

## Radiation and Public Health Project

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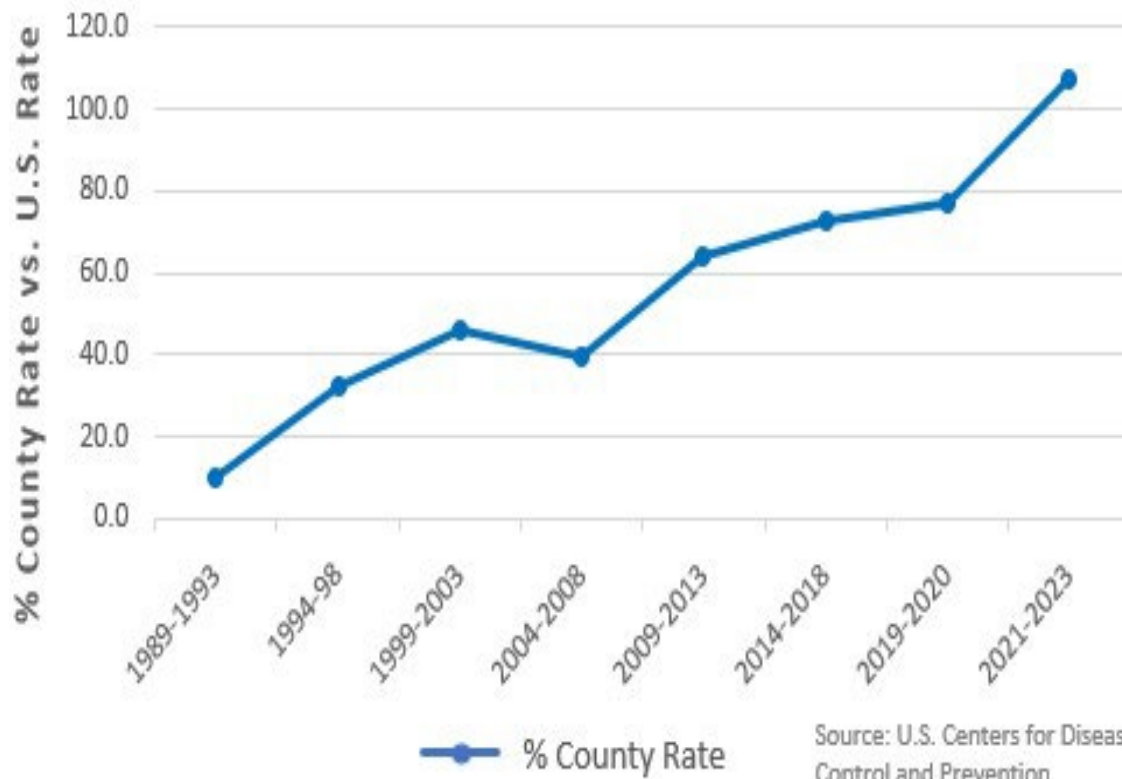
### **LATEST DATA SHOW SURGE IN PIKE COUNTY PREMATURE DEATH RATES**

Ongoing Exposures from Uranium Enrichment Seen as a Factor

November 4, 2024 – The premature death rate in Pike County, Ohio, which has been rising for decades, is now more than twice the U.S. rate, among the highest of all U.S. counties.

In the period 2021-2023, the mortality rate among Pike County residents age 0-74 was 107% above the U.S. rate, based on 750 deaths. This is a large jump from the 85% excess in the years 2017-2020. The gap between county and national rates has steadily grown since the early 1990s, when the Pike County rate was just 10% higher. Information used to calculate rates is from the U.S. Centers for Disease Control and Prevention (CDC). See graph below.

Age-Adjusted Mortality Rate, Age 0-74, Pike  
County OH vs. U.S., 1989-2023



Pike County, in southern Ohio, has a population of 27,000. It is the site of facilities that enriched uranium from 1954-2001, for nuclear weapons and nuclear reactors. The U.S. Department of Energy has proposed new facilities involving the continuing generation of radioactivity.

“Causes of the rapid increase in death rates among Pike County’s children, young adults, and middle-aged adults need to be identified,” said Joseph Mangano, who analyzed CDC data. “One potential factor is ongoing exposure to radioactivity released from the Portsmouth Nuclear Site into the local environment.” Mangano is an epidemiologist and director of the Radiation and Public Health Project research group.

Large excesses in Pike County death rates are consistently found for all major causes of death, with respiratory (lung) diseases being especially large. The largest gaps exist among persons age 25-54. Radioactivity can damage any part of the body.

