reported potential exposure to solvents in a manufacturing plant.
- Eight (38%) reported potential exposures to other chemicals including secondary exposure to pesticides via handling fruits and vegetables (n=1); hair dye (n=3); possible radiation exposure in a medical setting (n=1); chlorine in a swimming pool (n=1); and grease, paints or solvents in a manufacturing plant (n=2).

#### **10. Birth Weight of the Children and History of Breast Feeding**

- The range in reported birth weight of the children was 5 pounds 6 ounces to 8 pounds 4 ounces as presented in Table 10. The mean birth weight was 7 pounds 5 ounces.
- Thirteen (62%) of the mothers reported breast feeding the children as indicated in Table 10.

#### **11. Health Problems, Diagnosis of Birth Defects and/or Hereditary Diseases and/or Treatments at Birth or Within Six Months after Birth**

The reported health problems, diagnosis of birth defects and/or hereditary disease and/or treatments at birth or within six months after birth among the children are presented in Table 11:

- Ten (48%) had no history of health problems at birth or within six months after birth. Four (19%) had jaundice and seven (33%) had an infection at or shortly after birth (Respiratory Syncytial Virus, chicken pox, colds, upper respiratory infections, and thrush). Four (19%) had other problems including a need for resuscitation at birth, umbilical cord around arm, epileptic seizures, allergies, formula intolerance, allergic colitis, and reflux with vomiting.
- Nineteen (90%) had no reported history of diagnosis of birth defects or hereditary disease. One (5%) reported a diagnosis of “webbed toes” and one (5%) reported detection of the cardiomyopathy gene.
- Thirteen (62%) had no history of treatments at birth or during the six months after birth. Four (19%) received antibiotics for thrush or other infections. Two (10%) received UV light treatment for jaundice and two (10%) received oxygen via a respirator shortly after birth.

#### **12. Childhood Histories of Infectious Diseases, Immunizations, and Exposure to Mononucleosis Prior to Cancer Diagnosis**

The reported histories of infectious diseases, immunizations, and exposure to mononucleosis are presented in Table 12:

- Sixteen (76%) of the children had histories of some type of infectious disease prior to the diagnosis of cancer. Thirteen (62%) had a history of chicken pox. Other infections included Respiratory Syncytial Virus (n=2), EBV (n=1), Rotavirus (n=1), thrush (n=3), cold sores (n=2), mononucleosis (n=1), and upper respiratory infections (n=1).

- Twenty (95%) had a history of receiving routine childhood immunizations, including diphtheria, pertussis/whooping cough, tetanus, measles, rubella, mumps, polio, chicken pox, and hepatitis A & B.
- Three (14%) had a history of exposure to mononucleosis. Two of these involved exposure to siblings with mononucleosis.

### **13. Histories of Surgeries, Non-Routine X-Rays, Radiation Treatments, and Treatments for Head Lice Prior to Diagnosis**

The information regarding reported histories of surgeries, non-routine x-rays, radiation treatments, and treatments for head lice prior to diagnosis is presented in Table 13:

- Thirteen of the children (62%) had no reported histories of surgeries prior to the diagnosis of cancer.
- Eight of the children (38%) had a history of some type of surgery prior to the cancer diagnosis. Six children (29%) had histories of removal of tonsils and/or adenoids. Two children (10%) had placements of ear tubes for ear infections. Two children (10%) also had surgery for removal of wisdom teeth. One child had a history of liver transplant. Other surgeries consisted of circumcision (n=1) and tightening of ankle ligaments (n=1).
- Ten children (48%) had histories of non-routine x-rays including Intravenous Pyelograms (IVP) (n=2), a radiography of the urethra and renal pelvis (n=2); x-rays for fractured bones (n=4); head x-ray (n=1); chest x-rays (n=1); pre-op x-rays for ankle surgery (n=1); x-rays of the liver as part of a transplant (n=1); and full-body x-rays after a car crash (n=1).
- All 21 children (100%) had no histories of radiation treatment.
- 19 of the children (91%) reported no treatments for head lice. Two cases had histories of being treated with Rid-X for head lice.

### **14. History of Use of Tobacco and Household Exposures to Environmental Tobacco Smoke Prior to Diagnosis**

The reported data regarding the children's use of tobacco products and exposure to environmental tobacco smoke are presented in Table 14:

- All 21 children (100%) had no reported histories of use of tobacco products.
- Thirteen children (62%) had no reported histories of exposure to environmental tobacco smoke. Eight children (38%) had histories of exposure to environmental tobacco smoke including at home (n=5) and at the baby sitters' home (n=3).

### **15. Patient Use of Recreational Drugs and Alcoholic Beverages Prior to Cancer Diagnosis**

All 21 children (100%) had no reported histories of use of recreational drugs or alcoholic beverages prior to diagnosis as presented in Table 15.

### **16. Histories of Use of Prescription and Over-the-Counter Medications within Three Years Prior to Diagnosis**

There are extensive reported histories of use of prescription medications and over-the-counter medications for the children within the three years prior to diagnosis as indicated in Table 16:

- Fifteen of the children (71%) had a history of prescription medication use in the three years prior to the cancer diagnosis. These included: antibiotics, drugs to control transplant rejection, allergy control medications, seizure control medications, iron supplements, ringworm treatments, wart removal compounds, pain relievers, hyperactivity medications, and laxatives.
- Ten of the patients (48%) had a history of over-the-counter medications within three years prior to diagnosis. These included: children's cough, cold, and pain; allergy relief; and menstrual cramping medications.

**NOTE: Only 20 of the 21 children with cancer had parents who completed the remaining questions.**

### **17. Presence of Household Pets Prior to Diagnosis**

- Sixteen of the children (80%) reported having a household pet prior to diagnosis as indicated in Table 17. The most frequently reported pet was a dog (n=16, 80%) followed by a cat (n=12, 60%). Most households had two pets or more. Other pets included rabbits, a hamster, turtles, birds, and rats.
- Thirteen of the 16 households with pets reported routinely treating the pets for fleas, typically with sprays and/or flea collars. In every instance it was reported that an adult household member applied the flea spray/powder.

### **18. Residence in Close Proximity to Industrial Site Prior to Diagnosis [Please note: "Industrial Site" was not defined in the questionnaire and was interpreted broadly among the participants].**

- Ten of the households (50%) reported living in close proximity to an industrial site prior to the diagnosis of cancer as presented in Table 18. Two of the households reported living close to two industrial sites.

- Four of the households (20%) reported living close to a “large industrial site”; two lived close to an “old landfill”. Three households (15%) lived close to a “chemical waste disposal site”; one lived close to a “trucking site, junkyard”; one close to a “light manufacturing plant,” and one close to a “stone cutting” site.
- Seven of the 10 households were estimated to be one mile or less from the industrial site. Two households were unable to estimate a distance.
- Four of the households (20%) reported experiencing various odors and dusts from these sites. These consisted of “oil and chemical odors” (large industrial plant and old landfill); “burning, irritating, odors” (large industrial plant); “horrible smell” (large industrial plant, chemical waste disposal site); and “stone cutting dust” (stone cutting site).

### **19. Residence in Close Proximity to Cell Phone Towers, Electric Power Lines, and Cell Phone Usage Prior to Diagnosis**

The information regarding residence in close proximity to cell phone towers, electric power lines, and cell phone usage prior to diagnosis is presented in Table 19:

- Four of the households (20%) reported living in close proximity to a cell phone tower prior to diagnosis. Their estimated distances were 0.5 miles or less. All four were different sites/types of cancer (brain & CNS, osteosarcoma, pancreas, and rhabdomyosarcoma).
- Two of the households (10%) reported that the child used a cell phone prior to diagnosis. These were two distinct cancer sites/types (brain & CNS, pancreas).
- Two of the households (10%) reported having electric power lines in close proximity to the home prior to diagnosis. The reported distances were one mile and 1,000 feet. Again, these were two different types of cancer (melanoma of skin, pancreas).

### **20. Presence of Ponds and Streams on Property of Residence and Related Activities Prior to Diagnosis.**

The information regarding the presence of and activities related to ponds and streams on property of residence prior to diagnosis is presented in Table 20:

- Five of the households (25%) reported having a pond on the property of residence prior to diagnosis. Three of these households (15%) reported that the child waded, swam and/or fished in the pond. The frequency of these activities was described as “often,” “seldom,” and “sometimes” respectively.

- Eight of the households (40%) reported the presence of streams on their property of residence prior to diagnosis. Five of these households reported that the child waded, swam, played along the banks, or fished in the stream. The frequency of these activities was described as “seldom” (n=3); “often” (n=1); and “sometimes” (n=1). The children that engaged in activities involving streams on the property of residence had a diagnosis of brain & CNS (n=1); melanoma of skin (n=1); rhabdomyosarcoma (n=1); and leukemia (n=2).

## 21. Drinking Water Sources during Pregnancy and Birth to Time of Diagnosis

The information pertaining to drinking water sources during pregnancy with the case and from birth to diagnosis of cancer is presented in Table 21:

- Seven of the households (35%) reported having a private well as the primary drinking water source during the pregnancy with the child that developed cancer. This included all three children with leukemia, one child with melanoma of the skin, one child with brain & CNS cancer, one child with rhabdomyosarcoma, and the one child with thyroid cancer. All the other children with cancer had public water supplies as the primary drinking water source during pregnancy.
- Eighteen of the households (90%) reported having a public water supply as a secondary drinking water source during the pregnancy with the child that developed cancer. One (5%) reported a private well and one (5%) reported using bottled water as a secondary drinking water source during the pregnancy.
- Twelve of the households (60%) reported that the child had a private well as the primary drinking water source from birth to diagnosis. This includes all three children with leukemia, the one child with Ewing’s Sarcoma, one of the children with melanoma of the skin, three of the children with brain & CNS cancer, two of the children with rhabdomyosarcoma, the one child with thyroid cancer, and the one child with osteosarcoma.
- Three of the households (15%) reported having a private well as the secondary drinking water source from birth to diagnosis. Seventeen (81%) reported a public water supply as their secondary drinking water source. One reported use of a cistern and one child was reportedly exclusively breast fed.
- In total 12 households (60%) had a private well as the primary drinking water source during the pregnancy or from birth to diagnosis. However, all of the private water well testing conducted by the Ohio EPA showed no cancer causing chemicals at levels that would present a health risk.<sup>24,25,26</sup>

## **22. Perceived Presence of Old Dumps/Waste Disposal Areas on Property of Residence Prior to Diagnosis**

The information regarding the perceived presence of dumps/waste disposal areas on the property of residence prior to diagnosis is presented in Table 22:

- Four of the households (20%) reported that they had reason to believe that an old dump and/or waste disposal area was on their property of residence prior to diagnosis. This was reported for two of the children with rhabdomyosarcoma, one of the children with melanoma of the skin, and one of the children with brain & CNS cancer. The evidence reported included the findings of buried trash and broken glass, rumors that there was an old dump on the property, and for one household, a map that reportedly shows an old dump on the property.
- Three of these four households did not know of any potential exposures to the cases from these sites. One household reported that the child played outside near the site.

