Cancer Incidence Study

Cancer Incidence Statistical Review – Update for Monticello, San Juan County, Utah Covering the Period from 1980 to 2019

March 31, 2022

Prepared by:

Environmental Epidemiology Program
Bureau of Epidemiology
Division of Disease Control and Prevention
Utah Department of Health

TABLE OF CONTENTS

ACKNOWLEDGEMENT

Cancer data used for this investigation was obtained from the Utah Cancer Registry (UCR). The UCR is funded by a contract from the National Cancer Institute's (NCI) Surveillance, Epidemiology, and End Results (SEER) Program with additional support from the Utah Department of Health (UDOH) and the University of Utah.

Other data and analytical tools used for this investigation were obtained from the Utah Environmental Public Health Tracking Network (UEPHTN) and the Utah APPLETREE program within UDOH. The UEPHTN is funded by a grant from the Centers for Disease Control and Prevention (CDC), Environmental Public Health Tracking Branch. The Utah APPLETREE program is part of a cooperative agreement and funded by a grant from the Agency for Toxic Substances and Disease Registry (ATSDR).

Non-Certified

This publication was made possible by a cooperative agreement NU61TS000324-03-00 from the Agency for Toxic Substances and Disease Registry (ATSDR). Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the ATSDR, or the U.S. Department of Health and Human Services.

EXECUTIVE SUMMARY

Cancer is a dominating environmental public health concern. A function of the Utah Department of Health (UDOH) Environmental Epidemiology Program (EEP) is to investigate cancer incidence. Monticello is a rural city located in San Juan County in southeastern Utah. From 1942 to 1960, a mill actively processing uranium and vanadium was located immediately adjacent to Monticello. Mill waste was deposited at the Monticello Mill Tailings Site (MMTS), which included the site itself and several surrounding properties. Those tailings were contaminated with heavy metals and radioactive materials. Contaminated materials from the MMTS migrated into Monticello from natural phenomena or local utilization. Both the MMTS and the community were cleaned up; however, resident exposure to hazardous materials occurred before remediation. It is known that residents were exposed to both heavy metal and radioactive contaminants from the MMTS. Potential adverse health outcomes from exposure to contaminated materials from the MMTS include certain types of cancer. The EEP conducted cancer incidence statistical reviews in 2006, 2007, and 2012 following the initial public health assessment completed in 1997. Due to the long latency period of certain types of cancer, periodic follow-up studies were recommended. This study is a follow-up to and review of the 2012 study.

This report presents a statistical review of cancer incidence among residents of Monticello. The cancer incidence (i.e., new cancer cases) of Monticello between 1980 and 2019 in eight sequential five-year analytical time periods for the 42 anatomical site-specific cancer categories was compared to expected counts derived from the state age-adjusted cancer rate for the corresponding cancer site and time period. The EEP considers cancer rate ratios to be significantly elevated when the calculated 99% confidence limits do not include 1.0, which is the value expected when there is no difference between the study area and state rates. Additional criteria to help identify meaningful results include any final analytical periods where the rate ratio is three or more standard errors above 1.0, as this may indicate an emerging cluster.

This study found no significantly elevated cancer for any type of cancer in any study period (i.e., no excess cancer for any cancer site group). No significant increasing or decreasing trends in cancer incidence were identified. Previous Monticello cancer incidence studies conducted in 2006, 2007, and 2012 found significantly elevated lung and bronchial and stomach cancer which were not replicated by this study. The methodology used by this study is unable to conclusively prove or disprove a link between the observed cancer incidence rates and contaminant exposure from the MMTS. Additionally, the lack of significant findings in this study does not suggest the absence of prior risk of contaminant exposure, nor does it suggest an absence of other types of adverse health outcomes associated with heavy metal or radiation exposure.

Based on the results of this report, the EEP recommends the discontinuation of scheduled follow-up statistical reviews of Monticello. The EEP will conduct further studies of cancer incidence in Monticello at the request of the San Juan County health officer or in response to community concerns in collaboration with the San Juan County Public Health Department.

INTRODUCTION

Cancer Incidence Statistical Reviews

A core function of epidemiology is to track and evaluate disease patterns. This helps public health officials and policymakers identify and assess communities with public health challenges, define public health priorities, monitor, and evaluate public health actions, and recognize public health concerns (Dicker, 2002; Stanbury et al., 2012; Thacker, 2000; Thacker et al., 2012). Cancer is a dominating environmental public health concern. Public fear of cancer resulting from environmental hazards is reinforced by U.S. environmental regulatory actions that use cancer as a mechanism for making regulatory decisions (Morrone, 2011). Public concerns about excess cancer risk often result in requests to public health agencies to conduct investigations.

Public health agencies conduct investigations of cancer incidence using several different methods. The first is a cancer incidence statistical review. This approach focuses on determining whether a particular community is experiencing more cancer than would be expected. A cancer statistical review is usually conducted by linking cancer registry data to population data and evaluating trends. From a public health perspective, a cancer incidence statistical review is most useful in identifying community needs about cancer-related health education, building awareness, public health screening services, and other public health interventions. For the community, these kinds of studies empower the residents to make improvements in governmental policymaking and health care services (Bell et al., 2006; Kingsley et al., 2007).

Another method available to public health practitioners is a cancer cluster investigation. This method focuses on characterizing the size and extent of a population with known cancer excess and determining potential causal factors. The cancer cluster methodology involves linking many causal variables, usually collected by medical record review and individual surveys or interviews. In situations like the one addressed in this study, an extensive exposure assessment would also be important. Data about individual risks are then processed through complex statistical analyses to identify variables that seem to explain the risk (Kingsley et al., 2007). However, cluster investigations rarely result in important discoveries of causality (Goodman et al., 2012; Kingsley et al., 2007).

The present study is a cancer statistical review and not a cancer cluster investigation; therefore, the findings of this study will only determine if the study area (i.e., Monticello, Utah) is experiencing more cancer cases than expected when the cancer rates of the state of Utah are applied to the study area's population. This study will not determine the causes associated with cancer incidence in Monticello.

Site Information

Monticello, Utah	
Location:	37°52'09" N 109°20'31" W
Elevation	7,070 ft (2,155 m)
ZIP Code:	84535
Federal Information Processing Standards (FIPS) Code:	49-51580
Geographic Names Information System (GNIS) Code:	1443568
2020 U.S. Census Tract:	49.037.978100

Monticello is a rural city located in San Juan County in southeastern Utah. Please refer to **Table 1** below for a selection of Monticello and state of Utah population characteristics.

Table 1: Selected population characteristics comparing Monticello to the state of Utah. Obtained from the 2019 American Community Survey 5-year estimates data profiles (ACS, 2019a-c). Margin of error at 90% confidence is displayed in percent where applicable and available.

Parameter	Monticello	State of Utah
Estimated population	2,604	3,096,848
Percent of population who are children under 18 years old	31.7% (± 5.2%)	29.8% (± 0.1%)
Percent of population who are adults 65 years or older	13.6% (± 5.4%)	10.8% (± 0.1%)
Percent of population who are of a minority race	10.9%	14.2%
Percent of population who are American Indian and Alaska Native	8.9% (± 5.9%)	1.8% (± 0.1%)
Percent of population who are Hispanic or Latino	10.6% (± 5.4%)	14.0%
Percent of population born in Utah	65.6% (± 6.9%)	61.8% (± 0.2%)
Percent of population born outside of the U.S.	3.7% (± 2.2%)	8.5% (± 0.1%)
Percent of foreign-born population who are not U.S. citizens	88.7% (± 20.1%)	60.4% (± 0.8%)
Percent of adult high school graduates (or higher)	91.5% (± 4.0%)	92.3% (± 0.2%)
Percent of adults with a bachelor's degree (or higher)	31.7% (± 8.3%)	34.0% (± 0.3%)
Percent of population 16 years or older in the labor force who are unemployed	2.0 % (± 2.0%)	2.4% (± 0.1%)
Percent of total population living in poverty	10.2% (± 6.2%)	9.8% (± 0.3%)
Percent of total population under 18 years old living in poverty	15.2% (± 11.6%)	10.9% (± 0.5%)
Percent elderly adults 65 years or older living in poverty	4.7% (± 8.0%)	6.4% (± 0.3%)

Statement of Concern

From 1942 to 1960, an active uranium and vanadium processing mill was located immediately adjacent to the City of Monticello. The mill was built by the Defense Plant Corporation in 1942. The site was taken over by the U.S. Atomic Energy Commission (AEC), a predecessor to the U.S. Department of Energy (DOE), in 1948. Milling operations ended in 1960. Cleanup of the site began in 1961, and by 1980 the DOE had set up the Monticello Remedial Action Project (MRAP) under the Surplus Facilities Management Program (SFMP). As the owner and former operator of the site, the DOE was identified as responsible for funding and enacting remedial action. In 1983, the remediation project was divided into two sites: the Monticello Mill Tailings Site (MMTS) which included the mill site itself, and the Monticello Vicinity Properties (MVP), the residential and commercial properties located within or near the City of Monticello. No residences are located immediately on the MMTS.

