



## **Cancer Incidence Investigation 1995-2014**

**Village of Hoosick Falls,  
Rensselaer County, New York**

**May 2017**

## **Suggested Citation:**

New York State Department of Health. 2017. Cancer Incidence Investigation: Village of Hoosick Falls, Rensselaer County, New York. May 2017.

This report is available online at: <http://www.health.ny.gov/hoosick/>. For additional hard copies of the report call 518-402-7950.

For questions and comments please call the Bureau of Environmental and Occupational Epidemiology at 518-402-7950, or send an email to [BEOE@health.ny.gov](mailto:BEOE@health.ny.gov).

## **Acknowledgements:**

This report was prepared by staff from several units from the Center for Environmental Health and the Center for Community Health within the New York State Department of Health. The main authors of the report were Elizabeth Lewis-Michl, PhD, Division of Environmental Health Assessment; Kenneth Bogdan, PhD, and Thomas Johnson, PhD, Bureau of Toxic Substance Assessment; Aura Weinstein, MPH, and Marlene Trzaska, MPH, New York State Cancer Surveillance Program; and Francis Boscoe, PhD, New York State Cancer Registry.

The New York State Department of Health appreciates the efforts of the many experts in the fields of cancer, environmental health, epidemiology, public health, and toxicology who reviewed and provided valuable feedback. The final document represents the Department's work, findings, and conclusions.

# **Cancer Incidence Investigation Findings:** **Village of Hoosick Falls, 1995-2014**

## **Report Summary**

Perfluorooctanoic acid (PFOA) is a man-made, industrial chemical associated with certain cancers. Industrial manufacturing over the past 40 years resulted in the presence of PFOA in water sources in and around Hoosick Falls. To end residents' exposure to this contaminant in the drinking water, New York State took several actions, including installation of a granular activated carbon (GAC) filtration system on the Village of Hoosick Falls' public water supply. In 2016, the New York State Department of Health (NYS DOH) performed blood testing for Hoosick Falls area residents. Blood tests confirmed residents' exposure to PFOA.

To provide residents with information about cancer rates in the Village of Hoosick Falls, NYS DOH analyzed results from New York State's Cancer Registry from January 1995 through December 2014 – the most recent year for which complete data are available. No statistically significant elevations of cancer were found for any of the cancer types associated with PFOA exposure. The only cancer found to have a statistically significant elevation was lung cancer, which has not been associated with PFOA exposure in any study.

In approximately three to five years, NYS DOH will update and review the cancer data for the Village of Hoosick Falls to identify any changes in the comparative cancer profile for residents. NYS DOH will continue to monitor cancer cases in the Village of Hoosick Falls, and share new scientific findings with healthcare providers and residents as new information becomes available.

Copies of the full report can be mailed, emailed, or accessed at <http://www.health.ny.gov/hoosick/>. For copies, questions or comments, contact NYS DOH at 518-402-7950 or email [BEQE@health.ny.gov](mailto:BEQE@health.ny.gov).

## **INTRODUCTION**

The New York State Department of Health (NYS DOH) looked at cancers diagnosed among Village of Hoosick Falls residents to follow up on concerns related to perfluorooctanoic acid (PFOA) exposures from the Village's public water supply. This report summarizes the methods used for the cancer incidence investigation and reports its findings.

The investigation was designed to determine whether the number of cancer cases diagnosed among people residing in the study area was unusual. To do this, the number of cancer cases diagnosed among residents of the study area was compared with the number of cases of cancer one would expect to find, if cancer rates in the study area were the same as cancer rates in similar areas of the state.

### **Background**

The Village of Hoosick Falls is located within the Town of Hoosick, Rensselaer County, New York, in a rural area northeast of Albany, New York near Bennington, Vermont. The Village has a population of approximately 3,500 people and the Town of Hoosick has a total population, including the Village, of approximately 6,700.

Sampling of the Village water supply in late 2014 led to the discovery that the aquifer and the public drinking water supply were contaminated by a man-made chemical, PFOA. The chemical PFOA belongs to a group of manufactured chemicals called perfluoroalkyl and polyfluoroalkyl substances (PFAS), sometimes called perfluorinated chemicals (PFCs). PFOA levels are elevated in groundwater at the Saint-Gobain Performance Plastics Corporation McCaffrey Street facility located in the Village of Hoosick Falls. This facility has been in operation since 1956 with several different corporate owners. Early development of a variety of industrial and commercial uses for PFOA and Teflon occurred at facilities in the Hoosick Falls area. Early products included Teflon-coated wire suitable for use in high temperature applications, Teflon-coated yarns, and pressure sensitive adhesive tapes (Hoosick Township Historical Society 2016). PFOA was once widely used to make nonstick cookware and had many other uses, including surface coatings for stain-resistant carpets and fabric as well as in paper and cardboard food packaging (such as microwave popcorn bags and fast food containers). PFOA has also been used in fire-fighting foam and in many other products for the aerospace, automotive, building/construction, and electronics industries.

PFOA enters the environment (air, water, and soil) from industrial facilities or when PFOA-containing products are used or disposed. It can remain in the environment for many years, particularly in water. PFOA is persistent in the human body, with the estimated time it takes for the body to eliminate half of the PFOA being between two and four years (Olsen et al. 2007; Bartell et al. 2010).

