



Frequently Asked Questions

Expected Number of Primary Malignant and Non-Malignant Brain and Other Central Nervous System Tumors Among Students and Employees at Colonia High School in Woodbridge, NJ

Why are state cancer rates available for different years based on whether a brain tumor is malignant or non-malignant?

The New Jersey State Cancer Registry (NJSCR) maintains complete years of cancer data in New Jersey beginning in 1979. Incident cases of malignant tumors of the brain and central nervous system were reported to the NJSCR beginning in 1979. At the time this analysis was conducted, incidence data were considered complete for all years up to 2019. On January 1, 2004, all cancer registrars in the United States began to include non-malignant (benign and borderline) tumors of the brain and central nervous system.

Why does this analysis obtain expected numbers based on two different time periods of cancer rates?

For non-malignant brain and other central nervous system (CNS) tumors expected numbers were calculated using state cancer rates for 2004 to 2019 and 2015 to 2019 separately. The Department thought it was important to show the results of both time periods as the non-malignant expected numbers are higher in the 2015 to 2019 time period due to higher rates of non-malignant brain tumors during the more recent years. Since non-malignant brain and other CNS tumors began being reported to the NJSCR in 2004, the incidence rates of these types of tumors have increased. The Department thought it was important to show the expected number based on the more recent rates, if improvements of reporting these types of tumors is part of the reason for the increase.

What period of time do these expected numbers cover?

The expected number of brain and other CNS tumors among students are those that occur over the time period from 1968 to 2021 (since the school was opened after construction in 1967). For the estimated number of teachers and staff, the expected number is based on their lifetime risk.

Why did you choose 1968 to 2021 to define the cohort of students and staff?

This approach of calculating the expected number of brain and other CNS tumors is to provide information on how many tumors would be expected if the state rates were applied to this population. The Department defined the cohort, or population, to include all students and staff who attended or worked at Colonia High School since it opened in 1968 to the present.

It is important to note, when evaluating the incidence of cancer in the presence of an established environmental exposure pathway, the time frame and geographic area would be defined by the exposure pathway. For example, if environmental contamination occurred over a specific time period, the expected number of tumors would be based on that time frame. Similarly, if environmental contamination was identified, the population at-risk would include those within the delineated area of

environmental contamination. As no environmental contamination has been established at Colonia High School, the Department defined the cohort based on attendance or work at the high school.

Why do the rates from the state cancer registry differ from this period of time?

The time period of 1968 to 2021 is what defines the cohort, the number of people at risk to develop a benign brain and other CNS tumor. The state cancer rates from the NJSCR are based on the rates for the entire state during a time period (2004 to 2019 and 2015 to 2019). These state rates are applied to the time period of 1968 to 2021.

Why did the Department choose those time periods for cancer rates from NJSCR?

As discussed above, non-malignant brain and other CNS began being reported in 2004 so the rates of these types of tumors are not available prior to 2004. The more recent time period may more accurately reflect the true incidence rate of disease because of improvements in reporting.

Why did the Department use the registry data from 2004 to 2019 instead of 1979 to 2019 for malignant brain and other CNS tumor rates?

Malignant brain and other CNS tumors have remained fairly consistent over time (with a slight decrease over the past 30 years). Although the malignant rates are available since 1979 when the registry began, the calculated expected numbers were consistent across the three time periods, just slightly higher when using the 1979 to 2019 time period. Therefore, for simplicity, the expected number of malignant brain and other CNS tumors are only shown for the two more recent time periods.

The report includes calculated expected numbers based on two analytic methods, (1) risk approach and (2) incidence rate approach. Why did the Department use both methods of analysis to determine the expected number among students?

The risk approach is very familiar to some individuals, and it may be considered more intuitive than the other approach. Some people are very familiar in thinking of terms of risk. Alternatively, epidemiologists often use the application of annual incidence rates to a cohort of person-years, so the Department thought it would be useful to show this method as well. It also is important to know that both estimates provided the same range of expected numbers among students.

Why did the Department only use the risk method to determine the expected number among teachers and staff?

The Department could only use a risk approach for teachers and staff because the age and year specific cohort is not available to apply the incidence rate to person years in the cohort. A general lifetime risk formula was used for a broad age range since the age and year that each teacher and staff member began working is not known. Those two factors (age at “entry” in school and time since they entered in the school) are necessary to calculate the age and time specific risk or to determine the person years in the cohort.