In 1986 and 1989 the MVP and the MMTS, respectively, were placed on the Comprehensive Environmental Response, Compensation, and Liability Act National Priority List (CERCLA NPL). The first public health assessment (PHA) was completed in 1997 by the Agency for Toxic Substances and Disease Registry (ATSDR), which determined that the MMTS was a public health hazard due to radioactive tailings present at the site. Additionally, these tailings contained heavy metals. Despite public access to the MMTS being restricted, contaminated materials from the MMTS migrated into Monticello either because of natural phenomena or local use (e.g., construction), as in the case of the MVP.

Remediation of the MVP was completed in 1999. Remediation of the MMTS was partially completed in 2004, with remedial construction completed. Surface and groundwater treatment and monitoring for MMTS contaminants remain ongoing. All the completed exposure pathways identified in the original PHA have been eliminated, and potential pathways of exposure continue to be monitored. Exposure to hazardous materials occurred prior to the remediation of both sites. Although stringent controls were implemented to keep contamination from spreading, some exposure may have occurred on contaminated MVP properties during the remediation period depending on the scheduling of property clean-up activities. The MMTS was not accessible to the public during remediation and no exposure occurred during remediation of that property (ATSDR, 2014). Potential adverse health outcomes associated with the exposures of concern from these sites include certain types of cancers.

The EEP conducted cancer incidence statistical reviews in 2006, 2007, and 2012. These studies analyzed the rates of cancer for Monticello from 1973 to 2003, 1973 to 2004, and 1973 to 2009, respectively (EEP, 2006; EEP 2007; EEP 2012). Due to the long latency period of some types of cancer, periodic follow-up studies were recommended. This report is a follow-up to and review of the 2012 report.

Study Objectives

This report presents a statistical review of cancer incidence among residents of Monticello. The EEP conducted this statistical review by analyzing periodic rates and trends in cancer incidence in the defined study area (i.e., Monticello) compared to corresponding rates for the state of Utah. The objective of a statistical review is to identify significantly elevated cancer incidence rates. The methodology does not allow the definitive linkage of cancer rates to potential causal risk factors, and specific hazardous substances of concern and exposure risk are not addressed by this report. This study was conducted as a follow-up to the previous studies of cancer rates in Monticello which recommended periodic reviews.

DATA AND METHODS

Study Design

This investigation is a retrospective (i.e., looking backward in time) statistical review of cancer incidence among residents of the study area (defined below). Statistical reviews are not cancer cluster investigations and lack the power to link cancer incidence to putative risk factors (Jekel et al., 1996; Kingsley et al., 2007; Mann, 2003). Statistical reviews are a tool used by the EEP to review the health status of a population and assess public health activities.

The incidence of cancer, quantified in sequential five-year analytical periods for each cancer category among the residents of the study area, is compared to the corresponding expected cancer incidence counts derived from the rates for the rest of the state of Utah. The study's null hypothesis (the usual statistical default position) is that the cancer rates in the study area are not significantly different from the rates that would be expected if the study area had the same cancer rates as the rest of the state.

Study Area and Population

The study area was defined as the 2010 U.S. census block groups 49.037.978100.2 and 49.037.978100.3 located in San Juan County, Utah. This area includes all residential area of Monticello. The most recent cancer incidence study in Monticello used a study area definition using the equivalent 2000 U.S. census block group boundaries (EEP, 2012). No changes to the boundaries of these two census block groups occurred in the transition from the 2000 to 2010 U.S. census boundaries.

The study population was defined as all residents living in the study area (i.e., the sum of the population of the two census block groups). The population of Monticello was 1,972 at the time of the 2010 census and 1,824 at the time of the 2020 census (USCB, 2010b; USCB, 2020b).

Cancer Data

Cancer incidence data on persons diagnosed with primary invasive cancer between 1980 and 2019 were obtained from the Utah Cancer Registry (UCR). The EEP receives cancer data for all invasive cancers on an annual basis. The UCR completes a rigorous data review for completeness and quality before data are released to the EEP. The most recent years of cancer data are not made available to the EEP until they have been finalized. The UCR data includes diagnostic information, patient demographics, and residential addresses of the cases, as well as cancer behavior information. The residential address information provided by the UCR includes the street address, city, ZIP code, and county of the patient. Individuals with multiple primary invasive cancers have multiple records in the data set in sequential order. Cancer records are distinguished by individually unique cancer registry tracking numbers and a cancer sequence number. The sequence number allows for discrimination between the first cancer diagnosis and subsequent diagnoses (UCR, 2022). Diagnostic coding of cancers includes the International Classification of Disease Oncology, 3rd Edition (ICD-O-3) codes for site, histology, and behavior (WHO, 2013). The UCR groups cancer into 42 major cancer types by primary site following the guidance provided by the National Cancer Institute (NCI) Surveillance, Epidemiology, and End Results (SEER) Program (NCI, 2022). These 42 UCR site codes are a convenient grouping for conducting surveillance analyses (UCR, 2022).

The EEP geocodes cancer data received from UCR to obtain a precise location for each cancer record. Patient address data is processed by the Utah Geospatial Resource Center (UGRC) API to obtain an X- and Y-coordinate pair within the state of Utah. These coordinates can be used to assign the cancer record to various geographic boundaries (e.g., census block group). Cancer cases within the defined study area can be identified using these geocoded data. Several records listing Monticello as the city of residence in the complete cancer data do not have an address that can be geocoded to a census block group. Because it is essential to match cancer incidence data

to population count data, this study uses different definitions for the study area for health outcome (i.e., cancer incidence) and population data.

Some cancer records have insufficient address information and are not able to be geocoded to a census block group. However, some of these cases may rightly belong within the study area. For this study, all non-geocodable cancer records able to be georeferenced to Monticello were included in the study population. Specifically, all non-geocodable records with a residential city listed as "Monticello" were included in the study population if supported by other address data. This study assumes that all non-geocodable records reside within the study area. All records included in the study population were manually assessed to ensure that the available address data supported inclusion.

Certain kinds of medical treatment for cancer and other disease, such as radiation therapy, increases an individual's risk of developing leukemia, particularly myeloid leukemia (sometimes referred to as therapy-induced leukemia) (Godley and Larson, 2008; Larson, 2007; Leone et al., 1999; Leone et al., 2011; Sill et al., 2011; Wilkins and Woodgate, 2008). Myeloid leukemia cases that were the first of any sequence of cancers for an individual were included in this investigation. Myeloid leukemia cancer records were excluded if they were potentially therapy-induced leukemia (i.e., not the first record of an individual sequence of cancer records).

Carcinoma in situ (CIS; often called "pre-cancer") refers to cancer in which abnormal cells have not spread beyond where they first formed and are considered noninvasive. These in situ cells are not malignant or cancerous; however, they can sometimes become cancerous and spread. The UCR provides the EEP with records of in-situ cancers that have been diagnosed. Because statewide ascertainment of carcinoma in situ is incomplete, incident cases of CIS are not included as part of this investigation.

Site clean-up of both the MMTS and MVP were completed by the year 2000. Therefore, all individuals born in or after the year 2000 were excluded from the cancer data and population data used in this study. The EEP houses birth records data detailing all births occurring in Utah. These data are obtained from the Office of Vital Records and Statistics. Annual birth records geocoded to 2010 U.S. census block groups were used to estimate the number of individuals born in or after 2000 to be removed from the population data. Birth records listing a maternal residential address outside of Utah or indicating infant death were not considered for removal. Birth records were removed from the study population if they were geocoded to 2010 U.S. census block groups 49.037.978100.2 or 49.037.978100.3, following the study area definition. Birth records not able to be geocoded to a census block group were removed from the study population if the maternal city of residence was "Monticello." Non-geocodable birth records outside of the study area were removed from the comparison population if the records indicated maternal residence in Utah. This study assumes that all individuals born in or after 2000 continually resided in either the study area or comparison area after birth for the duration of the study period.

Overall, 273,263 invasive primary cancer incidence reports among 244,937 individuals were registered by the UCR statewide between 1980 and 2019. Of those, 265 persons living in the study area experienced 289 new cancer cases between 1980 and 2019.

Population Data
This study is retrospective (i.e., looking back in time); therefore, this study uses population data which conforms to previous census boundaries (i.e., for the study period 1980 to 2019). The 2010 U.S. census divides Utah into 1,690 census block groups with a median population of 1,445 people per block group (USCB, 2010c). Commercially available U.S. census population data for Utah for the 1980, 1990, 2000, and 2010 censuses were used to estimate annual age-group and sex population counts for each 2010 U.S. census block group in each intercensal year and each year for the period 2011 to 2020 (GeoLytics, 2014). These estimates were created by applying annual population growth rates derived from the previous and subsequent decennial data. This method follows national population estimation guidelines (USCB, 2012). Due to the COVID-19 pandemic, the release of the 2020 decennial census data was delayed (USCB, 2021). The 2020 census data have not yet been sufficiently processed into a useable form for this type of statistical review. Therefore, the EEP must rely on projected population estimation data which do not include 2020 U.S. census data and may deviate from true population values. From 2010 to 2020, the population of Utah grew from 2,763,885 to 3,271,616, or about an 18.4% increase (USCB, 2010a; USCB, 2020a). An increase in cancer incidence commensurate with the population increase of Utah (i.e., approximately 18%) would be expected for this period. In contrast, the population of Monticello remained stable from 2010 to 2020, decreasing slightly from 1,972 to 1,824 (USCB, 2010b; USCB, 2020b). An increase in cancer incidence in the comparison population applied to the stable study area population may affect analysis results for analytical periods within the period 2010 to 2020. Please refer to the Limitations section (below) for more detail.

