TRENDS IN PANCREATIC CANCER IN IDAHO, 2013–2017

August 2019

A Publication of the

CDRI Cancer Data Registry of Idaho

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Introduction

Pancreatic cancer is a term describing multiple types of malignant neoplasms originating from either exocrine or neuroendocrine pancreas cells. The most common type of pancreatic cancer is pancreatic ductal adenocarcinoma, an exocrine cell type of pancreatic cancer that accounts for >90% of pancreatic cancer cases.

While a relatively rare cancer, pancreatic cancer was the fifth leading cause of cancer-related mortality in the United States during 2012–2016, and is projected to become the second leading cause of cancer-related mortality in the United States by 2030.[1] Less than 10% of people diagnosed with pancreatic cancer are alive 5 years after diagnosis.[2] Currently, complete surgical resection – or removal – of the pancreas is the only curative therapy available, but <20% of patients are eligible for surgical intervention at the time of diagnosis.[3] Surgical resection of pancreatic tumors is typically only offered when the tumor remains localized in the pancreas and does not involve lymph nodes or major blood vessels.

This brief report describes Idaho trends in pancreatic cancer incidence and mortality during 2013–2017, risk factors for pancreatic cancer as described in the literature, and trends in behavioral risk factors for pancreatic cancer among Idahoans during 2007–2016.

Table 1: 5-year age-adjusted pancreatic cancer incidence by county — Idaho, 2013–2017*

State **County**	**Rate per 100,000**	**Lower 95% CI**	**Upper 95% CI**	**Direction of trend****
Idaho	13.8	13.1	14.6	←→
Jerome	23.8	15.5	34.8	←→
Washington	21.9	13.1	35.9	←→
Nez Perce	17.4	12.9	23.3	←→
Ada	14.9	13.3	16.6	←→
Kootenai	14.8	12.4	17.6	←→
Gem	14.5	8.5	23.9	←→
Canyon	14.3	12.1	16.9	←→
Bonner	14.3	10.4	19.5	←→
Elmore	14.3	8.4	22.8	←→
Bannock	14.1	10.7	18.2	↑
Payette	14.1	8.5	22.3	←→
Bingham	13.9	9.7	19.5	←→
Twin Falls	12.9	9.9	16.6	←→
Blaine	12.5	6.7	21.2	←→
Bonneville	12.5	9.7	15.8	←→
Idaho	12.2	7.3	20.4	←→
Latah	10.8	6.5	16.9	←→

Rates are age-adjusted to the 2000 U.S. Standard Population standard; 95% confidence intervals (CI) are calculated using the Tiwari method.

*Rates among counties with <15 cases diagnosed during 2013–2017 are suppressed in this table.

**↑ = statistically significant increase in incidence from 2013 to 2017; ←→ = no statistically significant change in incidence from 2013 to 2017.

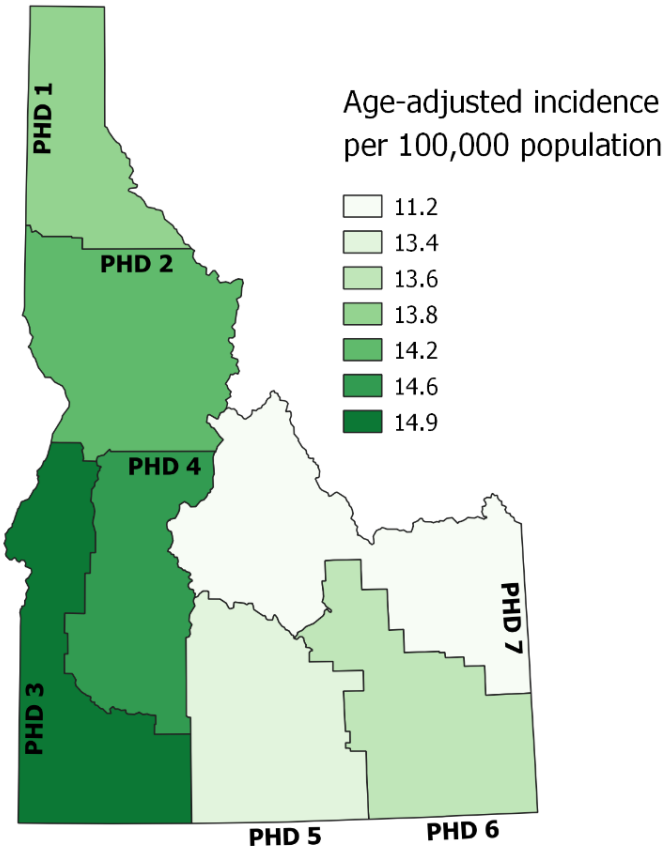
Incidence of Pancreatic Cancer

In 2016, the national age-adjusted rate of pancreatic cancer was 12.4 cases per 100,000 population in the United States.[2] In Idaho, the rate of pancreatic cancer was 15.2 cases per 100,000 population in 2017, increasing from 11.2 cases per 100,000 population in 2007. Although pancreatic cancer incidence varies by county in Idaho, only rates in Jerome County (23.8 cases per 100,000; **Table 1**) were significantly elevated relative to pancreatic cancer incidence in Idaho overall. Bannock County was the only jurisdiction reporting increasing incidence rates during 2013–2017, from 10.3 cases per 100,000 population in 2013 to 19.9 cases per 100,000 population in