## Exposure Information

Based on local information about the historical use of PFOA in the Village, exposures to PFOA from working at local factories and/or from drinking water have been occurring for 40 years or longer. It is not possible to know when contamination of the public drinking water supply began. Samples from the village water before the interim filter system was installed showed an average PFOA level of 595 parts per trillion (ppt). When other PFCs were detected, they were found inconsistently and in trace amounts. In every sample, PFOA was more than 95% of the total PFC level. Currently the US Environmental Protection Agency (US EPA) has a combined drinking water health advisory level for PFOA and another PFC, perfluorooctane sulfonate (PFOS), of 70 ppt (US EPA 2016a, ATSDR 2016a, ATSDR 2016b).

Water being delivered to the Village of Hoosick Falls distribution system has been non-detect (less than 2 ppt) for PFOA since March 24, 2016, after installation of the interim granular activated carbon (GAC) filtration system. In February 2017, the larger full capacity GAC filtration system became fully operational.

The environmental investigation of PFOA contamination expanded outside the Village and included sampling of over 1,000 private wells. Approximately 12 percent of wells sampled showed PFOA levels at or above 70 ppt. People with private wells in the area have been provided with GAC filtration (point of entry treatment [POET]) systems.

This cancer investigation focused on people living in the Village of Hoosick Falls. It does not include people who live in the Town of Hoosick outside of the Village or the surrounding area, even though there was private well contamination in these places. The primary reason for this is that the level of exposure from the public water supply was the same for all of the people living in the Village. This consistency of exposures makes the Village an appropriate study area for a cancer investigation. Outside of the Village, only some wells were impacted which means that the population was not equally exposed. Also, US Census population estimates are needed to conduct this type of review. This information is readily available for the population within the Village boundaries, but not for smaller populations of specific streets or addresses outside the Village where private well contamination occurred.

## Cancer and PFOA Literature Review

The US EPA and the International Agency for Research on Cancer (IARC) regularly conduct independent in-depth reviews of published laboratory animal and human studies and evaluate the weight of the evidence that specific types of exposures can increase the risk of human cancer. Based on its review, the US EPA has concluded that PFOA has “suggestive evidence of carcinogenic (cancer-causing) potential” (US EPA 2016b). The US EPA uses this classification, shaded below in Table 1, when the data raise a concern for potential cancer effects in humans, but are not sufficient to support a stronger conclusion (for example, “likely to be carcinogenic to humans”) (US EPA 2005). Similarly, IARC classifies PFOA as “possibly carcinogenic in humans”

based on limited evidence in humans and laboratory animals (IARC 2016). This classification is used by the IARC when the evidence does not support a stronger conclusion (for example, “probably carcinogenic in humans”) (IARC 2006).

<b>Table 1. Current Classification Categories Used by US EPA and IARC to describe the Strength of the Evidence for Carcinogenicity Based on Human and Experimental Animal Data<sup>1</sup></b>	
<b>US EPA</b>	<b>IARC</b>
Carcinogenic to humans	Carcinogenic to humans
Likely to be carcinogenic to humans	Probably carcinogenic to humans
Suggestive evidence of carcinogenic potential	Possibly carcinogenic to humans
Inadequate information to assess carcinogenic potential	Not classifiable as to its carcinogenicity to humans
Not likely to be carcinogenic to humans	Probably not carcinogenic to humans

*Shading shows categories assigned to PFOA*

The US EPA and IARC evaluations of PFOA both conclude that the evidence, while limited, is greatest – or strongest – for associations between exposure to PFOA and testicular and kidney cancer (US EPA 2016b; IARC 2016). The currently available information about PFOA and cancer in people reviewed by EPA and IARC comes mainly from a series of studies of two groups exposed to PFOA from working with the chemical and a large population exposed to PFOA in drinking water in the Ohio River Valley (US EPA, 2016b, IARC 2016, Frisbee et al. 2009, Shin et al. 2011, Barry et al. 2013, Vieira et al. 2013).

The Ohio River Valley community studies enrolled 69,030 people (Barry et al. 2013, Vieira et al. 2013). These studies, often called the C8 studies, were reviewed by a panel of three epidemiologists, known as the C8 Science Panel, that was created as part of a legal settlement process. The panel was asked to make determinations about the existence of probable links between PFOA exposures and specific cancer types. The panel concluded that there were probable links between exposure to PFOA and testicular cancer and kidney cancer. A description of the panel’s findings regarding cancer can be found on the C8 panel website (C8 Science Panel 2012).

The studies of people exposed to PFOA at work have shown some associations between PFOA exposures and kidney cancer, results that are consistent with the C8 study findings (Steenland and Woskie 2012). The occupational studies have also shown some evidence for associations between PFOA and prostate cancer (Steenland et al. 2015) and bladder cancer (Raleigh et al.

<sup>1</sup> References Table 1: US EPA 2016a, 2005; IARC 2016, 2006

2014), but the evidence for these associations is considered more limited – or weaker – than the evidence for testicular and kidney cancer, in part because the community studies did not show associations with prostate or bladder cancer (C8 Science Panel 2012, ACS 2016a).

Table 2 summarizes the statements made about PFOA and specific cancer types by EPA, IARC and the C8 Science Panel. Appendix B provides a more detailed version of these statements in a similar table.