Analytical Periods
Eight five-year analytical time periods (1980-1984, 1985-1989, 1990-1994, 1995-1999, 2000-2004, 2005-2009, 2010-2014, and 2015-2019) were evaluated for cancer incidence rates and trends over time.

Age Groups
Cancer cases and population data were aggregated into six age group strata: 0-19 years of age, 20-34 years of age, 35-49 years of age, 50-64 years of age, 65-74 years of age, and 75 years of age and older.

Comparison Population
The comparison population for this investigation was defined as the state population excluding the defined study population (i.e., the population of Monticello). Similar to the process of developing the study population, the cancer incidence by cancer type and population count for each age group, sex, and analytical period for all of the census block groups in the state not included in the study population were added together to generate the comparison population. The state population at the time of the 2010 U.S. census was 2,763,885, and 3,271,616 according to the 2020 U.S. census (USCB, 2010a; USCB, 2020a).

Indirect Age-Standardized Incidence Rates
RStudio version 1.3 using R version 4.0 was used to manage and analyze the cancer and population data (R, 2017). The sex-specific and non-sex-specific indirect age-standardized

incidence rate for each cancer type and analytical period was calculated using standard methods (Anderson and Rosenberg, 1998; Jekel et al., 1996; Selvin, 1996). This is the preferred method for analysis of disease with small numbers of cases per analytical period. The expected number of cases and rate was computed by applying the comparison population incidence rate to the study area population for each analytical period using the indirect age-standardization method (see EEP, 2016 for detailed information, including formulas). Following the methods of the 2012 study, the expected case count for both genders combined was computed by taking the sum of the expected case counts used in the male and female-specific rate computations.

Standardized Incidence Ratios

The standardized incidence count of cancer for the study area was evaluated against the expected incidence count in the form of standardized incidence ratios (SIR). An SIR greater than one (1.0) indicates that the incidence of cancer in the study area is greater than the proportional cancer incidence in the comparison population for that analytical period. An SIR less than one indicates that the incidence of cancer in the study area population is less than expected based on the comparison population's rate. For statistical validity, SIRs and corresponding confidence intervals were only calculated for time periods with four or more cases (Bender et al., 1990; Caldwell, 1990; Thun and Sinks, 2004). The EEP is required to protect confidential data from unlawful disclosure and therefore suppresses results for analytical time periods containing three or fewer cases (EEP, 2016).

Statistical significance is determined by applying the Byar's 99% confidence interval for the SIR (Breslow and Day, 1987; Rothman and Boice, 1979, 1982; Sahai and Khurshid, 1983, 1996). The EEP adopted the 99% confidence level following discussions at the local, state, and national stages, and is used due to the multiple comparisons conducted in this study type (Anderson et al., 2012; EEP, 2016). Statistical significance focuses on minimizing false positive interpretations. A false positive occurs when the results appear to be elevated but are due to random variation. It should be noted that a statistically significant SIR may be due to mathematical artifacts and not truly be biologically meaningful or relevant (Bender et al., 1990; Besag and Newell, 1991). When performing multiple analyses using the 99% confidence interval to interpret data, one would expect approximately 1 in 100 (1%) of the analyses to have a statistically significant interpretation resulting from random chance. Additional criteria to help identify meaningful results include any final analytical period where the SIR is three or more standard errors above 1.0, as this may indicate an emerging cluster. Situations where some of these criteria are met but that do not include the final analytical period are considered historical clusters that have resolved and are thus not actionable (EEP, 2016).

Analysis of Temporal Trend

Kendall's tau-b (or Kendall rank correlation coefficient) is a nonparametric measure of the strength and direction of an association between two variables, in this case time and cancer incidence rates. Kendall's tau-b correlation test was used to examine temporal trends of increasing or decreasing cancer incidence rates (Kendall, 1938). The Kendall tau-b statistic is an appropriate method to investigate trends when there are relatively few analytical periods. The Kendall tau-b tests the correlation between the analytical period-specific rate and the ordered numeric designation of the analytical periods (i.e., analytical period 1980 to 1984 is number 1, period 1985 to 1989 is number 2, etc.). The values of tau-b range from -1 (a consistent

decreasing trend) to +1 (a consistent increasing trend). Values near zero indicate no trend. Trend was indicated by statistically significant (p-value ≤ 0.05) correlation coefficients (corresponding roughly to a tau-b of ± 0.70).

FINDINGS

Statistically Significant Cancer Results
Cancer incidence rates in cases per 100,000 person-years for Monticello and the associated standardized incidence ratios are presented in **Table 2**. Comparisons for each cancer type, analytical period, and gender combination are shown in **Table 2**.

No significantly elevated cancer incidence (i.e., SIR) was identified among any of the analytical periods for any cancer type. Therefore, no excess cancer was identified in Monticello among any of the cancer types for any analytical period for any gender category.

Compared to the 2012 study, this study identified 1 less case of lung and bronchus cancer in the 1995-1999 and 2000-2004 analytical periods (2 cases total), 1 less case of breast cancer in the 1995-1999 analytical period, and 1 less case of prostate cancer in the 1990-1994 analytical period.

The three previous cancer statistical reviews that EEP has conducted for Monticello report similar findings. In the 2006 and 2007 studies, lung and bronchial cancer was found to be significantly elevated in one or more analytical periods (EEP, 2006; EEP, 2007). The 2007 study also identified significantly elevated stomach cancer in one analytical period (EEP, 2007). The 2012 study reported significantly elevated lung and bronchus cancer within the combined gender category for the analytical periods 1995-1999 (SIR = 3.3 [1.5-6.2]), 2000-2004 (SIR = 2.8 [1.1-5.9], and 2005-2009 (SIR = 3.6 [1.2-7.1]). The 2012 study also identified significantly elevated lung and bronchus cancer among males in the 1995-1999 analytical period (SIR = 3.5 [1.3-7.7]) (EEP, 2012).

Trends
Analysis of the changes in the rate of cancer incidence through time (i.e., a trend analysis) identified types of cancer with increasing or decreasing trends, if present. Not all cancer types that are elevated during one or more analytical periods will present a significant trend. Not all cancer types with a significant trend will have significantly elevated cancer incidence rates. However, it is possible that cancer types with a significant trend of increasing incidence will eventually reach a time where the incidence is significantly elevated. To reiterate, Kendall Tau-b values near +1 indicate a strong increasing trend, values near -1 indicate a strong decreasing trend, and values near 0 indicate no trend.

No significant increasing or decreasing trends in cancer incidence were identified across any analytical period for any cancer site.

DISCUSSION

Cancer

There are several distinct cell types that make up the human body, including epithelial cells, connective tissue cells, muscle cells, nerve cells, and blood cells. Each of these types arises from stem cells or progenitor cells that divide and specialize (i.e., differentiate) to become different kinds of tissues, forming organs and organ systems. Rapid cellular division and differentiation occurs throughout fetal development and juvenile maturation. Once adulthood is achieved, cellular division and differentiation are essentially limited to the replacement of damaged or dying cells. For example, the adult body replaces white blood cells every thirty days and red blood cells every four months. The process of cell division and differentiation is highly regulated, and when uncontrolled, the process can lead to non-functional growths. These nonfunctional growths are called neoplasms, or more commonly, cysts, polyps, or tumors. Most neoplasms are benign, meaning they lack the ability to invade surrounding tissues or metastasize (spread to other parts of the body) and can usually be treated or removed. Neoplasms that are malignant, also known as cancers, can invade surrounding tissues or metastasize (King and Robins, 2006; Weinberg, 2006).

Cancer is a broad group of more than 100 diseases that involve uncontrollable cell replication and growth. Often these cells are "undifferentiated," meaning they have lost their tissue-specific characteristics. As these cells grow to form tumor tissue, they invade nearby healthy tissue or spread via metastasis to other tissues. This invasion disrupts the functions of healthy tissue. Cancer cells may also produce metabolic products that can be transported to other parts of the body resulting in adverse health effects (NCI, 2015). The American Cancer Society (ACS) estimates that about one in two men and one in three women will develop cancer (all invasive sites) sometime in their life (called "lifetime risk") (ACS, 2020; NCI, 2021a-b). In the United States, cancer is the second leading cause of death (CDC, 2022). Among all causes of death, approximately one in five men and women will die of cancer (ACS, 2020; NCI, 2021a-b). On average, about one in nine people will develop two or more cancers in his or her lifetime (Wilkins and Woodgate, 2008).

