College of Public Health

Key Drivers of Cancer in Iowa

Project Progress Update

March 11, 2026

"Statistics are people with the tears wiped away"

Dr. Irving Selikoff

Cancer rates in Iowa compared to the U.S.

Age-adjusted incidence rates of **top 10 cancers** in Iowa compared to the U.S., **ages 20+**, diagnosis years 2018–2022

Cancer Sites	Iowa's Rank (Out of 50)	Iowa Rate per 100,000 population	U.S. Rate per 100,000 population
Female Breast	13th	192.3	184.1
Prostate	12th	181.6	163.2
Lung and Bronchus	10th	84.0	73.6
Colon and Rectum	8th	56.2	51.2
Melanoma of the Skin	2nd	45.8	32.3
Uterus	6th	42.2	37.7
Bladder	7th	30.5	26.3
Non-Hodgkin Lymphoma	1st	29.8	25.4
Kidney and Renal Pelvis	7th	29.4	24.3
Leukemia	1st	22.4	18.2

*Data Source: CDC WONDER, CI*Rank*

Age-adjusted incidence rates, **all cancers**, <20 years of age, 2018-2022

**Pediatric cancer incidence rates in Iowa are** not different **than the U.S. rate**

Age <15 years

Iowa: 16.3
US: 16.5
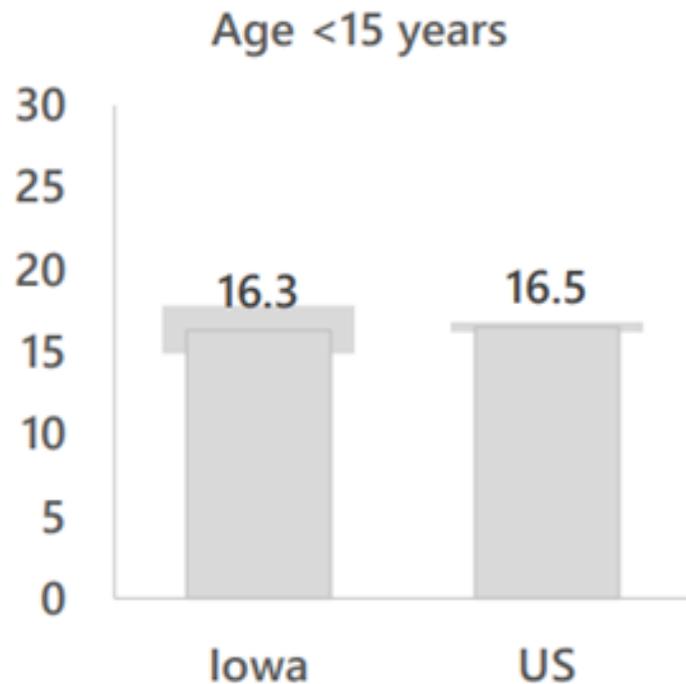
Adolescent cancer incidence rates in Iowa are not different **than the U.S. rate**

Ages 15-19 years


Iowa: 22.2
US: 23.9
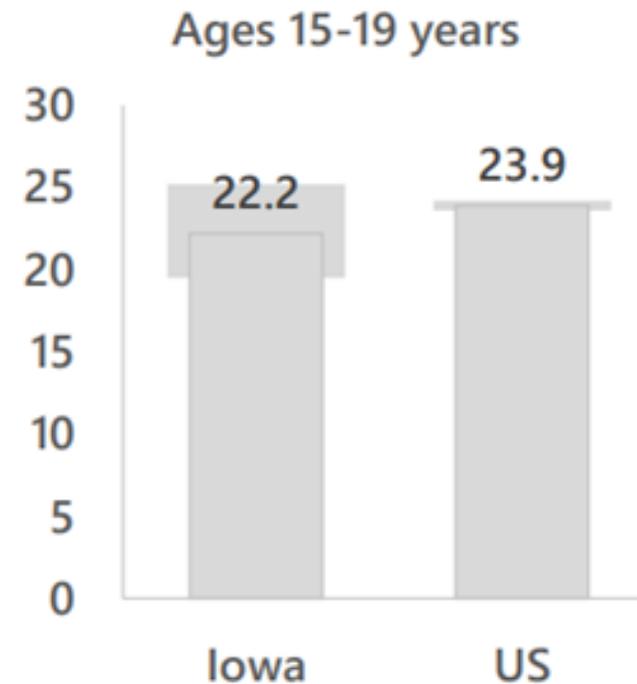
*Data Source: SEER*Stat (CiNA file)*

Cancer is complex

- There is **no one cause of cancer**; it is caused by a **combination of different genetic, lifestyle, and environmental risk factors**

- **Access to health care services can also lead to more cancer diagnoses** (e.g., the more people screened for prostate cancer, the more cases diagnosed)
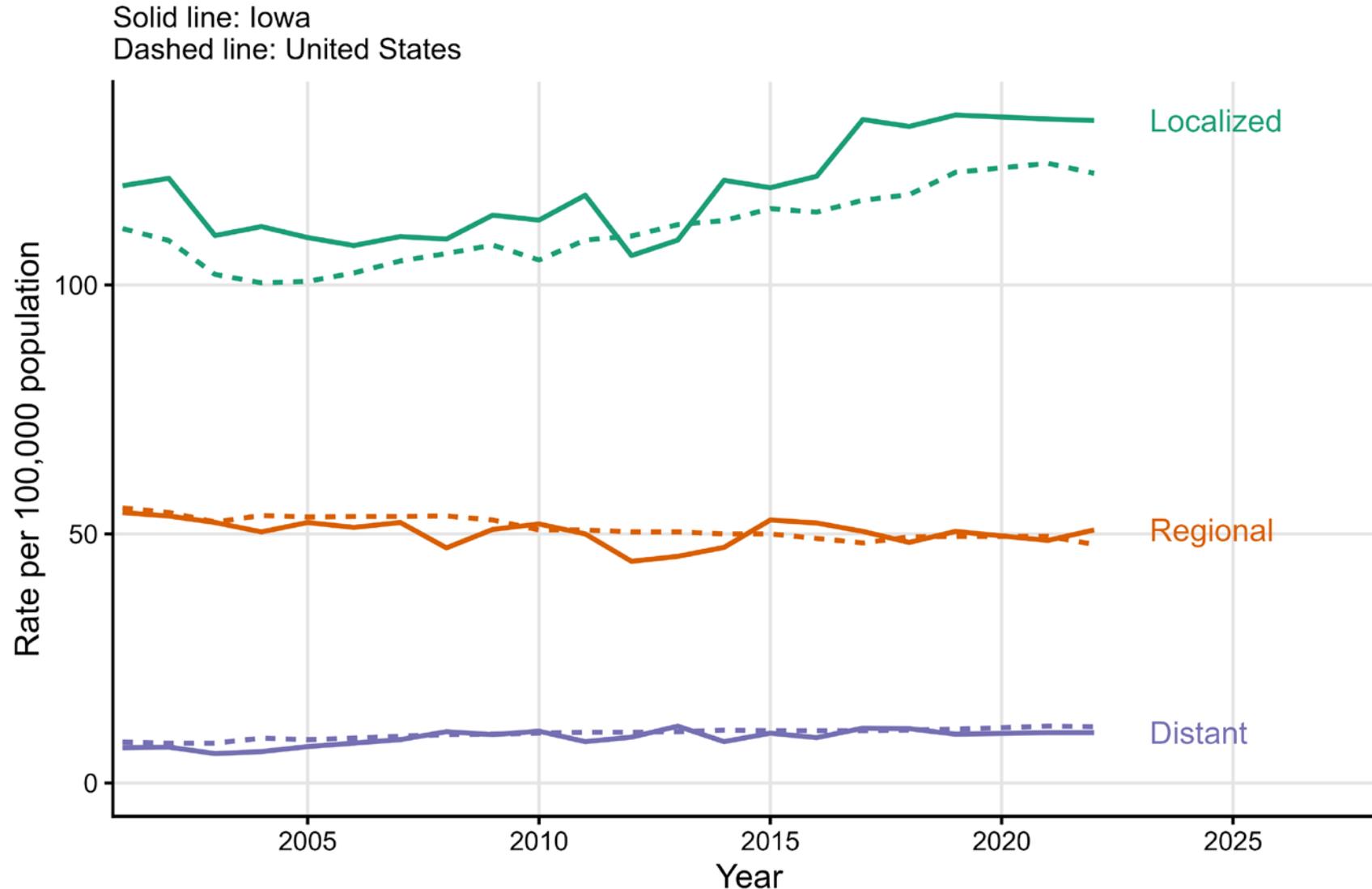

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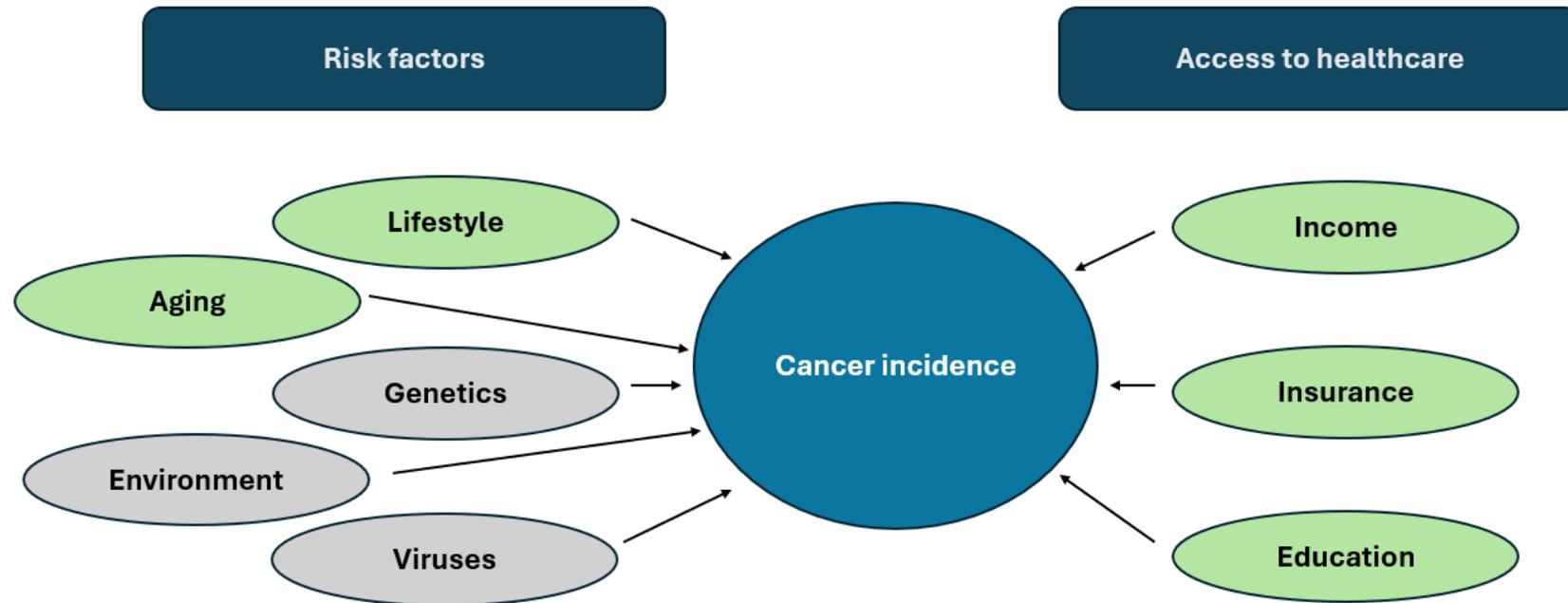
Age-adjusted <u>incidence rates</u> of the **five cancers driving Iowa's high rates, ages 20+**
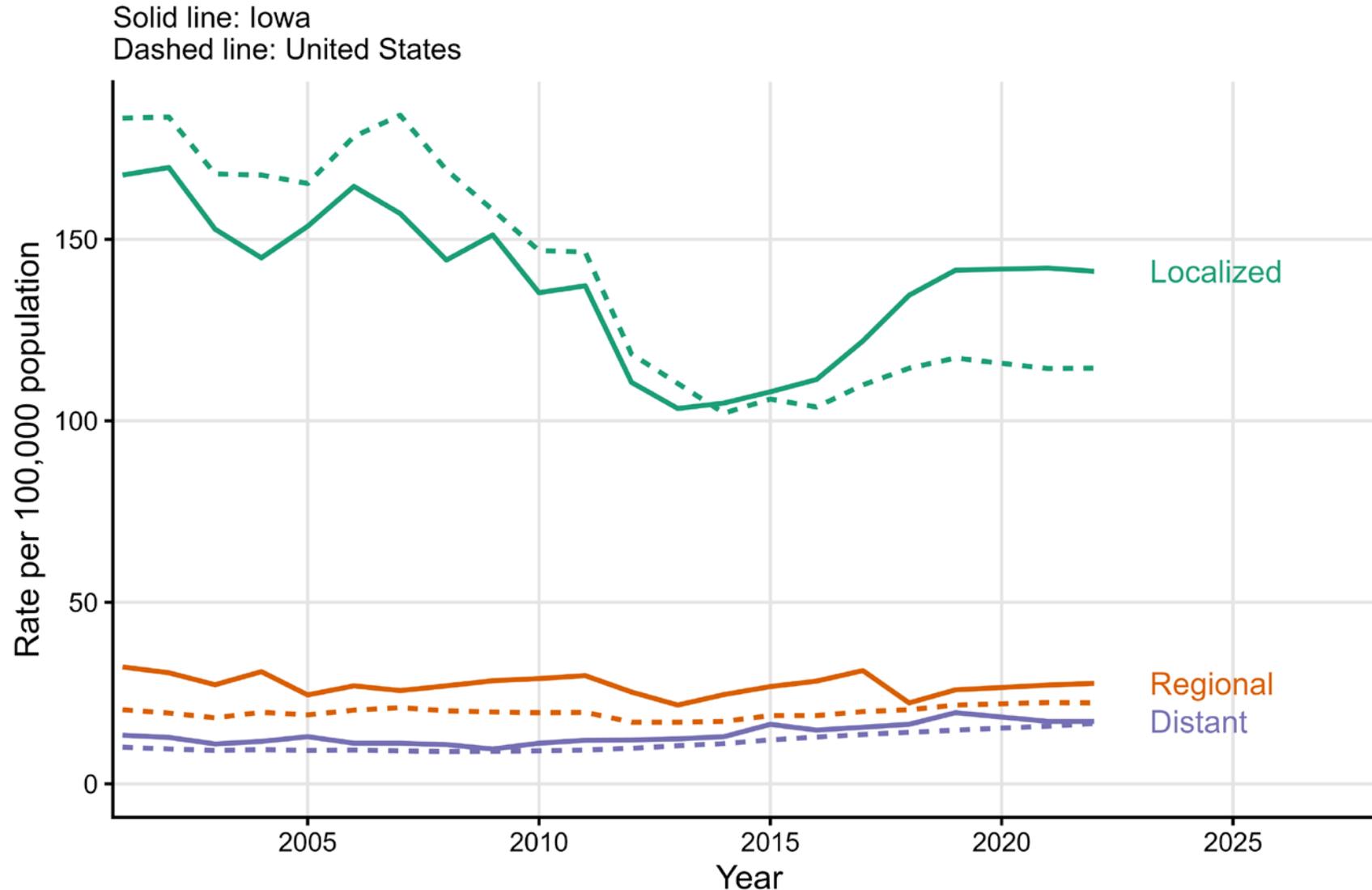