## **23. Tearing Down and/or Burning of Buildings/Structures on Property of Residence Prior to Diagnosis**

The information regarding the tearing down and/or burning of buildings/structures on the property of residence prior to diagnosis is presented in Table 23:

- Four households (20%) reported having a building/structure torn down or burned on the property of residence prior to diagnosis. This included two of the children with brain & CNS cancer and both of the children with melanoma of the skin.
- One of the households with a child with brain & CNS cancer reported the collapse and further tearing down of an old barn. The debris from the barn remained on the property. The other household with a child with brain & CNS cancer reported tearing down a structure with unknown use. The debris was hauled away.
- One of the households with a child with melanoma of the skin reported that an old shed and corn crib were burned and the debris hauled away. Another household with a child with melanoma of the skin reported an old trailer was burned on the site.

## **24. Painting and Remodeling in the Home Prior to Diagnosis**

Seven of the households (35%) related histories of painting/remodeling in the home prior to diagnosis as presented in Table 24. This included four of the children with brain & CNS cancer, one child with melanoma of the skin, one of the children with leukemia, and the child with osteosarcoma.

- Two of the children with brain & CNS cancer had scenarios of “built a new home” prior to diagnosis. Another child with brain & CNS cancer had a history of “periodic painting and wall papering” in the home, while a fourth child with brain & CNS cancer had a history of “renovating the attic” prior to diagnosis.
- The parents of one child with melanoma of the skin related a history of “building an additional room” prior to diagnosis.
- The parents of one of the children with leukemia reported a history of a “new garage and rooms” prior to diagnosis.
- The parents of the child with osteosarcoma reported a history of construction of a “new roof” prior to diagnosis.

## **25. Local Fish and Game Consumption Prior to Diagnosis**

The information from the reported histories of the children’s consumption of locally caught fish and game is presented in Table 25:

- Six of the children ate locally caught fish or game prior to diagnosis, but the frequency was less than once per month.

## **26. History of Fill-Dirt Ever Brought on to Property Prior to Diagnosis**

The data from the reported histories of fill-dirt ever brought on to the property of residence prior to diagnosis are presented in Table 26:

- Five of the households (24%) reported histories of fill-dirt brought onto the property of residence prior to diagnosis.
- Two of the households with children with rhabdomyosarcoma, two of the households with children with brain & CNS cancer and one of the households with a child with melanoma of the skin reported having fill-dirt brought onto the property of residence prior to diagnosis.
- All five households reported using the fill-dirt for flower beds and/or the leveling of ground. Three of the five households reported having the fill-dirt placed all around the property.
- The source of the fill-dirt was reportedly from various places in the Clyde area and from nearby Seneca County.

## **27. Use of Wood-Burning Stoves and Fireplaces in the Home Prior to Diagnosis**

The interview data pertaining to reported use of outside wood-burning stoves, inside wood-burning stoves, and fireplaces, and the sources of wood are presented in Table 27:

- Only one household reported use of an outside wood-burning stove. The reported source of wood was on the household property.
- Eight of the households (40%) reported use of inside wood-burning stoves or fireplaces. The reported sources of wood were on the household property in nearby woods.
- The sites/types of cancer from these households showed extensive variation. This included three of the children with brain & CNS cancer. One child with brain & CNS cancer reportedly had frequent visits to a grandfather's house where a wood-burning stove was the primary source of heat. The households of one of the children with leukemia, a child with rhabdomyosarcoma, a child with pancreatic cancer, a child with melanoma of the skin, and the child with Ewing's sarcoma reported use of inside wood-burning stoves or fireplaces that burned local wood.

## **28. Types of Fuels Used to Heat Homes Prior to Diagnosis**

Information related to the types of fuels used to heat the homes of cases prior to diagnosis is presented in Table 28:

- Seventeen of the households (85%) reported a combination of fuels used to heat their homes prior to diagnosis. The reported fuels consisted of propane gas (n=12), natural gas (n=13), wood (n=8), electricity (n=4), and kerosene (n=2). One household reported not knowing how the home was heated.
- Thirteen of the households (65%) reported using propane gas and/or kerosene/fuel oil to heat their homes. Seven of the 13 (54%) reported that fuel storage tanks were outside and away from the house. Six of the 13 (46%) reported that the fuel storage tanks were outside and next to the house.

## **29. Storage of Solvents, Fuels, and Other Chemicals in the Living Area or Basement of Residence Prior to Diagnosis**

The interview data regarding the storage of solvents, fuels, and other chemicals in the living area or basement of residence prior to diagnosis are presented in Table 29:

- Thirteen of the households (65%) reported keeping paints in the living area or the basement of the residence prior to diagnosis. This includes the residences of three of the children with leukemia, five of the children with brain & CNS cancer, the child with Ewing's sarcoma, the child with thyroid cancer, one of the children with Hodgkin's lymphoma, the child with osteosarcoma, and the child with pancreatic cancer.

- All 20 households (100%) denied keeping any cleaning supplies, fuels, solvents, or other chemicals in the living areas or basements prior to diagnosis.

### **30. Location of Child’s Bedroom in Relation to Garage Prior to Diagnosis**

Information was collected from the households pertaining to the presence of an attached or separate garage and the location of the child’s bedroom in relation to the garage. This information is presented in Table 30:

- Nineteen (95%) of the households reported having an attached or separate garage prior to diagnosis. This included 12 households with an attached garage (60%) and seven households with a separate garage (35%). One household reported having no garage.
- One of the households (8%) reported that the child’s bedroom was over the attached garage. Seven of these households (58%) with an attached garage reported that the child’s bedroom was away from the garage. Four of the households (33%) could not determine where the child’s bedroom was in relation to the garage. Three children had bedrooms on the first floor away from the garage and one child had a bedroom in the basement.

### **31. Use of Playgrounds and Parks Prior to Diagnosis**

Information related to use of local playgrounds and parks prior to diagnosis is presented in Table 31:

- Eleven of the households (55%) reported the child’s use of local playgrounds and parks prior to diagnosis. There was little consistency in the use of any park or a particular park by cancer site/type.
- Use of the following parks was reported: (a) East Side Park, Fremont (n=1, 5%); (b) Connor Park, Fremont (n=1, 5%); (c) Wee People Park, Castalia (n=1, 5%); (d) Green Springs Park, Green Springs (n=1, 5%); (e) Community Park, Clyde (n=9, 45%); (f) South Main School Park, Clyde (n=2, 10%); (g) Clyde High School Fields (n=1, 5%); and (g) McPherson Middle School Park, Clyde (n=1, 5%).
- The reported frequency of use of these playgrounds varied from seldom to sometimes.

## **DISCUSSION AND CONCLUSION**

The causes of childhood cancer are an active and growing field of research. However, to date there has been limited success in identifying the cause of childhood cancer. Because of this, information from these questionnaires can only reveal the presence or absence of each risk factor or exposure. It is impossible to identify a cause-and-effect from any factor, even if that factor is present in many or most of the children. For the results of this analysis, we can only present the findings from each question to generate a better picture of those factors that may have increased the risk for developing childhood cancer among the participants.

Some of the limitations to this analysis need to be noted. First, only 60% of families with children with cancer in the area of study participated in the investigation. While this does not affect the responses from those who did participate, it makes any generalization of the data to all 35 children with cancer difficult. Second and as noted above, due to the nature of the investigation, it is not possible to determine significance of any finding, and due to the relatively small number of families involved, even findings that seem important may be due to chance rather than a true correlation between exposure and disease. Third, in order to capture a large amount of information, the decision was made to use the *Cancer Risk Factor Questionnaire for Cases 19 Years of Age and Younger*<sup>4</sup> and *Supplemental Environmental Cancer Risk Factor Questionnaire for Cases 19 Years and Younger*<sup>5</sup> to capture information on known, suspect, and potential risk factors for childhood cancer. Therefore results can only be used as one piece of a broader data picture. Fourth, all retrospective analyses (looking at events that happened in the past) suffer from various forms of bias (circumstances which may inappropriately influence the data). One of the most common forms of bias is called recall bias and occurs when the recall of information from the past is difficult or influenced by other events. In some cases families were asked to remember small details that happened almost a decade ago. Lastly, the questions asked were concerning events during the time when the lives of the families were focused on the health of their children, and details are more likely to be missed or remembered incorrectly.

Based on the data collected from the families it is the conclusion of this assessment that there were no exposures or variables that were common to the 21 children with cancer who participated in this profile.

## **RECOMMENDATIONS**

- (1) Share the results of this profile with the parents of the children with cancer.
  
- (2) Post this profile report on the SCHD and ODH Web sites.

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**Table 1**

**Line Listing of Participating and Non Participating Children in Eastern Sandusky County Childhood Cancer Profile, 1996-2010, N=35<sup>1</sup>**

**Participating in Profile (n=21)**

<u>Case Number</u>	<u>Case Site/Type</u>	<u>Age at Diagnosis</u>	<u>Year of Diagnosis</u>	<u>Gender</u>
1.	Leukemia	<5	1996	Male
2.	Brain & CNS <sup>2</sup>	<5	1996	Female
3.	Ewing's Sarcoma	15-19	1997	Female
4.	Brain & CNS	5-9	2001	Female
5.	Melanoma of Skin	15-19	2001	Female
6.	Brain & CNS	5-9	2001	Male
7.	Rhabdomyosarcoma	10-14	2003	Female
8.	Thyroid	15-19	2004	Female
9.	Hodgkin's Lymphoma	10-14	2005	Male
10.	Brain & CNS	<5	2005	Male
11.	Brain & CNS	10-14	2005	Male
12.	Rhabdomyosarcoma	<5	2006	Male
13.	Leukemia	10-14	2006	Female
14.	Hodgkin's Lymphoma	10-14	2006	Male
15.	Brain & CNS	5-9	2006	Female
16.	Melanoma of Skin	<5	2006	Female
17.	Osteosarcoma	15-19	2006	Female
18.	Pancreas	15-19	2008	Female
19.	Leukemia	10-14	2008	Male
20.	Brain & CNS	10-14	2009	Male
21.	Rhabdomyosarcoma	5-9	2010	Female

**Range in Age: <1 to 19 years**

**Mean Age: 10 years**

**Not Participating in Profile (n=14)<sup>3</sup>**

• Oral	15-19	1998	Female
• Osteosarcoma	5-9	1998	Female
• Leukemia	5-9	1998	Male
• Soft Tissue	15-19	2000	Male
• Kidney	<5	2000	Female
• Liver	<5	2001	Female
• Leukemia	15-19	2001	Male
• Leukemia	15-19	2003	Male
• Leukemia	<5	2003	Female

Continued on page 28

**Range in Age: <1 to 19 years**  
**Mean Age: 10 years**

<u>Case Site/Type</u>	<u>Age at Diagnosis</u>	<u>Year of Diagnosis</u>	<u>Gender</u>
• Ovary	15-19	2005	Female
• Leukemia	5-9	2006	Female
• Ewing's Sarcoma	15-19	2006	Female
• Non-Hodgkin's Lymphoma	5-9	2006	Male
• Testes	15-19	2006	Male

**Range in Age: <1 to 19 years**  
**Mean Age: 10 years**

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Office of Healthy Ohio, Ohio Department of Health, 2010