Risk factors contributing to the development of cancer include both inherent and external factors. Inherent factors include a variety of genetic susceptibilities (e.g., *BRCA1* and *BRCA2* gene mutations). External factors include life choices and behaviors (e.g., tobacco use, alcohol use, poor diet, obesity, lack of physical activity, excessive sunlight exposure, and sexual behavior), medical conditions and medications, oncogenic pathogens, and chemical or radiological environmental exposures. Cancer may be the result of several factors interacting together with a triggering event (NCI, 2015).

Cancer Sites

The ACS and NCI maintain websites specific to cancer by type or anatomical site (ACS, 2022b; NCI, 2021c). Links to the relevant websites are available in the References and Resources sections of this document, and readers interested in further information are encouraged to explore them.

Comparison to previous studies

The 2007 study sought to ensure that cancer incidence ascertainment was as complete as possible through surveys and collaboration with Monticello residents. The UCR reviewed and validated all reported cases and updated the registry data where appropriate. The data used by EEP for this investigation included those data developed through the 2007 investigation processes.

Unlike previous studies, this study did not assess cancer incidence for the period 1973 to 1979. Current UDOH cancer investigation protocols recommend cancer statistical review study periods begin in 1980, dictated by the available years of population data (UDOH, 2016). This study included the same five-year sequential analytical periods as the 2012 study to provide comparability. Additional sequential five-year analytical periods were included according to available cancer data.

Previous studies in 2006 and 2007 included an investigation period analysis (i.e., assessing cancer incidence over the entire study period). However, this approach assumes factors associated with cancer, cancer risk, cancer diagnosis, reporting, and cancer treatment remain stable throughout the study period. Since this assumption is unlikely true, neither the 2012 investigation nor the present study included an investigation period analysis. Additionally, current UDOH cancer investigation protocols do not recommend a cumulative study period analysis (UDOH, 2016).

This study identified fewer cancer cases than the 2012 study in comparable analytical periods. Geocoding methods employed by the EEP to obtain precise locations for each cancer case are continuously improving. All cancer records used in previous studies were available to the EEP for this study, differing only in the geocoding data which must be updated to conform to the current U.S. census boundaries. Some cancer records listing “Monticello” as the city of residence were geocoded to a census block group outside of the study area, and therefore not included in the study population. When these now excluded cases are added to the included cases, the case counts match the 2012 study across cancer site group and analytical period. These cases may have been previously included in the study population based on the listed residential city due to a lack of address data sufficient to geocode them to a census block group (i.e., non-geocodable) when they truly fell outside of the study area. The cancer data are continuously refined to address gaps as new information becomes available. These factors may account for the difference in cases found between the 2012 and the present study.

The current study did not replicate the findings from any of the previous three studies. No significant SIRs were found for any cancer site, in any analytical period, in any gender category. The EEP feels that the present study continues the strength of the 2012 study, using the most precise definition of the study area and the most consistent approach to population estimates.

Limitations

The public often wants public health investigations to link cancer risk to a putative environmental concern. The methodology used in this investigation (i.e., calculation of indirectly standardized incidence ratios) does not have the capability to definitively link elevated cancer rates in the study population to any inherent or external risk factors, including environmental exposures (dos Santos Silva, 1999; Esteve et al., 1994; Jekel et al., 1996; Kingsley et al., 2007;

Mann, 2003).

These types of cancer statistical reviews are based on annual incidence data reported to the Utah Cancer Registry. The incidence of cancer per year is dependent on the diagnoses of clinically manifested cancers, and there are several limitations that can impede this linkage. There is seldom any knowledge about the frequency, duration, or intensity of exposure to potential environmental concerns in cancer victims. Cancer can also have a variable length latency period (the period between exposure and the actual manifestation and diagnosis of cancer). Cancer can be present for a substantial amount of time before an individual seeks medical assistance that leads to diagnosis (Bray and Parkin, 2009; Izquierdo and Schoenbach, 2000; Parkin and Bray, 2009; Thoburn et al., 2007).

Cancer risk is thought to be the result of complex interactions between individual factors (e.g., genetics, behaviors, socioeconomics, etc.) and environmental exposures (e.g., occupational exposures, domestic exposures, etc.). There is seldom sufficient information available to statistically control for the many non-environmental factors that contribute to cancer risk, or exposure to other potential environmental risks that are not the environmental concern in question (Chaix et al., 2010; Merlo et al., 2012; Peterson et al., 2006; Prentice and Thomas, 1993). For small populations, the incidence of cancer tends to manifest in arbitrary clusters. This tendency is a common phenomenon encountered when investigating the rate of rare diseases in small populations. Often, a few types of cancer may be statistically elevated for disparate periods, but that conclusion may change if the analytical periods are changed (Greenland et al., 1986, 2000). Overcoming these limitations usually requires a comprehensive assessment of individual risk supported by a clear and consistent trend of elevated rates for a population.

This investigation used data from the UCR and U.S. Census Bureau. In Utah, the diagnosis of cancer for all site categories is reportable to the UCR. When a Utah resident seeks diagnosis, a report is generated, and the UCR will follow-up to confirm information and collect additional factors about the case. This process occurs when cases are diagnosed in Utah, but may not occur if a case is diagnosed outside of Utah. The UCR may also contain records of incidence of cancer in persons who recently moved to the study area prior to their diagnosis. Alternatively, the UCR may lack records on individuals who lived for most of their life in the study area but moved elsewhere before seeking diagnosis and treatment. These situations create sampling biases. In the absence of information, this investigation assumes that the sampling bias is non-systematic, meaning the “move-in” and “move-out” situations balance each other. It is highly unlikely that this assumption is true in all cases, and can be a significant limitation when the study population is small.

The EEP uses U.S. Census data purchased from a commercial vendor, who has re-tabulated 1980, 1990, 2000, and 2010 data for the 2010 census block groups in Utah. Re-tabulation involves population distribution weighting based on census blocks that may not be consistent through time. The EEP estimates intercensal population counts using linear regression between the known census tabulations. This methodology does not account for short-term population growth dynamics (such as the zoning and development of a new subdivision), which can occur in just a few years.

As stated previously, the COVID-19 pandemic delayed the release of the 2020 U.S. census data (USCB, 2021). The 2020 census data have not yet been sufficiently processed into a useable form for this type of statistical review. Available 2020 census data indicate that the population of Utah grew by about 18.4% since the 2010 census, while the population of Monticello remained stable (USCB 2010a-b; USCB 2020a-b). An increase in cancer incidence for the state of Utah commensurate with the population increase (i.e., approximately 18%) would be expected for the period 2010 to 2020. Little to no change in cancer incidence would be expected in Monticello for the same period. For this type of analysis, increased cancer incidence in the state of Utah (i.e., the comparison population) would result in a larger number of expected cancer cases in Monticello when the state rates were applied to the study population. Given a stable number of observed cases in Monticello, this larger number of expected cases would result in a lower SIR and potentially mask significant SIRs in the 2010-2014 and 2015-2019 analytical periods. However, this cannot be conclusively determined until the 2020 census data are available and useable for this type of cancer statistical review.

Geocoded birth records were used to estimate the number of individuals born in or after the year 2000 to be removed from the population data used by this study. This method assumes that individuals born in the study area (i.e., Monticello) reside in the study area for the duration of the study period. This estimation method does not account for individuals born in or after 2000 moving in or out of the study area during the study period, which would alter the number of excluded individuals. This method resulted in the most accurate estimation of individuals born in or after 2000 for the defined census block groups of the study area, is the most specific to Utah, and makes fewer assumptions compared to other methods of population estimation.

This investigation used population-based summary data rather than individual-level data. An investigation of this type is termed an ecologic study. An interpretation error commonly associated with ecologic investigations is to apply population-level risk findings to individuals. This kind of interpretation error is called an “ecologic fallacy.” For example, a study may find a higher cancer rate among part of the study population (e.g., males) when compared to the rest of the state. This risk metric should not be applied to individuals, who may have no risk or a risk several times higher than the population risk based on the individual’s genetic makeup, behaviors, exposure history, and susceptibility or resiliency to cancer (Greenland, 2001; Greenland and Robins, 1994; Izquierdo and Schoenbach, 2000; Morgenstern, 1982, 1995; Rockhill, 2005).

CONCLUSIONS AND RECOMMENDATIONS

This study found no excess cancer in Monticello compared to the state of Utah in any cancer site group for the study period 1980 to 2019.

This statistical review is the fourth such study conducted as a follow-up to the original public health assessment in 1997, augmented by new cancer data received from the UCR. While this study’s methodology is incapable of conclusively linking cancer in Monticello to any specific environmental risk, it cannot preclude any link either. Previous studies yielded significantly

elevated incidence of lung and bronchial cancer and stomach cancer, which were not replicated by this study. The lack of significantly elevated cancer incidence found by this study does not discount previous findings of significantly elevated cancer incidence, nor does it suggest that environmental contaminant exposure from the MMTS or MVP did not play a role in cancer incidence or other adverse health outcomes in Monticello in the past.