<b>Table 2. Weight of Evidence for Carcinogenicity of PFOA by Cancer Type: Statements by EPA, IARC and the C8 Science Panel<sup>2</sup></b>			
<b>Cancer Type</b>	<b>EPA</b>	<b>IARC</b>	<b>C8 Science Panel</b>
Testicular	Suggestive evidence of carcinogenic potential	Credible evidence of carcinogenic potential	Probable link
Kidney	Suggestive evidence of carcinogenic potential	Credible evidence of carcinogenic potential	Probable link
Prostate	Not Available	Inadequate evidence due to inconsistent findings among studies	No probable link
Bladder	Not Available	Inadequate evidence due to inconsistent findings among studies	No probable link

*Shading shows the cancer types with stronger evidence for an association*

## CANCER INCIDENCE INVESTIGATION

### Methods

The New York State (NYS) Cancer Surveillance Program conducts studies with methods that allow for comparisons between the numbers of cancers diagnosed among residents (observed cases) and numbers of cancer diagnoses expected (expected cases) based on the size and age profile of a community’s population.

#### Data Sources:

The source for the cancer case data is the NYS Cancer Registry. All cases of cancer occurring among NYS residents are required to be reported to the NYS Cancer Registry. Cancer case information comes from hospitals, laboratories, physicians, and other health care facilities in New York, as well as from the New York State and New York City Vital Records death files, and through reciprocal reporting agreements with many other states, including Vermont, all other

<sup>2</sup> References Table 2: US EPA 2016a, 2005; IARC 2016, 2006; C8 Science Panel 2012

bordering states, and Florida. The Cancer Registry has been certified as more than 95% complete by the North American Association of Central Cancer Registries (Copeland et al. 2015). In addition, the Cancer Registry has received gold certification from the Association every year since 2000 (the year 1996 data was released), the highest certification given to central cancer registries (Copeland et al. 2015).

To identify all cancers diagnosed among residents of the study area, Cancer Registry data were obtained for the Village of Hoosick Falls. Cancer records for January 1995 through December 2014 were obtained for people who lived in this census tract at the time of their cancer diagnosis. These cases were then grouped by age, sex, and type of cancer. These are referred to as "observed" cases. Cancer Registry data are available by place of residence at time of diagnosis. Cancers that were diagnosed after a person moved away from the Village are not included in the available data.

The source for the expected numbers of cancer cases comes from the Cancer Registry and the US Census. The population of the Village is classified by the US Census as 96% non-Hispanic white. Rates for some types of cancer, including prostate and lung cancer, vary for different ethnicities. Therefore, the comparison population used to estimate the numbers of cancer cases expected to occur in the Village was the upstate New York (NYS excluding NYC) non-Hispanic white population.

General cancer incidence rates for the upstate New York non-Hispanic white population were applied to the numbers of people in each specific age and gender group in the Village to calculate the number of expected cancers in the Village. The Village population size by age and gender group was estimated using data from the 1990, 2000, and 2010 US Census Population Summary Files and the National Cancer Institute's Surveillance, Epidemiology, and End Results Program [SEER] US Population Data.

#### Study Area and Time Period:

The study area is the Village of Hoosick Falls, which is Census Tract 517.02, located within ZIP Code 12090 (Hoosick Falls), Rensselaer County. The NYS DOH reviewed 20 years of cancer data from January 1995 through December 2014 for cancers occurring among Village of Hoosick Falls residents. 1995 is the earliest year for which the address at the time of diagnosis is accessible in electronic form for all cancer cases in the NYS Cancer Registry. 2014 is the most recent year for which cancer data are verified as complete and accurate.

#### Statistical Testing:

Statistical tests are used to find out whether differences between the observed number of cases and the expected number might be due to chance. There is a possible number of cancer cases of each type that would be expected to occur by chance in the population. The statistical test tells us if the observed number is close to that number. When the difference between the number of cancers observed and the number expected is **statistically significant** (higher or

lower), this means the difference between the observed and expected numbers is not likely to be due to chance.

For example, the investigation found that 20 cases of melanoma (skin cancer) – which has not been associated with PFOA – have been diagnosed in the Village of Hoosick Falls between 1995 and 2014. Looking at cancer rates in similar areas of the state, investigators only expected to find 16 cases (Table 4). Using common statistical tests to analyze this data, the results showed that the difference was more likely to be due to chance than a pattern of increased cancers. This means that if more years of data were available or the Village population were larger, the proportional difference would decline. In a small population, four seems like a large number, but more years of data could eliminate the difference or the difference could be maintained but both the observed and expected numbers would increase making that four a smaller proportion of the total number of cases.

Tests of **statistical significance** in this type of study show whether a difference between the observed number of cancer cases and the expected number is likely due to random (chance) variations or whether the difference indicates that cancer rates in the population being studied are truly higher than rates in the comparison population.

## Results

Cancers may appear in adults between 5 to 40 years after exposure to a carcinogen – a substance that can cause cancer. Historical information indicates PFOA manufacturing in Hoosick Falls began in the 1950's, and analyses of blood PFOA data among Village residents provides additional evidence of exposure over decades (NYS DOH 2016d). This suggests that if PFOA exposure from public drinking water is connected to cancer in Hoosick Falls, enough time has passed that a review of cancers diagnosed from 1995 through 2014 would show evidence of elevated cancer numbers.

### All Cancer Types:

The NYS DOH looked at the observed versus expected numbers of cases for 19 specific types of cancer for males and 21 specific types of cancer for females. Observed versus expected numbers were reviewed for males and females separately, as well as males and females combined. Table 3 summarizes the results of the cancer investigation by listing the types of cancer for which the number of cases observed was higher than expected, the same as, or lower than expected. The results were based on analyses comparing cases diagnosed among Hoosick Falls residents to expected numbers of cases. Table 4 provides details about the observed versus expected numbers of cancer cases.

**One type of cancer was found to occur more frequently than expected: lung cancer.** While there is a great deal of research on the causes of lung cancer, within the published research,

there is no body of evidence suggesting lung cancer is connected to PFOA exposure. No other type of cancer was statistically significantly higher than expected. This includes the types of cancer that have been associated with PFOA.