<sup>2</sup>(CNS) = Central Nervous System

<sup>3</sup>Case parents declined to participate or were lost to follow-up; i.e. unable to establish contact

**Table 2**

**Blood Relatives with Cancer Diagnosis: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=21<sup>1</sup>**

<u>Case</u>	<u>Number of Blood Relatives with Cancer<sup>2</sup></u>	<u>Sites/Types of Cancer</u>	<u>Same Site/Type as Case?</u>
1. Leukemia	4	Breast, multiple myeloma, breast/bone, melanoma	No
2. Brain & CNS <sup>3</sup>	6	Thyroid, bladder/prostate, bladder, prostate, lung, lymphoma	No
3. Ewing's Sarcoma	4	Lung, breast, breast, brain & CNS	No
4. Brain & CNS	4	Breast, breast, bone, esophagus	No
5. Melanoma of Skin	2	Breast, colorectal/prostate	No
6. Brain & CNS	2	Leukemia/breast, brain & CNS	Yes
7. Rhabdomyosarcoma	3	Breast, testicular, colorectal	No
8. Thyroid	5	Ovarian, lung, lung, spleen, lymphoma	No
9. Hodgkin's Lymphoma	2	Unknown site/type, leukemia	Unknown
10. Brain & CNS	2	Melanoma, leukemia	No
11. Brain & CNS	1	Bone	No
12. Rhabdomyosarcoma	9	Throat, cervical, cervical, cervical, blood, uterine, lung, stomach, leukemia	No
13. Leukemia	8	Bladder, skin, skin, bone, uterine, pancreas, uterine, leukemia	Yes
14. Hodgkin's Lymphoma	2	Cervical, liver/pancreas	No
15. Brain & CNS	2	Melanoma/brain, colorectal/liver	Yes
16. Melanoma of Skin	3	Skin, lymphoma, brain & CNS	Yes
17. Osteosarcoma	2	Tonsils, bladder	No
18. Pancreas	4	Brain & CNS, prostate, larynx, brain & CNS	No
19. Leukemia	7	Leukemia, bladder, skin, bone, uterine, uterine, pancreas	Yes
20. Brain & CNS	2	Unknown site/type, unknown site/type	Unknown
21. Rhabdomyosarcoma	<u>2</u>	Stomach, lung	No
<b>TOTAL</b>	<b>76</b>		

This indicates an average of 3.6 blood relatives with a history of cancer per case.

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Office of Healthy Ohio, Ohio Department of Health, 2010

<sup>2</sup>These cases were not verified as to diagnosis of cancer.

<sup>3</sup>CNS = Central Nervous System

**Table 3**

**Estimated Years of Life and Percent of Total Life of Residence in Eastern Sandusky County Prior to Cancer Diagnosis: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=21<sup>1</sup>**

<u>Case</u>	<u>Estimated Percent of Total Life<sup>3</sup></u>
1. Leukemia	100%
2. Brain & CNS <sup>4</sup>	100%
3. Ewing's Sarcoma	90%
4. Brain & CNS	100%
5. Melanoma of Skin	100%
6. Brain & CNS	100%
7. Rhabdomyosarcoma	100%
8. Thyroid	100%
9. Hodgkin's Lymphoma	100%
10. Brain & CNS	84%
11. Brain & CNS	85%
12. Rhabdomyosarcoma	100%
13. Leukemia	100%
14. Hodgkin's Lymphoma	29%
15. Brain & CNS	53%
16. Melanoma of Skin	100%
17. Osteosarcoma	35%
18. Pancreas	100%
19. Leukemia	100%
20. Brain & CNS	51 %
21. Rhabdomyosarcoma	87%

Range = 29% (0.7 years) - 100% (19.5 years)

Mean = 86% (8.6 years)

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Office of Healthy Ohio, Ohio Department of Health, 2010.

<sup>2</sup>Estimated Years of Life in Eastern Sandusky County determined using case birth date, residential history, and date of diagnosis.

<sup>3</sup>Estimated percent of total life was determined using case birth date, date of diagnosis, and residential history.

<sup>4</sup>CNS= Central Nervous System.

**Table 4**

**Parental Work Histories and Potential Exposures to Chemicals, Infectious Agents, or Radiation Prior to Diagnosis: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=21<sup>1</sup>**

<u>Case No.</u>	<u>Maternal Exposure</u>	<u>Paternal Exposure</u>
1. Leukemia	None	None known
2. Brain & CNS <sup>2</sup>	Environmental Tobacco Smoke	Farm chemicals
3. Ewing's Sarcoma	None	None known
4. Brain & CNS	Possible infectious agents in school class room setting, pesticides at farmer's market	Herbicides, insecticides Fungicides, ammonia, gasoline fumes
5. Melanoma of Skin	None	Treated lumber, construction exposures, e.g. dust
6. Brain & CNS	Black mold	Paint thinners, acetone, solvents, ammonia, fertilizer, pesticides
7. Rhabdomyosarcoma	None	Lead, pesticides
8. Thyroid	Cleaning products, solutions, dry-cleaning products	None known
9. Hodgkin's Lymphoma	None	Unknown
10. Brain & CNS	Latex paint	Tar, oil base paint, pesticides
11. Brain & CNS	None	Unknown
12. Rhabdomyosarcoma	None	Herbicides, insecticides, fungicides, fertilizers
13. Leukemia	Grease and glue in manufacturing	Electrical transformer oils
14. Hodgkin's Lymphoma	Formalin, acetone in medical setting	Paints, solvents, drywall, dusts, gasoline, petroleum products
15. Brain & CNS	None	Molds, pesticides, paints
16. Melanoma of Skin	Pesticides, formaldehyde, cleaning solutions, asbestos, fiberglass	Concrete dust
17. Osteosarcoma	None	None
18. Pancreas	Hazardous waste with protective clothing	Farm chemicals
19. Leukemia	Paints, glues, oils, grease in manufacturing	None
20. Brain & CNS	None	None known
21. Rhabdomyosarcoma	Possible infectious agents in patient care setting, plastics in recycling	Plastics in recycling

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Office of Healthy Ohio, Ohio Department of Health, 2010

<sup>2</sup>CNS = Central Nervous System

**Table 5**

**Estimated Month of Conception and Age of Mother at Conception: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=21<sup>1</sup>**

<u>Case</u>	<u>Estimated Month of Conception</u>	<u>Calendar Quarter for Conception<sup>2</sup></u>	<u>Age of Mother at Conception (years)</u>
1. Leukemia	October	4	35
2. Brain & CNS <sup>3</sup>	January	1	35
3. Ewing's Sarcoma	January	1	22
4. Brain & CNS	March	1	31
5. Melanoma of Skin	April	2	27
6. Brain & CNS	July	3	17
7. Rhabdomyosarcoma	May	2	26
8. Thyroid	September	3	20
9. Hodgkin's Lymphoma	August	3	17
10. Brain & CNS	July	3	23
11. Brain & CNS	April	2	18
12. Rhabdomyosarcoma	April	2	17
13. Leukemia	June	2	25
14. Hodgkin's Lymphoma	August	3	18
15. Brain & CNS	May	2	38
16. Melanoma of Skin	June	2	29
17. Osteosarcoma	February	1	21
18. Pancreas	April	2	25
19. Leukemia	November	4	30
20. Brain & CNS	September	3	37
21. Rhabdomyosarcoma	April	2	18

1 = 4 (19%)  
 2 = 9 (43%)  
 3 = 6 (29%)  
 4 = 2 (10%)

Range = 17 to 38 years  
 Mean = 25 years

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Office of Healthy Ohio, Ohio Department of Health, 2010.

<sup>2</sup>Calendar Quarters: January – March = 1, April – June = 2, July – September =3, October – December = 4.

<sup>3</sup>CNS = Central Nervous System.

**Table 6**

**Maternal Infectious Disease/Illness and Medication Use During Pregnancy with Case: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=21<sup>1</sup>**

<u>Case</u>	<u>Infectious Disease/Illness During Pregnancy</u>	<u>Medication Use During Pregnancy</u>
1. Leukemia	No	Yes; Tylenol, Prenatal Vitamins
2. Brain & CNS <sup>2</sup>	No	Yes; Prenatal Vitamins, Iron Supplement
3. Ewing's Sarcoma	No	Yes; Prenatal Vitamins
4. Brain & CNS	No	Yes; Tylenol, Prenatal Vitamins
5. Melanoma of Skin	No	Yes; Prenatal Vitamins
6. Brain & CNS	Yes, chest cold	Yes, Medral Dose Pack, Prescription cough medicine
7. Rhabdomyosarcoma	Yes, Toxemia	Yes; Tylenol, Prenatal Vitamins
8. Thyroid	No	Yes; Prenatal vitamins
9. Hodgkin's Lymphoma	Yes, vaginal/uterine infection	Yes; Prenatal vitamins
10. Brain & CNS	No	Yes; Tylenol, Prenatal Vitamins
11. Brain & CNS	Yes, Toxemia	Yes; Prenatal vitamins
12. Rhabdomyosarcoma	No	Yes; Prenatal vitamins
13. Leukemia	No	Yes; Prenatal vitamins
14. Hodgkin's Lymphoma	Yes, pneumonia	Yes; Prenatal vitamins, Gaviscon
15. Brain & CNS	No	No
16. Melanoma of Skin	Yes, Strep B+	Yes; Prenatal vitamins
17. Osteosarcoma	No	Don't Know
18. Pancreas	No	Yes; Tylenol
19. Leukemia	No	Yes; Prenatal vitamins
20. Brain & CNS	No	Don't know
21. Rhabdomyosarcoma	No	No

Yes = 6 (29%)  
No = 15 (71%)

Yes = 17 (81%)  
No = 2 (10%)  
Don't know = 2 (10%)

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Office of Healthy Ohio, Ohio Department of Health, 2010.

<sup>2</sup>CNS= Central Nervous System

**Table 7**

**Maternal Smoking and Exposure to Environmental Tobacco Smoke at Home/Work during Pregnancy with Case: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=21<sup>1</sup>**

<u>Case</u>	<u>Maternal Smoking</u>	<u>Exposure to Environmental Tobacco Smoke</u>
1. Leukemia	No	Yes; at work
2. Brain & CNS <sup>2</sup>	No	No
3. Ewing's Sarcoma	No	No
4. Brain & CNS	No	No
5. Melanoma of Skin	No	No
6. Brain & CNS	No	Yes; at home
7. Rhabdomyosarcoma	No	No
8. Thyroid	No	Yes; at work
9. Hodgkin's Lymphoma	No	Yes; at home
10. Brain & CNS	No	No
11. Brain & CNS	No	No
12. Rhabdomyosarcoma	No	No
13. Leukemia	No	Yes; at work
14. Hodgkin's Lymphoma	Yes	Yes; at home and work
15. Brain & CNS	No	No
16. Melanoma of Skin	Yes	Yes; at home
17. Osteosarcoma	No	No
18. Pancreas	No	Yes; at work
19. Leukemia	No	No
20. Brain & CNS	No	No
21. Rhabdomyosarcoma	Yes	Yes; at work

Yes = 3 (14%)

No = 18 (86%)

Yes = 9 (43%)

No = 12 (57%)

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Office of Healthy Ohio, Ohio Department of Health, 2010.