Based on the results of this statistical review, the EEP recommends the discontinuation of scheduled follow-up cancer statistical reviews of Monticello. Assessment of cancer incidence in Monticello may be conducted in the future by the EEP at the request of the San Juan County health officer or in response to concerns from the community in collaboration with San Juan Public Health Department.

AUTHORSHIP AND REVIEW

This report was prepared by:

Johnny Auld, MPH
Environmental Epidemiology Program
Bureau of Epidemiology
Utah Department of Health

Alejandra Maldonado, PhD
Environmental Epidemiology Program
Bureau of Epidemiology
Utah Department of Health

Mail: PO Box 142104, Salt Lake City, Utah, 84114-2104
Street: 288 North 1460 West, Salt Lake City, Utah 84116
Phone: (801) 538-6191
Fax: (801) 538-6564
Email: eep@utah.gov

Certifying reviewers:

Sam LeFevre, DSc
Director, Bureau of Epidemiology
Utah Department of Health

Leisha Nolen, MD, PhD
State Epidemiologist
Utah Department of Health

Srimoyee Bose, PhD
Research Consultant, Center for Health Data and Informatics
Utah Department of Health

Recommended citation:
Environmental Epidemiology Program. *Cancer Incidence Statistical Review: Update for Monticello, San Juan County, Utah Covering the Period from 1980 to 2019*. March 30, 2022. Salt Lake City, UT: Utah Department of Health.

CERTIFICATION

This report titled "Cancer Incidence Statistical Review – Update for Monticello, San Juan County, Utah Covering the Period from 1980 to 2019" was prepared by the Environmental Epidemiology Program, Utah Department of Health. This report covers an investigation of cancer incidence using standard and approved methodology and procedures existing at the time the investigation herein reported was begun. Editorial and technical review was completed by UDOH certifying reviewers and program partners.

Approved by:

Sam LeFevre, DSc, Director
Bureau of Epidemiology
Utah Department of Health

Leisha Nolen, MD, PhD, State Epidemiologist
Utah Department of Health

Srimoyee Bose, PhD, Science Advisor to the Environmental Epidemiology Program
Utah Department of Health

REFERENCES

Web links provided as part of a reference to a government or organizational website may wrap to multiple lines.

ATSDR, 2014. Agency for Toxic Substances and Disease Registry. Public health assessment: Monticello mill tailings and vicinity properties, San Juan County, Utah / CERCLIS Nos. UT3890090035 and UTD980667208. February 26, 2014. Written in cooperation with the ATSDR by the Environmental Epidemiology Program, Utah Department of Health. Atlanta, GA: Agency for Toxic Substances and Disease Registry, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services.

ACS, 2020. American Cancer Society. Lifetime risk of developing or dying from cancer website. Available at: http://www.cancer.org/Cancer/CancerBasics/lifetime-probability-of-developing-or-dying-from-cancer. Accessed February 28, 2022.

ACS, 2022a. American Cancer Society. Learn about cancer. Available online at: www.cancer.org/cancer.html.

ACS, 2022b. American Cancer Society. Cancer types. Available online at: www.cancer.org/cancer/all-cancer-types.html.

ACS, 2019a. American Community Survey. DP02, 5-Year Estimates Data Profiles for Monticello, Utah, and the state of Utah: Selected Social Characteristics in the United States. Accessed December 23, 2021.

ACS, 2019b. American Community Survey. DP03, 5-Year Estimates Data Profiles for Monticello, Utah, and the state of Utah: Selected Economic Characteristics Accessed December 23, 2021.

ACS, 2019c. American Community Survey. DP05, 5-Year Estimates Data Profiles for Monticello, Utah, and the state of Utah: Demographic and Housing Estimates. Accessed December 23, 2021.

Anderson RN, Rosenberg HM, 1998. Age standardization for death rates: implementation of the year 2000 standard. National Vital Statistics Report. 1998; 47(3):1-17.

Anderson H et al., 2012. A synopsis of the 2010 national assessment of state cancer cluster investigations and protocols. Atlanta, Georgia: Council of State and Territorial Epidemiologists.

Bell BS et al., 2006. Current practices in spatial analysis of cancer data: mapping health statistics to inform policymakers and the public. International Journal of Health Geographics 5:49.

Bender AP et al., 1990. Appropriate public health response to clusters: the art of being responsibly responsive. American Journal of Epidemiology. 1900; 132(Suppl 1):S48-S52.

Besag J and Newell J, 1991. The detection of clusters of rare disease. Journal of the Royal Statistical Society, Part A. 1991; 154:143-155.

Bray F and Parkin DM, 2009. Evaluation of data quality in the cancer registry: principles and methods. Part I: comparability, validity and timeliness. European Journal of Cancer 45(5):747- 755.

Breslow NE and Day NE, 1987. Statistical Methods in Cancer Research. Vol. II, The Design and Analysis of Cohort Studies (IARC Scientific Publication No 82). 1987; Lyon, France: International Agency for Research on Cancer.

Caldwell GG, 1990. Twenty-two years of cancer cluster investigations at the Centers for Disease Control. American Journal of Epidemiology. 1990; 132(Suppl 1):S43-S47.

CDC, 2022. Centers for Disease Control and Prevention. Leading causes of death web page. 2022. Available at: https://www.cdc.gov/nchs/fastats/leading-causes-of-death.htm. Accessed February 28, 2022.

Chaix B et al., 2010. Neighborhood-level confounding in epidemiologic studies: unavoidable challenges, uncertain solutions. Epidemiology 21(1):124-127.

Dicker RC, 2002. A brief review of the basic principles of epidemiology. In: Field epidemiology, 2nd Ed. (Gregg MB, ed.). New York, NY: Oxford University Press.

dos Santos SI, 1999. Cancer epidemiology: principles and methods. Lyon, France: International Agency for Research on Cancer.

EEP, 2006. Environmental Epidemiology Program. Health consultation: an investigation of cancer incidence in Monticello, Utah. May 17, 2006. Salt Lake City, Utah: Utah Department of Health.

EEP, 2007. Environmental Epidemiology Program. Cancer incidence study: a follow-up study of cancer incidence in Monticello City, Utah – 1973-2004. December 27, 2007. Salt Lake City, Utah: Utah Department of Health.

EEP, 2012. Environmental Epidemiology Program. Cancer Incidence Follow-Up Investigation for Monticello, San Juan County, Utah, Covering the Period from 1973 to 2009. October 1, 2012. Salt Lake City, Utah: Utah Department of Health.

Esteve J et al., 1994. Statistical methods in cancer research: IV descriptive epidemiology (IARC Scientific Publication Number 128). Lyon, France: International Agency for Research on Cancer.

Geolytics, 2014. Census digital optical disks for the 1980, 1990, 2000 and 2010 U.S. census counts in the 2010 census boundaries. Information: www.GeoLytics.com.

Godley and Larson, 2008. Therapy-related myeloid leukemia. Seminars in Oncology. 2008; 35(4):418-429.

Goodman SN and Samet JM, 2006. Cause and cancer epidemiology. In: Cancer epidemiology and prevention, 3rd ed. (Schottenfeld D, Fraumeni JF, eds). New York City, NY: Oxford University Press.

Goodman M et al., 2012. Cancer clusters in the USA: what do the last twenty years of state and federal investigation tell us. Critical Reviews in Toxicology 42(6):474-490.

Greenland S et al., 1986. The rare-disease assumption revisited. American Journal of Epidemiology 124(6):869-876.

Greenland S and Robins J, 1994. Ecologic studies – biases, misconceptions, and counter examples. American Journal of Epidemiology 139(8):747-760.

Greenland S et al., 2000. Problems due to small samples and sparse data in conditional logistic regression analysis. American Journal of Epidemiology 151(5):531- 539.

Greenland S, 2001. Ecologic versus individual-level sources of bias in ecologic estimates of contextual health effects. International Journal of Epidemiology 30(6):1343-1350.

Izquierdo JN and Schoenbach VJ, 2000. The potential and limitations of data from population-based state cancer registries. American Journal of Public Health 90(5):695-698.

Jekel JF et al., 1996. Epidemiology, biostatistics and preventive medicine. 1996; Philadelphia, PA: WB Saunders Co. Kendall M, 1938. A new measure of rank correlation. Biometrika 30(1-2):81-93.

King RJB and Robins MW, 2006. What is cancer? In: Cancer Biology, 3rd Ed. (King RJB, Robins MW, eds.) San Francisco, California: Benjamin Cummings Publishing.

Kingsley BS et al., 2007. An update on cancer cluster activities at the Centers for Disease Control and Prevention. Environmental Health Perspectives 115(1):167-171.

Larson RA. Etiology and management of therapy-related myeloid leukemia. *Hematology Am Soc Hematol Educ Program*. 2007:453-9. doi: 10.1182/asheducation-2007.1.453. PMID: 18024664.

Leone G et al., 1999. The incidence of secondary leukemia. *Haematologica*. 1999; 84(10):937-945.