2017. Due to low case counts, incidence rates were suppressed for 63.6% (28/44) of Idaho counties (**Table 1**).

At the Public Health District (PHD) level (**Figure 1**), PHD 3 had the highest 5-year average rate of pancreatic cancer incidence (14.9 cases per 100,000 population), followed by PHD 2 (14.2 cases per 100,000 population), PHD1 (13.8 cases per 100,000 population), PHD6 (13.6 cases per 100,000 population), PHD5 (13.4 cases per 100,000 population), and PHD 7 (11.2 cases per 100,000 population). There were no significant differences in incidence between districts apart from Public Health District 7, which had a lower incidence rate relative to state average.

Figure 1: 5-year Pancreatic Cancer Incidence by Public Health District — Idaho, 2013–2017



Rates are age-adjusted to the 2000 U.S. Standard Population standard.

Pancreatic Cancer-related Mortality

Table 2: Age-Adjusted Mortality Rate of Pancreatic Cancer by Idaho County, 2013-2017*

State **County**	**Rate per 100,000**	**Lower 95% CI**	**Upper 95% CI**
Idaho	11.6	0.4	10.9
Washington	18.4	4.6	10.5
Nez Perce	17.6	2.6	12.9
Payette	16.6	3.5	10.5
Idaho	13.9	3.1	8.5
Kootenai	13.8	1.2	11.5
Bingham	13.3	2.4	9.1
Jerome	13.2	3.5	7.3
Ada	12.0	0.8	10.6
Canyon	11.6	1.1	9.6
Bannock	11.6	1.7	8.5
Bonneville	11.1	1.5	8.4
Twin Falls	10.3	1.4	7.6
Bonner	10.2	1.9	6.9
Latah	8.5	2.2	4.7

Rates are age-adjusted to the 2000 U.S. Standard Population standard; 95% confidence intervals (CI) are calculated using the Tiwari method.
*Rates among counties with <15 pancreatic cancer-related deaths during 2013–2017 are suppressed in this table.

In 2016, pancreatic cancer-related mortality in the United States was estimated at 11.1 deaths per 100,000 population; rates were higher among males than females (12.7 versus 9.7 deaths per 100,000 population). In Idaho in 2017, pancreatic cancer-related mortality was estimated at 12.3 deaths per 100,000 population; mortality among males was 13.9 deaths per 100,000 and mortality among females was 10.9 deaths per 100,000. Although no Idaho counties had significantly elevated pancreatic cancer-related mortality rates relative to the state average (**Table 2**), Idaho's age-adjusted pancreatic cancer-related mortality increased from 13.7 deaths per 100,000 in 2013 to 15.2 deaths per 100,000 in 2017. Due to low case counts, mortality rates were suppressed in 68.2% (30/44) of counties.

Factors Associated with Increased Risk for Pancreatic Cancer

Many risk factors for pancreatic cancer are potentially modifiable, meaning that personal and population-level initiatives to modify risk behaviors could reduce the incidence of this highly fatal cancer.

Modifiable Risk Factors

Smoking tobacco – Smoking tobacco is the most important known pancreatic cancer risk factor, with 11%–32% of pancreatic cancers being attributable to smoking.[4] Although pancreatic cancer risk is lower among former smokers than current smokers, current and former smokers have approximately twice the risk of being diagnosed with pancreatic cancer than never smokers.

Heavy alcohol consumption – Multiple studies have shown an increased risk for pancreatic cancer among people with high alcohol consumption (≥3 drinks per day), with ~9% of pancreatic cancers being attributable to heavy alcohol consumption.[4] This increased risk could be linked to alcohol-induced pancreatitis.

Being overweight (Body Mass Index (BMI) ≥25) or obese (BMI ≥30) – Pancreatic cancer risk is approximately 30% higher among people with a BMI ≥25 compared to people maintaining a normal BMI (BMI ≥18 and <25). At the population level, it is estimated that ~11% of pancreatic cancers in North America are attributable to being overweight.[5]

Occupational chemical exposure – Heavy occupational exposures to certain chemicals, for example chlorinated hydrocarbon solvents as using in dry cleaning, nickel and nickel compounds, benzene, asbestos, and pesticides have been associated with increased pancreatic cancer risk.

Infectious Agents – The link between *Helicobacter pylori* infection, an established risk factor for certain cancers of the stomach, and pancreatic cancer is still being investigated. However, there is evidence to support associations between certain strains of *H. pylori* and an elevated risk for pancreatic cancer.[6,7]

Non-modifiable Risk Factors

Multiple non-modifiable risk factors for pancreatic cancer have been identified, although some of these non-modifiable risk factors (e.g. race) might be confounded by BMI or co-morbidities. Pancreatic cancer risk **increases with age**, with >4.5 times higher incidence among people ≥75 years old versus people 50–64 years old. Incidence rates are 35% higher in **men** than women. **African-Americans** have ~25% higher incidence and mortality than Whites.