The Portsmouth plant routinely emitted radioactive particles into the local air, soil, and water. These particles included Americium-241, Neptunium-237, Plutonium-238/239/240, Technecium-99, and Uranium-233/234/235/236/238. Each isotope decays slowly and remains in the ecosystem for thousands of years. Uncovered demolition of the giant, contaminated buildings continues.

While the original uranium enrichment operations ended in 2001, Portsmouth still is the site of uranium enrichment using centrifuges, and a new operation to purify depleted uranium for nuclear weapons. Other nuclear operations are proposed for the site, including two experimental nuclear reactors and possibly a nuclear waste reprocessing plant.

Studies published in 2022 and 2023 by Mangano showed that while mortality rates in Pike County were unexpectedly high, those counties closest to Pike were nearly as high. In addition, local rates exceed those in other Ohio counties with similar rates of poverty and other socioeconomic risk factors, but are not close to the Portsmouth plant. <https://radiation.org/rphp-report-finds-soaring-death-rate-near-ohio-uranium-plant/>.

See Report on page 3.

## ANALYSIS OF PREMATURE DEATH RATE PIKE COUNTY OHIO vs. U.S., 2021-2023

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Background – Recent Health Studies Find Unusually High and Rising Mortality Rates. The Portsmouth Gaseous Diffusion Plant (PGDP), located just south of Piketon in Pike County, Ohio, operated from 1954 to 2001. The plant occupies about one-third of the 3,777-acre Portsmouth Site, and is owned and operated by the federal government. The U.S. Department of Energy’s Office of Environmental Management began its environmental cleanup program at the site in 1989, an ongoing effort coordinated with the U.S. and Ohio Environmental Protection Agencies.

During plant operation, radioisotopes and hazardous chemicals were routinely emitted into the air, soil, surface water, and groundwater. These toxic products have been detected in the local environment, and pose a potential health risk to human health. Because studies of the effect of exposure to these toxic substances have been very limited, the Ohio Nuclear Free Network recently commissioned two studies of health near PGDP (Mangano 2022, 2023).

These studies identified high and rising morbidity and mortality rates in Pike County and the surrounding areas. Among the most dramatic of these findings was the premature death rate in Pike County, vs. the U.S. The premature death rate is defined as mortality among persons under age 75, which is essentially the U.S. life expectancy (National Cancer Institute, 2024).

In five-year periods from the late 1960s to the early 1990s, Pike County’s premature death rate (all causes combined) ranged from 10% to 18% above the U.S. This finding is not unexpected, given Pike County’s below-average socioeconomic status, including high poverty and unemployment rates, and lack of access to medical care.

After 1993, a steady increase in the gap between the Pike County and U.S. premature death rates was observed, peaking at 85% higher in the most recent period (2017-2020), based on 878 deaths. Of the 3,243 U.S. counties, Pike had the 112<sup>th</sup> highest premature death rate - 69<sup>th</sup> highest for white non-Hispanics, which make up 95% of Pike County residents (U.S. Census Bureau, 2024).

Since the publication of those data, the Centers for Disease Control and Prevention (CDC) has made information available for 2021, 2022, and 2023 (Centers for Disease Control and Prevention, 2024). This report analyzes these data, to assess if the trend has continued.

Methods. This analysis will compare age-adjusted mortality rates for persons age 0-74 for Pike County versus the U.S. Age-adjustment is a standard method used in epidemiologic studies comparing populations, to avoid bias in results based on age distribution, since mortality for many causes are higher among older persons. The CDC web site adjusts mortality by 10-year age groups, using the 2000 U.S. standard population. Rates are given in annual deaths per 100,000 persons.

The number of deaths for 2021, 2022, and 2023 in the CDC web site are final. U.S. populations for 2021 and 2022 are final, but the 2023 population are the same as 2022, and will change later. For Pike County, populations after 2020 for each age group were estimated, based on trends from 2018 to 2020. Final figures will likely be very close to those used in this report.

Several comparisons of county vs. national mortality rates are included in this report, including

1. Each premature (0-74) age group in 2021-2023
2. Most common causes of death, for age 0-74 and age 75+ in 2021-2023
3. Most common causes of death for age 0-74, for 1999-2008, 2009-2020, and 2021-2023.