Leone G et al., 2011. Therapy-related myeloid neoplasms. *Current Opinions in Oncology*. 2011; 23(6):672-680.

Mann CJ, 2003. Observation research methods. Research design II: cohort, cross sectional, and case-control studies. *Emergency Medicine Journal*. 2003; 20:54-60.

Merletti F et al., 2011. The socioeconomic determinants of cancer. Environmental Health 10:S7.

Merlo DF et al., 2012. Cancer risk and the complexity of the interactions between environmental and host factors: HENVINET interactive diagrams as simple tools for exploring and understanding the scientific evidence. Environmental Health 11(Suppl 1):S9.

Morgenstern H, 1982. Uses of ecologic analysis in epidemiologic research. American Journal of Public Health 72:1336-1344.

Morgenstern H, 1995. Ecologic studies in epidemiology: concepts, principles, and methods. Annual Reviews of Public Health 16:16-81.

Morrone M, 2011. From cancer to diarrhea: the moving target of public concern about environmental health risks. Environmental Health Insights 5:87-96.

NCI, 2015. National Cancer Institute. Risk factors for cancer. Available online at: http://www.cancer.gov/about-cancer/causes-prevention/risk

NCI, 2021a. National Cancer Institute. SEER Cancer Statistics Review 1975-2018. Lifetime Risk (Percent) of Being Diagnosed with Cancer by Site and Race/Ethnicity: Males, 21 SEER Areas, 2016-2018 (Table 1.15) and Females, 21 SEER Areas, 2016-2018 (Table 1.16). Available at: https://seer.cancer.gov/csr/1975_2018. Accessed on May 21, 2021.

NCI, 2021b. National Cancer Institute. SEER Cancer Statistics Review 1975-2018. Lifetime Risk (Percent) of Dying from Cancer by Site and Race/Ethnicity: Males, Total US, 2016-2018 (Table 1.18) and Females, Total US, 2016-2018 (Table 1.19). 2011b. Available at: https://seer.cancer.gov/csr/1975_2018. Accessed on May 21, 2021.

NCI, 2021c. National Cancer Institute. Cancer types. Available online at: www.cancer.gov/types.

NCI, 2022. National Cancer Institute. Surveillance, Epidemiology and End Results (SEER) Program website. 2022. Available at: http://seer.cancer.gov/. Accessed February 28, 2022.

Parkin DM and Bray F, 2009. Evaluation of data quality in the cancer registry: principles and methods. Part II: completeness. European Journal of Cancer 45(5):756-764.

Peterson ML et al., 2006. Estimation of direct causal effects. Epidemiology 17(3):276-284.

Prentice RL and Thomas D, 1993. Methodologic research needs in environmental epidemiology: data analysis. Environmental Health Perspectives 101(Suppl 4):39-48.

R, 2017. The R Project for Statistical Computing. Information: www.r-project.org/about.html.

Rockhill B, 2005. Theorizing about causes at the individual level while estimating effects at the population level: implications for prevention. Epidemiology 16(1):124-129.

Rothman KJ and Boice JD, 1979. Epidemiologic analysis with a programmable calculator. NIH Publication 79-1649. Washington, DC: Government Printing Office.

Rothman KJ and Boice JD, 1982. Epidemiologic analysis with a programmable calculator, New Edition. 1982; Boston, MA: Epidemiology Resources, Inc.

Sahai H and Khurshid A, 1983. Confidence intervals for the mean of a Poisson distribution: a review. Biometrical Journal; 35:857-867.

Sahai H. and Khurshid A, 1996. Statistics in Epidemiology: Methods, Techniques and Applications. Boca Raton, FL: CRC Press, Inc.

Schottenfeld D and Fraumeni JF, 1996. Cancer Epidemiology and Prevention, 2nd Ed. New York, NY: Oxford University Press.

Selvin S, 1996. Chapter 1: Measures of risk: rates and probabilities. In: Monographs in epidemiology and biostatistics, Vol 25: Statistical analysis of epidemiologic data. (Selvin S, ed.) 1996; Oxford, UK: Oxford University Press.

Sill H et al., 2011. Therapy-related myeloid neoplasms: pathobiology and clinical characteristics. British Journal of Pharmacology. 2011; 162(4):792-805.

Stanbury M et al., 2012. Functions of environmental epidemiology and surveillance in state health departments. Journal of Public Health Management and Practice 18(5):453-460.

Thacker SB, 2000. Historical development. In: Principles and practice of public health surveillance, 2nd Ed. (Teutsch SM, Churchill RE, eds.). New York, NY: Oxford University Press.

Thacker SB et al., 2012. Public health surveillance in the United States: evolution and challenges. Morbidity and Mortality Weekly Report – Surveillance Supplement 61(3):3-9.

Thoburn KK et al., 2007. Case completeness and data accuracy in the Centers for Disease Control and Prevention's National Program of Cancer Registries. Cancer 109(8):1607-1616.

Thun MJ and Sinks T, 2004. Understanding cancer clusters. CA Cancer Journal for Clinicians. 2004; 54(5):273-280.

UCR, 2022. Utah Cancer Registry. 2022 cancer dataset for the Utah Environmental Public

Health Tracking Network: containing public use data records for primary in-situ Utah resident cancers from 1973 to 2019. Electronic data transfer. See: http://ucr.utah.edu/.

UDOH, 2016. Utah Department of Health. Protocol for Investigating Cancer Cluster Concerns in Utah. May 2, 2016. Available at: https://health.utah.gov/enviroepi/cancerstudies/Documents/Utah_Cancer_Investigatio_Protocol_Final_2May2016.pdf. Accessed August 10, 2021.

UEPHTN, 2022. Utah Environmental Public Health Tracking Network. Available at: epht.health.utah.gov/epht-view.

USCB, 2012. U.S. Census Bureau. Method for intercensal population estimates: 2000 to 2010. Available at: http://www.census.gov/popest/methodology/2000-2010_Intercensal_Estimates_Methodology.pdf. Accessed August 8, 2021.

USCB, 2010a. U.S. Census Bureau. 2010 Census, Redistricting Data, Table P1 for Utah. Generated using data.census.gov/cedsci/. Accessed March 29, 2022.

USCB, 2010b. U.S. Census Bureau. 2010 Census, Redistricting Data, Table P1 for Monticello city, Utah. Generated using data.census.gov/cedsci/. Accessed March 29, 2022.

USCB, 2010c. U.S. Census Bureau. 2010 Census, Reference Files for Utah. Available at www.census.gov/geographies/reference-files/2010/geo/state-local-geo-guides-2010/utah.html. Accessed March 29, 2022.

USCB, 2020a. U.S. Census Bureau. 2020 Census, Redistricting Data, Table P1 for Utah. Generated using data.census.gov/cedsci/. Accessed March 29, 2022.

USCB, 2020b. U.S. Census Bureau. 2020 Census, Redistricting Data, Table P1 for Monticello city, Utah. Generated using data.census.gov/cedsci/. Accessed March 29, 2022.

USCB, 2021. U.S. Census Bureau. Redistricting Data: What to Expect and When. Available at: https://www.census.gov/newsroom/blogs/director/2021/07/redistricting-data.html. Accessed March 28, 2022.

Weinberg RA, 2006. The nature of cancer. In: Biology of Cancer. (Weinberg RA, ed.) New York, New York: Garland Science, Taylor & Francis Group.

Wilkins KL and Woodgate RL, 2008. Preventing second cancers in cancer survivors. Oncology Nursing Forum. 2008; 35(2):E12-E22.

WHO, 2013. World Health Organization. International Classification of Diseases for Oncology, 3rd Edition (ICD-O-3) website. 2013. Available at: https://www.who.int/standards/classifications/other classifications/international-classification-of-diseases-for-oncology. Accessed July 27, 2021.

Wilkins and Woodgate, 2008. Preventing second cancers in cancer survivors. Oncology Nursing Forum 35(2):E12-E22.

APPENDICES

Figure 1. Maps detailing 2010 U.S. census blocks and location of Monticello, Utah.