Solid line: Iowa
Dashed line: United States
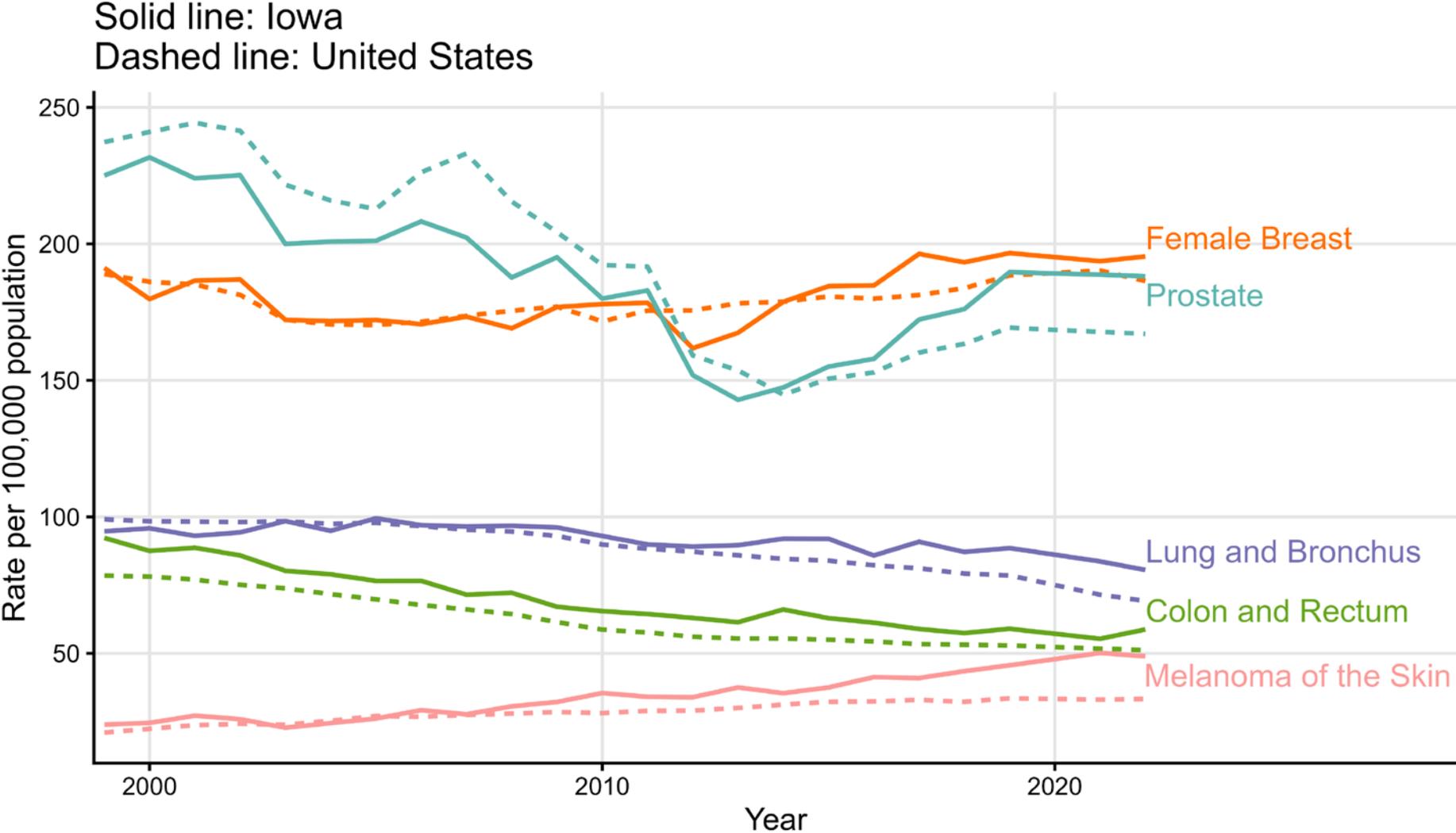
Data Source: CDC WONDER

Age-adjusted <u>incidence rates</u> by stage of **breast cancer, ages 20+**

Solid line: Iowa
Dashed line: United States

*Data Source:
SEER*Stat (CiNA file)*

8

Age-adjusted <u>incidence rates</u> by stage of **prostate cancer, ages 20+**

Solid line: Iowa
Dashed line: United States

*Data Source: SEER*Stat (CiNA file)*

Age-adjusted <u>incidence rates</u> by stage of **lung cancer, ages 20+**

Solid line: Iowa
Dashed line: United States

Data Source:
*SEER*Stat (CiNA file)*

10
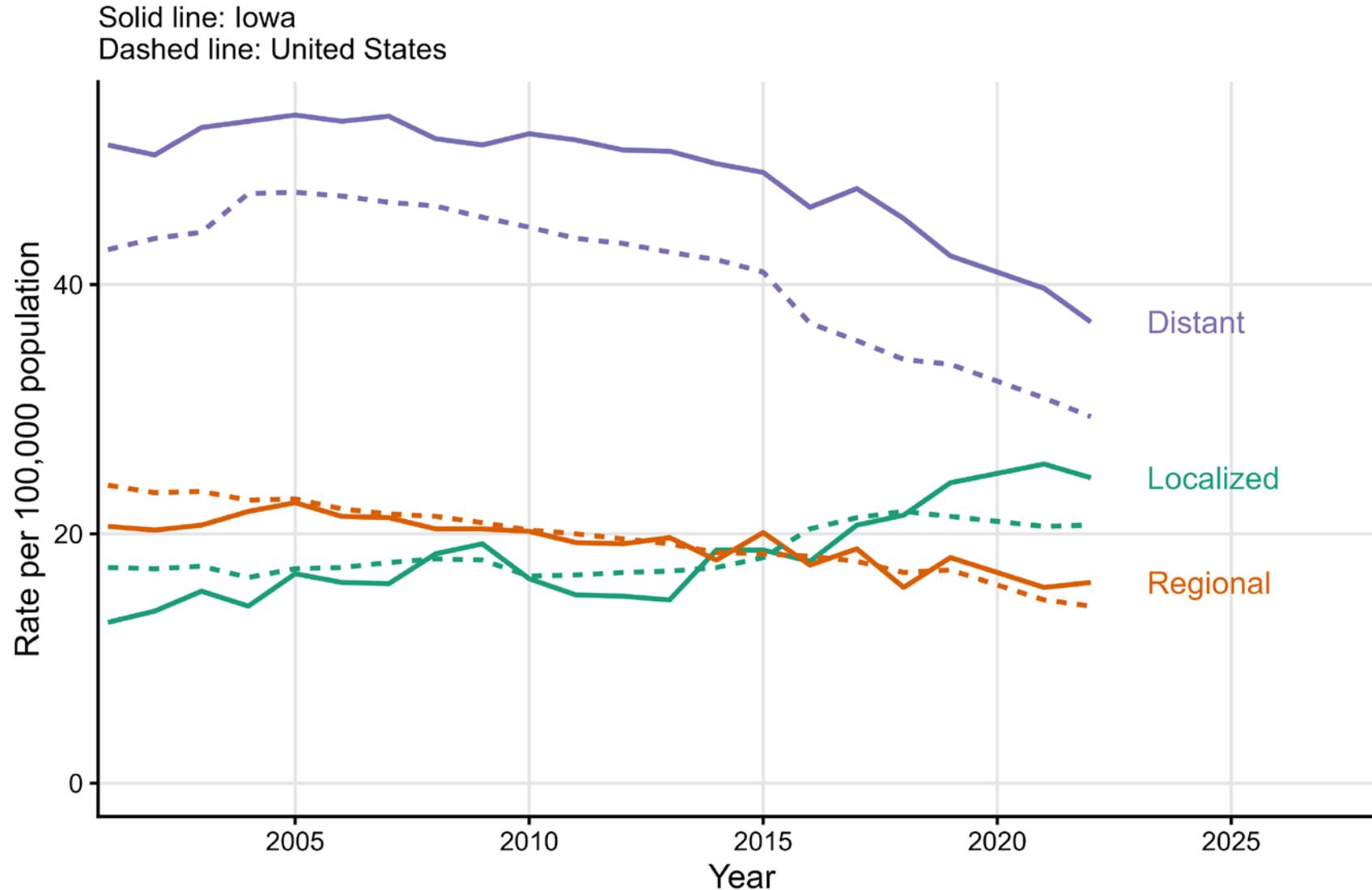
Age-adjusted <u>incidence rates</u> by stage of **colorectal cancer, ages 20+**

Solid line: Iowa
Dashed line: United States
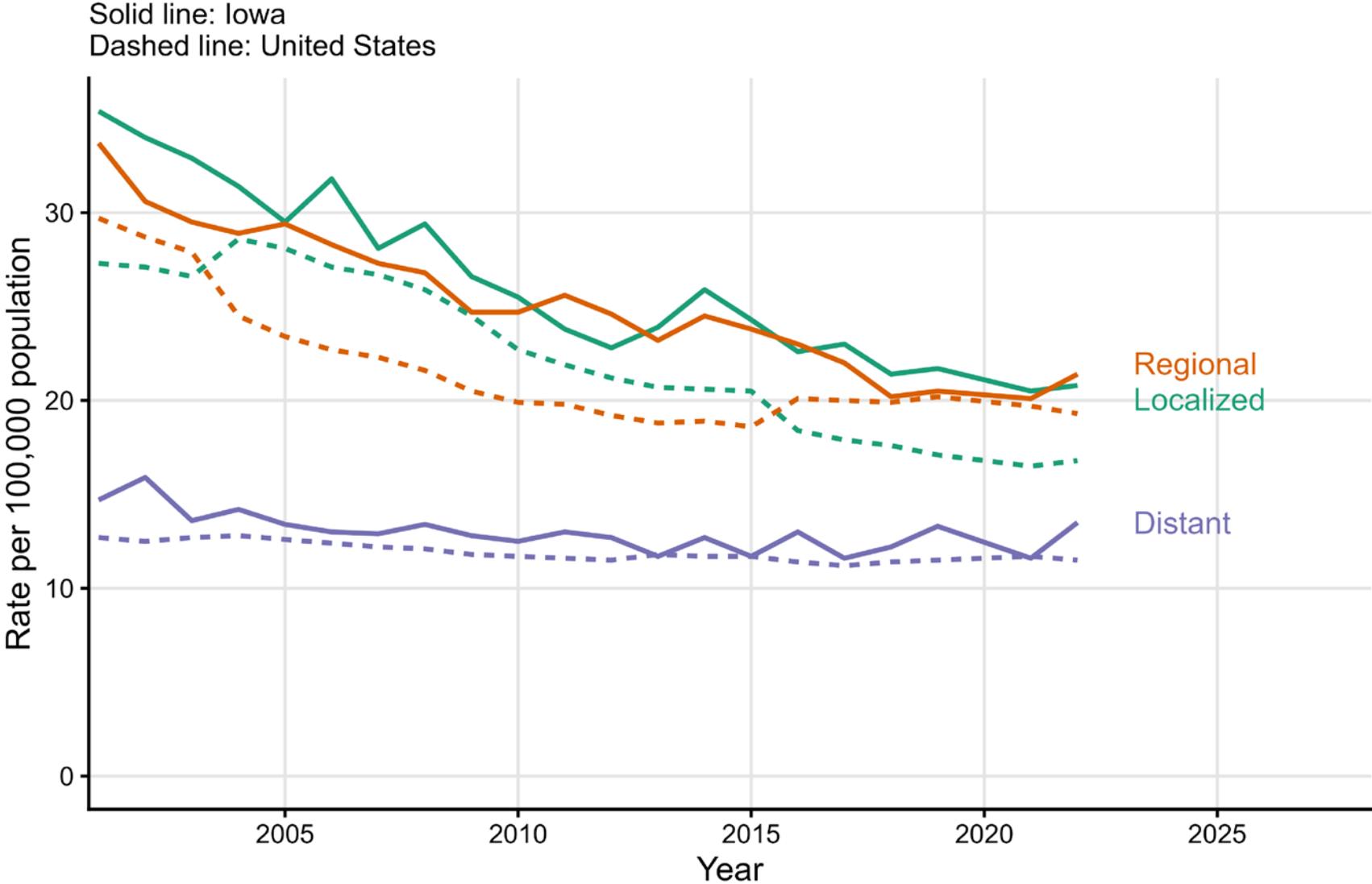
Data Source: SEER*Stat (CiNA file)

Age-adjusted <u>incidence rates</u> by stage of **melanoma, ages 20+**

Solid line: Iowa
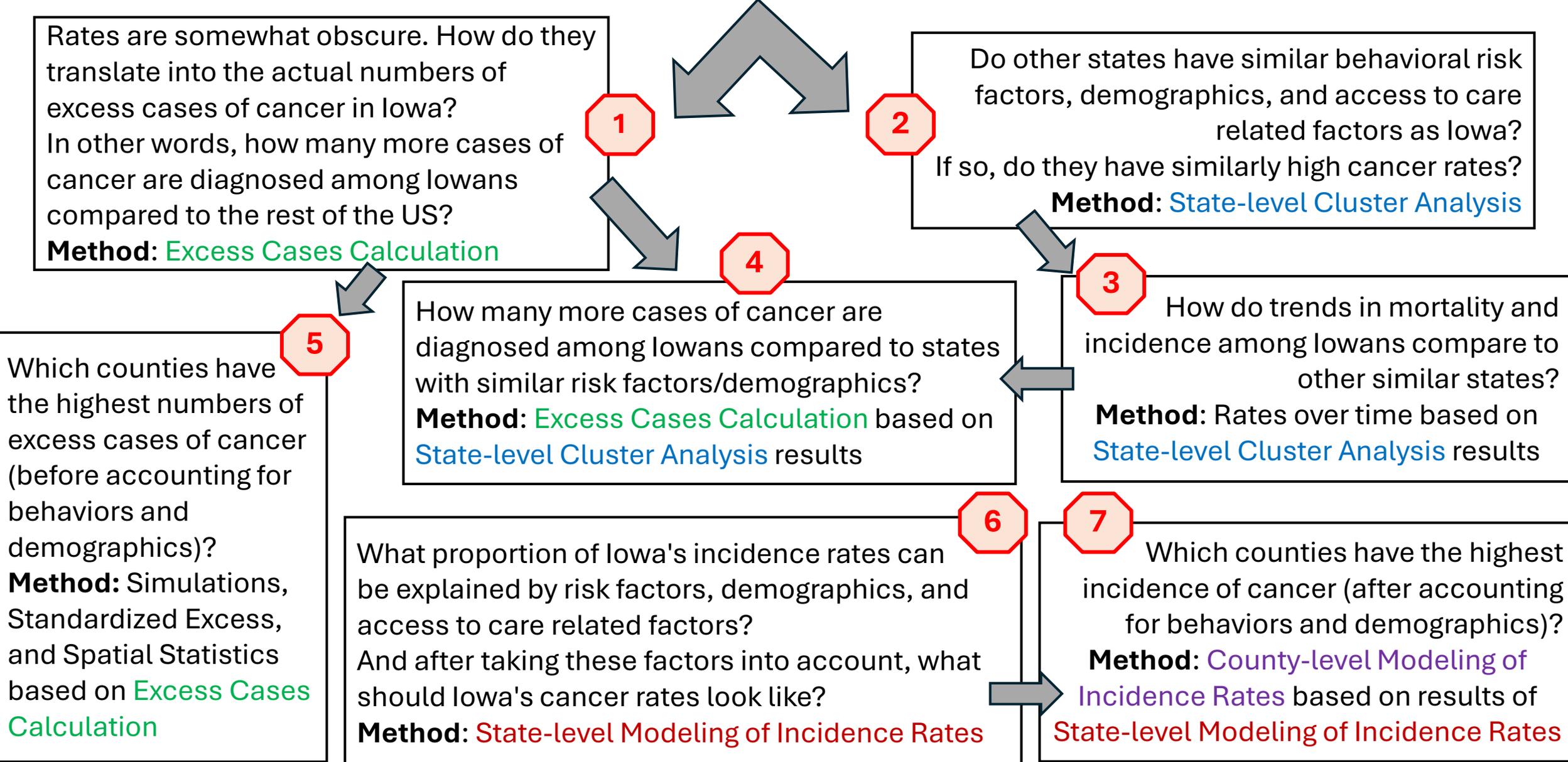Dashed line: United States