For 21 specific types of cancer, a grouping of rare cancers labeled “all other types”, and for all cancers combined, the analyses showed no statistically significant differences between observed and expected numbers of cases. These types are oral cavity/pharynx, esophagus, stomach, colorectal, liver, pancreas, larynx, breast, cervical, uterine, ovary, prostate, testicular, bladder, kidney, brain, Hodgkin lymphoma, non-Hodgkin lymphoma, multiple myeloma, leukemia(s), melanoma, and all other types.

**One type of cancer was found to occur less frequently than expected: thyroid cancer.** Thyroid cancer among males and females combined and for females considered separately was statistically significantly **lower** than expected. When the number of cancer cases is smaller than six, as it is here, the number is not shown to protect patient confidentiality.

Table 3. Cancer Investigation Findings: Village of Hoosick Falls, 1995-2014 <sup>3</sup>	
Statistically Significant Increases or Decreases in Observed Number of Cases	Cancer types
Types of Cancer in which Observed Number of Cases was Statistically Significantly <b>Higher</b> (not likely due to chance) →	One type only: <b>Lung cancer</b> , 91 cases observed compared to 65 expected
Types of Cancer in which Observed Number of Cases was <b>Not Statistically Significantly Higher or Lower</b> (any variation <b>likely</b> due to chance) →	Cancers associated with PFOA: Testicular, kidney, prostate, bladder
	Cancers not associated with PFOA: Oral cavity/pharynx, esophagus, stomach, colorectal, liver, pancreas, larynx, breast, cervical, uterine, ovary, melanoma, brain, Hodgkin lymphoma, non-Hodgkin lymphoma, multiple myeloma, leukemia(s), and all other types
Types of Cancer in which Observed Number of Cases was Statistically Significantly <b>Lower</b> (not likely due to chance) →	One type only: <b>Thyroid cancer</b> (When the number of cancer cases is smaller than six, the number is not shown to protect patient confidentiality.)

<sup>3</sup> Reference for Table 3: New York State Department of Health Cancer Registry, 1995 – 2014

Cancer Types Associated with PFOA Exposure:

**For testicular cancer**, there were fewer cases than expected, with no cases observed compared to approximately two cases expected (Table 4). This was not statistically significant, meaning the lack of cases could easily occur by chance. The number of testicular cancer cases expected was very small because of the rarity of this cancer, and this limited the study's ability to produce findings about testicular cancer.

**For kidney cancer**, there were slightly fewer cases than expected, with 12 cases observed and 13 expected (Table 4). This was not a statistically significant decrease, meaning the difference between 13 and 12 could easily occur by chance or random variation. Kidney cancer cases were reviewed to see if there was evidence for unusual patterns among the diagnoses considering factors such as gender, age at diagnosis, cancer stage at diagnosis, and cell type. The number of kidney cancer diagnoses were equal to or slightly lower than expected for both males and females when reviewed separately. Ages at diagnosis, stage, and cell type did not differ from what was expected. However, the numbers of cases in each group by characteristic are relatively small for this kind of in-depth analysis.

**For prostate cancer**, there were slightly more cases than expected with 61 cases observed compared to 56 expected (Table 4). This was not a statistically significant increase, meaning the difference between 61 and 56 could easily be due to chance or random variation. Prostate cancer cases were reviewed to see if cases showed any unusual patterns for age at diagnosis or tumor grade. Diagnoses of cancer at unusually young ages or with unusual characteristics can be an indication that an environmental exposure is involved. This evaluation showed that none of the men diagnosed with prostate cancer in this investigation were in their 30's or early 40's when they were diagnosed. The number of men in the 45 to 54-year age group was similar to the number expected for this age group. A tumor's grade indicates how aggressive the tumor is likely to be. The tumors in men age 45 to 54 were all either grade II or grade III, similar to what is usually found for men in this age group.

**For bladder cancer**, there were slightly fewer cases than expected with 22 cases observed compared to 26 expected (Table 4). This was not a statistically significant difference, meaning the difference between 22 and 26 could easily be due to chance or random variation. The types of bladder cancer tumors were also reviewed. Most were either papillary transitional cell carcinoma or transitional cell carcinoma, which are the two most frequently diagnosed types of this cancer.

Rare Cancers:

The NYS DOH conducted an additional review of rare cancers due to concerns in the community about some specific types of rare cancers. Most cancers that are particularly rare are included in the category "All Other Types" that is shown in Table 4. This category can include up to 25 different types of cancer or groups of even rarer types of cancer. In the general NYS population,

rare cancer diagnoses combined make up about eight percent of the total cancer diagnoses. It is therefore not uncommon to find one or more cases of a rare cancer or cancer cell type in a community.

Review of the individual cancer diagnoses showed no unusually high numbers of cases or patterns of diagnoses in unusually young ages for any of these types of rare cancers. The most frequently occurring cancers in this “All Other Types” category were cancers where the primary site (the body part where the cancer started) could not be determined. These cases likely include a range of different primary cancers. Almost all the people with unknown primary cancers were age 60 or older at the time of diagnosis and most were age 75 or older. Cancer diagnoses without a known primary cancer type most often occur among elderly people in situations where there is no clinical benefit to be gained from additional diagnostic testing.