<sup>2</sup>CNS= Central Nervous System

**Table 8**

**Maternal Use of Recreational Drugs, Consumption of Alcoholic Beverages, and Home Extermination during Pregnancy with Case: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=21<sup>1</sup>**

<u>Case</u>	<u>Recreational Drugs</u>	<u>Alcoholic Beverages</u>	<u>Home Extermination</u>
1. Leukemia	No	No	No
2. Brain & CNS <sup>2</sup>	No	No	No
3. Ewing's Sarcoma	No	No	Yes, insect bomb
4. Brain & CNS	No	No	No
5. Melanoma of Skin	No	No	No
6. Brain & CNS	No	No	No
7. Rhabdomyosarcoma	No	No	No
8. Thyroid	No	No	No
9. Hodgkin's Lymphoma	No	No	No
10. Brain & CNS	No	No	No
11. Brain & CNS	No	No	No
12. Rhabdomyosarcoma	No	No	No
13. Leukemia	No	No	Yes, insect bomb
14. Hodgkin's Lymphoma	No	No	No
15. Brain & CNS	No	No	No
16. Melanoma of Skin	No	No	No
17. Osteosarcoma	No	No	Don't know
18. Pancreas	No	No	No
19. Leukemia	No	No	No
20. Brain & CNS	No	No	Don't know
21. Rhabdomyosarcoma	No	No	No

Yes = 0 (0%)  
No = 21 (100%)

Yes = 0 (0%)  
No = 21 (100%)

Yes = 2 (10%)  
No = 17 (81%)  
Don't know = 2 (10%)

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Office of Healthy Ohio, Ohio Department of Health, 2010.

<sup>2</sup>CNS= Central Nervous System

**Table 9**

**Maternal Exposure during Pregnancy with Case to Paints, Cleaning Supplies, Fuels, Solvents, or Other Chemicals: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=21<sup>1</sup>**

<u>Case</u>	<u>Paints</u>	<u>Cleaning Supplies</u>	<u>Fuels</u>	<u>Solvents</u>	<u>Other Chemicals</u>
1. Leukemia	No	No	No	No	No
2. Brain & CNS <sup>2</sup>	No	No	Yes <sup>3</sup>	No	No
3. Ewing's Sarcoma	Yes <sup>4</sup>	No	No	No	No
4. Brain & CNS	No	No	No	No	Yes <sup>5</sup>
5. Melanoma of Skin	Yes <sup>4</sup>	No	No	No	No
6. Brain & CNS	No	No	Yes <sup>3</sup>	No	No
7. Rhabdomyosarcoma	No	No	No	No	No
8. Thyroid	No	No	No	No	No
9. Hodgkin's Lymphoma	No	No	No	No	No
10. Brain & CNS	Yes <sup>4</sup>	No	No	No	No
11. Brain & CNS	No	No	No	No	No
12. Rhabdomyosarcoma	No	No	No	No	Yes <sup>6</sup>
13. Leukemia	No	No	No	No	Yes <sup>6</sup>
14. Hodgkin's Lymphoma	No	No	No	No	Yes <sup>7</sup>
15. Brain & CNS	Yes <sup>4</sup>	No	No	No	Yes <sup>6</sup>
16. Melanoma of Skin	No	No	Yes <sup>3</sup>	No	Yes <sup>8</sup>
17. Osteosarcoma	Don't know	No	Don't know	Don't know	Don't know
18. Pancreas	No	No	No	No	No
19. Leukemia	Yes <sup>9</sup>	No	No	Yes <sup>9</sup>	Yes <sup>9</sup>
20. Brain & CNS	No	No	No	No	No
21. Rhabdomyosarcoma	Yes <sup>9</sup>	No	No	Yes <sup>9</sup>	Yes <sup>9</sup>

Yes=6 (29%)

	Yes=0 (0%)	Yes=3 (14%)	Yes=2 (10%)	Yes=8 (38%)
No=14 (67%)	No=21 (100%)	No=17 (81%)	No=18 (86%)	No=12 (57%)
Don't know = 1(5%)		Don't know = 1 (5%)	Don't know = 1 (5%)	Don't know = 1 (5%)

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Office of Healthy Ohio, Ohio Department of Health, 2010.

<sup>2</sup>CNS= Central Nervous System

<sup>3</sup>Propane gas

<sup>4</sup>Once or twice at home

<sup>5</sup>Secondary exposure to pesticides via handling fruits and vegetables

<sup>6</sup>Hair Dye

<sup>7</sup>Possible radiation exposure in medical setting

<sup>8</sup>Swimming pool chlorine

<sup>9</sup>Grease, paints, solvents in manufacturing plant

**Table 10**

**Birth Weight of Cases and History of Breast Feeding: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=21<sup>1</sup>**

<u>Case</u>	<u>Birth Weight</u>	<u>Breast Fed</u>
1. Leukemia	7 lb. 4 oz.	Yes
2. Brain & CNS <sup>2</sup>	7 lb. 10 oz.	Yes
3. Ewing's Sarcoma	8 lb. 3 oz.	Yes
4. Brain & CNS	7 lb. 5 oz.	Yes
5. Melanoma of Skin	8 lb. 2 oz.	Yes
6. Brain & CNS	8 lb. 2 oz.	Yes
7. Rhabdomyosarcoma	7 lb. 4 oz.	No
8. Thyroid	7 lb. 11 oz.	No
9. Hodgkin's Lymphoma	7 lb. 5 oz.	No
10. Brain & CNS	8 lb. 4 oz.	Yes
11. Brain & CNS	5 lb. 6 oz.	Yes
12. Rhabdomyosarcoma	6 lb. 1 oz.	No
13. Leukemia	6 lb. 12 oz.	Yes
14. Hodgkin's Lymphoma	7 lb. 6 oz.	No
15. Brain & CNS	7 lb. 5 oz.	Yes
16. Melanoma of Skin	7 lb. 3 oz.	No
17. Osteosarcoma	7 lb. 12 oz.	Unknown
18. Pancreas	7 lb. 11 oz.	Yes
19. Leukemia	7 lb. 4 oz.	Yes
20. Brain & CNS	7 lb. 9 oz.	Yes
21. Rhabdomyosarcoma	6 lb. 5 oz.	No

Range = 5 lb. 6 oz. – 8 lb. 4 oz.  
 Mean = 7 lb. 5 oz.

Yes = 13 (62%)  
 No = 7 (33%)  
 Unknown=1 (5%)

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Office of Healthy Ohio, Ohio Department of Health, 2010.

<sup>2</sup>CNS= Central Nervous System

**Table 11**

**Health Problems, Diagnosis of Birth Defects and/or Hereditary Disease, and/or Treatments at Birth or Within Six Months after Birth: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=21<sup>1</sup>**

<u>Case</u>	<u>Health Problems<sup>2</sup></u>	<u>Birth Defects/Hereditary Disease<sup>3</sup></u>	<u>Treatments<sup>4</sup></u>
1. Leukemia	No	No	No
2. Brain & CNS <sup>5</sup>	Yes; Respiratory Syncytial Virus (RSV) <sup>6</sup> , Chicken Pox	No	No
3. Ewing's Sarcoma	No	Yes; Webbed toes	No
4. Brain & CNS	No	No	No
5. Melanoma of Skin	No	No	No
6. Brain & CNS	Yes; jaundice, thrush <sup>7</sup> , ear infection	No	Yes; antibiotics
7. Rhabdomyosarcoma	Yes; jaundice, moderate to severe reflux with vomiting	No	Yes; UV lights for jaundice
8. Thyroid	No	No	No
9. Hodgkin's Lymphoma	Yes; jaundice, resuscitation at birth	No	Yes; UV lights for jaundice
10. Brain & CNS	No	No	No
11. Brain & CNS	No	No	No
12. Rhabdomyosarcoma	Yes; RSV	No	Yes; oxygen at birth; Amoxicillin
13. Leukemia	Yes; Emergency C-section, cord around arm; low heart rate; thrush; RSV	Yes, cardio-myopathy gene	No
14. Hodgkin's Lymphoma	Yes; jaundice	No	No
15. Brain & CNS	No	No	No
16. Melanoma of Skin	Yes; Epileptic Forme Seizures; colds, allergies; formula intolerance; allergic colitis	No	No
17. Osteosarcoma	Don't know	No	Don't know
18. Pancreas	Yes; Thrush	No	Yes; antibiotics for oral thrush
19. Leukemia	No	No	Yes; Oxygen, respirator
20. Brain & CNS	No	No	No
21. Rhabdomyosarcoma	Yes; Upper respiratory infection	No	Yes; antibiotics for upper respiratory infection

Yes=10 (48%)	Yes=2 (10%)	Yes=7 (33%)
No=10 (48%)	No=19 (90%)	No=13 (62%)
Don't know=1 (5%)		Don't know=1 (5%)

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Office of Healthy Ohio, Ohio Department of Health, 2010.

<sup>2</sup>Including jaundice, diarrhea and/or vomiting, infection, other.

<sup>3</sup>Including Down 's syndrome, Klinefelter's Syndrome, Fanconi Anemia, Bloom's Syndrome, Turner's Syndrome, Li-Fraumeni Syndrome, other.

<sup>4</sup>Including UV lights for jaundice, oxygen/respirator, blood transfusion, medication, other.

<sup>5</sup>CNS= Central Nervous System.

<sup>6</sup>Respiratory syncytial virus is a major cause of lower respiratory infections in infants.

<sup>7</sup>Infection of the mucosa of the mouth caused by *Candida albicans*. In patients with healthy immune systems, thrush occurs when the balance of normal flora is destroyed during antibiotic therapy or following the use of corticosteroid-based inhalers, which suppress normal white blood cell function in the mouth. Thrush is also common in patients receiving immunosuppressive therapy for organ transplants; in cancer patients; and in those with acquired immunodeficiency syndrome; in who oral candida infection may be chronic. Occasionally healthy neonates, and persons who wear dentures develop thrush.