Data Source:
SEER*Stat (CiNA file)

12
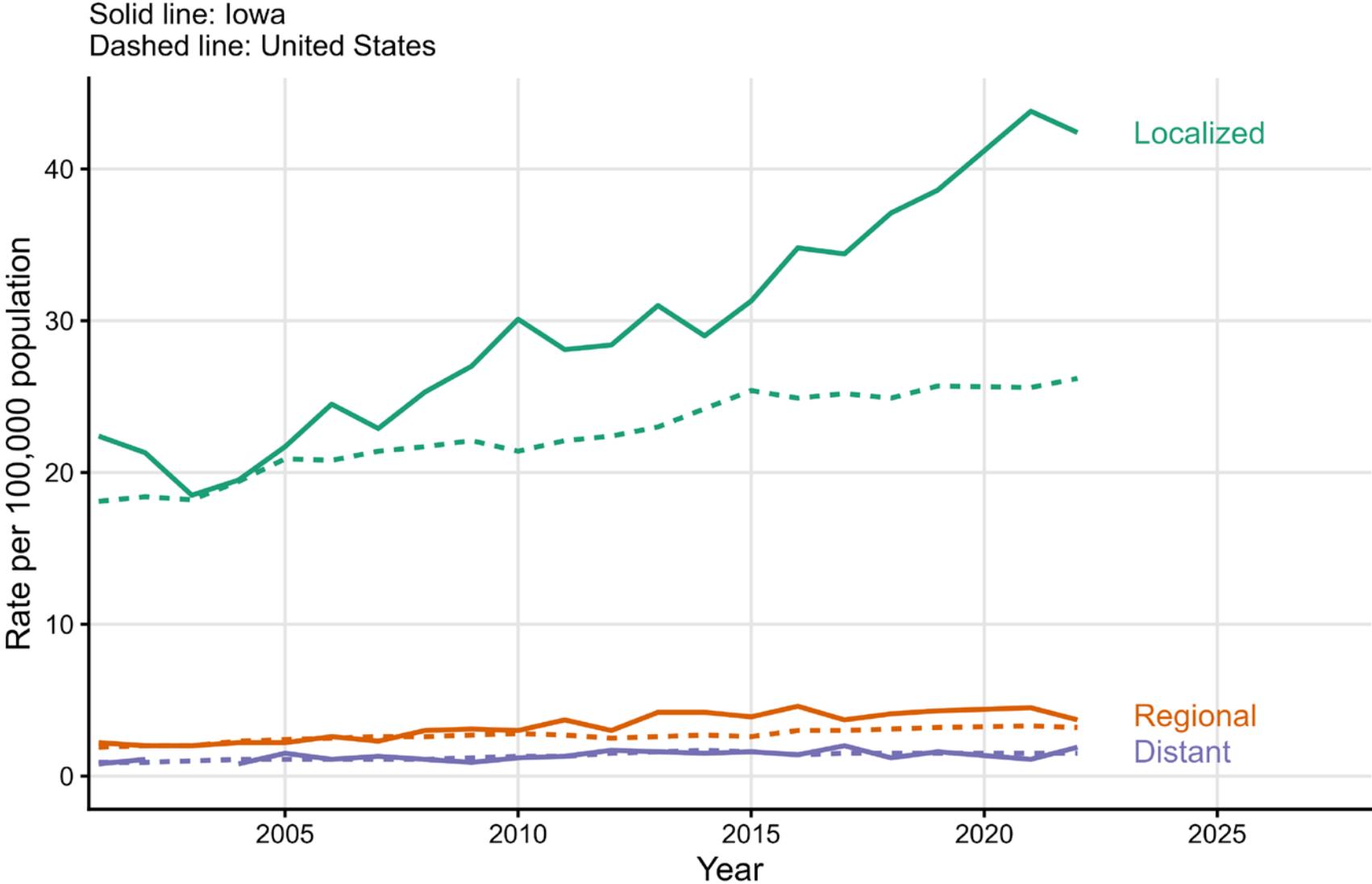
Age-adjusted <u>mortality rates</u> of the **five cancers driving Iowa's high rates, ages 20+**

Solid line: Iowa
Dashed line: United States
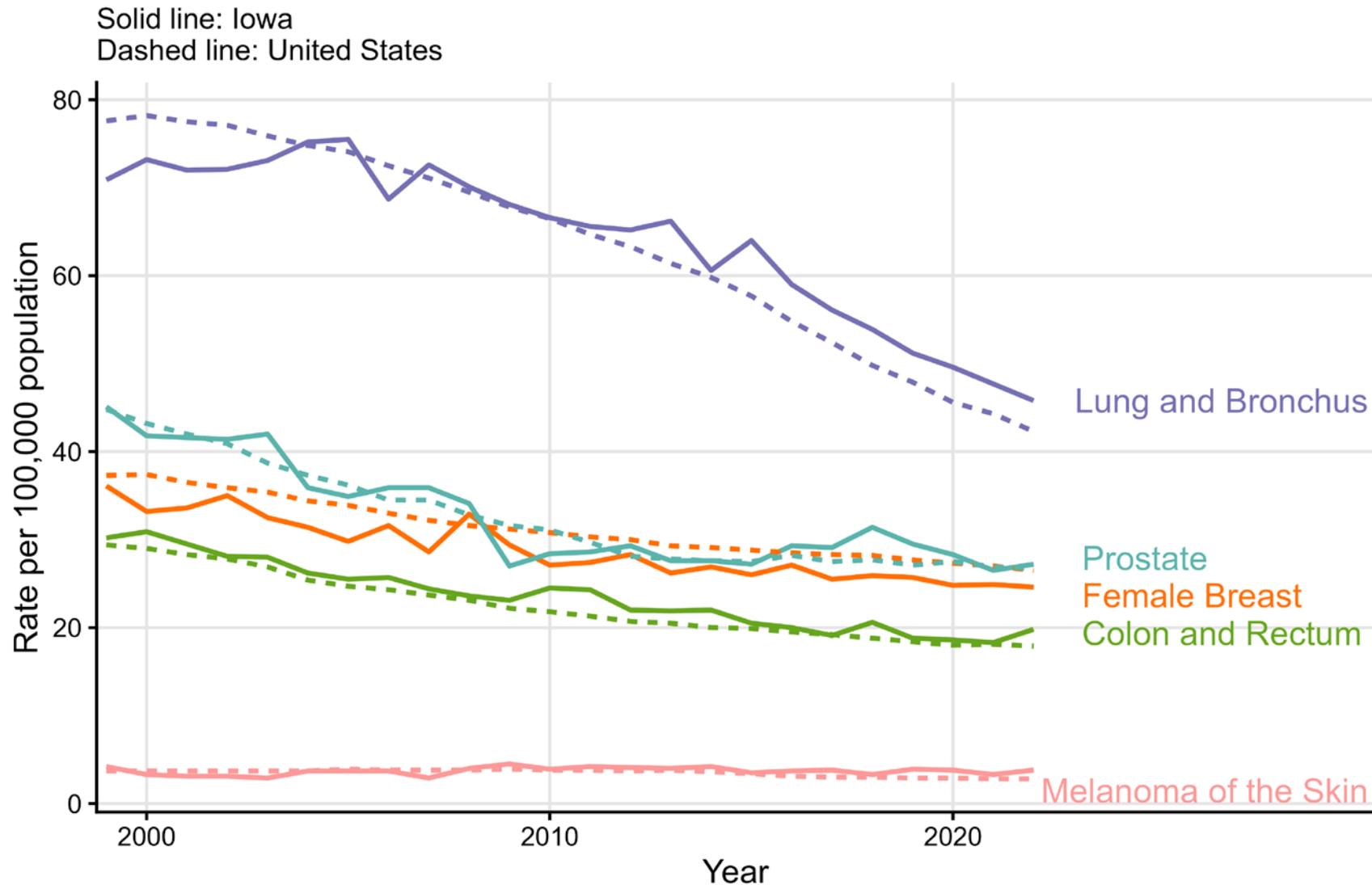
Data Source: SEER*Stat

Roadmap for how we determined: the impact of Iowa's cancer rates, how Iowa's rates compare to similar states, how much of Iowa's rates are explained by behaviors and demographics, and which specific counties warrant further investigation into genetic, environmental, and other potential factors to explain their high rates

1. Rates are somewhat obscure. How do they translate into the actual numbers of excess cases of cancer in Iowa?
In other words, how many more cases of cancer are diagnosed among Iowans compared to the rest of the US?
Method: Excess Cases Calculation

2. Do other states have similar behavioral risk factors, demographics, and access to care related factors as Iowa?
If so, do they have similarly high cancer rates?
Method: State-level Cluster Analysis

3. How do trends in mortality and incidence among Iowans compare to other similar states?
Method: Rates over time based on State-level Cluster Analysis results

4. How many more cases of cancer are diagnosed among Iowans compared to states with similar risk factors/demographics?
Method: Excess Cases Calculation based on State-level Cluster Analysis results

5. Which counties have the highest numbers of excess cases of cancer (before accounting for behaviors and demographics)?
Method: Simulations, Standardized Excess, and Spatial Statistics based on Excess Cases Calculation

6. What proportion of Iowa's incidence rates can be explained by risk factors, demographics, and access to care related factors?
And after taking these factors into account, what should Iowa's cancer rates look like?
Method: State-level Modeling of Incidence Rates

7. Which counties have the highest incidence of cancer (after accounting for behaviors and demographics)?
Method: County-level Modeling of Incidence Rates based on results of State-level Modeling of Incidence Rates
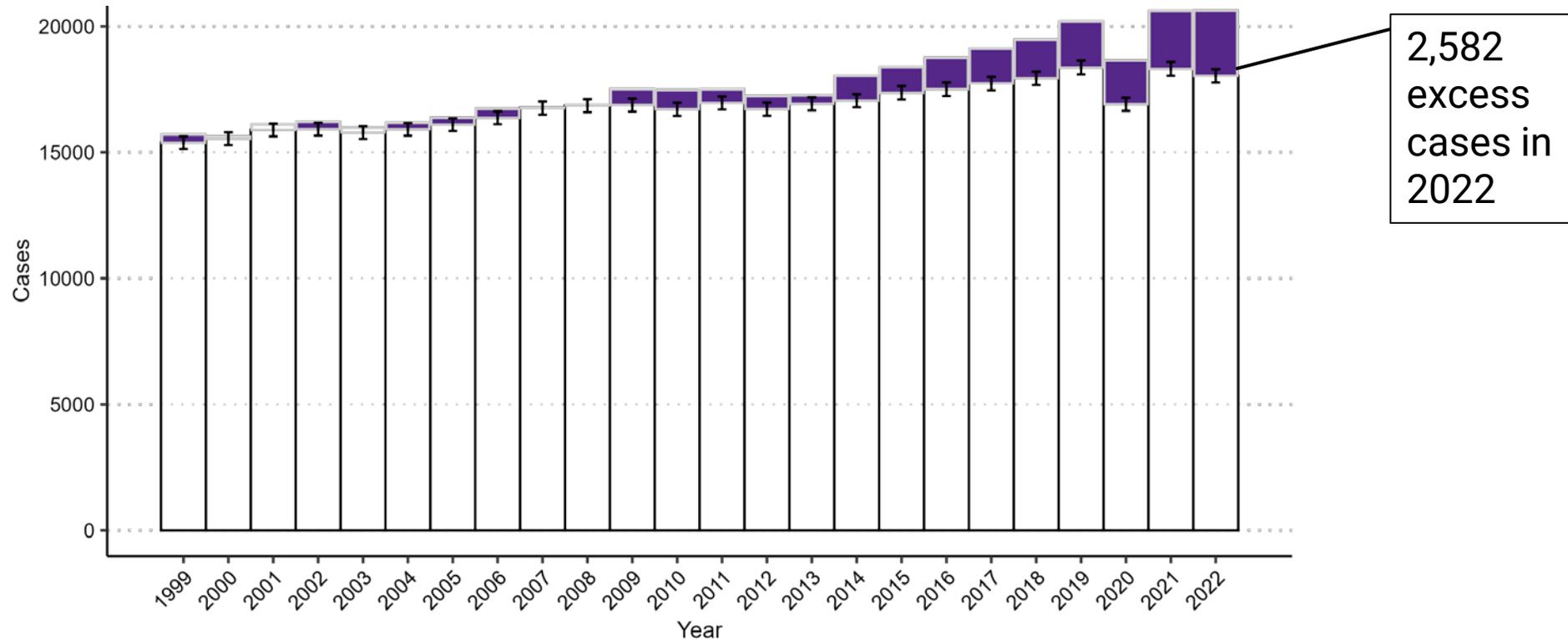
1

Excess cancer cases

We know that Iowa has higher than average age-adjusted incidence rates, but how do they translate into the actual numbers of excess cases of cancer in Iowa?

Observed, expected, and excess cases with 95% confidence intervals for **all cancers, ages 20+**

2,582 excess cases in 2022

Data Source: CDC WONDER

Cases	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Observed	15697	15619	16098	16209	15965	16170	16375	16717	16749	16875	17505	17470	17498	17235	17265	18036	18382	18744	19115	19454	20194	18637	20603	20615
Expected	15380	15540	15884	15916	15783	15912	16097	16370	16757	16850	16875	16708	16956	16713	16921	17047	17361	17502	17731	17934	18365	16906	18312	18033
Excess	317	79	214	293	182	258	278	347	-8	25	630	762	542	522	344	989	1021	1242	1384	1520	1829	1731	2291	2582

1 | **Summary of how many more cases of cancer are diagnosed among Iowans compared to the rest of the US**

Cancer Site	Excess Cases Relative to U.S.	Percent of Excess Cases Relative to U.S.
Melanoma	400	15.5%
Lung	376	14.6%
Prostate	331	12.8%
Colorectal	189	7.3%
Female Breast	141	5.5%
Other	1,145	44.3%
Total	**2,582**	**100%**

2

State level comparisons of risk factors

Which states have the most similar behavioral risk factors to Iowa?