Because of specific inquiries from Village residents, additional review was conducted for cancers of the nasal cavity and for carcinoid tumors. Cancers of the nasal cavity, including the sinuses, are rare. There were a few cases of cancer of the sinuses, all diagnosed between 2010 and 2014. The cell type(s) noted was/were among the less frequently diagnosed types for this rare cancer. The higher than expected number of cases of sinus cancers and other cancers of the nasal cavity was not statistically significant over the 20-year investigation period. Some studies have linked increased risk for cancers of the nasal cavity with exposures to second hand smoke and tobacco products other than cigarettes, viruses including Epstein-Barr virus (the virus that causes infectious mononucleosis) and the human papilloma virus, HPV, (the virus that causes cervical cancer), and noncancerous conditions such as nasal polyps (NYS DOH 2012). There are no reports in the scientific literature that cancers of the nasal cavity and sinuses are associated with PFOA.

Another type of rare cancer reviewed separately was carcinoid tumors, or carcinoids. These are typically slow-growing tumors of neuroendocrine cells, specialized cells in the body that release hormones into the bloodstream when acted upon by nerve cells. Carcinoid tumors may be found in many different organs of the body, but are most often seen in the digestive system and the lungs (NYS DOH 2007). They are classified based on their location in the body, so they are included in various specific cancer categories or in the “All Other Types” group in Table 4. Six cases of malignant carcinoid tumors were observed compared to four cases expected during the 20-year investigation period. The number of observed cases was not statistically significantly elevated.

In summary, this review of several types of rare cancers generally included in the “All Other Types” category showed no evidence of unusual patterns or unusually high numbers of cases for any type of rare cancer.

<b>Table 4. Observed and Expected Numbers of Cancer Cases, Village of Hoosick Falls January 1995 – December 2014<sup>4</sup></b>		
<b>Cancer Type</b>	<b>Observed</b>	<b>Expected</b>
Oral Cavity / Pharynx	11	9
Esophagus	--	5
Stomach	12	7
Colorectal	57	48
Liver / Intrahepatic Bile Duct	8	4
Pancreas	8	12
Larynx	--	3
Lung / Bronchus**	<b>91</b>	<b>65</b>
Females Only:		
Female Breast	57	65
Cervix Uteri	--	3
Corpus Uterus	16	14
Ovary	8	7
Males Only:		
Prostate	61	56
Testis	0	2
Urinary Bladder (including <i>in situ</i> )	22	26
Kidney / Renal Pelvis	12	13
Brain / Other Nervous System	--	6
Thyroid###	--	<b>10</b>
Hodgkin Lymphoma	--	2
Non-Hodgkin Lymphoma	19	19
Multiple Myeloma	--	6
Leukemia(s)	14	14
Melanoma	20	16
All Other Types	44	39
All Types (Total)	480	453

**Table 4 Notes:**

Cancer types are listed in Table 4 in the order of their assigned diagnostic codes in the International Classification of Diseases for Oncology, 3rd Edition. Expected numbers are based on standard cancer incidence rates by age and sex for New York State, exclusive of New York City, non-Hispanic white population. Breast cancer also occurs among males, but at a much lower rate than for females, so male cases are not included here.

Unless otherwise noted, the difference between the number of cases observed and the number expected is not statistically significant. The probability that this difference is due to chance is greater than 95%.

\*\* The number of cases observed is higher than the number of cases expected and the difference is statistically significant. The probability that this difference is due to chance is less than 5%.

### The number of cases observed is lower than the number of cases expected and the difference is statistically significant. The probability that this difference is due to chance is less than 5%.

-- When the number of cancer cases is smaller than six, the number is not shown to protect patient confidentiality.

<sup>4</sup>Reference for Table 4: New York State Department of Health Cancer Registry as of April 2017

## **NEXT STEPS**

NYS DOH is committed to continuing to be involved with and support Hoosick Falls area residents as they deal with ongoing concerns related to the history of PFOA contamination.

- The NYS DOH will update and review the cancer incidence data for the Village in approximately three to five years to check for any changes in the comparative cancer profile for Village residents.
- The NYS DOH will work with the Town, Village, and local healthcare providers to make future blood testing available in an appropriate manner and timeframe to monitor the reduction of PFOA blood levels among area residents.
- The NYS DOH will continue to review the science and update healthcare providers and Hoosick Falls residents as new information on the health effects of PFOA becomes available.
- NYS DOH Staff will continue to be available to answer residents' questions Monday through Friday from 9 a.m. to 5 p.m. at 518-402-7950.

One out of two men and one out of three women in New York State, and the U.S., are diagnosed with some type of cancer in their lifetime. The NYS DOH encourages all New Yorkers and healthcare providers to follow the published guidelines for cancer prevention and screenings.

## **Additional copies of report**

This report is available at <http://www.health.ny.gov/hoosick/>. Copies of the report can be mailed or emailed. Contact the NYS DOH by phone (518-402-7950) or email ([BEOE@health.ny.gov](mailto:BEOE@health.ny.gov)).

