

Arizona Cancer Registry

Cancer Report Overview for Dewey-Humboldt

February 20, 2024

Presenting To

Dewey-Humboldt Town Council | Dewey-Humboldt, Arizona

Dana Doyle, MPH | Epidemiologist



ARIZONA DEPARTMENT
OF HEALTH SERVICES

Health and Wellness for all Arizonans

OBJECTIVES

- Arizona Cancer Registry introduction
- Background on cancer
- Overview of cancer analysis report
 - Original request
 - Methods
 - Results
 - Limitations
 - Conclusions



ARIZONA CANCER REGISTRY (ACR) INTRODUCTION

- Who are we?
 - A population-based system that collects, manages, and analyzes information on the incidence and survival of Arizona residents diagnosed with cancer. Cancer registry data is used to understand the overall burden of cancer in Arizona and to inform research on evidence-based interventions that help improve the health of our community and patients overall.
- Who reports cases to the ACR?
 - Hospitals, free-standing clinics, physicians, pathology laboratories, data exchanges, and death certificates.
- Where is the ACR located?
 - Located within the Arizona Department of Health Services in Phoenix, Arizona.

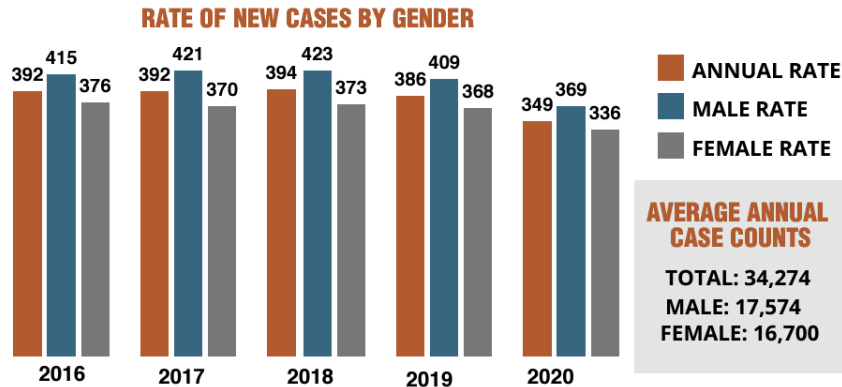


ARIZONA DEPARTMENT
OF HEALTH SERVICES

Health and Wellness for all Arizonans

CANCER BACKGROUND, 2016-2020

AN AVERAGE OF 34,274 ARIZONANS WERE DIAGNOSED WITH INVASIVE CANCER EACH YEAR AT A RATE OF 382.0 CASES PER 100,000 PEOPLE



- There are more than 100 types of cancer.
- Top cancer types in Arizona for 2016-2020: **Female Breast, Prostate, Lung and Bronchus, Colorectal Cancer, and Melanoma.**
- Arizona (377 cases per 100,000) has a lower overall cancer incidence rate compared the U.S. national rate (442 cases per 100,000).
- Cancer is unfortunately very common. An estimated 42 out of 100 men and 40 out of 100 women will develop cancer during their lifetime; 1 out of every 5 deaths in the United States is due to cancer.
- Risk factors for leading preventable cancers are tobacco use, high UV radiation exposure, obesity, and high alcohol consumption.



ARIZONA DEPARTMENT
OF HEALTH SERVICES

Health and Wellness for all Arizonans

CANCER BACKGROUND, 2016-2020

- Determining the cause of cancer is extremely difficult, if not impossible. Why?
 - **Latency periods:** this is the time frame from when someone is exposed to a suspected cancer causing agent and the development of cancer symptoms. This time frame can be years or decades long.
 - Factors that affect determining a latency period:
 - Dose and intensity of exposure
 - Duration of exposure
 - The particular substance
 - Type of cancer that develops
 - Age at exposure
 - Gender
 - Genetic susceptibility
 - Additional risk factors (tobacco use, high UV radiation exposure, obesity, high alcohol consumption)
 - Other medical conditions (immunosuppression)