Can the Department obtain the cases from this cohort directly from the cancer registry?

Incident brain and other CNS tumors can be obtained from the NJSCR for current community members since the residency in the registry is the address the person was living at the time of diagnosis. However, this cohort includes former residents and the Department cannot identify former students or teachers who may live in another town.

What is the difference between “ionizing” and “non-ionizing” radiation?

Ionizing radiation is a form of energy that acts by removing electrons from atoms and molecules of materials that include air, water, and living tissue. Common examples of this type of high frequency radiation include natural sources such as radon and radiation from space, and from manmade sources such as x-rays and CT scans. *Non-ionizing radiation*, unlike x-rays and other forms of ionizing radiation, does not have enough energy to remove electrons from atoms and molecules. Examples include microwaves used in the home kitchen, infrared radiation used in heat lamps, and ultraviolet (UV) radiation from the sun and tanning beds.

What is a latency period? Why do epidemiological analyses that are based on environmental exposures incorporate a latency period? Was a latency period factored in the Colonia High School expected analysis?

A latency period takes into account the number of years after an exposure occurs for a tumor to be diagnosed in a person exposed to a hazardous substance. When evaluating health outcomes among a population exposed to a particular hazardous substance, epidemiological analyses account for varying times to develop a disease after an exposure (i.e., a latency period). Often the analysis will be carried out using different time frames to account for the latency period. As an example, multiple analyses are conducted separately to include cancers diagnosed in different time frames. Specifically, one analysis would include cancers diagnosed immediately after the exposure occurred, and separate analyses would include cancers that were diagnosed five (or ten or more) years after the exposure occurred. These types of epidemiological analyses are based on known environmental exposures.

The purpose of the Colonia High School expected analysis is to provide information on how many primary brain and other central nervous system tumors would be expected if the rates that occur statewide are applied to this population. This analysis is not based on an environmental exposure and therefore, the population is not defined by time from exposure.

How was age factored in this analysis?

DOH calculated an expected number of brain and other central nervous system tumors among former students using the age and year of each cohort of first-year students entering Colonia High School to apply age-specific state rates. Age-specific incidence rates for the state were obtained from the state cancer registry and applied to the age-specific population to obtain expected numbers. Specifically, we calculated an expected number of brain and other central nervous system tumors among Colonia High School students based on applying age-specific state rates to each cohort of first-year students entering Colonia High School, which accounted for their age and their time in the cohort.

This report calculates an estimate of the age-specific expected number of brain and other central nervous system tumors based on the states incidence rates.

How many students were in the cohort based on the record review?

Based on the record review detailed in the report, the number of students who attended the school between 1968 to 2021 was 19,272.

Why did the Department include classes as recent as 2021 when cancers can take decades or longer to develop?

Latency (which takes into account the timeframe for cancers to develop) should be considered in evaluating health outcomes in a scenario where there are defined environmental exposures. This cohort was not defined by an environmental exposure pathway and there is no latency period to be considered. The purpose of this analysis is to provide information on how many primary brain and other central nervous system tumors would be expected if the rates that occur statewide are applied to this population. As noted in the FAQs, if environmental contamination occurred over a specific time-period, the expected number of tumors would be based on that time frame. As no environmental contamination has been established at Colonia High School, the Department defined the cohort based on attendance or work at the high school.

It should be noted that although rare, pediatric brain and other CNS tumors do occur and it is conceivable that a younger person who recently attended CHS could be diagnosed with a brain and other CNS tumor. Although the risk of pediatric (ages infancy to 19) brain and other CNS tumors is very low, the incidence rate is highest among the 14 to 19-year-old population.

The objective of providing the expected number is to be responsive to concerns of all CHS community members who may have been impacted by brain and other CNS tumors. Since the purpose of this analysis is to provide the expected number of brain and other CNS tumors among this population and it is unfortunately possible that there are students who entered CHS in recent years who may have developed a brain and other CNS tumor, all CHS students were included in this cohort.

It is important to note that the inclusion of recent school attendees to this cohort contributed minimally to the calculated expected number of total expected cancers. This is because the risk of developing a brain tumor among students who graduated in the most recent years is extremely low (for example, the risk or probability of a 14-year-old developing a brain cancer over the next three, six, or ten years is minimal). As such, the most recent years of the student cohort contributed a very small number into the total calculated expected number.

Updated 9/28/2022