Many **hereditary and genetic factors** are associated with increased pancreatic cancer risk, e.g. family history of pancreatic cancer, gene mutations (e.g. BRCA2, p16/CDKN2A gene), and inherited genetic syndromes (e.g. familial pancreatitis, Lynch syndrome, Peutz-Jeghers syndrome). Co-morbidities such as **diabetes** and **chronic pancreatitis** have also been linked to increased risk of pancreatic cancer.

Trends in Risk Factors of Pancreatic Cancer

Idaho Department of Health and Welfare Behavioral Risk Factor Surveillance System (BRFSS) data from 2007 through 2016 were used to evaluate temporal trends and geographic patterns in behavioral risk factors that could influence pancreatic cancer risk.[8,9]

These risk factors included prevalence of:

- Adult ever smokers;
- People who drink more than 1 (women) or 2 (men) alcoholic beverages per day (heavy drinkers);
- People with a BMI ≥25 (overweight and obese);
- People with a diabetes diagnosis; and
- People who consume <5 servings of fruits and vegetables daily.

The proportion of adults reporting ever smoking decreased 4.6% during 2007 to 2016 (**Table 3**). Prevalence of people with a BMI ≥25 has increased by 1.4% during 2007–2016. A high prevalence (~70%) of BMI ≥25 has been reported in PHD 3 since 2007, which had the highest incidence of pancreatic cancer during 2013–2017. The prevalence of BMI ≥25 has also been increasing in PHD 5 and 6. The prevalence of people not consuming the recommended ≥5

servings of fruits and vegetables per day has been consistently high in Idaho from 2007 through 2015, and no geographic variability was reported across PHDs. Prevalence of heavy drinking and diabetes diagnosis were low, had not changed over time, and did not reflect patterns in pancreatic cancer incidence and mortality at the PHD level.

Table 3: Risk Factor Prevalence Trends as Measured by Idaho BRFSS data

Risk Factor	2007 Prevalence	2016 Prevalence	Trend*
Ever Smoking	19.1%	14.5%	↓
Heavy Drinking	6.2%	7.0%	←→
BMI ≥25	63.1%	64.5%	↑
<5 daily servings fruits and vegetables	77.7%	82.5%	←→
Diabetes Diagnosis	7.9%	8.9%	←→
No healthcare coverage	18.9%	15.5%	↓

* P-values determining significance in temporal trends as reported in Idaho Department of Health and Welfare BRFSS Annual Reports.
←→ = no statistically significant change from 2011 to 2016
↓ = statistically significant decrease from 2011 to 2016
↑ = statistically significant increase from 2011 to 2016

Healthcare coverage in the state increased over time, which could indicate more opportunities for at risk individuals in relatively younger age groups – i.e. non-Medicare recipients aged <65 – to engage with providers about modifiable and non-modifiable pancreatic cancer risk factors. The proportion of Idaho residents without healthcare coverage decreased by 3.4% from 2007 to 2016.

Recommendations for Public Health Action

More detailed assessments of patient-specific and community-level risk factors may be warranted in areas with particularly high or increasing pancreatic cancer rates.

Public health practitioners in all jurisdictions can reinforce primary prevention messaging related to pancreatic cancer risk factors, such as smoking prevention and encouraging people to seek smoking cessation support as needed, consuming alcohol in moderation, and maintaining a healthy weight through diet and exercise. Public health practitioners can also provide support to employers in following Occupational Safety and Health Administration standards to limit occupational risk to known carcinogens, and provide resources to employees on how to mitigate workplace risk and seek care.

Given the known genetic and hereditary components of pancreatic cancer, public health practitioners might consider incorporating messages about knowing one's family history and consulting with a health care provider about genetic testing into public health outreach materials. Finally, as additional screening options are becoming available, public health practitioners can work with healthcare providers and policy makers to determine when introducing broader screening guidelines to the public is warranted.

Acknowledgements

The Idaho Hospital Association (IHA) contracts with, and receives funding from, the Idaho Department of Health and Welfare, Division of Public Health, to provide a statewide cancer surveillance system, the Cancer Data Registry of Idaho (CDRI).

The statewide cancer registry database is a product of collaboration among many report sources, including hospitals, physicians, surgery centers, pathology laboratories, and other states in which Idaho residents are diagnosed or treated for cancer. Their cooperation in reporting timely, accurate, and complete cancer data is acknowledged and sincerely appreciated.

CDRI would also like to thank the Division of Public Health, Idaho Department of Health and Welfare, and the Comprehensive Cancer Alliance for Idaho for their continued partnership and for using CDRI data as a tool in cancer control and prevention.

This report has been funded in whole or in part with Federal funds from the National Cancer Institute, National Institutes of Health, Department of Health and Human Services, under Contract No. HHSN261201800006I and the Centers for Disease Control and Prevention, Department of Health and Human Services, under Cooperative Agreement 1NU58DP006270. The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention or the National Cancer Institute.

Suggested citation:

Morawski BM, Rycroft RK, Johnson CJ. *Trends in Pancreatic Cancer in Idaho, 2013–2017.* Boise, ID: Cancer Data Registry of Idaho; August 2019.

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