Results – Each Age Group 0-74. Table 1 (below) compares the 2021-2023 mortality rate for Pike County and the U.S., by each age group under 75. Major findings include:

1. The age-adjusted death rate for Pike County was 107.1% above the U.S. rate, slightly more than double, based on 750 deaths during the three-year period.
2. The 107.1% excess was well above the prior period of 2017-2020 (+85.0%), and the excess for 1989-1993 (+9.9%), just before decades of steady increases began.
3. The greatest excesses occurred for young and middle-age adults (age 25-34, 128.1% higher; age 35-44, 152.6% higher; and age 45-54, 139.3% higher).

Table 1

<u>Age at Death</u>	<u>Pike Co. Rate (Deaths)</u>	<u>U.S. Rate</u>	<u>% Pike Co. vs. U.S</u>
0-4	147.74 ( 11)	129.95	+ <b>13.7</b>
5-24	56.23 ( 11)	49.14	+ <b>14.4</b>
25-34	374.49 ( 38)	164.17	+ <b>128.1</b>
35-44	660.18 ( 55)	261.39	+ <b>152.6</b>
45-54	1114.32 (112)	465.72	+ <b>139.3</b>
55-64	1968.50 (230)	1001.97	+ <b>96.5</b>
65-74	3102.40 (296)	1995.72	+ <b>55.5</b>
0-74	813.84 (750)	393.06	+ <b>107.1</b>

Results – Age 0-74 vs. Age 75+, by Major Cause of Death. Table 2 (below) compares the age-adjusted mortality rate for ages 0-74 and over 75, for 16 major causes of death, accounting for about 60% of total U.S. deaths. Major findings include:

1. The Pike County premature (age 0-74) death rate was 107.1% higher than the U.S. rate, but just 14.9% higher for age above 75.
2. The excesses in age 0-74 in Pike County rates were greatest for:
  - a. 294.0% higher for acute myocardial infarction (heart attack)
  - b. 287.0% higher for influenza and pneumonia
  - c. 232.7% higher for chronic obstructive pulmonary disease
  - d. 198.0% higher for drug overdoses
  - e. 178.2% higher for cancers of the lung and bronchus
  - f. 173.6% higher for Covid-19

Other than drug overdoses and heart attacks, each of these causes are respiratory/lung diseases.

Table 2

<u>ICD-10 Code</u>	<u>Cause of Death</u>	<u>% Pike County vs. U.S. Age-Adj Rate (Deaths)</u>	
		<u>Age 0-74</u>	<u>Age 75+</u>
C18-C20	Colorectal Cancer	+ 48.7 (11)	+23.8 ( 8)
C25	Pancreatic Cancer	+ 59.1 (12)	- 83.8 ( 1)
C34	Lung/bronchus Cancer	<b>+178.2</b> (54)	- 5.1 (16)
C50	Breast Cancer	+ 27.4 ( 8)	+40.4 ( 7)
E10-E14	Diabetes Mellitus	+ 91.0 (23)	+59.2 (20)
I21	Acute Myocardial Infarction	<b>+294.9</b> (48)	+43.3 (21)
I25	Chronic Ischemic Heart Dis.	+ 24.9 (33)	- 31.8 (30)
I60-I69	Cerebrovascular Dis/Stroke	+ 34.1 (17)	- 4.8 (30)
J9-J18	Influenza/Pneumonia	<b>+287.0</b> (15)	+96.6 (15)
J44	Chronic Obstructive Pulm Dis.	<b>+232.7</b> (44)	+77.0(40)
K70-K74	Cirrhosis of the Liver	+109.9 (29)	+228.0 (9)
U07.1	Covid-19	<b>+173.6</b> (74)	+65.4 (50)
V01-X59*	Accidents	+ 92.2 (34)	- 2.6 (13)
X40-X45	Drug Overdoses	<b>+198.0</b> (58)	+360.5 (1)
X60-X84	Suicide	+ 26.5 (12)	----- ( 0)
X85-Y89	Homicide	- 77.7 ( 3)	+12.8 ( 1)
<b>TOTAL</b>		<b>+107.1</b> (750)	<b>+ 14.9</b> (563)

\* Excludes X40-X45/Drug Overdoses

Results – Age 0-74, by Major Cause of Death, Trend over Time. Table 3 (below) presents the county-national ratios of age-adjusted mortality age 0-74 for major causes, for three time periods, including 1999 to 2008, 2009 to 2020, and 2021 to 2023. Major findings include