## REFERENCES

- ACS (American Cancer Society). 2016a. Teflon and PFOA.  
<http://www.cancer.org/cancer/cancercauses/othercarcinogens/athome/teflon-and-perfluorooctanoic-acid--pfoa>.
- ACS (American Cancer Society). 2016b. Cancer Facts & Figures 2016. Atlanta, GA: American Cancer Society. <https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/annual-cancer-facts-and-figures/2016/cancer-facts-and-figures-2016.pdf>.
- ATSDR (Agency for Toxic Substances and Disease Registry). 2016a. Perfluoroalkyl Substances (PFAS) Frequently Asked Questions.  
[http://www.atsdr.cdc.gov/pfc/docs/pfas\\_fact\\_sheet.pdf](http://www.atsdr.cdc.gov/pfc/docs/pfas_fact_sheet.pdf).
- ATSDR (Agency for Toxic Substances and Disease Registry). 2016b. An Overview of Perfluoroalkyl and Polyfluoroalkyl Substances and Interim Guidance for Clinicians Responding to Patient Exposure Concerns.  
[https://www.atsdr.cdc.gov/pfc/docs/pfas\\_clinician\\_fact\\_sheet\\_508.pdf](https://www.atsdr.cdc.gov/pfc/docs/pfas_clinician_fact_sheet_508.pdf).
- Barry V, Winquist A, Steenland K. 2013. Perfluorooctanoic acid (PFOA) exposures and incident cancers among adults living near a chemical plant. Environ Health Perspect. 121:1313-1318. <https://ehp.niehs.nih.gov/1306615/>.
- Bartell SM, Calafat AM, Lyu C, et al. 2010. Rate of decline in serum PFOA concentrations after granular activated carbon filtration at two public water systems in Ohio and West Virginia. Environ Health Perspect. 118:222-228. <https://ehp.niehs.nih.gov/0901252/>.
- C8 Science Panel. 2012. Probable link evaluation of cancer.  
[http://www.c8sciencepanel.org/pdfs/Probable\\_Link\\_C8\\_Cancer\\_16April2012\\_v2.pdf](http://www.c8sciencepanel.org/pdfs/Probable_Link_C8_Cancer_16April2012_v2.pdf).
- Copeland G, Lake A, Firth R, Wohler B, et al. (eds). 2015. Cancer in North America: 2008-2012. Appendix D – Data Quality Indicators by Year and Registry. Springfield, IL: North American Association of Central Cancer Registries, Inc.
- Frisbee SJ, Brooks AP, Maher A, et al. 2009. The C8 health project: design, methods, and participants. Environ Health Perspect. 117:1873-1882. <https://ehp.niehs.nih.gov/0800379/>.
- Hoosick Township Historical Society. 2016. Cleveland E. Dodge Jr 1922 – 2007.  
<http://www.hoosickhistory.com/biographies/dodgebio.htm>.
- IARC (International Agency for Research on Cancer Working Group). 2006. Preamble to the IARC Monographs (amended January 2006).  
<http://monographs.iarc.fr/ENG/Preamble/index.php>.

IARC (International Agency for Research on Cancer Working Group). 2014. Carcinogenicity of perfluorooctanoic acid, tetrafluoroethylene, dichloromethane, 1,2-dichloropropane, and 1,3-propane sulfone. *Lancet*. 15:924-925.

[http://www.thelancet.com/pdfs/journals/lanonc/PIIS1470-2045\(14\)70316-X.pdf](http://www.thelancet.com/pdfs/journals/lanonc/PIIS1470-2045(14)70316-X.pdf).

IARC (International Agency for Research on Cancer Working Group). 2016. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. Volume 110: Perfluorooctanoic Acid, Tetrafluoroethylene, Dichloromethane, 1,2-Dichloropropane, and 1,3-Propane Sultone.

<http://monographs.iarc.fr/ENG/Monographs/vol110/mono110-01.pdf>.

Maine Center for Disease Control and Prevention 2014. Maximum exposure guideline for perfluorooctanoic acid in drinking water.

<http://www.maine.gov/dhhs/mecdc/environmental-health/eohp/wells/documents/pfoameg.pdf>.

Minnesota Department of Health 2016. Perfluorochemicals and health.

<http://www.health.state.mn.us/divs/eh/hazardous/topics/pfcshealth.html>

New Jersey Department of Environmental Protection 2007. Guidance for PFOA in Drinking Water at Pennsgrove Water Supply Company.

[http://www.nj.gov/dep/watersupply/pdf/pfoa\\_dwguidance.pdf](http://www.nj.gov/dep/watersupply/pdf/pfoa_dwguidance.pdf).

New Jersey Drinking Water Quality Institute. 2016. Maximum Contaminant Level recommendations for perfluorooctanoic acid in drinking water.

<http://www.nj.gov/dep/watersupply/pdf/pfoa-hb--mcl-public-review-draftwithappendices.pdf>.

NYS DOH (New York State Department of Health). 2007. Carcinoid Tumors.

<http://www.health.ny.gov/statistics/cancer/registry/abouts/carcinoid.htm>.

NYS DOH (New York State Department of Health). 2012. About Cancer of the Nasal Cavity and Nasopharynx. <http://www.health.ny.gov/statistics/cancer/registry/abouts/nasal.htm>.

NYS DOH (New York State Department of Health). 2014. About Lung Cancer.

<http://www.health.ny.gov/statistics/cancer/registry/abouts/lung.htm>.

NYS DOH (New York State Department of Health, New York State Cancer Registry). 2016a. Cancer Incidence and Mortality by Year of Diagnosis/Death and Gender, 1976-2012.

<http://www.health.ny.gov/statistics/cancer/registry/pdf/table2.pdf>.

NYS DOH (New York State Department of Health). 2016b. Tobacco, Alcohol and Other Substance Abuse Indicators - Rensselaer County 2011-2013.

[http://www.health.ny.gov/statistics/chac/chai/docs/sub\\_38.htm](http://www.health.ny.gov/statistics/chac/chai/docs/sub_38.htm).