State clusters based on behavioral and demographic factors
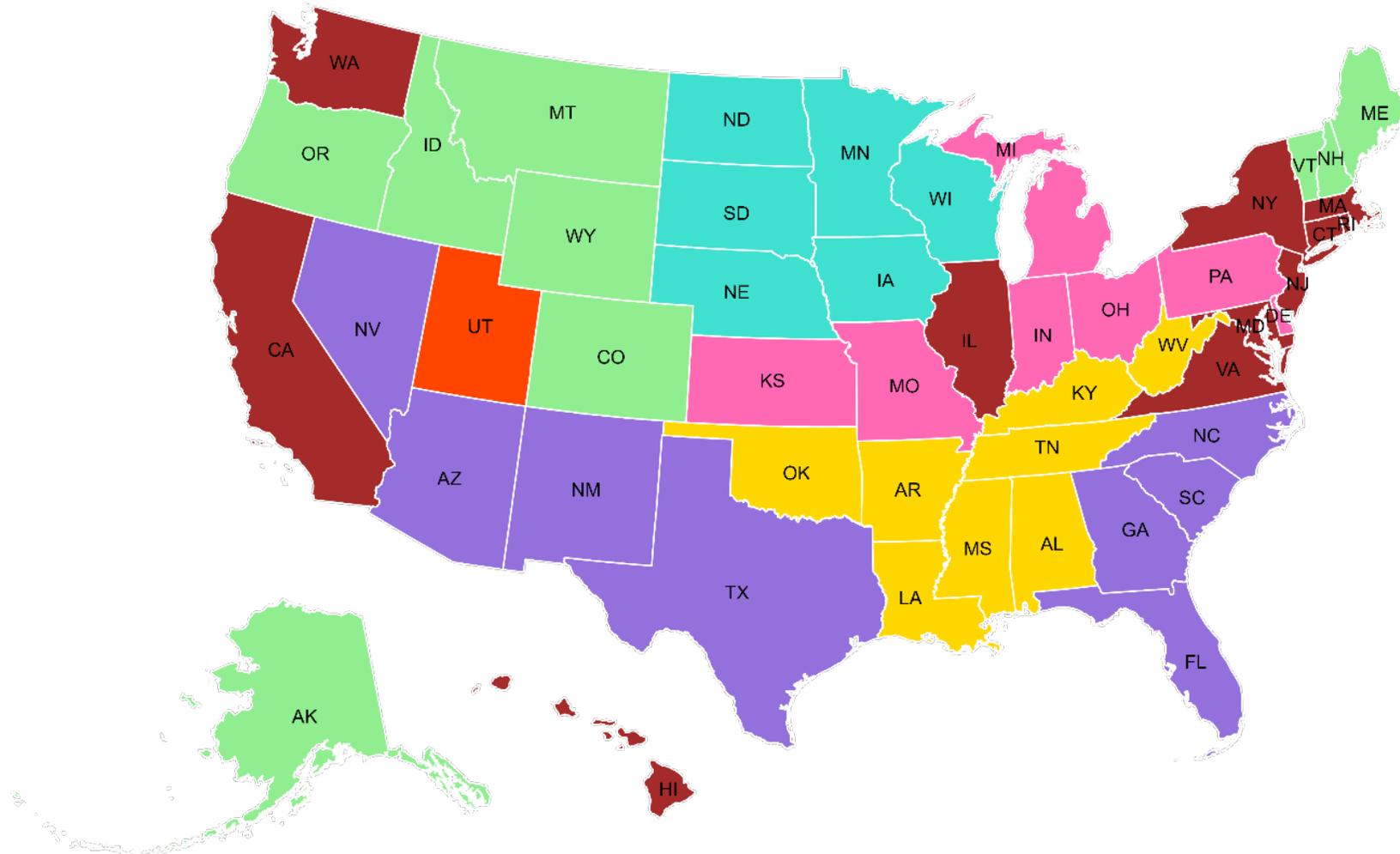
Data Source: BRFSS, ACS

State level characteristics by cluster (2018–2022)

Iowa highlighted; dotted line = overall mean

Data Source: BRFSS, ACS

20
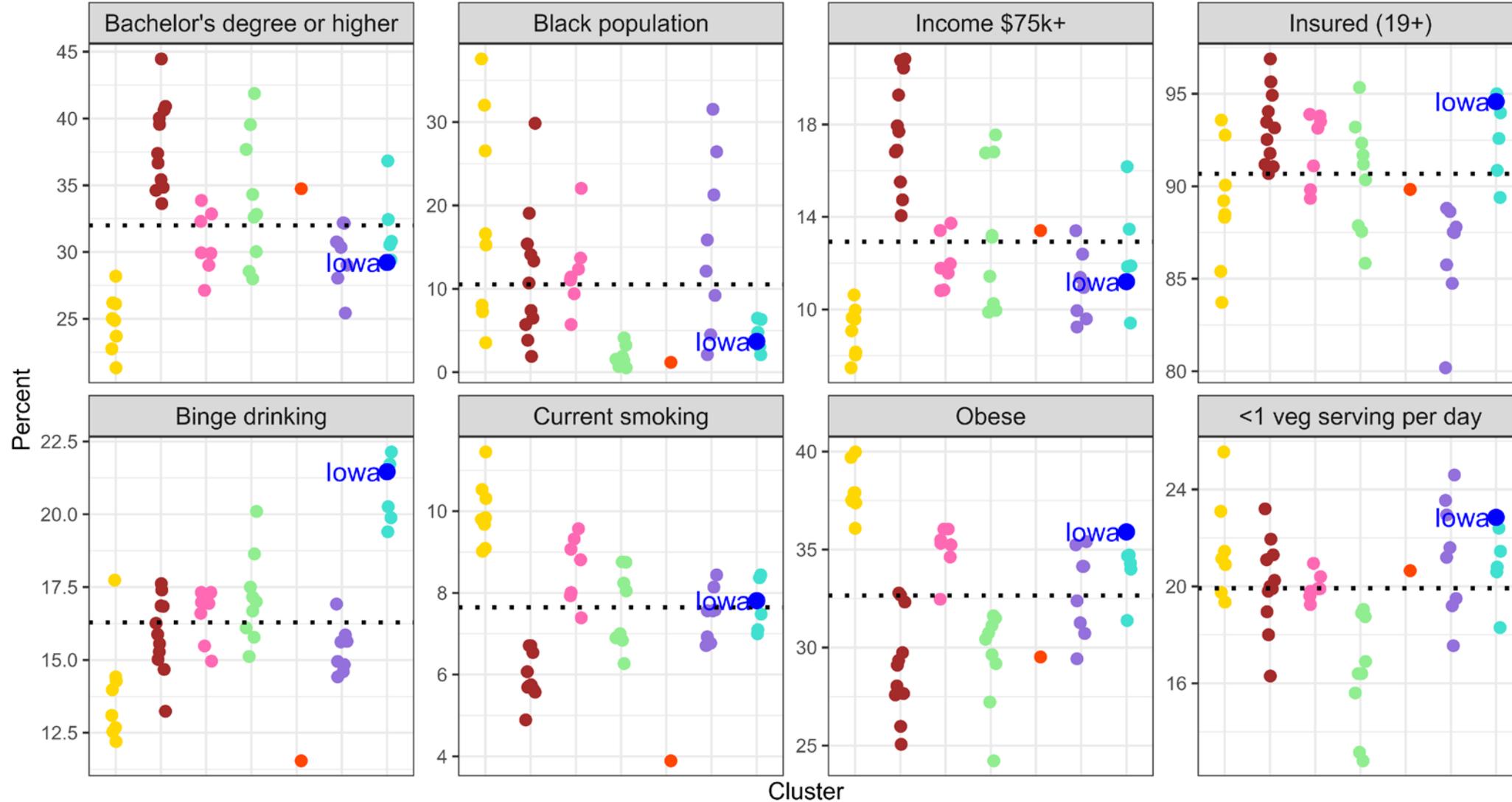
Age-adjusted incidence rates by state clusters for **all cancers, ages 20+**
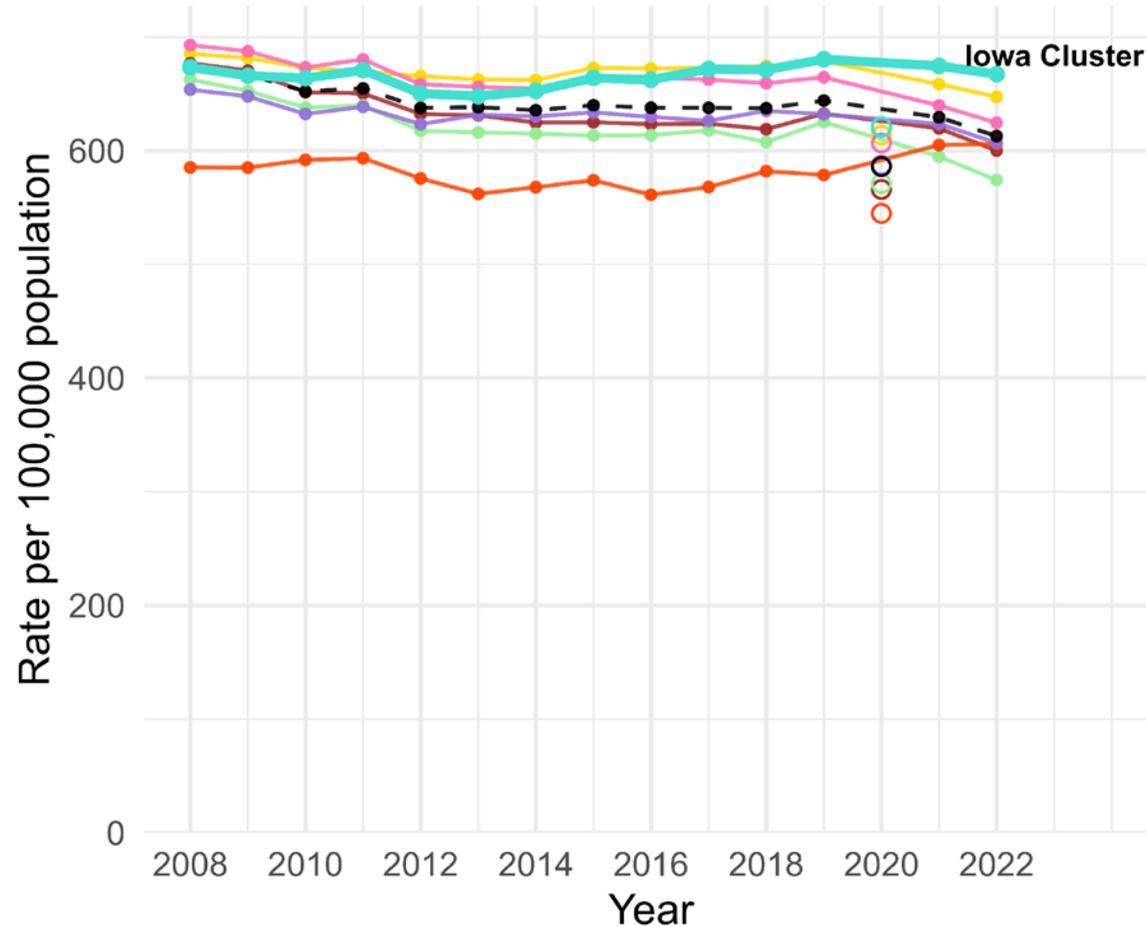
Open circles indicate 2020 values affected by COVID-19.

Data Source: CDC WONDER

2 | **Summary of State-Level Cluster Analyses**

Based on **available** risk factor and demographic data:

- Iowa clusters with several other Midwestern states, which collectively had:
  - Above average health insurance, average income and education, and a small proportion of Black people in the population
  - High binge drinking, above average obesity and % of people not consuming any vegetables, and average smoking

- In 2022, Iowa's Midwestern cluster of states had:
  - Highest rate of cancer than all other clusters of states in the US
  - Highest rate of prostate cancer, breast cancer, and melanoma (aside from Utah)
  - 2nd highest rate of colorectal cancer (behind a cluster of in the south)
  - 3rd highest rate of lung cancer (behind clusters in the south)

3

Incidence and Mortality Rate Comparisons

How do trends in mortality and incidence by stage among Iowans compare to other similar states?
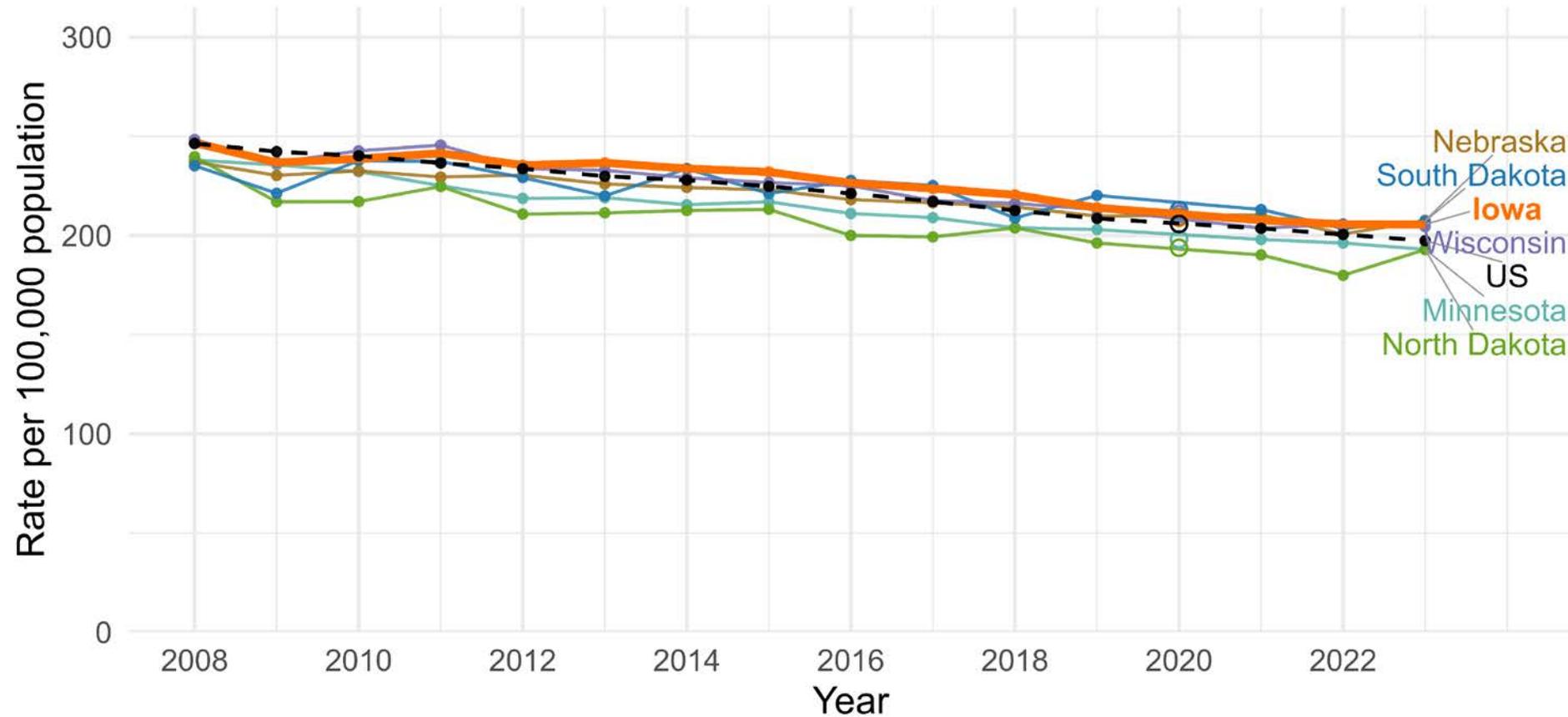
Age-adjusted <u>incidence rates</u> for states in Iowa's cluster for **all cancers**, **ages 20+**

