

20,000 EXCESS CANCER CASES IN 15 YEARS NEAR INDIAN POINT  
NEW REPORT SUGGESTS RADIATION EXPOSURE MAY BE ONE CAUSE  
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November 18, 2010 – Cancer incidence rates in the four counties closest to the Indian Point nuclear plant have risen much more rapidly than U.S. rates since the early 1990s, according to a report released today. If trends in local rates had equaled U.S. trends, over 20,000 fewer local residents would have been diagnosed with the disease.

“Cancer incidence rates in counties closest to Indian Point was 11% below the U.S. two decades ago, but now is 7% above the U.S.” says Joseph Mangano MPH MBA. “There are reasons for this gap, and one that should be considered is continuing radioactive emissions from Indian Point.” Mangano is Executive Director of the New York-based Radiation and Public Health Project research group (RPHP), and author of the study.

Counties included in the study were Orange, Putnam, Rockland, and Westchester, where about 9,000 residents are diagnosed with cancer each year. Patterns in each county were similar, i.e. a rate below the U.S. in the early 1990s that is now above the nation.

RPHP used data from the New York State Cancer Registry (for county cancer rates) and from the National Cancer Institute (for national cancer rates). It compared cancer rates for the 5-year period 1988-92 with later 5 year periods (1993-97, 1998-02, and 2003-07).

Unexpected rises occurred for 19 of 20 major types of cancer. The greatest increase was found in the local rate of thyroid cancer, which has moved from 13% below the U.S. to 51% above. There are no known causes of thyroid cancer other than exposure to radioactive iodine, only produced in atomic bomb tests and nuclear reactor operations.

RPHP researchers have published 27 medical journal articles and 7 books on health risks of radiation exposure. It conducted the only study of in-body radiation levels near U.S. nuclear plants; Strontium-90 in baby teeth rose sharply near seven U.S. nuclear plants, including Indian Point, since the 1980s.

The 40 year licenses of Indian Point’s two reactors expire in several years, and Entergy Nuclear, has asked federal regulators to extend these licenses for an additional 20 years.

The U.S. Nuclear Regulatory Commission (NRC) is planning to update a 1990 study of cancer near nuclear plants. Mangano states that the Indian Point report can provide helpful suggestions on how the NRC might construct the new study.

## RISING CANCER INCIDENCE RATES IN COUNTIES CLOSE TO INDIAN POINT

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Summary. Cancer incidence rates in the four counties closest to Indian Point (compared to the U.S.) have risen since the early 1990s. At that time, the local rate was 11% below the U.S.; now it is 7% higher. If the local rate had stayed at 11% below the U.S., 20,000 fewer local cancer cases would have occurred in the past 15 years.

Introduction. The Indian Point nuclear plant lies close to the point where four New York counties meet. Nearly all of the residents of these counties (Orange, Putnam, Rockland, and Westchester) live within 20 miles of the plant.

The New York State Cancer Registry makes data on cancer incidence (cases) available on the Internet by county, for all cancers combined and 20 common cancer types. These data can be used to compare trends in local and national cancer incidence rates.

Cancer incidence data near Indian Point have never been analyzed by federal or state health officials. (The 1990 study by the National Cancer Institute on cancer near U.S. nuclear plants included Indian Point, but only used deaths, not cases). With the U.S. Nuclear Regulatory Commission planning an updated study, it is important to evaluate methods of studying cancer.

Sources. The 1990 NCI study was based on an analysis of trends in local cancer rates near nuclear plants, compared to U.S. rates. The NCI typically selected counties within 20 miles of nuclear plants for study.

Indian Point lies near the intersection of Orange, Putnam, Rockland, and Westchester counties in New York. The area has a total population of about 1.73 million, the large majority of whom live within 20 miles of Indian Point.

The New York State Cancer Registry has operated since the mid-1970s, and maintains incidence data by county, gender, and cancer type on its web site. National data on cancer incidence since 1975 are provided by the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) system, consisting of 5 states and 4 metropolitan areas (10% of the U.S. population). SEER is often used to represent the U.S. as a whole.

Methods. The 1990 NCI study was restricted to cancer mortality; it included data from 1950 to 1984, when few states operated registries that collected cancer cases. It is often more meaningful to study cancer cases (not deaths) when investigating environmental effects, since some cancers have low death rates. For example, thyroid and child cancer, which are known to be susceptible to radiation exposure, have high survival rates, and thus studying cases is more helpful.

This analysis will compare trends in age-adjusted cancer incidence rates (all ages) for the four-county area and the U.S. Trends will be assessed using five-year periods. The earliest period (1988-1992) will be the baseline and rates in three subsequent periods (1993-1997, 1998-2002, and 2003-2007) will be compared to the baseline.

The data provided on the Internet are given for each county. A four-county rate will be calculated by multiplying each county's rate by the proportion of the county's population for the region, and adding each of the four totals. The U.S. rates for each five year period are produced by adding the rate for each year and dividing by five.

Comparisons will be made for incidence of all cancer types combined, plus 20 common types of cancer, which account for nearly 90% of all cancer cases in the U.S.

Results – Total of 20,087 Excess Cancer Cases. In 1988-1992, there were 32,697 residents of the four counties closest to Indian Point diagnosed with cancer. The local age-adjusted rate was 452.9 cases per 100,000, or 10.8% below the U.S. rate of 507.8.

In the subsequent five-year periods, the local rate exceeded the U.S., by progressively higher percentages (see table below). This increase from the baseline figure was highly statistically significant. **If the local cancer rate had remained 10.8% below the U.S., 20,087 fewer persons would have been diagnosed with cancer in the 15 year period 1993-2007.** Based on the figure of 126,745 cancer cases diagnosed from 1993-2007, the 20,087 figure represents an “excess” of 15.8%.