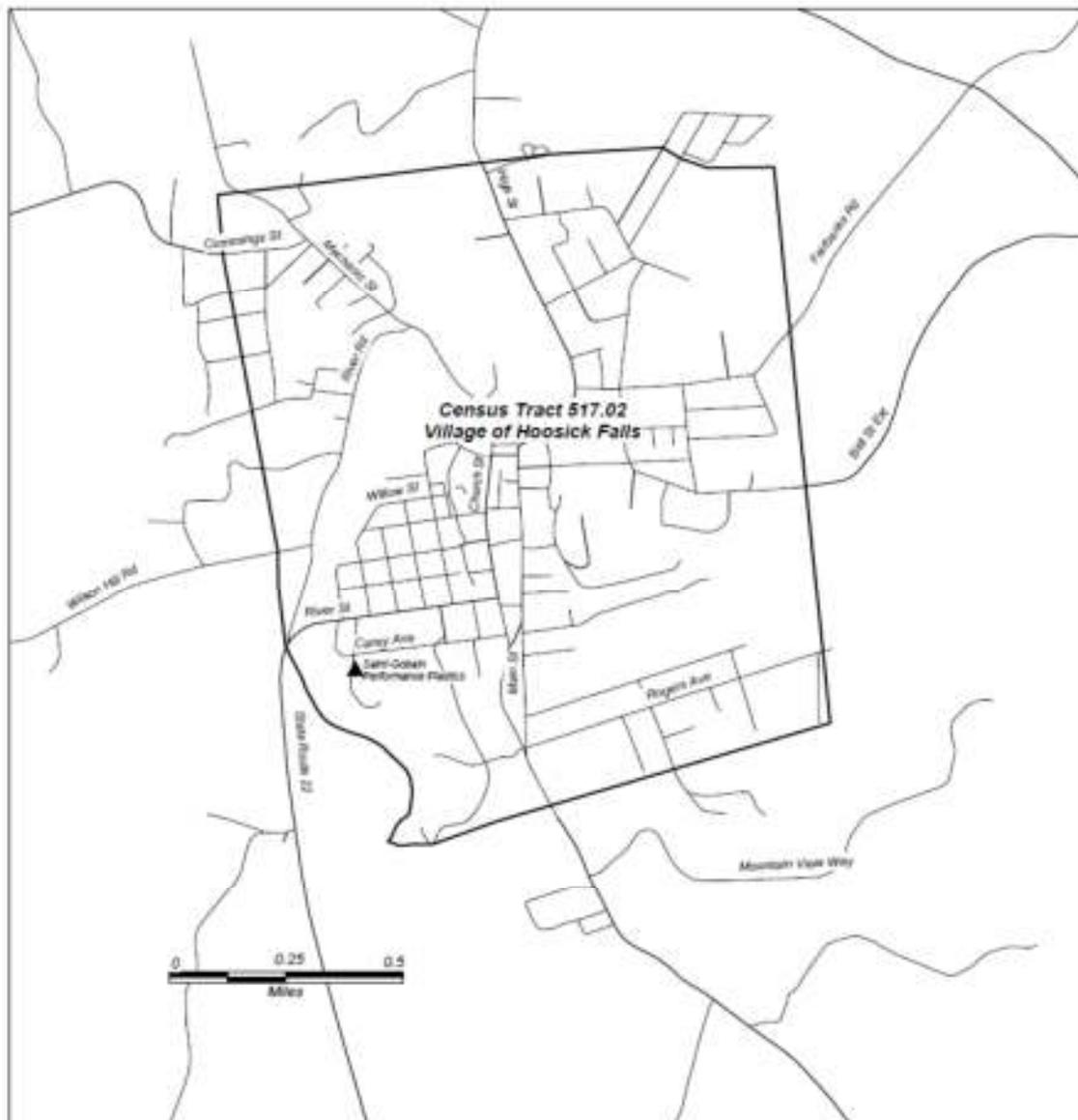
- NYS DOH (New York State Department of Health). 2016c. Measured Basement Screening Radon Levels by Town. <http://www.health.ny.gov/environmental/radiological/radon/towns.htm>.
- NYS DOH (New York State Department of Health). 2016d. Information Sheet. PFOA Preliminary Biomonitoring Group-Level Results: Village of Hoosick Falls and Town of Hoosick Participants Information Sheet Update, August 2016. <http://www.health.ny.gov/environmental/investigations/hoosick/index.htm>.
- Olsen GW, Burriss JM, Ehresman DJ, et al. 2007. Half-life of serum elimination of perfluorooctanesulfonate, perfluorohexanesulfonate, and perfluorooctanoate in retired fluorochemical production workers. *Environ Health Perspect*. 115:1298-1305. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1964923/pdf/ehp0115-001298.pdf>.
- Raleigh KK, Alexander BH, Olsen GW, et al. (2014). Mortality and cancer incidence in ammonium perfluorooctanoate production workers. *Occup Environ Med*, 71(7):500–6. <http://oem.bmj.com/content/71/7/500.long>.
- Shin HM, Vieira VM, Ryan PB, et al. 2011. Retrospective exposure estimation and predicted versus observed serum perfluorooctanoic acid concentrations for participants in the C8 Health Project. *Environ Health Perspect*. 119:1760-1765. <https://ehp.niehs.nih.gov/1103729/>.
- Steenland K, Woskie S 2012. Cohort mortality study of workers exposed to perfluorooctanoic acid. *Am J Epidemiol*, 176(10):909–17. <https://academic.oup.com/aje/article/176/10/909/93256/Cohort-Mortality-Study-of-Workers-Exposed-to?searchresult=1>.
- Steenland K, Zhao L, Winqvist A. 2015. A cohort incidence study of workers exposed to perfluorooctanoic acid (PFOA). *Occup Environ Med*. 72373-380. <http://oem.bmj.com/content/72/5/373.long>.
- US CDC (United States Centers for Disease Control and Prevention, National Health and Nutrition Examination Survey (NHANES)). 2015. National Report on Human Exposure to Environmental Chemicals. [https://www.cdc.gov/biomonitoring/pdf/FourthReport\\_UpdatedTables\\_Feb2015.pdf](https://www.cdc.gov/biomonitoring/pdf/FourthReport_UpdatedTables_Feb2015.pdf).
- US DHHS (United States Department of Health and Human Services). 2014. The Health Consequences of Smoking – 50 Years of Progress: A Report of the Surgeon General. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. <https://www.surgeongeneral.gov/library/reports/50-years-of-progress/exec-summary.pdf>.