Open circles indicate 2020 values affected by COVID-19.
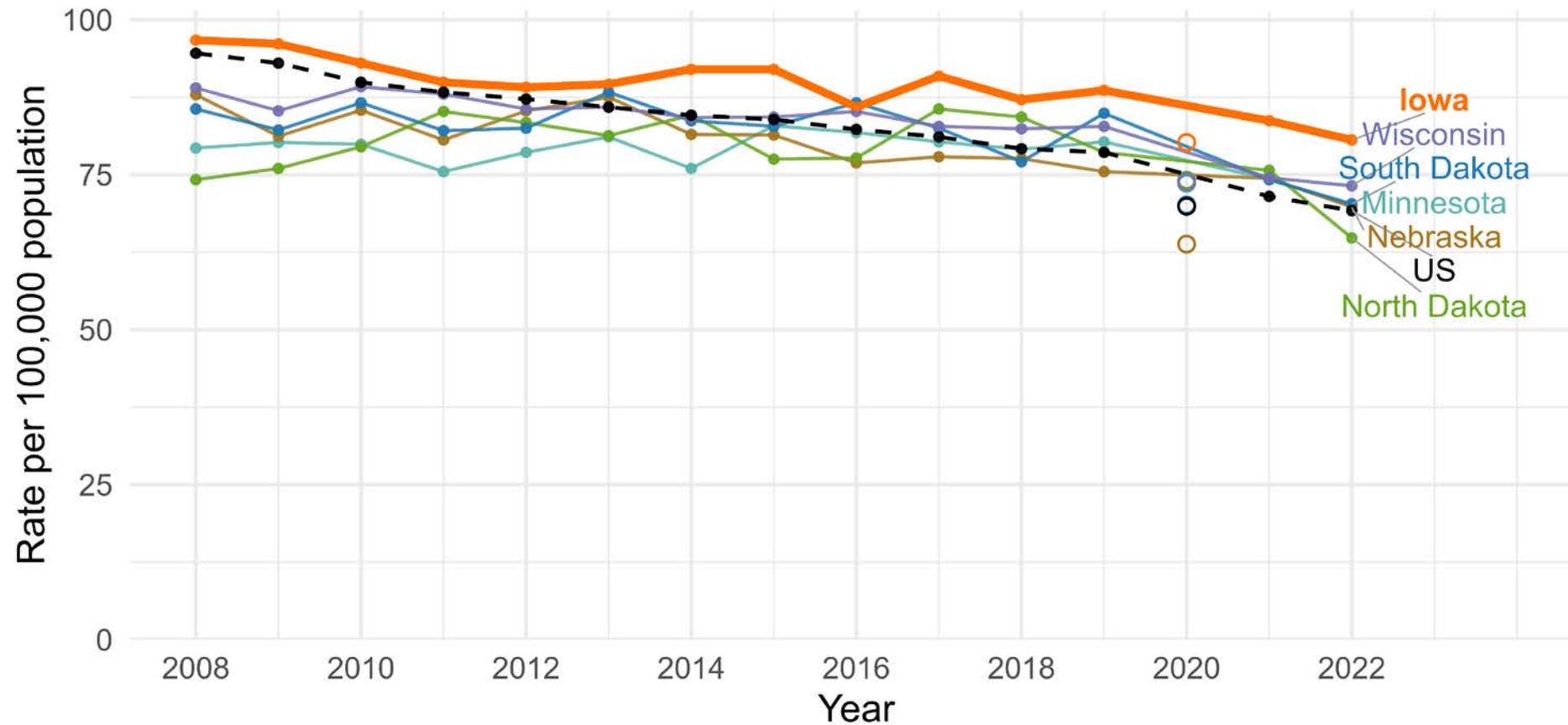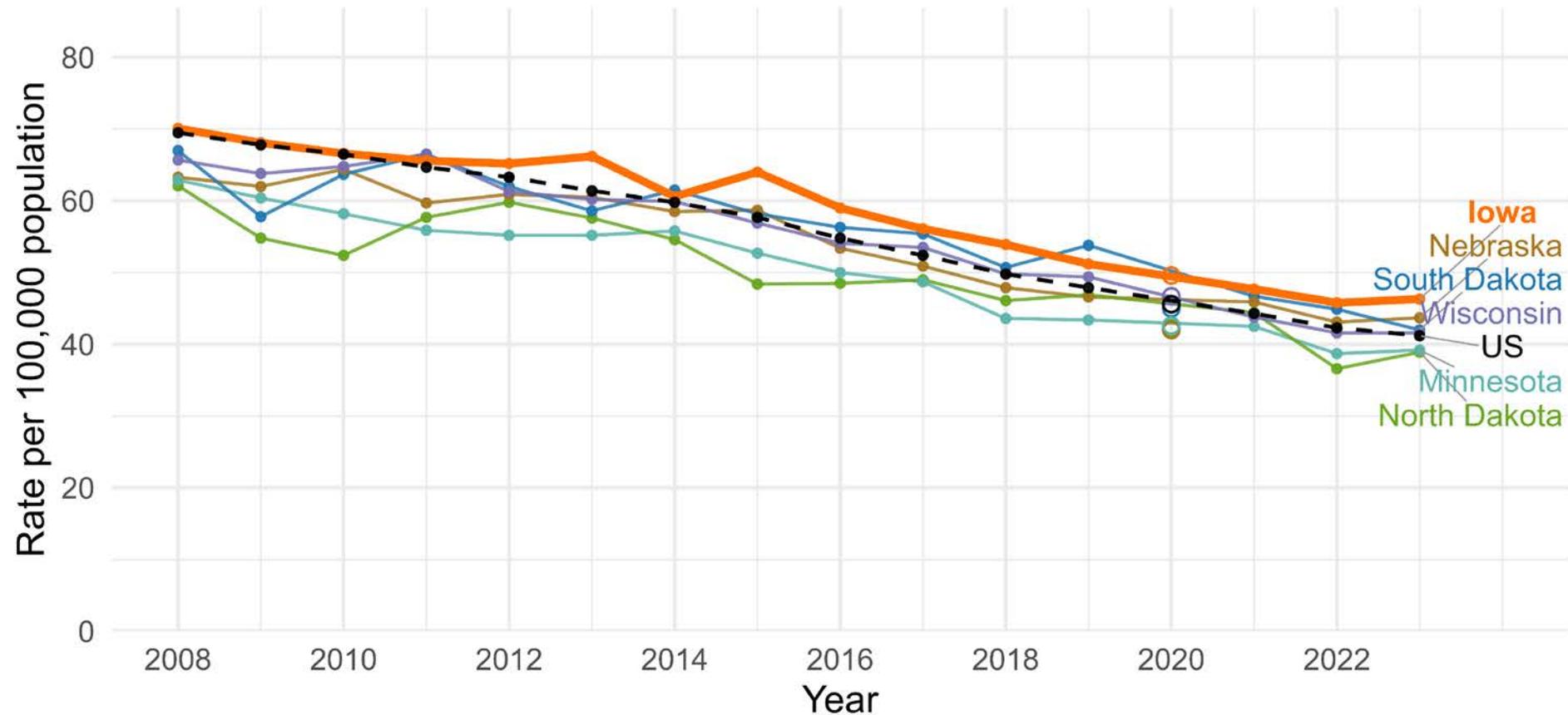
Data Source: CDC WONDER

Age-adjusted <u>mortality rates</u> for states in Iowa's cluster for **all cancers**, **ages 20+**

Open circles indicate 2020 values affected by COVID-19.

Data Source:
*SEER*Stat*

Age-adjusted <u>incidence rates</u> for states in Iowa's cluster for **lung cancer**, **ages 20+**

Open circles indicate 2020 values affected by COVID-19.

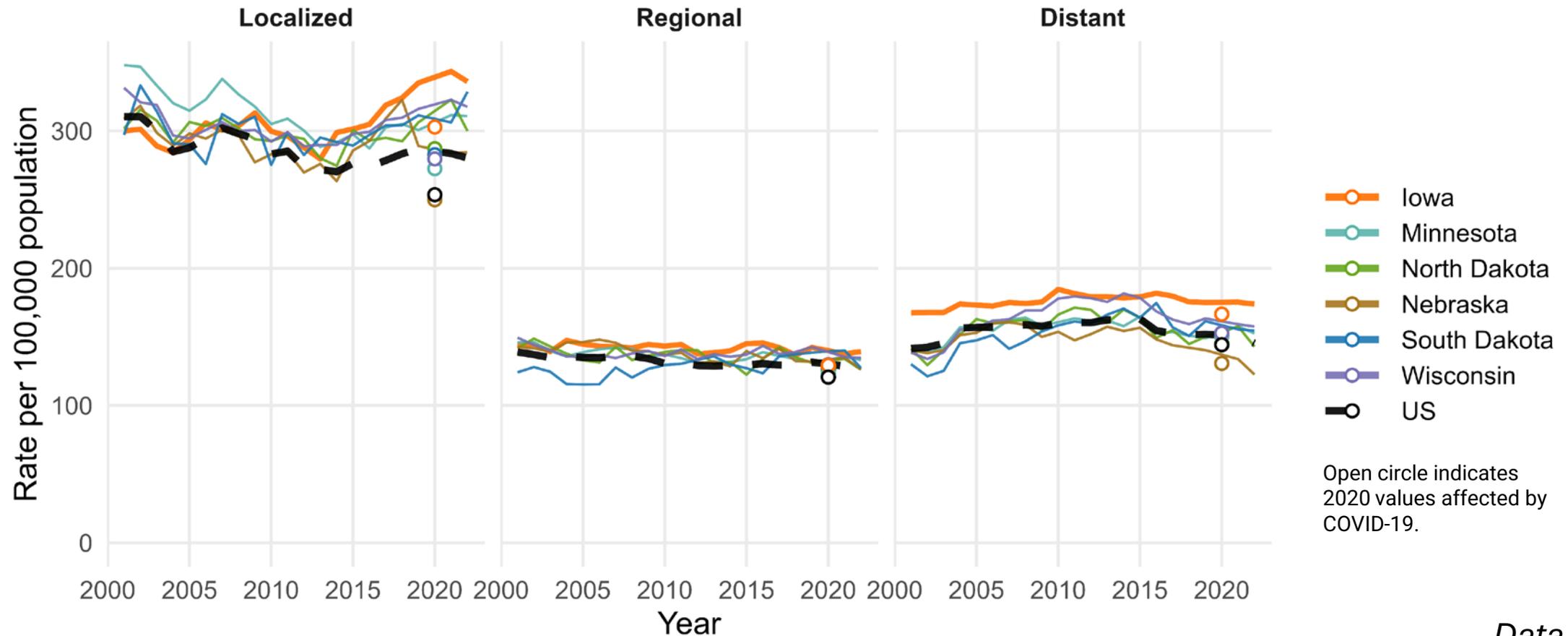*Data Source:
CDC WONDER*

Age-adjusted <u>mortality rates</u> for states in Iowa's cluster for **lung cancer, ages 20+**

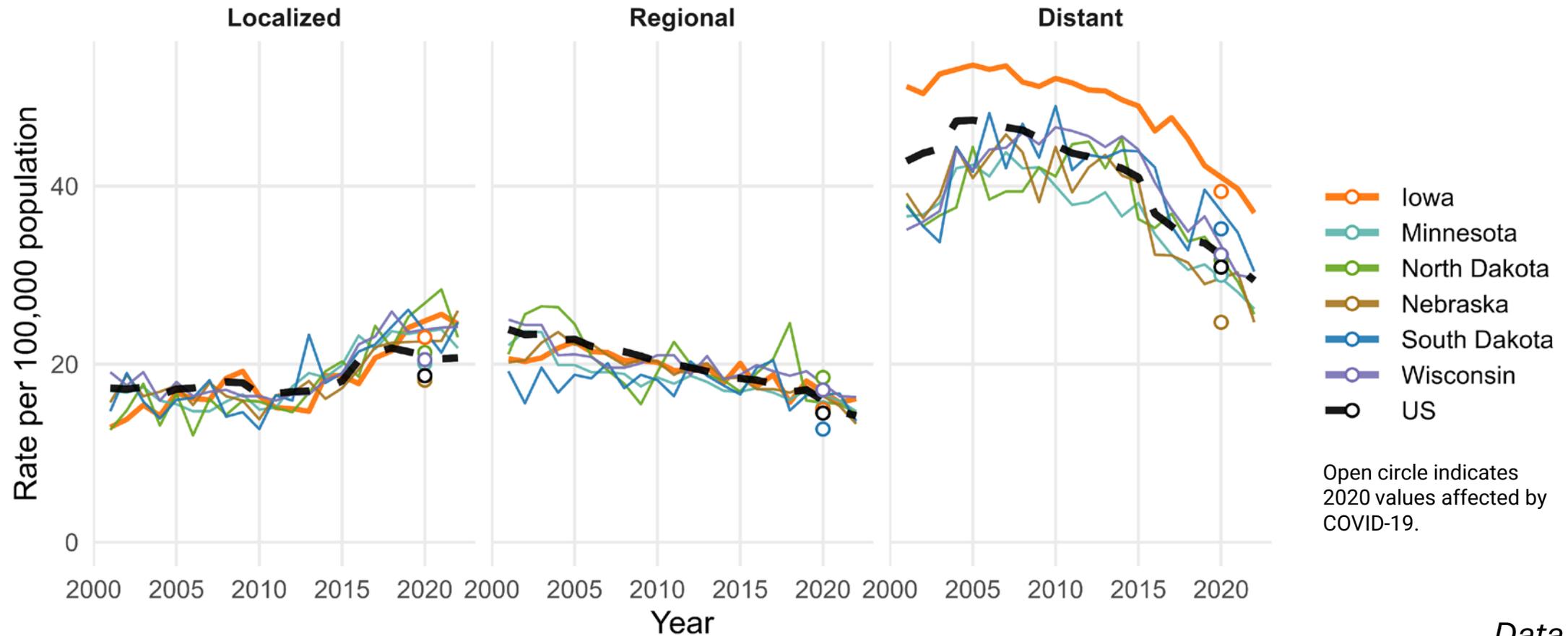Open circles indicate 2020 values affected by COVID-19.

*Data Source: SEER*Stat*

Age-adjusted <u>incidence rates</u> by stage for states in Iowa's cluster for **all cancers**, **ages 20+**

Open circle indicates 2020 values affected by COVID-19.

Data Source:
SEER*Stat (CiNA file)

Age-adjusted <u>incidence rates</u> by stage for states in Iowa's cluster for **lung cancer**, **ages 20+**

Open circle indicates 2020 values affected by COVID-19.

Data Source: SEER*Stat (CiNA file)

3 **Summary of how trends in mortality and incidence among Iowans compare to other similar states**

- Iowa's cancer rates are substantially higher than the US, but not generally much higher than the Midwestern cluster of states. In 2022, within Iowa's cluster, Iowa had:
  - Highest overall cancer rate
  - Highest rate of lung and colorectal cancer
- Iowa had a higher overall rate of early stage (localized) incidence compared to states in its cluster, but also had a higher rate of distant (metastatic) lung cancer
- Iowa's mortality rates are similar to the other Midwestern states with the exception of lung cancer which is substantially higher in Iowa
- With respect to behavioral risk factors and demographics:
  - Iowans have one of the highest % insured, which can lead to more diagnoses of early-stage cancers; it can also lead to more diagnoses of cancers that may have otherwise never been found (e.g., prostate cancer)
  - Iowans are among the highest in binge drinking, obesity, and people not consuming any vegetables, which increase the risk of many types of cancers

4

Comparisons within Iowa's cluster

How many more cases of cancer are diagnosed among Iowans compared to states with similar risk factors/demographics?