**Table 12**

**Case History of Infectious Disease, Immunizations, and Exposure to Mononucleosis Prior to Cancer Diagnosis: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=21<sup>1</sup>**

<u>Case</u>	<u>Infectious Disease<sup>2</sup></u>	<u>Routine Childhood Immunizations<sup>3</sup></u>	<u>Exposure to Mononucleosis<sup>4</sup></u>
1. Leukemia	No	Yes	No
2. Brain & CNS <sup>5</sup>	Yes; Chicken pox, Respiratory Syncytial Virus (RSV) <sup>6</sup>	Yes	No
3. Ewing's Sarcoma	Yes; Chicken pox, Epstein Barr Virus <sup>7</sup>	Yes	No
4. Brain & CNS	Yes; Chicken pox	Yes	No
5. Melanoma of Skin	Yes; Chicken pox	Yes	Yes; sibling
6. Brain & CNS	Yes; Chicken pox, thrush	Yes	No
7. Rhabdomyosarcoma	Yes; Chicken pox	Yes	No
8. Thyroid	Yes; Chicken pox	Yes	No
9. Hodgkin's Lymphoma	Yes; Chicken pox	Yes	No
10. Brain & CNS	Yes, Rotavirus <sup>8</sup>	Yes	No
11. Brain & CNS	Yes; Chicken pox	Yes	No
12. Rhabdomyosarcoma	Yes, RSV	Yes	No
13. Leukemia	Yes; Thrush, RSV, chicken pox, cold sores, mononucleosis	Yes	Yes
14. Hodgkin's Lymphoma	Yes; Chicken pox	Yes	No
15. Brain & CNS	No	Yes	No
16. Melanoma of Skin	No	Yes	No
17. Osteosarcoma	No	Yes	No
18. Pancreas	Yes; Chicken pox, cold sores, thrush	Yes	No
19. Leukemia	No	Yes	Yes; sibling
20. Brain & CNS	Yes; Chicken pox	No	Don't know
21. Rhabdomyosarcoma	Yes; Upper respiratory infection	Yes	No

Yes = 16 (76%)  
No = 5 (24%)

Yes = 20 (95%)  
No = 1 (5%)

Yes = 3 (14%)  
No = 17 (81%)  
Don't Know=1 (5%)

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Office of Healthy Ohio, Ohio Department of Health, 2010.

<sup>2</sup>Includes: Diphtheria; Pertusis/whooping cough; Tetanus; Measles; Rubella (German Measles); Mumps; Polio; small pox; chicken pox; Hepatitis A, B, and C; cold sores (Herpes Simplex); Rheumatic fever; Mononucleosis

<sup>3</sup>Includes: Diphtheria; Pertusis/whooping cough; Tetanus; Measles; Rubella (German Measles); mumps; Polio; chicken pox; Hepatitis A & B

<sup>4</sup>Mononucleosis: An acute infectious disease caused by the Epstein-Barr virus, resulting in the presence of an abnormally high number of mononuclear leukocytes in the blood

<sup>5</sup>CNS= Central Nervous System

<sup>6</sup>Respiratory Syncytial virus (RSV) is a major cause of lower respiratory infections in infants

<sup>7</sup>Epstein-Barr virus is a member of the herpes virus family. It is one of the causes of infectious mononucleosis. In South African children it is associated with Burkitt's lymphoma; in Asian populations, with nasopharyngeal cancer.

<sup>8</sup>Rotaviruses are a group of viruses that worldwide are the most common cause of dehydrating diarrhea in children. The incubation period of the disease is short (1 to 3 days) and the transmission is via the fecal-oral route.

**Table 13**

**History of Surgery, Non-Routine X-Rays, Radiation Treatment, and Treatment for Head Lice Prior to Diagnosis: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=21<sup>1</sup>**

<u>Case</u>	<u>History of Surgery<sup>2</sup></u>	<u>Non-Routine X-Rays<sup>3</sup></u>	<u>Radiation Treatment</u>	<u>Treated for Head Lice</u>
1. Leukemia	No	No	No	No
2. Brain & CNS <sup>4</sup>	No	No	No	No
3. Ewing's Sarcoma	Yes; Tonsils and adenoids removed	Yes; IVP, <sup>5</sup> arm x-ray	No	No
4. Brain & CNS	No	No	No	No
5. Melanoma of Skin	Yes; Adenoids removed	Yes; IVP	No	No
6. Brain & CNS	No	Yes; Head x-ray	No	No
7. Rhabdomyosarcoma	No	Yes; Arm x-ray	No	No
8. Thyroid	No	No	No	Yes, Rid-X
9. Hodgkin's Lymphoma	Yes; Liver transplant, ear tubes, tonsils/ adenoids removed	Yes; Liver	No	No
10. Brain & CNS	No	No	No	No
11. Brain & CNS	Yes; Circumcision	Yes; Wrist	No	No
12. Rhabdomyosarcoma	No	No	No	No
13. Leukemia	No	No	No	No
14. Hodgkin's Lymphoma	Yes; Ear tubes, tonsils/ adenoids removed	Yes, Thumb	No	No
15. Brain & CNS	No	No	No	No
16. Melanoma of Skin	No	Yes; Chest x-ray	No	No
17. Osteosarcoma	Yes; Oral surgery for wisdom teeth	Yes; Total body x-rays after auto crash	No	No
18. Pancreas	Yes; Oral surgery for wisdom teeth, tightening of ankle ligaments, tonsils/ adenoids removed	Yes; Pre-ops for ankle surgery	No	No
19. Leukemia	Yes; Tonsils/ adenoids removed	No	No	No
20. Brain & CNS	No	No	No	No
21. Rhabdomyosarcoma	No	No	No	Yes, Rid-X

Continued on page 43

Yes=8 (38%)	Yes=10 (48%)	Yes=0 (0%)	Yes=2 (10%)
No=13 (62%)	No=11 (52%)	No=21 (100%)	No=19 (90%)

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Office of Healthy Ohio, Ohio Department of Health, 2010.

<sup>2</sup>Includes: Removing tonsils and adenoids; removal of appendix; heart valve repair; insertion of ear tubes, etc.

<sup>3</sup>As a result of injury, trauma, heart imaging, etc. Dental x-rays not included

<sup>4</sup>CNS= Central Nervous System

<sup>5</sup>IVP=Intravenous Pyelogram (a radiograph of the urethra and renal pelvis)

**Table 14**

**Case Use of Tobacco Products and Household Exposure to Environmental Tobacco Smoke Prior to Diagnosis: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=21<sup>1</sup>**

<u>Case</u>	<u>Use of Tobacco Products</u>	<u>Exposure to Environmental Tobacco Smoke</u>
1. Leukemia	No	No
2. Brain & CNS <sup>2</sup>	No	No
3. Ewing's Sarcoma	No	No
4. Brain & CNS	No	Yes, at baby sitter's
5. Melanoma of Skin	No	No
6. Brain & CNS	No	No
7. Rhabdomyosarcoma	No	No
8. Thyroid	No	Yes, at baby sitter's
9. Hodgkin's Lymphoma	No	Yes, at home
10. Brain & CNS	No	No
11. Brain & CNS	No	No
12. Rhabdomyosarcoma	No	No
13. Leukemia	No	Yes, at baby sitter's
14. Hodgkin's Lymphoma	No	Yes, at home
15. Brain & CNS	No	No
16. Melanoma of Skin	No	Yes, at home
17. Osteosarcoma	No	Yes, at home
18. Pancreas	No	No
19. Leukemia	No	No
20. Brain & CNS	No	No
21. Rhabdomyosarcoma	No	Yes, at home

Yes = 0 (0%)  
 No = 21 (100%)

Yes = 8 (38%)  
 No = 13 (62%)

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Office of Healthy Ohio, Ohio Department of Health, 2010.

<sup>2</sup>CNS= Central Nervous System

**Table 15**

**Case Use of Recreational Drugs and Alcoholic Beverages Prior to Diagnosis: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=21<sup>1</sup>**

<u>Case</u>	<u>Recreational Drugs</u>	<u>Alcoholic Beverages</u>
1. Leukemia	No	No
2. Brain & CNS <sup>2</sup>	No	No
3. Ewing's Sarcoma	No	No
4. Brain & CNS	No	No
5. Melanoma of Skin	No	No
6. Brain & CNS	No	No
7. Rhabdomyosarcoma	No	No
8. Thyroid	No	No
9. Hodgkin's Lymphoma	No	No
10. Brain & CNS	No	No
11. Brain & CNS	No	No
12. Rhabdomyosarcoma	No	No
13. Leukemia	No	No
14. Hodgkin's Lymphoma	No	No
15. Brain & CNS	No	No
16. Melanoma of Skin	No	No
17. Osteosarcoma	No	No
18. Pancreas	No	No
19. Leukemia	No	No
20. Brain & CNS	No	No
21. Rhabdomyosarcoma	No	No

No = 21 (100%)

No = 21 (100%)

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Office of Healthy Ohio, Ohio Department of Health, 2010.

<sup>2</sup>CNS= Central Nervous System

**Table 16**

**Case Use of Prescription and Over-the-Counter Medications within Three Years Prior to Diagnosis:  
Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=21<sup>1</sup>**

<u>Case</u>	<u>Prescription Medications</u>	<u>Over-the-Counter Medications</u>
1. Leukemia	No	No
2. Brain & CNS <sup>2</sup>	No	No
3. Ewing's Sarcoma	No	No
4. Brain & CNS	Yes; Antibiotics	No
5. Melanoma of Skin	Yes; Antibiotics	No
6. Brain & CNS	Yes; Antibiotics, Kondac	Yes; Children's pain relievers
7. Rhabdomyosarcoma	Yes; Amoxicillin, antihistamines, anti-seizure medications, pain relievers	Yes; Children's cough syrup, children's pain relievers
8. Thyroid	No	Yes; Menstrual cramp relief
9. Hodgkin's Lymphoma	Yes; Anti-rejection medications for transplant	Yes; Allergy relief
10. Brain & CNS	No	Yes; Pain relief
11. Brain & CNS	Yes; hyperactivity medications, antibiotics	No
12. Rhabdomyosarcoma	Yes; Antibiotics	Yes; Pain relief
13. Leukemia	Yes; Antibiotics for strep throat, compounds for wart removal	Yes; Pain relief
14. Hodgkin's Lymphoma	Yes; Allergy relief	Yes; Allergy relief
15. Brain & CNS	No	No
16. Melanoma of Skin	Yes; Anti-seizure medication, antibiotics, asthma/allergy relief, laxatives, iron supplements	Yes; Pain relief
17. Osteosarcoma	Yes; Antibiotics	No
18. Pancreas	Yes; Antibiotics, pain medication, acne medication	Yes; Pain relief
19. Leukemia	Yes; Allergy relief	No
20. Brain & CNS	Yes; Ringworm medication	No
21. Rhabdomyosarcoma	Yes; Antibiotics	No

Yes= 15 (71%)  
No= 6 (29%)

Yes=10 (48%)  
No= 11 (52%)

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Office of Healthy Ohio, Ohio Department of Health, 2010.