1. The excess for all causes for the three periods rose from +42.7% to +69.3% to +107.1%.
2. The largest rises in excesses occurred in the six causes of death mentioned in the prior section (other than Covid-19, which did not exist until 2020), including:
  - a. 102.7% to 238.4% to 294.0% higher for acute myocardial infarction (heart attack)
  - b. 117.7% to 150.3% to 287.0% higher for influenza and pneumonia
  - c. 106.5% to 159.6% to 232.7% higher for chronic obstructive pulmonary disease
  - d. 37.9% to 160.4% to 198.0% higher for drug overdoses
  - e. 30.5% to 111.8% to 178.2% higher for cancers of the lung and bronchus

Table 3

Code	Cause of Death	% Pike County vs. U.S. Rate			Pike Co. Deaths		
		1999-08	2009-20	2021-23	'99-08	'09-20	'21-23
C18-C20	Colorectal Cancer	+ 36.6	+ 58.2	+ 48.7	38	53	11
C25	Pancreatic Cancer	+ 19.0	+ 10.4	+ 59.1	19	30	12
C34	Lung/bronchus Cancer	+ <b>30.5</b>	<b>+111.8</b>	<b>+178.2</b>	128	213	54
C50	Breast Cancer	+ 10.8	+ 26.1	+ 27.4	29	37	8
E10-E14	Diabetes Mellitus	+ 39.9	+ 45.1	+ 91.0	51	70	23
I21	Acute Myocardial Infarction	<b>+102.7</b>	<b>+238.4</b>	<b>+294.9</b>	130	197	48
I25	Chronic Ischemic Heart Dis.	+ 30.9	- 4.0	+ 24.9	125	97	33
I60-I69	Cerebrovascular Disease	+ 30.1	+ 15.8	+ 34.1	53	54	17
J9-J18	Influenza/Pneumonia	<b>+117.7</b>	<b>+150.3</b>	<b>+287.0</b>	31	46	15
J44	Chronic Obstructive Pulm Dis.	<b>+106.5</b>	<b>+159.6</b>	<b>+232.7</b>	82	154	44
K70-K74	Cirrhosis of the Liver	+ 37.4	+ 59.5	+109.9	34	69	29
U07.1	Covid-19	----	----	+173.6	0	3	74
V01-X59*	Accidents	+ 27.0	+ 87.7	+ 92.2	142	115	34
X40-X45	Drug Overdoses	+ <b>37.9</b>	<b>+160.4</b>	<b>+198.0</b>	25	122	58
X60-X84	Suicide	+ 7.3	+ 26.6	+ 26.5	29	48	12
X85-Y89	Homicide	- 17.9	+ 48.2	- 77.7	20	39	3
<b>TOTAL</b>		<b>+42.7</b>	<b>+69.3</b>	<b>+107.1</b>	1515	2277	750

\* Excludes X40-X45/Drug Overdoses

Discussion. The most recent data on Pike County’s premature mortality rate vs. the U.S. rate show a rapidly-growing gap. The excess of 85.0% rose to 107.1% from 2017-2020 to 2021-2023. When final figures become available for all counties, it is likely that Pike County’s premature mortality rate for the latest three years will rank among the highest 100 of the 3,243 U.S. counties, and among the highest 50 for white non-Hispanics. This new data is based on 750 deaths.

The large and growing county-national gap exists only for premature deaths, as Pike County’s most recent death rate for persons over 75 was just 14.9% above the U.S. rate. The excess among county residents age 25 to 54 is highest, between double and triple the U.S. rate

Four of the six causes with the largest excesses are diseases of the respiratory system. The 2022 report noted that the smoking rate among Pike County adults was somewhat higher than Ohio’s (27% vs. 22%). While smoking contributes to the lung diseases mentioned in this report, it is not clear that the current and rising excesses can be attributed only to smoking.

For decades, the Portsmouth Gaseous Diffusion Plant (PGDP) generated radioactive isotopes - Neptunium-237; Plutonium-239 and 240; Uranium-235, 236, and 238; and Technecium-99 - that were released into the local environment. Tiny metal particles of each isotope enter the lung after being inhaled, resulting in damage or destruction of cells, leading to cancer and other diseases.

The extent to which these toxic chemicals have affected Pike County residents cannot be precisely calculated. However, no other major factor contributing to unexpectedly high mortality rates is obvious. Thus, these new findings must be taken seriously.

With no end in sight for soaring death rates, immediate actions are warranted. Known hazards from exposure to radioactive isotopes indicate that PGDP decommissioning activities should assume a greater priority; and any future nuclear operations at the site should be postponed indefinitely.

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