Iowa excess cases relative to the U.S. and relative to the Midwestern cluster

Cancer Site	Excess Cases Relative to U.S.	Percent of Excess Cases Relative to U.S.	Excess Cases Relative to Cluster	Percent of Excess Cases Relative to Cluster
Melanoma	400	15.5%	26	2.0%
Lung	376	14.6%	329	25.3%
Prostate	331	12.8%	66	5.1%
Colorectal	189	7.3%	206	15.9%
Female Breast	141	5.5%	64	4.9%
Other	1,145	44.3%	607	46.8%
Total	**2,582**	**100%**	**1,298**	**100%**

4 **Summary of how many more cases of cancer are diagnosed among Iowans compared to states with similar risk factors/demographic characteristics**

An estimated 1,298 more Iowans (ages 20+) were diagnosed with cancer in 2022 compared to the number of cases that would have been diagnosed if Iowa had the same age- and sex-specific cancer rates as its Midwestern cluster of states
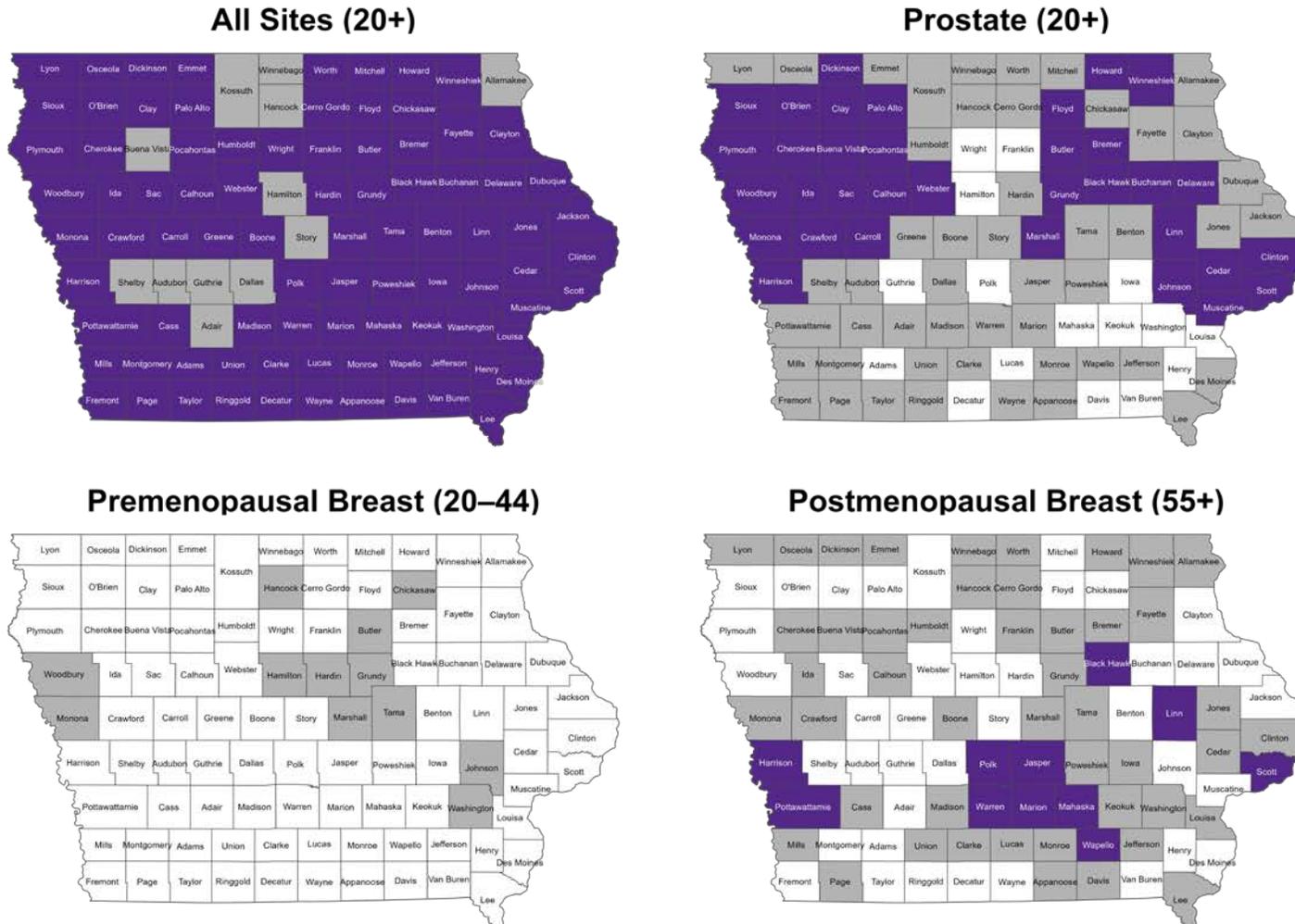
- Iowa is generally more comparable to the Midwestern cluster for prostate cancer, breast cancer, and melanoma
- Iowa is **not** comparable to the Midwestern cluster for lung or colorectal cancers

5

Approaches for identifying counties with excess cancer cases

Which counties have cancer burden higher than the national average WITHOUT adjusting for known risk factors?

Consistently flagged counties across 3 methods for detecting excess cases from 2018−2022, **not** accounting for known risk factors or demographics

All Sites (20+)

Prostate (20+)

Premenopausal Breast (20–44)

Postmenopausal Breast (55+)

Inconsistent · Below · Within · Above

Data Source: Iowa Cancer Registry, CDC WONDER, ACS

5 **Summary description of counties that have the highest numbers of excess cases of cancer (before accounting for behaviors and demographics)**

- In 2018-2022, 87 of Iowa's 99 counties had a significantly higher number of excess cases of overall cancer above what would be expected if each county had the same age-sex-specific rate as the US

- For prostate cancer, 18 counties in west/northwest Iowa and 16 counties in east/northeast Iowa had a significantly higher number of excess cases of prostate cancer than would be expected

- No Iowa counties had a significantly higher number of excess cases of pre-menopausal breast cancer, but 11 counties across Iowa had a significantly higher number of post-menopausal breast cancer, with 6 of the counties clustered together in central Iowa
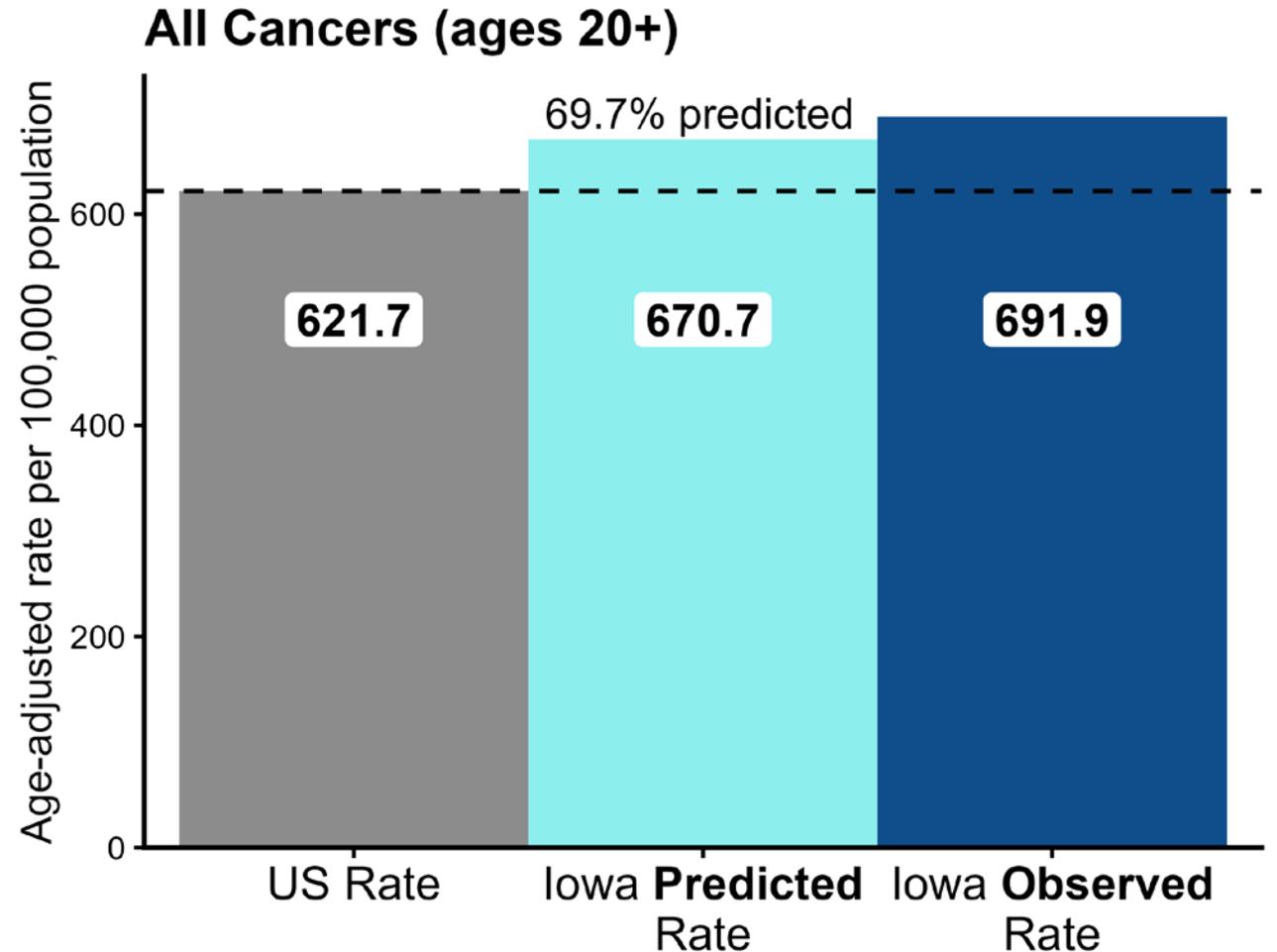
6

Impact of behavioral risk factors and demographic characteristics on cancer rates

What proportion of Iowa's incidence rates can be predicted by risk factors, demographics, and access to care related factors?

All cancers (**ages 20+**): Multivariable modeling of age-adjusted incidence rate

Iowa's age-adjusted incidence rate was predicted based on the following behavioral risk factors and demographic characteristics:
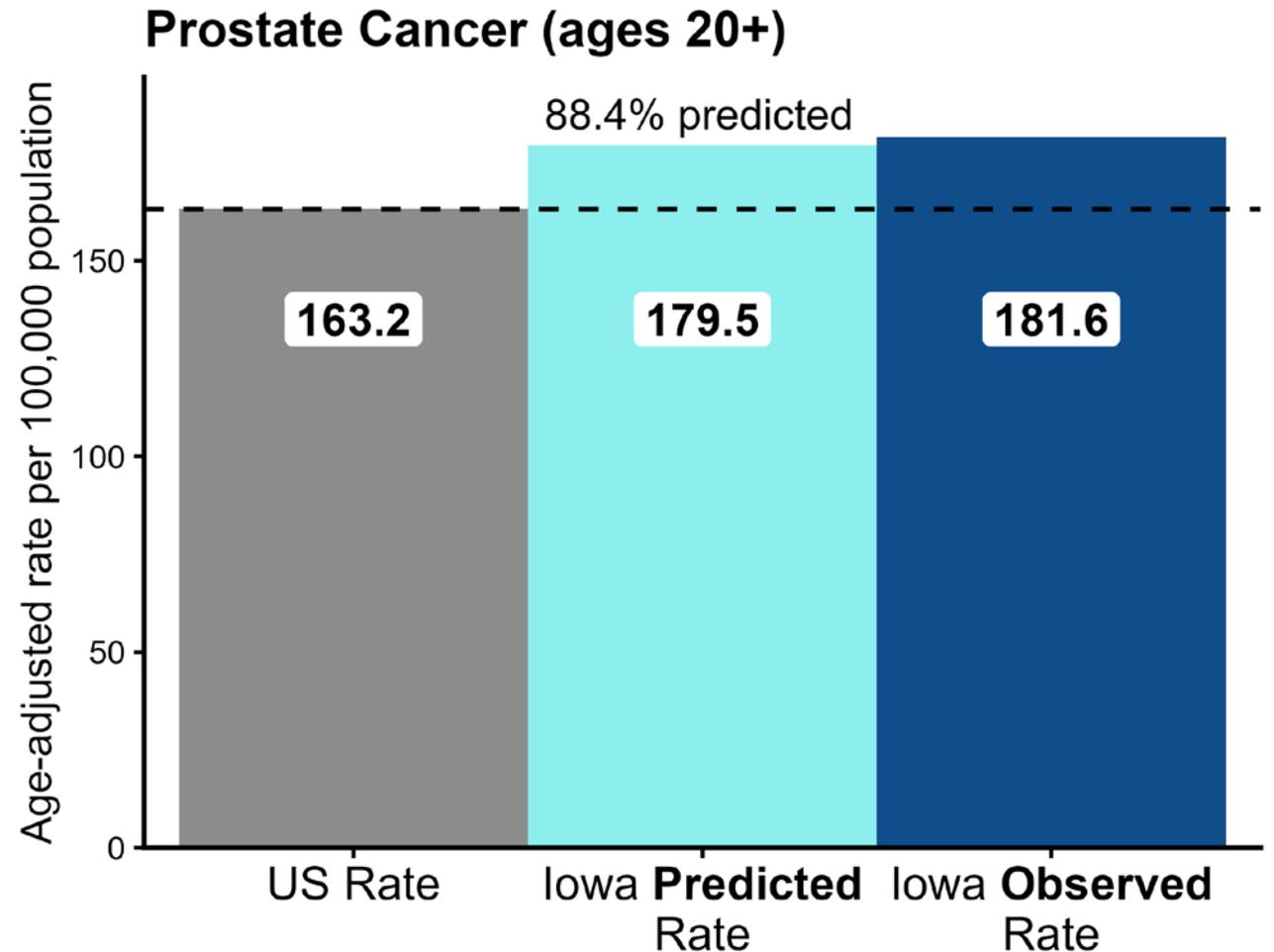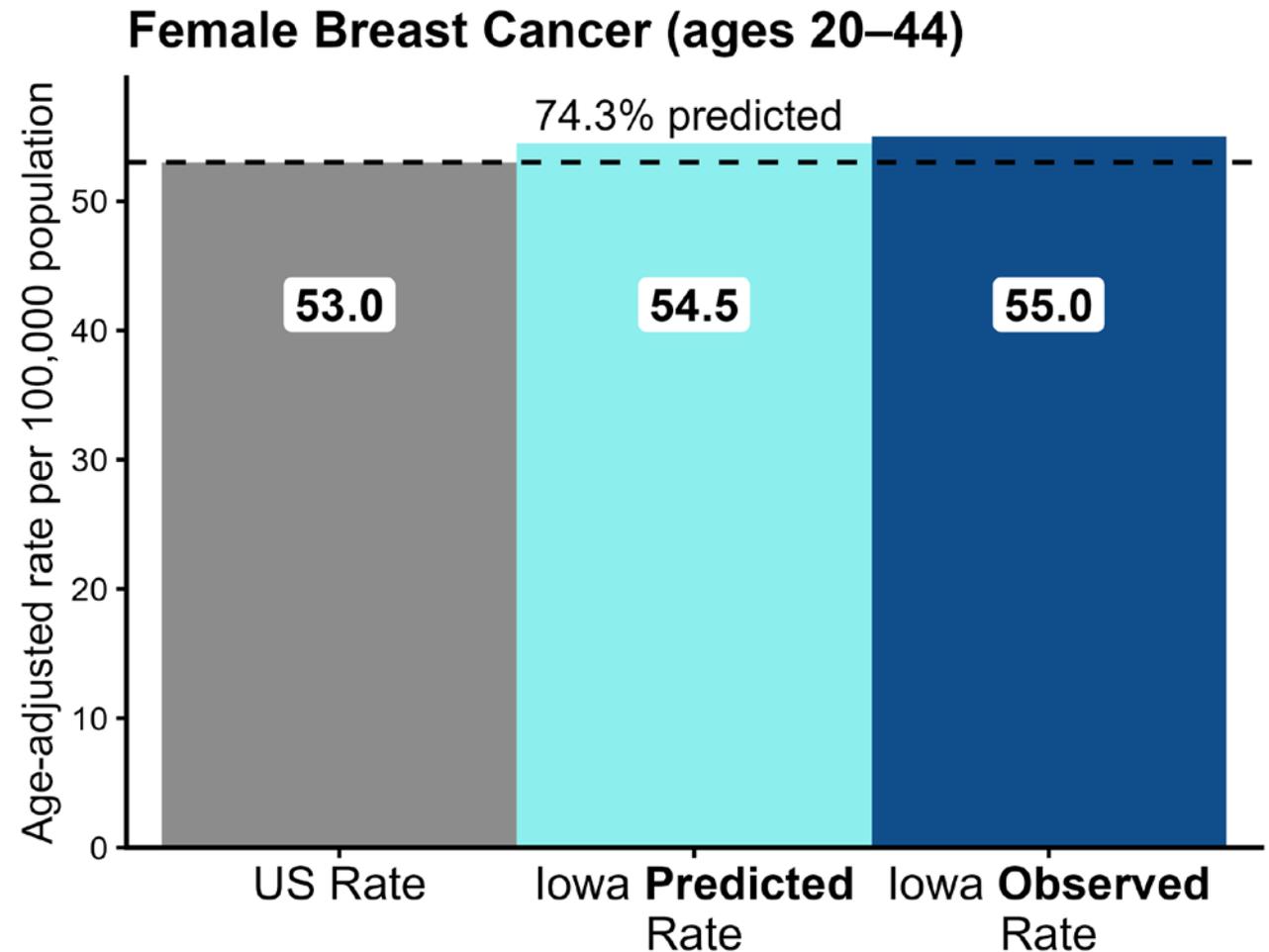
- % Obese
- % Binge drinking
- % Check-up (in past year)
- % White population