OVERVIEW OF CANCER ANALYSIS REPORT



ARIZONA DEPARTMENT
OF HEALTH SERVICES

Health and Wellness for all Arizonans

PROCESS BREAKDOWN

1. Receive and document concern/request
2. Conduct literature review to determine what cancer sites should be included in analysis
3. Pull the most the most current and available data (at time of report) for the selected cancer sites
4. Determine geographic region for analysis
5. Calculate age-adjusted rates for each cancer sites and geographic area to see if there are statistically higher rates of cancer
6. Write report and share with community



WHAT WAS REQUESTED?

- ACR received a request from the Public Health Protection Section Manager for Yavapai County.
- Request for a review of cancer incidence rates in Dewey-Humboldt because the community has been concerned about contamination of arsenic, lead, and beryllium at the closed Iron King mine site.



METHODS: LITERATURE REVIEW AND DATA

- Based on the literature review, the following cancer sites were included in the analysis:
 - Lung and Bronchus
 - Bladder
 - Liver and Intrahepatic Bile Duct
 - Kidney Renal Pelvis
 - Stomach
- The data in this report includes cancer cases that were diagnosed in Arizona between 2010-2018. Why these years?
 - The year range begins with 2010 due to Primary Care Area population limitations.
 - The year range ends with 2018 because at the time that this analysis began the most available cancer registry data was for the 2018 diagnosis year.



METHODS: GEOGRAPHIC REGION

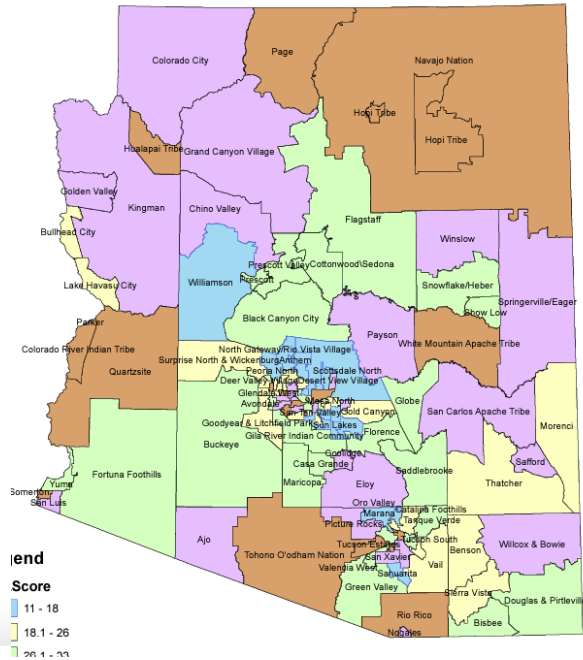
- Cancer age-adjusted rates were calculated for 3 geographic levels
 - State level
 - County level
 - Primary Care Area level



ARIZONA DEPARTMENT
OF HEALTH SERVICES

Health and Wellness for all Arizonans

PRIMARY CARE AREAS (PCA)



- Geographic regions that represent Arizona communities while maintaining sufficient population numbers for statistical analysis.
- Represent community boundaries & populations as they exist in 2010 (2010 Census Tracts). Identify where people go for primary care.
- Populations between 10,000-200,000
- PCA are limited to 7,500 square miles and do not cross county lines.
- 126 PCAs. Tribal PCA are exempt.
- Geocoded using the **address at diagnosis** for each case.