<sup>2</sup>CNS= Central Nervous System

**Table 17**

**Presence of Household Pets Prior to Diagnosis: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=20<sup>1</sup>**

<u>Case</u>	<u>Household Pet</u>	<u>Treatment for Fleas</u>
1. Leukemia	No	N.A. <sup>2</sup>
2. Brain & CNS <sup>3</sup>	No	N. A.
3. Ewing’s Sarcoma	Yes <sup>4</sup>	Flea Collar <sup>11</sup>
4. Brain & CNS	Yes <sup>4,5,6</sup>	No
5. Melanoma of Skin	Yes <sup>4,5, 7,8</sup>	Flea Powder <sup>11</sup>
6. Brain & CNS	Yes <sup>4</sup>	Flea Spray <sup>11</sup>
7. Rhabdomyosarcoma	Yes <sup>4</sup>	Flea Spray <sup>11</sup>
8. Thyroid	No	N. A.
9. Hodgkin’s Lymphoma	Yes <sup>4</sup>	Flea Spray, Collar <sup>11</sup>
10. Brain & CNS	No	N. A.
11. Brain & CNS	Yes <sup>4,5</sup>	Flea Spray, Collar <sup>11</sup>
12. Rhabdomyosarcoma	Yes <sup>4,5</sup>	No
13. Leukemia	Yes <sup>4,5</sup>	Flea Spray, Collar <sup>11</sup>
15. Brain & CNS	Yes <sup>4,5</sup>	Flea Spray, Collar <sup>11</sup>
16. Melanoma of Skin	Yes <sup>4,5</sup>	No
17. Osteosarcoma	Yes <sup>4,5</sup>	Flea Pills <sup>11</sup>
18. Pancreas	Yes <sup>4,5, 7 9,10</sup>	Flea Spray, Collars <sup>11</sup>
19. Leukemia	Yes <sup>4,5</sup>	Flea Spray, Collars <sup>11</sup>
20. Brain & CNS	Yes <sup>4,5</sup>	Flea Spray, Collars <sup>11</sup>
21. Rhabdomyosarcoma	Yes <sup>4,5</sup>	Flea Spray, Collars <sup>11</sup>

Yes =	16 (80%)	Yes =	13 (65%)
No =	4 (20%)	No =	3 (14%)
		N.A. =	4 (19%)

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Ohio Department of Health, 2010

<sup>2</sup>N.A. = Not Applicable

<sup>3</sup>CNS = Central Nervous System

<sup>4</sup>Dog

<sup>5</sup>Cat

<sup>6</sup>Rabbits

<sup>7</sup>Hamster

<sup>8</sup>Turtles

<sup>9</sup>Birds

<sup>10</sup>Rats

<sup>11</sup>Applied by adults

**Table 18**

**Residence in Close Proximity to Industrial Sites Prior to Diagnosis: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=20<sup>1</sup>**

<u>Case</u>	<u>Residence in Close Proximity to Industrial Site</u>	<u>Estimated Distance</u>	<u>Odors, Dusts, Noted</u>
1. Leukemia	No	N.A. <sup>2</sup>	N.A.
2. Brain & CNS <sup>3</sup>	No	N.A.	N.A.
3. Ewing's Sarcoma	No	N.A.	N.A.
4. Brain & CNS	Yes <sup>4,5</sup>	1 mile	Oil, chemicals
5. Melanoma of Skin	No	N.A.	N.A.
6. Brain & CNS	No	N.A.	N.A.
7. Rhabdomyosarcoma	Yes <sup>4</sup>	½ mile	Burning, irritating odors
8. Thyroid	Yes <sup>6</sup>	¼ mile	None
9. Hodgkin's Lymphoma	Yes <sup>4</sup>	1 mile	None
10. Brain & CNS	No	N.A.	N.A.
11. Brain & CNS	Yes <sup>5</sup>	Don't know	None
12. Rhabdomyosarcoma	Yes <sup>4,7</sup>	Don't know	Horrible smell
13. Leukemia	No	N.A.	N.A.
15. Brain & CNS	No	N.A.	N.A.
16. Melanoma of Skin	Yes <sup>8</sup>	1 mile	Dusts
17. Osteosarcoma	No	N.A.	N.A.
18. Pancreas	Yes <sup>7</sup>	3 miles	None
19. Leukemia	No	N.A.	N.A.
20. Brain & CNS	Yes <sup>7</sup>	1 mile	None
21. Rhabdomyosarcoma	Yes <sup>9</sup>	50 feet	Stone cutting dusts

Yes 10 (50%)

No 10 (50%)

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Ohio Department of Health, 2010

<sup>2</sup>N.A. = Not Applicable

<sup>3</sup>CNS=Central Nervous System

<sup>4</sup>Large Industrial Plant

<sup>5</sup>Old Landfill

<sup>6</sup>Trucking Site, junkyard

<sup>7</sup>Chemical Waste Disposal Site

<sup>8</sup>Light Manufacturing Plant

<sup>9</sup>Stone Cutting Site

**Table 19**

**Residence in Close Proximity to Cell Phone Towers, and/or High Voltage Electric Power Lines and Cell Phone Usage Prior to Diagnosis: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=20<sup>1</sup>**

<u>Case</u>	<u>Cell Phone Tower Close to Residence</u>	<u>High Voltage Electric Power Lines Close to Residence</u>	<u>Cell Phone Usage</u>
1. Leukemia	No	No	No
2. Brain & CNS <sup>2</sup>	No	No	No
3. Ewing's Sarcoma	No	No	No
4. Brain & CNS	Yes <sup>3</sup>	No	No
5. Melanoma of Skin	No	Yes <sup>4</sup>	No
6. Brain & CNS	No	No	No
7. Rhabdomyosarcoma	No	No	No
8. Thyroid	No	No	No
9. Hodgkin's Lymphoma	No	No	No
10. Brain & CNS	No	No	No
11. Brain & CNS	No	No	No
12. Rhabdomyosarcoma	Don't Know	No	No
13. Leukemia	No	No	No
15. Brain & CNS	No	No	Yes <sup>5</sup>
16. Melanoma of Skin	Don't Know	Don't Know	No
17. Osteosarcoma	Yes <sup>6</sup>	No	No
18. Pancreas	Yes <sup>7</sup>	Yes <sup>9</sup>	Yes <sup>8</sup>
19. Leukemia	No	No	No
20. Brain & CNS	No	No	No
21. Rhabdomyosarcoma	Yes <sup>10</sup>	No	No

<b>Yes= 4 (20%)</b>	<b>Yes=2 (10%)</b>	<b>Yes =2 (10%)</b>
<b>No= 14 (70%)</b>	<b>No=17 (85%)</b>	<b>No =18 (90%)</b>
<b>Don't Know= 2 (10%)</b>	<b>Don't Know=1 (5%)</b>	<b>Don' Know =0 (0%)</b>

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Ohio Department of Health, 2010

<sup>2</sup>CNS=Central Nervous System

<sup>3</sup>Four Hundred Yards away

<sup>4</sup>One Mile away

<sup>5</sup>Once a day

<sup>6</sup>0.5 Mile away

<sup>7</sup>0.5 Mile away

<sup>8</sup>Multiple times a day

<sup>9</sup>1,000 feet away

<sup>10</sup>0.5 Mile away

**Table 20**

**Ponds and Streams on Property of Residence Prior to Diagnosis: Eastern Sandusky County  
Childhood Cancer Profile, 1996-2010, n=20<sup>1</sup>**

<u>Case</u>	<u>POND</u>			<u>STREAM</u>		
	<u>Presence</u>	<u>Activity</u>	<u>Frequency</u>	<u>Presence</u>	<u>Activity</u>	<u>Frequency</u>
1. Leukemia	No	N.A. <sup>2</sup>	N.A.	No	N.A.	N.A.
2. Brain & CNS <sup>3</sup>	Yes	No	N.A.	No	N.A.	N.A.
3. Ewing's Sarcoma	No	N.A.	N.A.	No	N.A.	N.A.
4. Brain & CNS	No	N.A.	N.A.	Yes	Yes <sup>4</sup>	Seldom
5. Melanoma of Skin	Yes	Yes <sup>4,5</sup>	Often	Yes	Yes <sup>4,5</sup>	Sometimes
6. Brain & CNS	No	N.A.	N.A.	No	N.A.	N.A.
7. Rhabdomyosarcoma	No	N.A.	N.A.	Yes	No	N.A.
8. Thyroid	No	N.A.	N.A.	No	N.A.	N.A.
9. Hodgkin's Lymphoma	No	N.A.	N.A.	No	N.A.	N.A.
10. Brain & CNS	No	N.A.	N.A.	Yes	No	N.A.
11. Brain & CNS	No	N.A.	N.A.	No	N.A.	N.A.
12. Rhabdomyosarcoma	No	N.A.	N.A.	Yes	Yes <sup>6</sup>	Often
13. Leukemia	Yes	Yes <sup>4,5,7</sup>	Seldom	Yes	Yes <sup>4,7</sup>	Seldom
15. Brain & CNS	No	N.A.	N.A.	No	N.A.	N.A.
16. Melanoma of Skin	No	N.A.	N.A.	No	N.A.	N.A.
17. Osteosarcoma	No	N.A.	N.A.	Yes	No	N.A.
18. Pancreas	Yes	No	N.A.	No	N.A.	N.A.
19. Leukemia	Yes	Yes <sup>4,5,7</sup>	Seldom	Yes	Yes <sup>4,7</sup>	Seldom
20. Brain & CNS	No	N.A.	N.A.	No	N.A.	N.A.
21. Rhabdomyosarcoma	No	N.A.	N.A.	No	N.A.	N.A.

**Yes =5 (25%)**  
**No =15 (75%)**

**Yes = 8 (40%)**  
**No = 12 (60%)**

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Ohio Department of Health, 2010

<sup>2</sup>N.A. = Not Applicable

<sup>3</sup>CNS=Central Nervous System

<sup>4</sup>Wading

<sup>5</sup>Swimming

<sup>6</sup>Played along banks

<sup>7</sup>Fishing

**Table 21**

**Drinking Water Sources During Pregnancy and Birth to Diagnosis: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=20<sup>1</sup>**

<u>Case</u>	<u>DURING PREGNANCY</u>		<u>BIRTH TO DIAGNOSIS</u>	
	<u>Primary</u>	<u>Secondary</u>	<u>Primary</u>	<u>Secondary</u>
1. Leukemia	Private well	Bottled <sup>2</sup>	Private well	Private well
2. Brain & CNS <sup>3</sup>	Public <sup>4</sup>	Public <sup>4</sup>	None <sup>5</sup>	None <sup>5</sup>
3. Ewing's Sarcoma	Public <sup>6</sup>	Public <sup>6</sup>	Private well, public <sup>6,7</sup>	Public <sup>6,7</sup>
4. Brain & CNS	Public <sup>8</sup>	Public <sup>9</sup>	Public <sup>8</sup>	Public <sup>8</sup>
5. Melanoma of Skin	Private well, public <sup>4</sup>	Public <sup>4</sup>	Private well, public <sup>10</sup>	Public <sup>8</sup>
6. Brain & CNS	Private well	Public <sup>4</sup>	Private well, public <sup>4</sup>	Public <sup>4,7,11</sup>
7. Rhabdomyosarcoma	Private well	Private well <sup>12</sup>	Private well, public <sup>4</sup>	Private well, public <sup>4,9</sup>
8. Thyroid	Private well	Public <sup>4</sup>	Private well, public <sup>7</sup>	Private well
9. Hodgkin's Lymphoma	Public <sup>7</sup>	Public <sup>4</sup>	Public <sup>4,7</sup>	Public <sup>4</sup>
10. Brain & CNS	Public <sup>13</sup>	Public <sup>4</sup>	Private well, public <sup>4</sup>	Public <sup>4,7</sup>
11. Brain & CNS	Public <sup>14</sup>	Public <sup>14</sup>	Private well, public <sup>4</sup>	Public <sup>4</sup>
12. Rhabdomyosarcoma	Public <sup>4</sup>	Public <sup>4</sup>	Public <sup>4</sup>	Public <sup>4,7</sup>
13. Leukemia	Private well	Public <sup>4</sup>	Private well	Public <sup>4,9</sup>
15. Brain & CNS	Public <sup>4</sup>	Public <sup>4</sup>	Public <sup>4</sup>	Public <sup>4</sup>
16. Melanoma of Skin	Public <sup>15</sup>	Public <sup>4</sup>	Public <sup>15</sup>	Public <sup>7</sup>
17. Osteosarcoma	Public <sup>16</sup>	Public <sup>16</sup>	Private well, public <sup>4,15</sup>	Public <sup>4,7</sup>
18. Pancreas	Public <sup>17</sup>	Public <sup>13</sup>	Public <sup>15,17</sup>	Public <sup>13</sup>
19. Leukemia	Private well	Public <sup>4</sup>	Private well	Public <sup>4,9</sup>
20. Brain & CNS	Public <sup>13</sup>	Public <sup>11</sup>	Public <sup>13</sup> , cistern <sup>18</sup>	Public <sup>13</sup> , cistern <sup>15</sup>
<u>21. Rhabdomyosarcoma</u>	<u>Public<sup>11</sup></u>	<u>Public<sup>4</sup></u>	<u>Private well</u>	<u>Public<sup>4,11</sup></u>