All Cancers (ages 20+)

69.7% predicted

US Rate: 621.7
Iowa **Predicted** Rate: 670.7
Iowa **Observed** Rate: 691.9

Age-adjusted rate per 100,000 population

Prostate cancer (ages 20+): Multivariable modeling of age-adjusted incidence rate

Iowa's age-adjusted incidence rate was predicted based on the following behavioral risk factors and demographic characteristics:
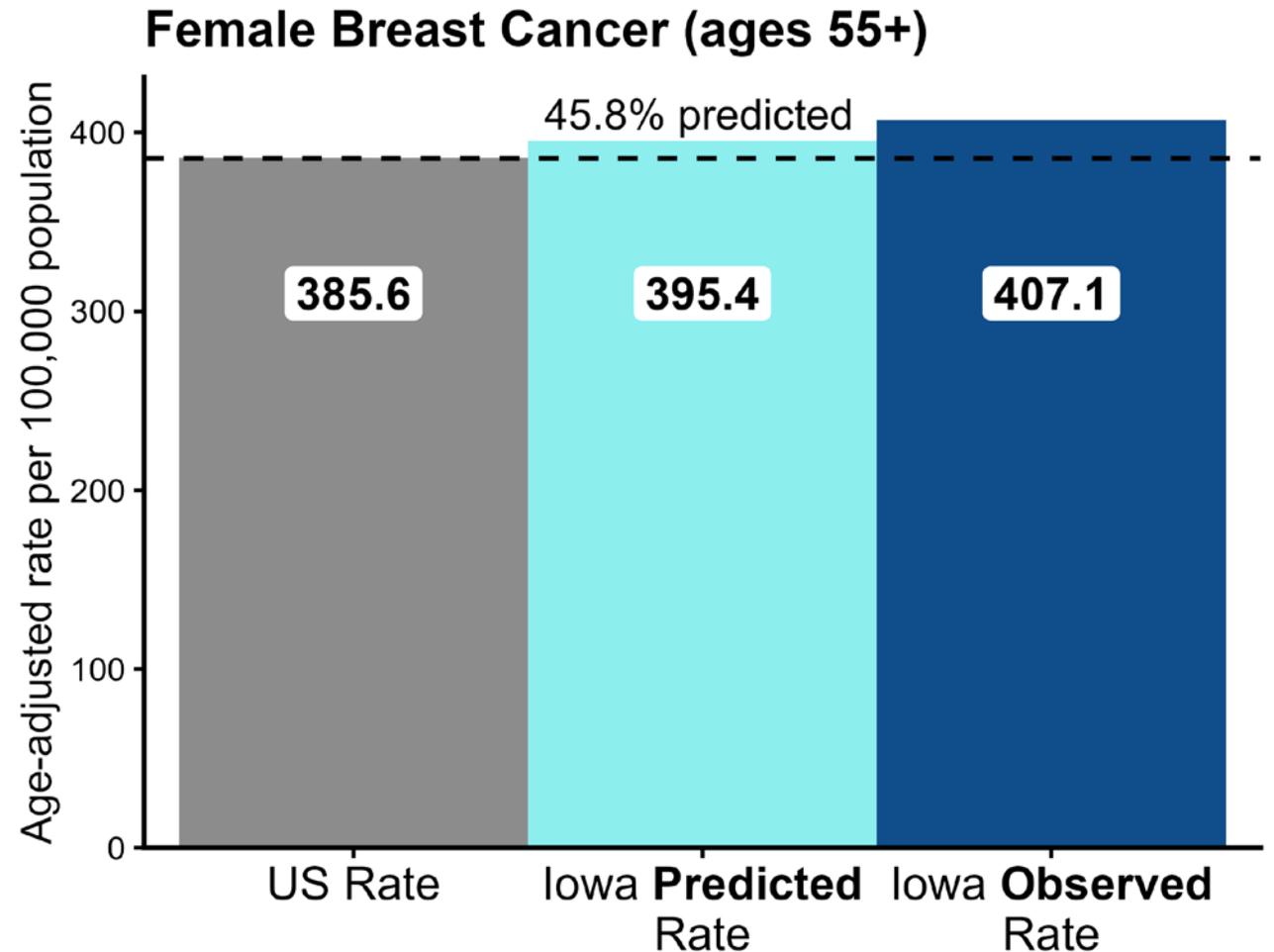- % Married/Partnered
- % Obese
- % Black population
- % Binge drinking
- % Never smoked
- PSA screening (within past 2 years)
- % Insured (19+ years of age)

Prostate Cancer (ages 20+)

88.4% predicted

	US Rate	Iowa **Predicted** Rate	Iowa **Observed** Rate
Age-adjusted rate per 100,000 population	163.2	179.5	181.6

Premenopausal breast cancer (ages 20–44): Multivariable modeling of age-adjusted incidence rate

Iowa's age-adjusted incidence rate was predicted based on the following behavioral risk factors and demographic characteristics:
- % White population
- % Binge drinking
- % Never smoked
- % Mammogram (up to date)
- % Insured (19+ years of age)

Female Breast Cancer (ages 20–44)

74.3% predicted

US Rate: 53.0
Iowa **Predicted** Rate: 54.5
Iowa **Observed** Rate: 55.0

Age-adjusted rate per 100,000 population

Postmenopausal breast cancer (ages 55+): Multivariable modeling of age-adjusted incidence rate

Iowa's age-adjusted incidence rate was predicted based on the following behavioral risk factors and demographic characteristics:
- % Obese
- % White population
- % Binge drinking
- % Mammogram (up to date)
- % Bachelor's degree or higher

Female Breast Cancer (ages 55+)

45.8% predicted

| | 385.6 | 395.4 | 407.1 |

US Rate | Iowa **Predicted** Rate | Iowa **Observed** Rate

6 | **Summary of the proportion of Iowa's cancer incidence rates that were predicted by behavioral risk factors and demographic characteristics**

Models accounting for behavioral risk factors and demographic characteristics show that Iowa's cancer rates should be higher than the US
- However, Iowa's rates for overall cancers and post-menopausal cancer were still higher than what the models predicted

7

Cancer incidence rates after accounting for risk factors

Which counties had age-adjusted incidence rates higher than the national average AFTER adjusting for known risk factors?

All cancers (ages 20+): Multivariable modeling of age-adjusted incidence rate
Adjusted for *% Obese, % Binge drinking, % Checkup (within past year), % White population*

Before adjusting
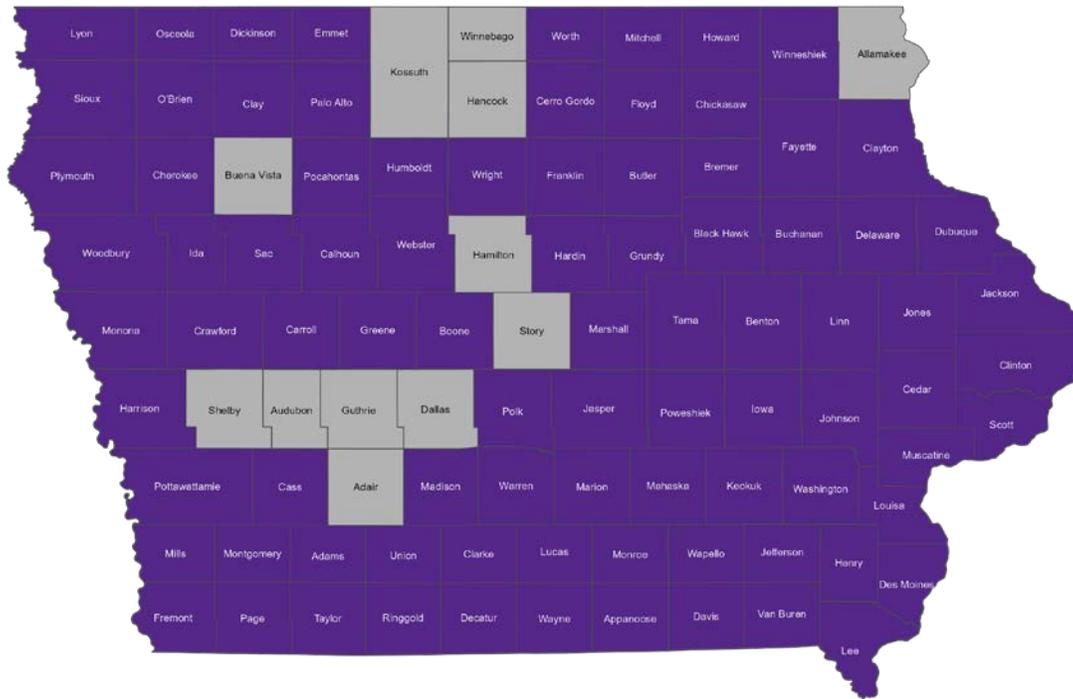
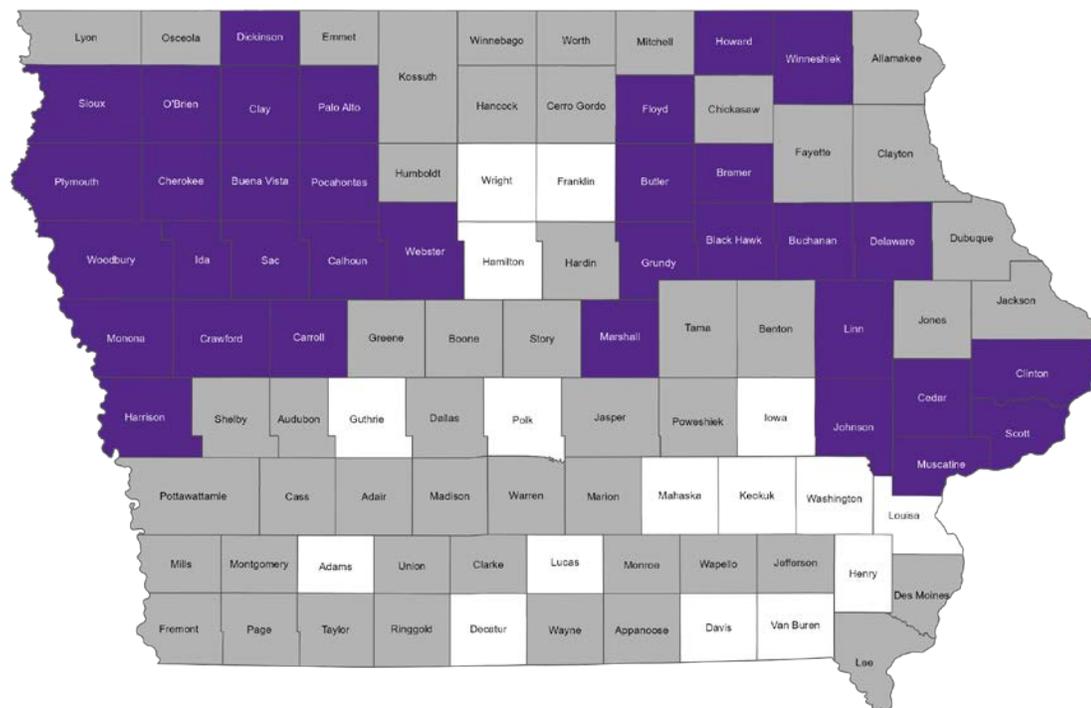Inconsistent | Above

After adjusting
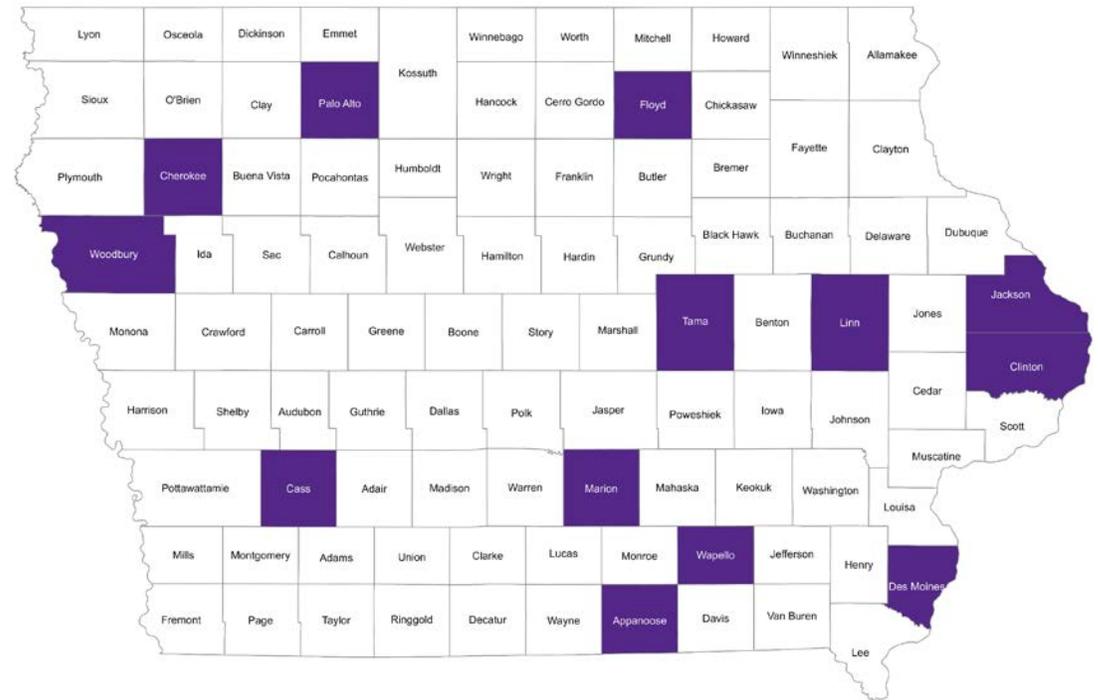
Within | Above

Prostate cancer (ages 20+): Multivariable modeling of age-adjusted incidence rate

Adjusted for PSA Screening (within 2 years), % Insured (19+ years of age), % Married/Partnered, % Black population, % Never smoked, % Binge drinking, % Obese