<u>Period</u>	<u>Local Rate vs. U.S.</u>	<u>Excess Cases</u>	<u>Total Cases</u>	<u>% Excess</u>
1988-1992	<b>- 10.8</b>	-----	32,697	-----
1993-1997	<b>+ 1.1</b>	4,601	38,616	11.9
1998-2002	<b>+ 6.7</b>	7,598	43,391	17.5
2003-2007	<b>+ 6.8</b>	7,888	44,738	17.6
<b>Total 15 Year Period</b>		<b>20,087</b>	<b>126,745</b>	<b>15.8</b>

Results – By County. Each of the four counties reported an excess number of cancer cases (see table below), including Orange (16.7%), Putnam (24.7%), Rockland (10.1%), and Westchester (16.4%).

<u>County</u>	<u>County Rate Compared to U.S. Rate</u>				<u>15 Year % Excess</u>
	<u>1988-92</u>	<u>1993-97</u>	<u>1998-02</u>	<u>2003-07</u>	
Orange	- 7.9	+ 7.6	+ 8.6	+ 9.8	16.7
Putnam	- 15.9	- 5.3	+12.0	+15.2	24.7
Rockland	- 2.0	+ 6.1	+10.9	+ 7.1	10.1
Westchester	- 14.0	- 2.0	+ 4.2	+ 4.8	16.4

Results – By Type of Cancer. Excess cases were also reported for 19 of the 20 types of cancer (see table below). The excesses range from 56.1% (for thyroid cancer) to 0.7% (for pancreatic cancer). The only cancer for which there was no excess, i.e. increases in local rates were less than the U.S. over time, was cancer of the larynx.

<u>Type of Cancer</u>	<u>Excess Cases</u>	<u>Total Cases</u>	<u>% Excess</u>
Thyroid	1,656	2,953	56.1
Prostate (males)	5,768	18,964	30.4
Testis (males)	172	692	24.8
Hodgkin’s Disease	192	935	20.6
Urinary bladder	1,237	6,365	19.4
Kidney/renal pelvis	640	3,536	18.1
Multiple myeloma	267	1,601	16.7
Melanoma	525	3,561	14.7
Brain	269	1,912	14.1
Non-Hodgkin’s Lymphoma	719	5,470	13.1
Colorectal	1,851	14,292	13.0
Stomach	325	2,515	12.9
Liver	153	1,478	10.3
Breast (females)	1,698	19,155	8.9
Leukemia	247	3,472	7.1
Oral cavity/pharynx	140	2,315	6.0
Esophagus	59	1,239	4.8
Lung/bronchus	556	16,130	3.4
Pancreas	22	3,317	0.7
Larynx	-103	989	-10.4

Discussion – Potential Link with Indian Point. Cancer can be caused by multiple factors. Tobacco use is often cited as one common example of harmful lifestyle choices. But the local lung cancer rate change was only 3.4% above the U.S. Other cancers strongly linked with smoking (oral cavity and larynx) had excesses of only 6.0% and -10.4%. Thus, local tobacco use does not appear to be a major factor in rising cancer rates.

The greatest excess occurred for thyroid cancer, with a 56.1% excess rate for the 2953 cases diagnosed in the most recent 15 years. In 1988-1992, the local thyroid cancer rate was 13.3% below the U.S., but in subsequent periods, the gap between the local and national rates grew, until it reached 51.0% higher (see table below).

<u>Period</u>	<u>% Local Rate vs. U.S.</u>	<u>Local Rate</u>	<u>U.S. Rate</u>
1988-1992	<b>- 13.3%</b>	4.66	5.38
1993-1997	<b>+17.3%</b>	7.27	6.20
1998-2002	<b>+46.4%</b>	11.39	7.78
2003-2007	<b>+51.0%</b>	15.79	10.46

Thyroid cancer excesses occurred in all four counties. In the most recent period (2003-2007), the Putnam, Rockland, Orange, and Westchester County rates were 105.5%, 74.5%, 63.5%, and 33.4% above the U.S. Putnam, Rockland, and Orange had among the highest thyroid cancer rates of all U.S. counties with at least 100,000 residents. There are no known causes of thyroid cancer other than exposure to radiation, particularly radioactive iodine (produced only in atomic bomb tests and nuclear reactor operations).

Discussion – Disseminating Data and Policy Implications. These findings, which are consistent and statistically significant, indicate that one or more factors are causing local cancer rates to increase over time. Rising cancer rates in areas near Indian Point, whose reactors are aging and corroding over time, raises concerns. A previous study of radioactive Strontium-90 levels in baby teeth of Indian Point-area children also show a consistent rise after the late 1980s, and higher levels than areas far from nuclear plants.

It is important not only to continue research of this type, but to ensure that results are shared with policy makers, who should be encouraged to consider them. In particular, the U.S. Nuclear Regulatory Commission should be informed of results, because the Commission is considering an application by the Entergy Corporation to grant a 20-year license extension for the Indian Point reactors. The NRC should examine these data and discuss them with the public as a “report card” of Indian Point performance before making any decision on license extension.

The NRC is also planning an update to the 1990 National Cancer Institute cancer study near U.S. nuclear plants, and should be informed that the approach used in this report is a workable one. The methods used can help the NRC and its contractor, the National Academy of Science, develop a methodology for the study.

Results should also be shared with the public, who have the right to be informed of health threats in their communities. Information can be communicated in a variety of ways, i.e. through media reports, citizen-based community groups, and postings on web sites.