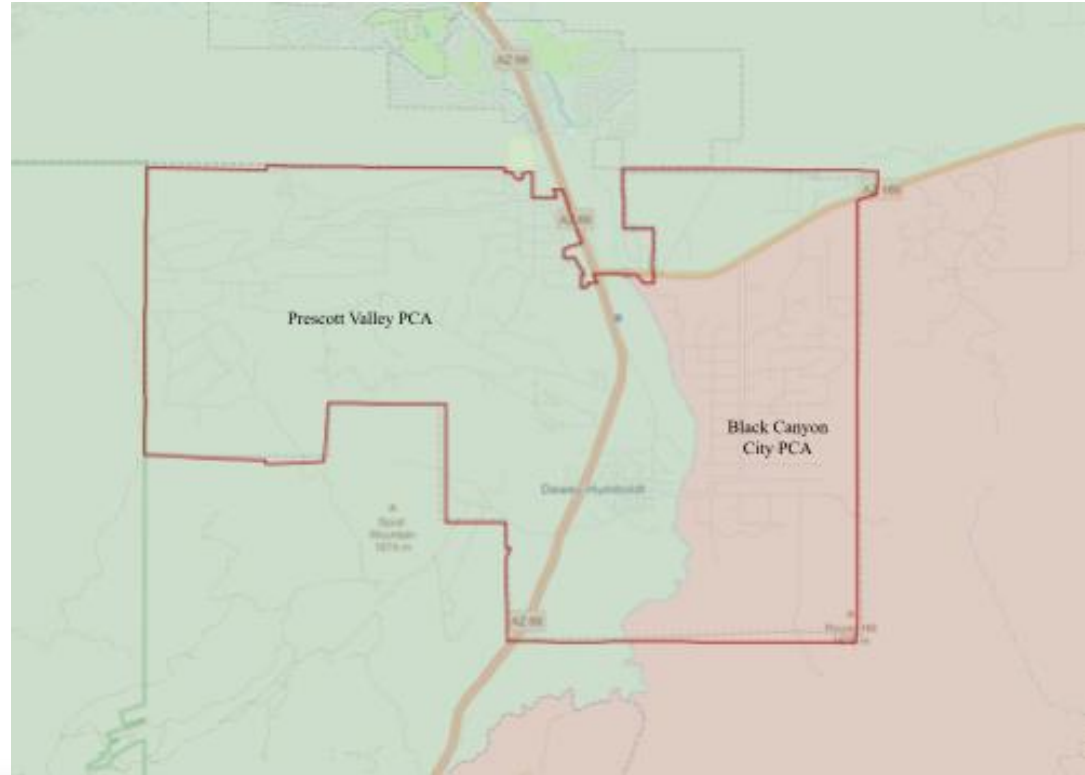


ARIZONA DEPARTMENT
OF HEALTH SERVICES

Health and Wellness for all Arizonans

PRIMARY CARE AREAS

- Dewey-Humboldt town boundaries overlap 2 PCAS
 - Prescott Valley (green)
 - Black Canyon City (pink)
- The findings of this request provide information on rates for the two PCA areas only
- Dewey-Humboldt cancer cases comprise only 5.7% of the cancer cases in the Prescott Valley and Black Canyon City PCAs combined



ARIZONA DEPARTMENT
OF HEALTH SERVICES

Health and Wellness for all Arizonans

Green: Prescott Valley PCA
Pink: Black Canyon City PCA
Red Line: Dewey-Humboldt town boundaries