<b>Private Well</b>	<b>7 (35%)</b>	<b>1 (5%)</b>	<b>12 (60%)</b>	<b>3 (15%)</b>
<b>Public</b>	<b>14 (70%)</b>	<b>18 (90%)</b>	<b>15 (75%)</b>	<b>17 (85%)</b>
<b>Bottled</b>	<b>0 (0%)</b>	<b>1 (5%)</b>	<b>0 (0%)</b>	<b>0 (0%)</b>
<b>Cistern</b>	<b>0 (0%)</b>	<b>0 (0%)</b>	<b>1 (5%)</b>	<b>1 (5%)</b>
<b>None</b>	<b>0 (0%)</b>	<b>0 (0%)</b>	<b>1 (5%)</b>	<b>1 (5%)</b>

Continued on page 53

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Ohio Department of Health, 2010

<sup>2</sup>Private company

<sup>3</sup>CNS=Central Nervous System

<sup>4</sup>Clyde City

<sup>5</sup>Child was exclusively breast fed

<sup>6</sup>Toledo City

<sup>7</sup>Fremont City

<sup>8</sup>Hauled from Clyde City

<sup>9</sup>Green Springs City

<sup>10</sup>Hauled from Castalia

<sup>11</sup>Bellevue City

<sup>12</sup>Lyme School

<sup>13</sup>Sandusky County

<sup>14</sup>Detroit City

<sup>15</sup>Northern Ohio Rural Water

<sup>16</sup>Pewaukee City, WI

<sup>17</sup>Hauled from Sandusky City

<sup>18</sup>Mountain water with collection cistern in Idaho

**Table 22**

**Presence of Old Dumps/Waste Disposal Areas on Property of Residence Prior to Diagnosis:  
Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=20<sup>1</sup>**

<u>Case</u>	<u>Presence: Yes/No</u>	<u>Potential Exposure</u>
1. Leukemia	No	N.A. <sup>2</sup>
2. Brain & CNS <sup>3</sup>	No	N.A.
3. Ewing's Sarcoma	No	N.A.
4. Brain & CNS	No	N.A.
5. Melanoma of Skin	Yes <sup>4</sup>	Don't Know
6. Brain & CNS	No	N.A.
7. Rhabdomyosarcoma	No	N.A.
8. Thyroid	No	N.A.
9. Hodgkin's Lymphoma	No	N.A.
10. Brain & CNS	Yes <sup>5</sup>	Don't Know
11. Brain & CNS	No	N.A.
12. Rhabdomyosarcoma	Yes <sup>6</sup>	Don't Know
13. Leukemia	No	N.A.
15. Brain & CNS	No	N.A.
16. Melanoma of Skin	Don't Know	Don't Know
17. Osteosarcoma	Don't Know	Don't Know
18. Pancreas	No	N.A.
19. Leukemia	No	N.A.
20. Brain & CNS	No	N.A.
21. Rhabdomyosarcoma	Yes <sup>7</sup>	Yes; Played outside near site

Yes 4 (20%)  
 No 14 (70%)  
 Don't Know 2 (10%)

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Ohio Department of Health, 2010

<sup>2</sup>N.A. = Not Applicable

<sup>3</sup>CNS=Central Nervous System

<sup>4</sup>Buried trash, outhouse till 1950s

<sup>5</sup>Found buried trash, broken glass

<sup>6</sup>Have heard that there is old dump on property

<sup>7</sup>Map shows old dump on property

Table 23

**Tearing Down and/or Burning of Buildings/Structures on Property of Residence Prior to Diagnosis: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=20<sup>1</sup>**

<u>Case</u>	<u>Buildings/Structure Torn Down or Burned</u>	<u>Description</u>	<u>Disposition</u>
1. Leukemia	No	N.A. <sup>2</sup>	N.A.
2. Brain & CNS <sup>3</sup>	Yes	Barn	Fell down, deteriorated on property
3. Ewing's Sarcoma	No	N.A.	N.A.
4. Brain & CNS	No	N.A.	N.A.
5. Melanoma of Skin	Yes	Shed, corncrib	Burned/hailed away
6. Brain & CNS	No	N.A.	N.A.
7. Rhabdomyosarcoma	No	N.A.	N.A.
8. Thyroid	No	N.A.	N.A.
9. Hodgkin's Lymphoma	No	N.A.	N.A.
10. Brain & CNS	No	N.A.	N.A.
11. Brain & CNS	Yes	Structure with unknown use	Hauled away
12. Rhabdomyosarcoma	No	N.A.	N.A.
13. Leukemia	No	N.A.	N.A.
15. Brain & CNS	No	N.A.	N.A.
16. Melanoma of Skin	Yes	Old trailer	Burned on site
17. Osteosarcoma	No	N.A.	N.A.
18. Pancreas	No	N.A.	N.A.
19. Leukemia	No	N.A.	N.A.
20. Brain & CNS	No	N.A.	N.A.
21. Rhabdomyosarcoma	No	N.A.	N.A.

Yes = 4 (20%)

No = 16 (80%)

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Ohio Department of Health, 2010

<sup>2</sup>N.A. = Not Applicable

<sup>3</sup>CNS=Central Nervous System

**Table 24**

**Painting and Remodeling in Home Prior to Diagnosis: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=20<sup>1</sup>**

<u>Case</u>	<u>Painting/Remodeling</u>	<u>Description</u>
1. Leukemia	No	N.A. <sup>2</sup>
2. Brain & CNS <sup>3</sup>	No	N.A.
3. Ewing's Sarcoma	No	N.A.
4. Brain & CNS	Yes	Periodic painting, wall papering
5. Melanoma of Skin	Yes	Built an additional room
6. Brain & CNS	Yes	Built new home
7. Rhabdomyosarcoma	No	N.A.
8. Thyroid	No	N.A.
9. Hodgkin's Lymphoma	No	N.A.
10. Brain & CNS	Yes	Built new home
11. Brain & CNS	No	N.A.
12. Rhabdomyosarcoma	No	N.A.
13. Leukemia	Yes	New garage, rooms
15. Brain & CNS	Yes	Finished attic, new walls
16. Melanoma of Skin	No	N.A.
17. Osteosarcoma	Yes	New roof
18. Pancreas	No	N.A.
19. Leukemia	No	N.A.
20. Brain & CNS	No	N.A.
21. Rhabdomyosarcoma	No	N.A.

Yes = 7 (35%)

No = 13 (65%)

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Ohio Department of Health, 2010

<sup>2</sup>N.A. = Not Applicable

<sup>3</sup>CNS=Central Nervous System

**Table 25**

**Local Fish and Game Consumption Prior to Diagnosis: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=20<sup>1</sup>**

<u>Case</u>	<u>Locally Caught Fish</u>	<u>Local Game</u>
1. Leukemia	No	No
2. Brain & CNS <sup>2</sup>	No	No
3. Ewing's Sarcoma	No	No
4. Brain & CNS	No	No
5. Melanoma of Skin	Yes <sup>3</sup>	Yes <sup>4</sup>
6. Brain & CNS	No	No
7. Rhabdomyosarcoma	No	No
8. Thyroid	No	No
9. Hodgkin's Lymphoma	No	No
10. Brain & CNS	Yes <sup>3</sup>	Yes <sup>5</sup>
11. Brain & CNS	No	No
12. Rhabdomyosarcoma	No	Yes <sup>5</sup>
13. Leukemia	No	Yes <sup>5</sup>
15. Brain & CNS	No	No
16. Melanoma of Skin	No	No
17. Osteosarcoma	No	No
18. Pancreas	No	No
19. Leukemia	No	Yes <sup>5</sup>
20. Brain & CNS	No	No
21. Rhabdomyosarcoma	No	Yes <sup>5</sup>

Yes = 2 (10%)  
No = 18 (90%)

Yes = 6 (30%)  
No = 14 (70%)

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Ohio Department of Health, 2010

<sup>2</sup>CNS=Central Nervous System

<sup>3</sup>Lake Erie perch at restaurants less than once a month

<sup>4</sup>Venison and pheasant less than once a month

<sup>5</sup>Venison less than once a month

Table 26

Fill Dirt Ever Brought Onto Property Prior to Diagnosis: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=20<sup>1</sup>

<u>Case</u>	<u>Fill Dirt Brought Onto Property</u>	<u>Description</u>
1. Leukemia	No	N.A. <sup>2</sup>
2. Brain & CNS <sup>3</sup>	No	N.A.
3. Ewing's Sarcoma	No	N.A.
4. Brain & CNS	No	N.A.
5. Melanoma of Skin	Yes <sup>4</sup>	None
6. Brain & CNS	No	N.A.
7. Rhabdomyosarcoma	Yes <sup>5</sup>	When house was built
8. Thyroid	No	N.A.
9. Hodgkin's Lymphoma	No	N.A.
10. Brain & CNS	Yes <sup>6</sup>	All around property
11. Brain & CNS	Don't Know	N.A.
12. Rhabdomyosarcoma	No	N.A.
13. Leukemia	No	N.A.
15. Brain & CNS	Yes <sup>7</sup>	All around property
16. Melanoma of Skin	No	N.A.
17. Osteosarcoma	No	N.A.
18. Pancreas	No	N.A.
19. Leukemia	No	N.A.
20. Brain & CNS	No	N.A.
21. Rhabdomyosarcoma	Yes <sup>7</sup>	Flowerbeds, leveling of ground

Yes = 5 (25%)  
 No = 14 (70%)  
 Don't know = 1 (5%)

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Ohio Department of Health, 2010

<sup>2</sup>N.A. = Not Applicable

<sup>3</sup>CNS=Central Nervous System

<sup>4</sup>Dirt from a private club; sand from Sandhill/Mason Road

<sup>5</sup>Prior to birth of case

<sup>6</sup>30 loads from various places in Clyde area

<sup>7</sup>Numerous loads of dirt and gravel from Sandusky and Seneca Counties

Table 27

Use of Wood-Burning Stoves and Fireplaces in the Home Prior to Diagnosis: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=20<sup>1</sup>