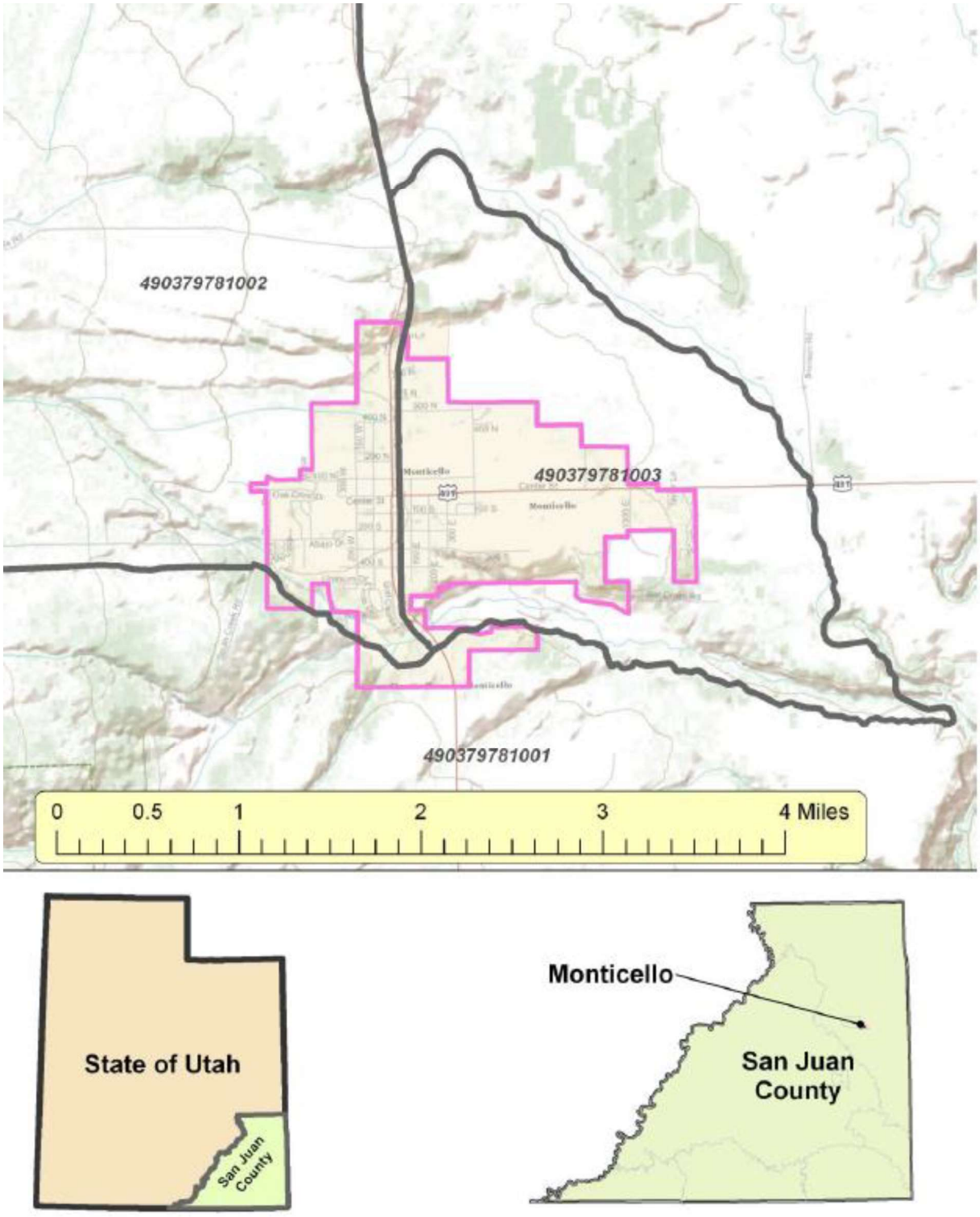

Table 2: Study results by cancer type, analytical period, and gender.
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
01 Oral cavity and pharynx	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
02 Esophagus	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
03 Stomach	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
04 Small intestine	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate, but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
05 Colon	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate, but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
06 Rectum and recto-sigmoid junction	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤v3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate, but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
07 Anal, anal canal, and anorectum	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate, but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
08 Liver and intrahepatic bile duct	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
09 Gallbladder and biliary ducts	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate, but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
10 Pancreas	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
11 Other digestive system	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate, but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
12 Larynx	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
13 Lung and bronchus	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	> 3	95.1	2.9	[0.6, 8.1]
		F	≤ 3			
		B	8	79.3	2.9	[0.9, 6.7]
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	> 3	59.5	2.0	[0.5, 5.3]
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	> 3	55.5	1.8	[0.4, 4.6]
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate, but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
14 Other respiratory system	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
15 Bones and joints	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
16 Soft tissues (including heart)	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
17 Cutaneous melanoma	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	4	39.7	2.4	[0.4, 7.5]
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	>3	51.7	1.2	[0.3, 3.3]
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	5	39.4	0.8	[0.2, 2.3]

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
18 Other non-melanoma skin, excluding basal and squamous cell carcinoma	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
19 Breast	1980-1984	F	≤ 3	—	—	—
	1985-1989	F	4	74.5	0.9	[0.2, 3.0]
	1990-1994	F	≤ 3	—	—	—
	1995-1999	F	7	144.9	1.4	[0.4, 3.4]
	2000-2004	F	4	83.8	0.7	[0.1, 2.4]
	2005-2009	F	4	78.6	0.7	[0.1, 2.2]
	2010-2014	F	5	91.3	0.8	[0.2, 2.2]
	2015-2019	F	7	116.1	1.0	[0.3, 2.5]

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
20 Cervix	1980-1984	F	≤ 3	—	—	—
	1985-1989	F	≤ 3	—	—	—
	1990-1994	F	≤ 3	—	—	—
	1995-1999	F	≤ 3	—	—	—
	2000-2004	F	≤ 3	—	—	—
	2005-2009	F	≤ 3	—	—	—
	2010-2014	F	≤ 3	—	—	—
	2015-2019	F	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
21 Uterus	1980-1984	F	≤ 3	—	—	—
	1985-1989	F	≤ 3	—	—	—
	1990-1994	F	≤ 3	—	—	—
	1995-1999	F	≤ 3	—	—	—
	2000-2004	F	≤ 3	—	—	—
	2005-2009	F	≤ 3	—	—	—
	2010-2014	F	≤ 3	—	—	—
	2015-2019	F	4	66.3	2.5	[0.4, 7.8]

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
22 Ovary	1980-1984	F	≤ 3	—	—	—
	1985-1989	F	≤ 3	—	—	—
	1990-1994	F	≤ 3	—	—	—
	1995-1999	F	≤ 3	—	—	—
	2000-2004	F	≤ 3	—	—	—
	2005-2009	F	≤ 3	—	—	—
	2010-2014	F	≤ 3	—	—	—
	2015-2019	F	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
23 Other female genital	1980-1984	F	≤ 3	—	—	—
	1985-1989	F	≤ 3	—	—	—
	1990-1994	F	≤ 3	—	—	—
	1995-1999	F	≤ 3	—	—	—
	2000-2004	F	≤ 3	—	—	—
	2005-2009	F	≤ 3	—	—	—
	2010-2014	F	≤ 3	—	—	—
	2015-2019	F	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
24 Prostate	1980-1984	M	5	79.8	1.3	[0.3, 3.8]
	1985-1989	M	≤ 3	—	—	—
	1990-1994	M	4	76.0	0.5	[0.1, 1.7]
	1995-1999	M	4	76.1	0.6	[0.1, 1.8]
	2000-2004	M	4	75.3	0.4	[0.1, 1.4]
	2005-2009	M	9	157.3	0.8	[0.3, 1.8]
	2010-2014	M	9	147.0	0.9	[0.3, 2.0]
	2015-2019	M	13	195.4	1.2	[0.5, 2.3]

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
25 Testis	1980-1984	M	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
26 Other male genital	1980-1984	M	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
27 Bladder	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
28 Kidney and renal pelvis	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
29 Other urinary	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
30 Eye and orbit	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
31 Brain	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
32 Other central nervous system	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
33 Thyroid	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
34 Other endocrine	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
35 Hodgkin's lymphoma	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
36 Non-Hodgkin's lymphoma	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	4	37.0	1.8	[0.3, 5.6]
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	4	31.5	1.5	[0.2, 4.7]

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
37 Multiple myeloma	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
38 Lymphocytic leukemia	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
39 Myeloid leukemia	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
40 Monocytic leukemia	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
41 Other leukemia	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—

Table 2: Study results by cancer type, analytical period, and gender (continued).
Analysis of the incidence of primary cancer diagnoses among Monticello residents between 1980 and 2019 reported to the Utah Cancer Registry by site code. Case counts with "≤ 3" indicate a stratum with three or fewer cases, resulting in suppression of the results. Case counts with "> 3" means the case count was large enough to evaluate but was suppressed to protect confidential data. Rates are crude incidence rates per 100,000 person-years. The SIRs are the standardized incidence ratios (SIR) with Byar's 99% confidence intervals (CI). Significance is indicated by shading and bold text. Gender codes are "M" for male, "F" for female, and "B" for both genders combined.

Cancer Site	Analytical Period	Sex	Case Count	Rate	SIR	99% CI
42 Other sites/types (not specified above)	1980-1984	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1985-1989	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1990-1994	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	1995-1999	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2000-2004	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2005-2009	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2010-2014	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	≤ 3	—	—	—
	2015-2019	M	≤ 3	—	—	—
		F	≤ 3	—	—	—
		B	> 3	47.3	3.1	[0.8, 8.2]

Definitions

ACS American Cancer Society. The ACS, first established in 1913, is a nationwide voluntary health organization dedicated to eliminating cancer. The society, headquartered in Atlanta, Georgia, has over 900 offices throughout the United States. ACS funding is used for patient support services, research, prevention, detection and treatment, and society operations. For more information, see: http://www.cancer.org.

