Racial and Ethnic Disparities in Pancreatic Cancer: An Epidemiologic Analysis Using Arkansas Central Cancer Registry Data

Daniela Ramirez Aguilar, MPH
Arkansas Department of Health, Arkansas Central Cancer Registry, Little Rock, AR

BACKGROUND

Pancreatic cancer is one of the most aggressive and deadly malignancies given its high mortality rate and poor survival. It usually shows little or no symptoms until it has advanced and spread.[1] There are imaging and blood-based tests that may be able to detect pancreatic cancer in its early stages among high-risk individuals with two or more close relatives who had pancreatic cancer, or if an individual has an identifiable inherited genetic risk factor for the disease plus a relative with pancreatic cancer. For the general population, however, there is no established early detection method for pancreatic cancer. Moreover, approximately 90% of cases are pancreatic adenocarcinoma (PDAC). About half of cases are diagnosed when the cancer has already metastasized, leading to a poor 5-year survival.[2,3]

In October 2022, *Cancer* published the 'Annual Report to the Nation on the Status of Cancer' observing an increase in pancreatic cancer incidence and mortality during pre-pandemic years.[4] However, surveillance of pancreatic cancer is needed in Arkansas to follow the disease through 2020-2021, consistent of the first two COVID-19 pandemic years. **This study aims to examine rates and trends of pancreatic cancer incidence in Arkansas by race and ethnicity.**

METHODS

Using an imported Arkansas Central Cancer Registry database to SEER*Stat, age-adjusted incidence rates (AAIR) and incidence rate ratios (IRR) for pancreatic cancer from 2012-2021 were examined by available characteristics for two major race and ethnic groups in Arkansas, Non-Hispanic (NH) White and Black. Other race and ethnic groups were excluded due to low case counts in the state.

Joinpoint (JP) regression analysis was performed from 1996 through 2021 to calculate the annual percent change (APC) of the most commonly diagnosed subtype: pancreatic adenocarcinoma (PDAC) by White and Black, NH individuals and geographic area (urban/rural counties). Diagnosis year 2020 was excluded from JP analysis per the NCI's Surveillance Research Program recommendation.

RESULTS

In 2021, Arkansas had an AAIR of 14 pancreatic cancer cases per 100,000 population while the US had 13 pancreatic cancer cases per 100,000 population (**Figure 1**). Among White, NH individuals, the IRR (1.4) shows males had a significantly different AAIR (13.8) than females (10.2) (**Table 1**)**.** All age groups 50+ had a significantly different AAIR compared to 45-49 age group (6.9). Rural counties had a significantly different AAIR (12.5) than Urban counties (11.4). Among Black, NH, age groups 55 through 85+ IRR were significantly different from 45-49 age group. There was no significant difference for age group 50-54. For both White and Black, NH groups, IRR showed significant rate difference for regional and distant staging compared to localized staging. The 5 counties with the highest AAIR in the state were Dallas, Chicot, Lafayette, Poinsett, and Arkansas (**Figure 2**)**.**

JP analysis from 1996-2021 for PDAC showed NH Black individuals in urban counties had a 2.99% APC increase (95%CI: 1.33-5.31, p-value<0.05), while those living in rural counties had an APC increase of 1.50% (95%CI: -0.05-3.35) (**Figure 3**)**.** NH White individuals in urban counties had an APC increase of 2.47% (95%CI: 1.75-3.34, p-value<0.05) while those in rural counties had an APC decreasing of 0.34% from 1996-2010 but experienced an APC increase of 4.35% (95%CI: 2.05-11.10, p-value<0.05) from 2010-2021.

Figure 1. Age-Adjusted Incidence Rate (AAIR) Trend of Pancreatic Cancer, US and Arkansas, 2012-2021

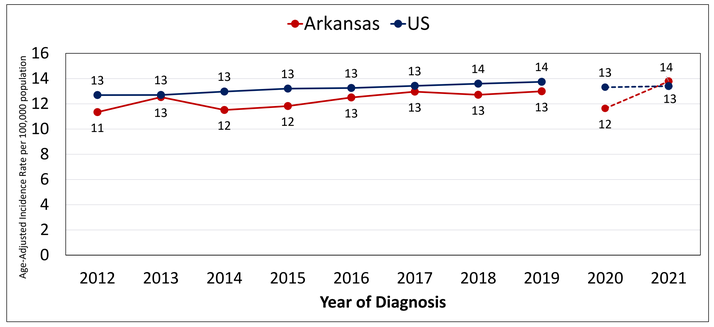


Table 1. Counts, Age-Adjusted Incidence Rate (AAIR), and Incidence Rate Ratio (IRR) of Pancreatic Cancer by Characteristics, Arkansas, 2012-2021