<u>Case</u>	<u>Outside Wood-Burning Stove</u>	<u>Inside Wood-Burning Stove/Fireplace</u>	<u>Source of Wood</u>
1. Leukemia	No	Yes <sup>2</sup>	On property
2. Brain & CNS <sup>3</sup>	No	Yes <sup>4</sup>	On property
3. Ewing's Sarcoma	No	Yes <sup>5</sup>	No answer
4. Brain & CNS	No	Yes	No answer
5. Melanoma of Skin	No	Yes <sup>4</sup>	Woods near Attica
6. Brain & CNS	No	No	N.A. <sup>6</sup>
7. Rhabdomyosarcoma	No	No	N.A.
8. Thyroid	No	No	N.A.
9. Hodgkin's Lymphoma	No	No	N.A.
10. Brain & CNS	No	No	N.A.
11. Brain & CNS	No	No	N.A.
12. Rhabdomyosarcoma	No	No <sup>7</sup>	N.A.
13. Leukemia	No	No	N.A.
15. Brain & CNS	No	Yes <sup>8</sup>	Nearby woods
16. Melanoma of Skin	No	No	N.A.
17. Osteosarcoma	No	No	N.A.
18. Pancreas	Yes <sup>9</sup>	Yes <sup>9</sup>	On property
19. Leukemia	No	No	N.A.
20. Brain & CNS	No	No	N.A.
21. Rhabdomyosarcoma	No	Yes <sup>10</sup>	On property

Yes = 1 (5%)  
No = 20 (95%)

Yes = 8 (40%)  
No = 12 (60%)

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Ohio Department of Health, 2010

<sup>2</sup>Fireplace on main floor used on special occasions; basement wood-burning stove used occasionally

<sup>3</sup>CNS=Central Nervous System

<sup>4</sup>Used all winter

<sup>5</sup>Occasional use

<sup>6</sup>N.A. = Not Applicable

<sup>7</sup>However, frequent visits to grandfather's house where a wood-burning stove was the primary source of heat

<sup>8</sup>Once or twice a week

<sup>9</sup>Daily during cold months

<sup>10</sup>Once a week during cold months

**Table 28**

**Types of Fuels Used to Heat Homes Prior to Diagnosis: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=20<sup>1</sup>**

<u>Case</u>	<u>Type of Fuel</u>	<u>Location of Storage Tanks</u>
1. Leukemia	Natural gas, wood	N.A. <sup>2</sup>
2. Brain & CNS <sup>3</sup>	Propane, wood	Outside, away from house
3. Ewing's Sarcoma	Natural gas, electricity, wood	N.A.
4. Brain & CNS	Propane, wood, electricity	Outside, away from house
5. Melanoma of Skin	Propane, wood	Outside, away from house
6. Brain & CNS	Propane, natural gas	Outside, next to house
7. Rhabdomyosarcoma	Propane, natural gas	Outside, next to house
8. Thyroid	Propane, natural gas	Outside, away from house
9. Hodgkin's Lymphoma	Natural gas	N.A.
10. Brain & CNS	Natural gas, kerosene/fuel oil	Outside, next to house
11. Brain & CNS	Natural gas	N.A.
12. Rhabdomyosarcoma	Don't know	N.A.
13. Leukemia	Propane, natural gas, electricity	Outside, next to house
15. Brain & CNS	Natural gas, wood	N.A.
16. Melanoma of Skin	Propane, electricity, kerosene/fuel oil	Outside, next to house
17. Osteosarcoma	Propane, natural gas	Outside, next to house
18. Pancreas	Propane, wood	Outside, away from house
19. Leukemia	Propane, electricity	Outside, away from house
20. Brain & CNS	Propane, natural gas	Outside, away from house
21. Rhabdomyosarcoma	Natural gas, wood	N.A.

Propane gas: 12 (60%)

Natural gas: 13 (60%)

Wood: 8 (40%)

Electricity: 4 (20%)

Kerosene/fuel oil: 2 (10%)

Don't know: 1 (5%)

\*Note: Totals do not equal 20 or 100% because many homes had multiple fuels

Outside, away from house: 7 (54%)

Outside, next to house: 6 (46%)

\*Note: the denominator consists of the 13 homes using propane gas, kerosene/fuel oil.

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Ohio Department of Health, 2010

<sup>2</sup>N.A. = Not Applicable

<sup>3</sup>CNS=Central Nervous System

Table 29

Storage of Solvents, Fuels, and Other Chemicals in Living Area or Basement of Residence Prior to Diagnosis: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=20<sup>1</sup>

<u>Case Number</u>	<u>Case Site/Type</u>	<u>Paints</u>	<u>Cleaning Supplies</u>	<u>Fuels</u>	<u>Solvents</u>	<u>Other Chemicals</u>
1.	Leukemia	Yes <sup>2</sup>	No	No	No	No
2.	Brain & CNS <sup>3</sup>	Yes <sup>4,5</sup>	No	No	No	No
3.	Ewing's Sarcoma	Yes <sup>5</sup>	No	No	No	No
4.	Brain & CNS	Yes <sup>5</sup>	No	No	No	No
5.	Melanoma of Skin	No	No	No	No	No
6.	Brain & CNS	Yes <sup>5</sup>	No	No	No	No
7.	Rhabdomyosarcoma	No	No	No	No	No
8.	Thyroid	Yes <sup>5</sup>	No	No	No	No
9.	Hodgkin's Lymphoma	Yes <sup>5</sup>	No	No	No	No
10.	Brain & CNS	Yes <sup>5</sup>	No	No	No	No
11.	Brain & CNS	No	No	No	No	No
12.	Rhabdomyosarcoma	No	No	No	No	No
13.	Leukemia	Yes <sup>5</sup>	No	No	No	No
15.	Brain & CNS	Yes <sup>5</sup>	No	No	No	No
16.	Melanoma of Skin	No	No	No	No	No
17.	Osteosarcoma	Yes <sup>5</sup>	No	No	No	No
18.	Pancreas	Yes <sup>5</sup>	No	No	No	No
19.	Leukemia	Yes <sup>5</sup>	No	No	No	No
20.	Brain & CNS	No	No	No	No	No
21.	Rhabdomyosarcoma	No	No	No	No	No

Yes = 13 (65%)      0 (0%)      0 (0%)      0 (0%)      0 (0%)  
 No = 7 (35%)      20 (100%)      20 (100%)      20 (100%)      20 (100%)

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Ohio Department of Health, 2010

<sup>2</sup>"Back Room" of home

<sup>3</sup>Central Nervous System

<sup>4</sup>Living area

<sup>5</sup>Basement

**Table 30**

**Location of Patient Bedroom in Relation to Garage Prior to Diagnosis: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=20<sup>1</sup>**

<u>Case Number</u>	<u>Case Site/Type</u>	<u>Attached or Separate Garage</u>	<u>Location of Case Bedroom</u>
1.	Leukemia	Separate	N.A. <sup>2</sup>
2.	Brain & CNS <sup>3</sup>	Separate	N.A.
3.	Ewing's Sarcoma	Attached	First Floor, away from garage
4.	Brain & CNS	Separate	N.A.
5.	Melanoma of Skin	Separate	N.A.
6.	Brain & CNS	Attached	Over garage
7.	Rhabdomyosarcoma	Attached	First Floor
8.	Thyroid	Attached	Second floor, away from garage
9.	Hodgkin's Lymphoma	Separate	N.A.
10.	Brain & CNS	Attached	Second floor, away from garage
11.	Brain & CNS	Separate	N.A.
12.	Rhabdomyosarcoma	Attached	Second floor, away from garage
13.	Leukemia	Attached	First Floor
15.	Brain & CNS	Attached	Second floor, away from garage
16.	Melanoma of Skin	No Garage	N.A.
17.	Osteosarcoma	Attached	Basement
18.	Pancreas	Attached	Second floor, away from garage
19.	Leukemia	Attached	First Floor
20.	Brain & CNS	Attached	Second floor, away from garage
21.	Rhabdomyosarcoma	Separate	N.A.

Attached= 12 (60%)

Separate= 7 (35%)

No Garage= 1 (5%)

Over attached garage= 1 (8%)

Away from attached garage= 7 (58%)

First floor, not specified= 3 (25%)

Basement=1 (8%)

\*Note: the denominator is the 12 homes with attached garages

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Ohio Department of Health, 2010

<sup>2</sup>N.A. = Not Applicable

<sup>3</sup>CNS=Central Nervous System

**Table 31**

**Use of Playgrounds and Parks Prior to Diagnosis: Eastern Sandusky County Childhood Cancer Profile, 1996-2010, n=20<sup>1</sup>**

<u>Case Number</u>	<u>Case Site/Type</u>	<u>Park/Playground</u>	<u>Frequency</u>
1.	Leukemia	None	N.A. <sup>2</sup>
2.	Brain & CNS <sup>3</sup>	None	N.A.
3.	Ewing's Sarcoma	East side Park, Fremont	Often
4.	Brain & CNS	Community Park, Clyde	Often
5.	Melanoma of Skin	<ul style="list-style-type: none"> <li>● South main School Park, Clyde</li> <li>● Wee People, Castalia</li> </ul>	Seldom Sometimes
6.	Brain & CNS	None	N.A.
7.	Rhabdomyosarcoma	<ul style="list-style-type: none"> <li>● Community Park, Clyde</li> <li>● Green Springs Park, Green Springs</li> <li>● Connor Park, Fremont</li> </ul>	Often Seldom Seldom
8.	Thyroid	None	N.A.
9.	Hodgkin's Lymphoma	None	N.A.
10.	Brain & CNS	<ul style="list-style-type: none"> <li>● Community Park, Clyde</li> <li>● Clyde High School Fields, Clyde</li> <li>● McPherson Middle School Park, Clyde</li> </ul>	Often Often Often
11.	Brain & CNS	Community Park, Clyde	Often
12.	Rhabdomyosarcoma	Community Park, Clyde	Often
13.	Leukemia	Community Park, Clyde	Often
15.	Brain & CNS	<ul style="list-style-type: none"> <li>● South Main School Park, Clyde</li> <li>● Community Park, Clyde</li> </ul>	Often Sometimes
16.	Melanoma of Skin	Community Park, Clyde	Often
17.	Osteosarcoma	None	N.A.
18.	Pancreas	None	N.A.
19.	Leukemia	Community Park, Clyde	Often
20.	Brain & CNS	None	N.A.
21.	Rhabdomyosarcoma	None	N.A.

- East Side Park, Fremont= 1 (5%)
- Connor Park, Fremont= 1 (5%)
- Wee People, Castalia= 1 (5%)
- Green Springs Park, Green Springs= 1 (5%)
- Community Park, Clyde= 9 (45%)
- South Main School Park, Clyde= 2 (10%)
- Clyde High School fields, Clyde= 1 (5%)
- McPherson Middle School Park, Clyde= 1 (5%)
- None= 9 (45%)

<sup>1</sup>Source: Sandusky County Health Department; Comprehensive Cancer Control Program, Ohio Department of Health, 2010

<sup>2</sup>N.A. = Not Applicable

<sup>3</sup>CNS=Central Nervous System