- US EPA (United States Environmental Protection Agency). 2005. Guidelines for Carcinogen Risk Assessment. EPA/630/P-03/001F. <https://www.epa.gov/risk/guidelines-carcinogen-risk-assessment>.
- US EPA (United States Environmental Protection Agency). 2009. Provisional Health Advisories for Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS). <http://www2.epa.gov/sites/production/files/2015-09/documents/pfoa-pfos-provisional.pdf>.
- US EPA (United States Environmental Protection Agency). 2014. Health Effects Document for Perfluorooctanoic Acid. Draft. EPA 822R14001. [https://peerreview.versar.com/epa/pfoa/pdf/Health-Effects-Documents-for-Perfluorooctanoic-Acid-\(PFOA\).pdf](https://peerreview.versar.com/epa/pfoa/pdf/Health-Effects-Documents-for-Perfluorooctanoic-Acid-(PFOA).pdf).
- US EPA (United States Environmental Protection Agency). 2016a. Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA). EPA 822-R-16-005. [https://www.epa.gov/sites/production/files/2016-05/documents/pfoa\\_health\\_advisory\\_final\\_508.pdf](https://www.epa.gov/sites/production/files/2016-05/documents/pfoa_health_advisory_final_508.pdf).
- US EPA (United States Environmental Protection Agency). 2016b. Health Effects Support Document for Perfluorooctanoic Acid (PFOA). EPA 822-R-16-003. [https://www.epa.gov/sites/production/files/2016-05/documents/pfoa\\_hesd\\_final\\_508.pdf](https://www.epa.gov/sites/production/files/2016-05/documents/pfoa_hesd_final_508.pdf)  
<https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos>.
- Vermont DOH (Vermont Department of Health). 2016a. Memorandum: PFOA and PFOS Vermont Drinking Water Health Advisory. <http://www.healthvermont.gov/enviro/pfoa.aspx>.
- Vermont DOH (Vermont Department of Health). 2016b. Perfluorooctanoic Acid (PFOA). <http://www.anr.state.vt.us/dec/VDHPFOASummary.pdf>.
- Vieira VM, Hoffman K, Shin HM, et al. 2013 Perfluorooctanoic acid exposure and cancer outcomes in a contaminated community: a geographic analysis. Environ Health Perspect. 121:318-323. <https://ehp.niehs.nih.gov/1205829/>.

## Appendix A

# MAP OF VILLAGE OF HOOSICK FALLS STUDY AREA

HOOSICK FALLS STUDY AREA  
RENSSELAER COUNTY, NEW YORK



## Appendix B

Quoted Statements by EPA, IARC and the C8 Science Panel on the Weight of Evidence for Carcinogenicity of PFOA by Cancer Type			
Cancer Type	EPA	IARC	C8 Science Panel
Testicular	“Under EPA’s Guidelines for Carcinogen Risk Assessment (US EPA 2005), there is suggestive evidence of carcinogenic potential for PFOA. Epidemiology studies demonstrate an association of serum PFOA with kidney and testicular tumors among highly exposed members of the general population.”	“The evidence for cancer of the testis was considered credible and unlikely to be explained by bias and confounding, however, the estimate was based on small numbers.”	“We conclude that there is a probable link between PFOA and both testicular and kidney cancer.”
Kidney	“Under EPA’s Guidelines for Carcinogen Risk Assessment (US EPA 2005), there is suggestive evidence of carcinogenic potential for PFOA. Epidemiology studies demonstrate an association of serum PFOA with kidney and testicular tumors among highly exposed members of the general population.”	“The evidence for cancer of the kidney was considered credible; however, chance, bias, and confounding could not be ruled out with reasonable confidence.”	“We conclude that there is a probable link between PFOA and both testicular and kidney cancer.”
Prostate	Not Available <i>EPA did not provide written summaries for other types of cancers</i>	“Some positive associations were observed for cancers of the bladder, thyroid, and prostate, but the results were inconsistent among studies and based on small numbers. The evidence for carcinogenicity for all of these sites was judged to be inadequate.”	“We also conclude that there are no probable links with any of the other cancers considered.”
Bladder	Not Available <i>EPA did not provide written summaries for other types of cancers</i>	“Some positive associations were observed for cancers of the bladder, thyroid, and prostate, but the results were inconsistent among studies and based on small numbers. The evidence for carcinogenicity for all of these sites was judged to be inadequate.”	We also conclude that there are no probable links with any of the other cancers considered.”

Shading shows the cancer types with stronger evidence for an association

## **Appendix B (continued)**

### **Appendix B Table Notes:**

Chance, bias, confounding, and small numbers are issues related to study methods that limit the conclusiveness of study results.

References for Appendix B Table: US EPA 2016a, p. 10; IARC 2016, p. 96; C8 Science Panel 2012, p. 10.