ACS American Community Survey. The ACS is an ongoing survey that provides annual updates to population and demographic estimates derived from census data. The ACS is operated by the USCB. For more information see: http://www.census.gov/acs/www/.

ATSDR Agency for Toxic Substances and Disease Registry. An agency with the Centers for Disease Control and Prevention, National Centers for Environmental Health. The ATSDR was created under the authority of the Comprehensive Environmental, Compensation, and Liability Act (CERCLA). The role of the ATSDR is to assess and document CERCLA sites and to provide documentation and decision-making criteria for evaluating CERCLA sites. In some states, such as Utah, the ATSDR works through a cooperative agreement with the state. For more information see: http://www.atsdr.cdc.gov/.

CDC Centers for Disease Control and Prevention. A federal agency within the U.S. Department of Health and Human Services responsible for investigating disease trends and causalities and promoting best disease prevention practices. For more information, see: http://www.cdc.gov/.

CI Confidence interval. Because there is some error in estimating a population parameter, and that error increases as the population size decreases, a confidence interval is used to indicate the degree of uncertainty associated with a parameter estimate. It is important to remember that a CI of a particular level (for example, a 99% confidence interval) does not refer to a specific calculated interval. Rather, the 99% probability relates to the reliability of the estimation procedure. Once a study is done and a CI calculated, the interval either covers the true parameter value or it does not (i.e., the probability is either 100% or 0%).

CIS Carcinoma in-situ is an early form of cancer that is defined by the absence of tumor cell invasion into surrounding tissues. Instead, the lesion is flat or follows the existing architecture of the affected organ. In this state, CIS seldom causes clinical systems sufficient to prompt the affected person to seek medical assistance and is generally undetected. CIS can progress to invasive tumors and are considered a precursor or incipient form of cancer.

EEP Environmental Epidemiology Program. A program within the Bureau of

Epidemiology, Division of Disease Control and Prevention, UDOH. The EEP was established in 1996 and is responsible for investigating diseases related to the environment. The program has three sections. One section conducts surveillance and data management activities, including managing the UEPHTN. The second section conducts health hazards risk assessment, including cancer investigations. The program is staffed with personnel with experience and expertise in environmental epidemiology, environmental sciences, toxicology, statistics, public health informatics and geomatics, and health education. The third section oversees state environmental sanitation rules and regulations. For more information see: http://health.utah.gov/environepi/.

GeoLytics GeoLytics is a commercial vendor of census and demographic data calibrated to the 2010 census boundaries. The EEP has purchased 1970, 1980, 1990, 2000, and 2010 census data from GeoLytics to be the basis for estimating intercensal population counts for each of the 1,690 census block group boundaries in Utah. Population counts are aggregated into 5-year age groups for each sex. For more information see: http://www.geolytics.com/.

GIS Geographic Information Systems. A GIS includes computer software and geographically referenced data. The EEP uses QGIS as the computer software, and obtains data from the UGRC.

ICD-O-3 International Classification of Disease - Oncology, 3rd Edition. The ICD-O-3 is one of many internationally established coding standards for coding site (topography) and histology (morphology) of neoplasms (cancers). For more information see: http://www.who.int/classifications/icd/adaptations/oncology/en/.

Incidence The term incidence refers to new cases occurring in a period, usually annually. Cancer incidence is the number of new cases that occurred in a year. New cancer cases occur when a diagnosis is made. For more information, see: www.cancer.gov/publications/dictionaries/cancerterms/def/incidence.

MMTS Monticello Mill Tailings Site. One of two superfund (NPL) sites associated with the uranium milling operations that occurred in Monticello. The MMTS is specifically the site of the mill tailings (radioactive waste materials) that were located just south of Monticello. For more information see: https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=91001QKV.txt

MVP Monticello Vicinity Properties. Also called Monticello Radioactively Contaminated Properties. One of two superfund (NPL) sites associated with the Uranium milling operations that occurred in Monticello. The MVP is specifically associated with private and commercial properties in Monticello that were contaminated with materials from the MMTS. For more information see: https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=9100MYEA.txt

NCI National Cancer Institute. The NCI is one of the National Institutes of Health and part of the U.S. Department of Health and Human Services. The NCI was established under the National Cancer Act of 1937 and is primarily responsible for conducting surveillance and research about cancer incidence, diagnosis, prevention, treatment, and rehabilitation. The SEER program is operated by the NCI. For more information see: http://www.cancer.gov/.

NPL National Priority List. A list of sites of national priority, also called superfund sites, among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. NPL sites are eligible for long-term remedial investigation and remedial action. Once a site is placed on the NPL, a series of activities are conducted by the U.S. Environmental Protection Agency, other federal agencies, and in Utah, the Utah Department of Environmental Quality, which leads to cleanup and remediation. Some of those activities involve health assessments conducted by the UDOH. For more information see: http://www.epa.gov/superfund/sites/npl/.

Prevalence The term prevalence refers to the number of cases that exist either at a moment in time or during a time period (e.g., annual, lifetime, etc.). When using this term, the time should be included. Cancer prevalence is the total number of cases that exist. For more information, see:www.cancer.gov/publications/dictionaries/cancer-terms/def/prevalence.

R R is a globally recognized system of integrated open-source computer software products provided by the Comprehensive R Archive Network (CRAN). The application is developed using a collaboration of contributing developers with expertise in a variety of fields, including epidemiology and public health statistics. The R application includes a large variety of data manipulation and statistical analysis methodologies. In this study, the EEP used version 4.0. For more information, see: https://cran.r-project.org.

Rate Sometimes called an incidence rate; this is a ratio of the cancer incidence (the number of new cancer diagnoses) over the total population. When computing a multi-year rate, the total population added from each year of the rate period is used to get the rate. For more information, see: www.cancer.gov/publications/dictionaries/cancer-terms/def/incidence.

SEER Surveillance, Epidemiology and End Results Program. The SEER program is an agency within the NCI. The SEER program works with state cancer registries to develop and disseminate incidence and mortality statistics about cancer in the United States. The SEER program also establishes standards for the analysis of cancer data and interpretation of cancer statistics. For more information see: http://seer.cancer.gov/.

SIR Standardized incidence ratio. Please refer to the UDOH cancer investigation protocol document in the reference section for an in-depth explanation.

SJPHD San Juan Public Health Department. One of thirteen local health departments serving Utah residents. For more information see: https://sanjuanpublichealth.org/.

UCR Utah Cancer Registry. The UCR is operated under authority from the UDOH by the University of Utah. The UCR was established in 1966 to be a statewide population-based cancer registry. Utah administrative rule requires the reporting of cancer diagnoses to the UCR. The UCR collaborates with the NCI, SEER, and the North American Association of Central Cancer Registries to implement data standards for cancer data. The UCR provides cancer to the EEP through the UEPHTN. For more information, see: https://uofuhealth.utah.edu/utah-cancer-registry/.

UDOH Utah Department of Health. The UDOH is one of the executive agencies within the Utah state government. The UDOH strives to improve health in Utah through promoting healthy lifestyles, evidence-based interventions, creating healthy and safe communities and eliminating health disparities. The EEP is a program within the UDOH. For more information, see: http://health.utah.gov/.

UEPHTN Utah Environmental Public Health Tracking Network. The UEPHTN is a data warehouse that contains health outcome, environmental, and supporting data. Data from the UCR and population data derived from the USCB are warehoused in the UEPHTN. For more information see: http://health.utah.gov/enviroepi/activities/EPHTP/NewEPHT/ephtpnew.htm.

UGRC Utah Geospatial Resource Center (formerly named Automated Geographic Reference Center). An agency within the Utah Department of Information Technology, responsible for maintaining a repository of geographic information system (GIS) data files and GIS functionality. For more information see: http://gis.utah.gov/.

USCB U.S. Census Bureau. Officially the "Bureau of the Census," the USCB is an agency authorized by Federal law, within the U.S. Department of Commerce that is charged with preparing and conducting regular surveys and censuses of the United States population. In addition to the decennial population survey, the USCB conducts several other surveys and has recently implemented the ACS. For more information, see: http://www.census.gov/.

WHO The World Health Organization is an agency of the United Nations that deals with international health concerns and policies. For more information, see: http://www.who.int/en/.

Resources

American Cancer Society:	www.cancer.org/cancer/all-cancer-types.html
American Society of Clinical Oncology:	www.cancer.net/cancer-types
Huntsman Cancer Institute:	healthcare.utah.edu/ huntsmancancerinstitute/cancer-information/ cancer-types-and-topics
Intermountain Healthcare Cancer Services:	intermountainhealthcare.org/ services/cancer/Pages/home.aspx
National Cancer Institute:	www.cancer.gov
UDOH Cancer Control Program:	cancerutah.org
UDOH Tobacco Prevention and Control Program	www.tobaccofreeutah.org
Utah Radon Program (including discounted tests)	deq.utah.gov/ProgramsServices/ programs/radiation/radon
Utah Cancer Action Network:	www.ucan.cc
Utah Cancer Specialists:	www.utahcancer.com