	White, NH							Black, NH						
	Count	AAIR	AAIR 95% CI		IRR	IRR 95% CI		Count	AAIR	95% CI		IRR	IRR 95% CI	
Sex														
Female	1,730	10.2	9.7	10.7	*Ref*	-	-	391	16.5	14.8	18.3	*Ref*	-	-
Male	1,980	13.8*	13.2	14.4	1.4	1.3	1.5	322	17.6	15.6	19.8	1.1	0.9	1.2
Age at Diagnosis[α]														
45-49 years	96	6.9	5.6	8.4	*Ref*	-	-	35	13.0	9.0	18.0	*Ref*	-	-
50-54 years	192	12.9*	11.1	14.8	1.9	1.4	2.4	35	12.4	8.7	17.3	1.0	0.6	1.6
55-59 years	327	21.1*	18.9	23.5	3.0	2.4	3.9	88	30.8*	24.7	37.9	2.4	1.6	3.6
60-64 years	483	32.9*	30.1	36.0	4.8	3.8	6.0	119	47.2*	39.1	56.5	3.6	2.5	5.5
65-69 years	545	40.9*	37.5	44.5	5.9	4.8	7.4	122	65.1*	54.0	77.7	5.0	3.4	7.5
70-74 years	618	56.9*	52.5	61.6	8.2	6.6	10.3	93	77.9*	62.9	95.5	6.0	4.0	9.1
75-79 years	538	69.4*	63.6	75.5	10.0	8.1	12.6	76	100.5*	79.2	125.8	7.7	5.1	11.9
80-84 years	437	83.4*	75.8	91.6	12.1	9.7	15.2	56	113.4*	85.7	147.3	8.7	5.6	13.7
85+ years	402	80.8*	73.1	89.1	11.7	9.3	14.8	60	113.8*	86.9	146.5	8.8	5.7	13.7
Geographic Area														
Urban	2,006	11.4	10.9	11.9	*Ref*	-	-	403	16.5	14.8	18.3	*Ref*	-	-
Rural	1,703	12.5*	11.9	13.2	1.1	1.0	1.2	310	17.8	15.8	20.0	1.1	0.9	1.3
SEER Summary Staging														
Localized	514	1.7	1.5	1.8	*Ref*	-	-	93	2.2	1.8	2.8	*Ref*	-	-
Regional	858	2.7*	2.5	2.9	1.6	1.5	1.8	158	3.6*	3.1	4.3	1.6	1.2	2.1
Distant	1,778	5.7*	5.4	6.0	3.4	3.1	3.8	356	8.2*	7.3	9.1	3.6	2.9	4.7
Unstaged	560	1.8	1.6	1.9	1.1	0.9	1.2	106	3.0	2.5	3.7	1.3	1.0	1.8

* *The rate ratio indicates that the rate is significantly different than the reference (Ref) rate (p<0.05).*
α *Reflects as age-specific rates.*
Sources Arkansas Central Cancer Registry data retrieved 2/14/2025.

Figure 2. Age-Adjusted Incidence Rate (AAIR) of Pancreatic Cancer by County, Arkansas, 2012-2021

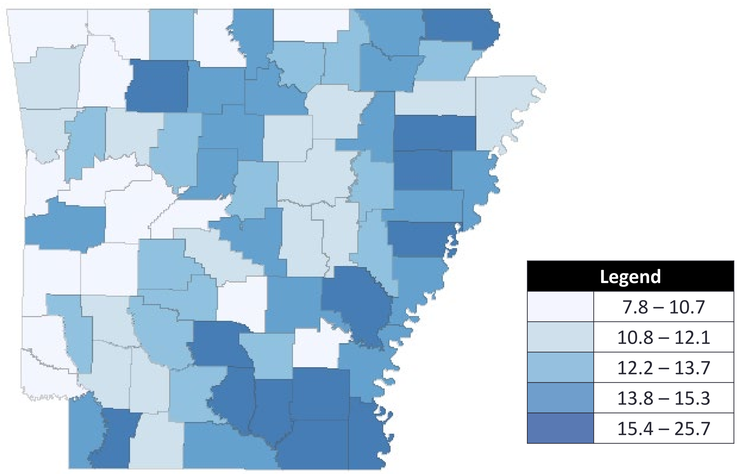
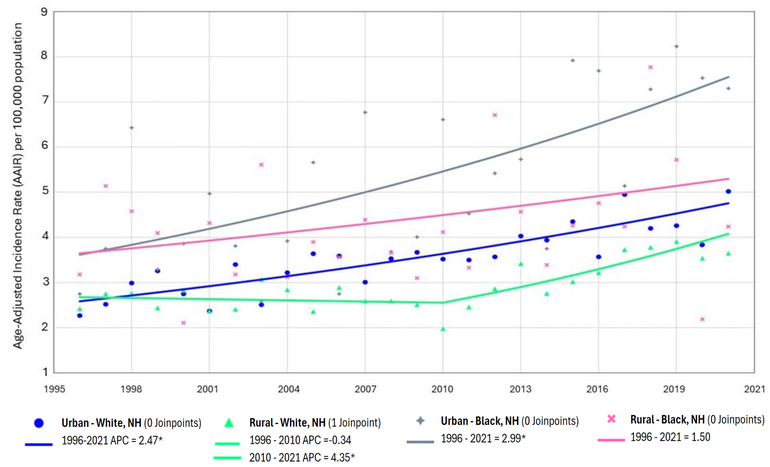


Figure 3. Analysis of Pancreatic Adenocarcinoma (PDAC) by Race, Ethnicity, and Geographic Area (Urban/Rural), Arkansas, 2012-2021



*Indicates that the Annual Percent Change (APC) is significantly different from zero at alpha = 0.05 level

CONCLUSIONS

The incidence of pancreatic cancer has been on the rise in Arkansas, with the 2021 rate slightly higher than the US and previous Arkansas years. Higher pancreatic cancer rates were observed in the southwest corner of the state, which consists of rural-designated counties. Although pancreatic cancer rates are higher among Black, NH individuals, JP analysis shows White, NH individuals have higher APC rates for PDAC. While descriptive statistics for Arkansas helps describe and follow the burden of pancreatic cancer, this study is limited in providing explanations for the results. In general, pancreatic cancer research can be challenging due to late detection, aggressive nature, complex tumor environment, and genetic differences by subtype. Current treatments have limited success, particularly for advanced stages, which may be due to the dense tissue that forms a protective barrier around pancreatic tumors, preventing treatments like chemotherapy from effectively reaching the cancer cells. Despite these challenges, pancreatic cancer research is making progress in understanding the cancer, including advancements in genetic research, early detection methods, and targeted therapies. However, continued research is crucial to develop more effective therapies, and personalized treatment approaches.

References:

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