METHODS: MEASURES

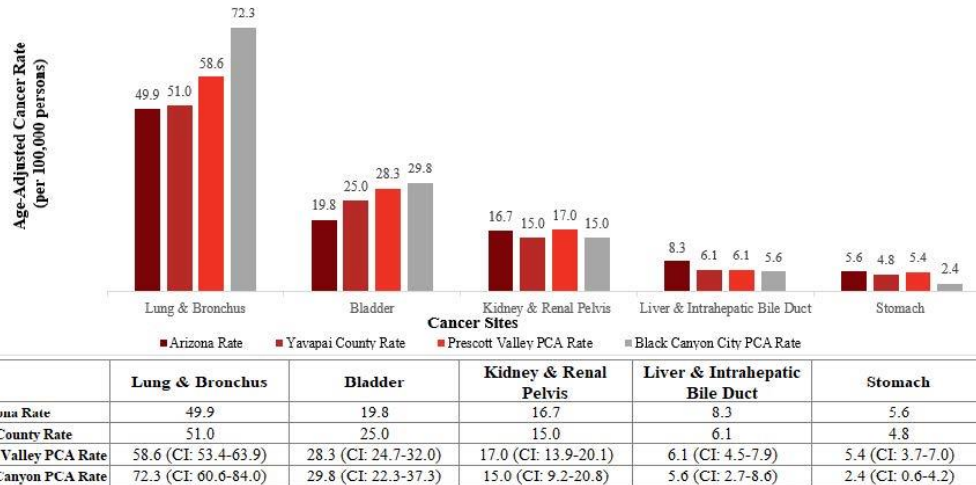
- **Age-Adjusted Incidence Rate (“rate”)**: The number of new cancer cases diagnosed for every 100,000 people in the geographic area of interest (state, county, and PCA level).
- **95% Confidence Interval**: A statistical measure that tells us how precise our cancer rate is. With a 95% confidence interval, we have a 95% chance of being correct that our rate would fall within the range of values and a 5% chance of being wrong.

Example: We want to figure out the average height of women in the U.S.. Assume someone tells you that the 95% confidence interval is (5'2, 5'7), that means if we randomly pick one woman from the crowd, there is 95% chance that the height of this women is between 5'2 and 5'7.



RESULTS

Figure: Comparison of the Prescott Valley PCA, Black Canyon City PCA, Yavapai County, and Arizona Age-Adjusted Cancer Rates by Cancer Site (Diagnosis Years 2010-2018)



- The age-adjusted cancer rate for the PCA is considered statistically higher than the county or state rate if the PCA rate's lower confidence bound is higher than the county or state rate.
- The PCA rate is considered *not* statistically different if the county or state rate falls within the confidence interval of the rate for the PCA.



RESULTS

- The Prescott Valley and Black Canyon City PCA cancer rates were statistically higher for **Lung and Bronchus** cancer compared to the Arizona and Yavapai County rates.
- The Prescott Valley and Black Canyon City PCA cancer rates were statistically higher for **Bladder cancer** compared to the Arizona cancer rate but not the Yavapai County rate.
- The Prescott Valley and Black Canyon City PCA cancer rates were *not* statistically higher for **Kidney and Renal Pelvis, Liver and Intrahepatic Bile Duct, and Stomach cancer** compared to the Arizona and Yavapai County cancer rates.



LIMITATIONS

- Limitations
 - Determining time period when the unusual pattern started.
 - Defining geographic area of focus.
 - Lack of data on cancer latency periods.
 - Lack of sufficient data to assess the relationship between cancer and environmental factors.
 - The ACR does not have data on past exposures to heavy metals for cases included in this report.
- Cancer registries do not collect information on patient address history, occupational exposures, environmental exposures, or all lifestyle factors that can be related to cancer risk (diet, tobacco use, exercise, alcohol consumption, etc.).



CONCLUSIONS

- The rates for lung and bladder cancer are elevated for the Prescott Valley and Black Canyon City PCA areas compared to the Yavapai County and State rate but Dewey-Humboldt only comprises 5.7% of those cases, making it difficult to attribute higher rates specifically to Dewey-Humboldt.
- The Arizona Department of Health Services is unable to reach any conclusions regarding the presence of an elevated cancer risk in the Dewey-Humboldt area. Determine a cause of source of cancers in the Dewey-Humboldt area is not possible using ACR data.



THANK YOU

Dana Doyle, MPH | Epidemiologist

Dana.doyle@azdhs.gov

azhealth.gov

 [@azdhs](https://twitter.com/azdhs)

 facebook.com/azdhs



ARIZONA DEPARTMENT
OF HEALTH SERVICES

Health and Wellness for all Arizonans