Before adjusting

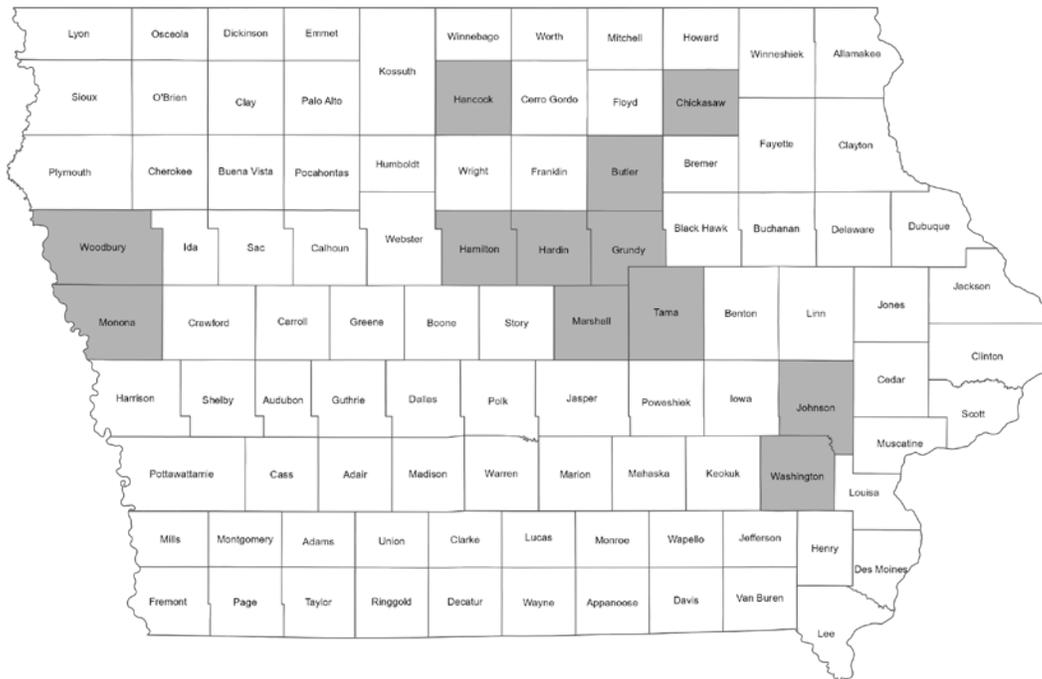Inconsistent   Within   Above

After adjusting
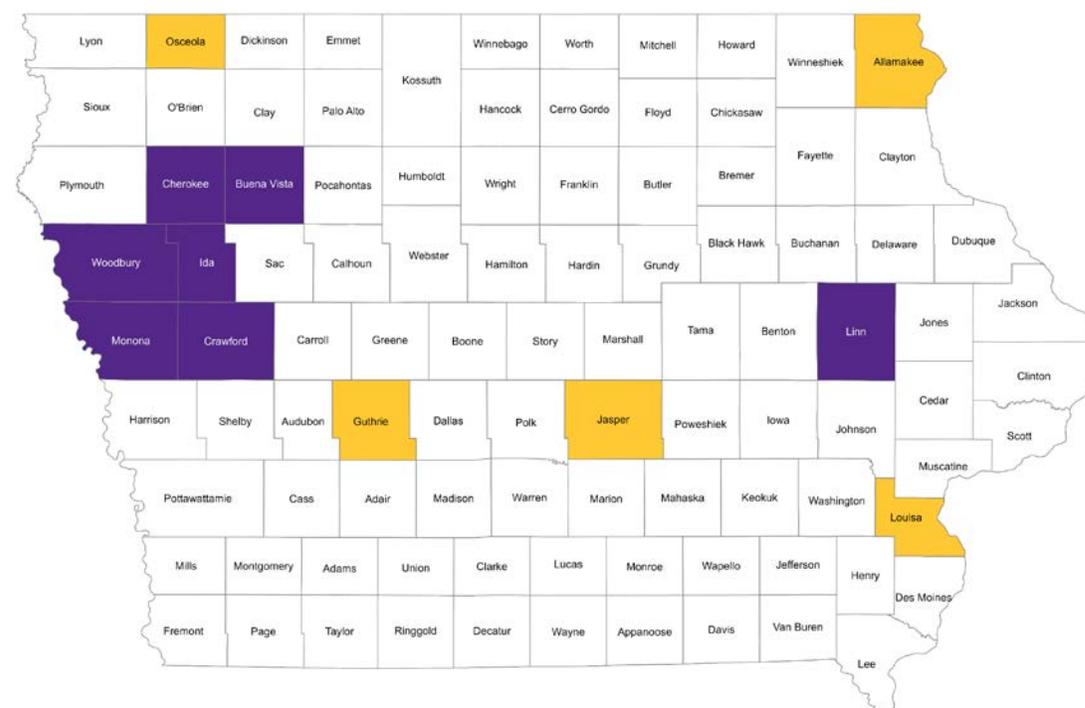
Below   Within   Above

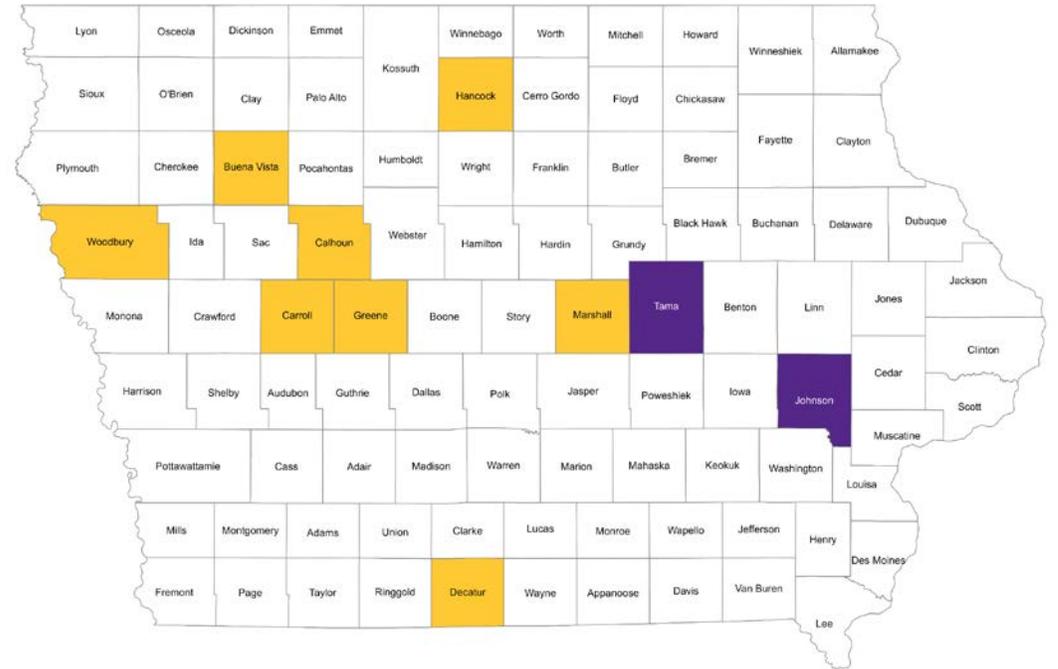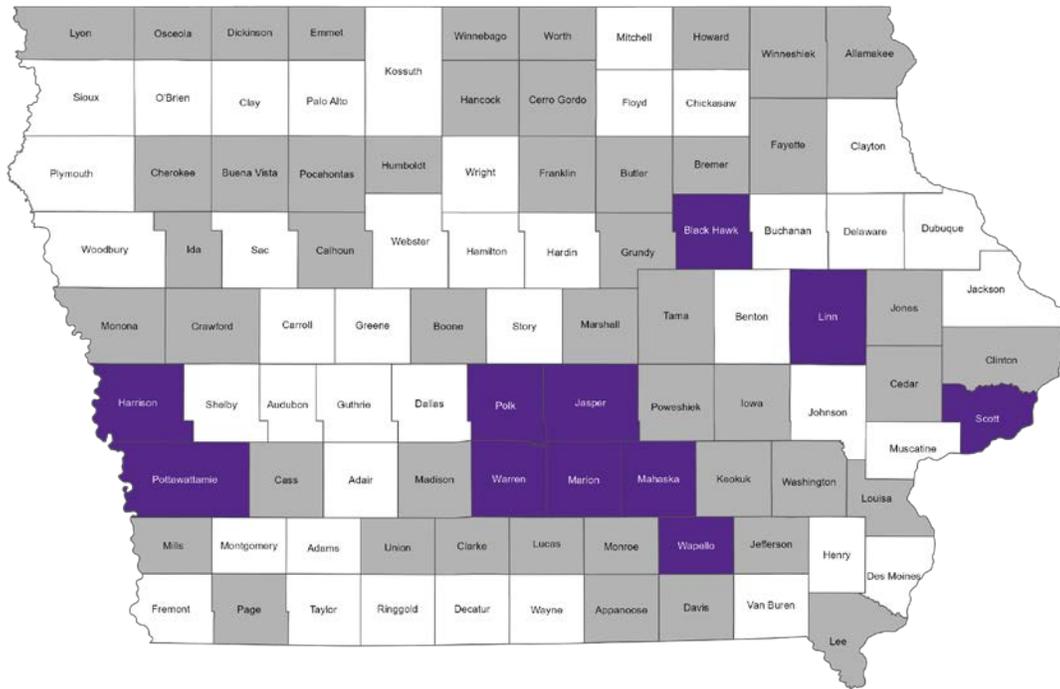# **Premenopausal breast cancer (ages 20–44)**: Multivariable modeling of age-adjusted incidence rate

Adjusted for % Mammogram (up to date), % Insured (19+ years of age), % White population, % Never smoked, % Binge drinking

Before adjusting

After adjusting

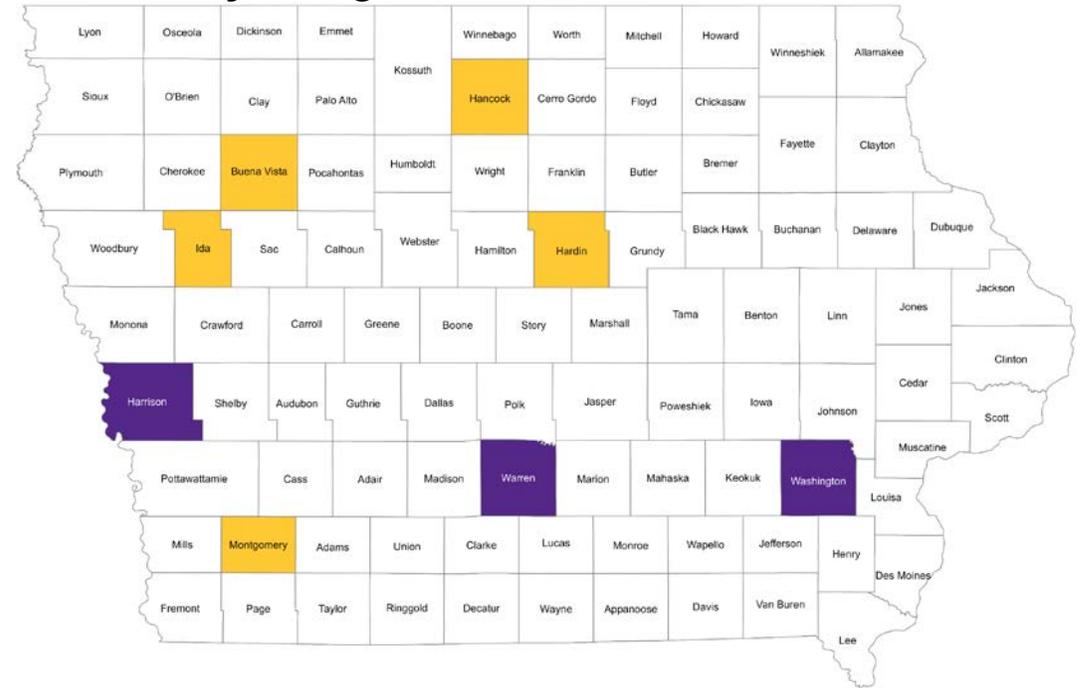# Postmenopausal breast cancer (ages 55+): Multivariable modeling of age-adjusted incidence rate

Adjusted for % Mammogram (up to date), % Bachelor's degree or higher, % White population, % Binge drinking, % Obese
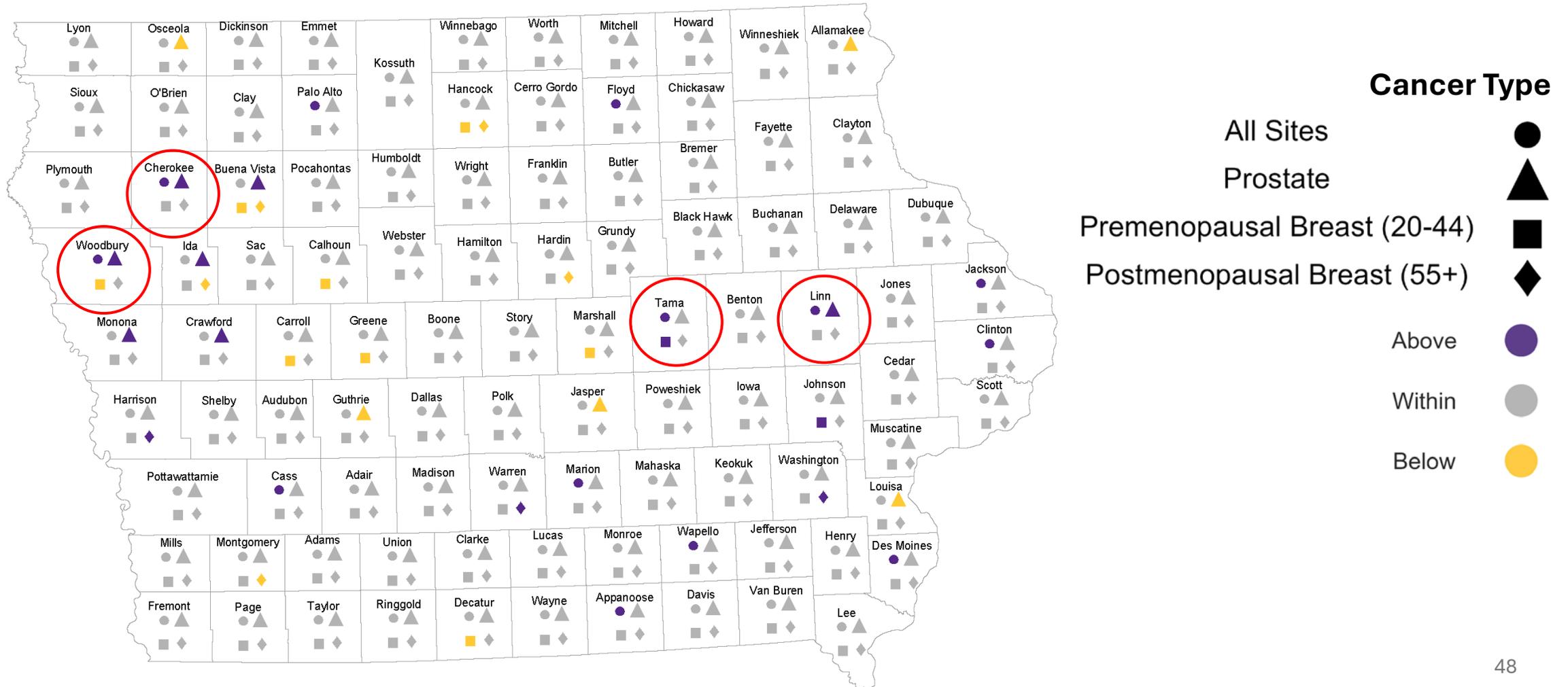

Before adjusting

Legend: Inconsistent | Within | Above

After adjusting

Legend: Below | Within | Above

Counties flagged after controlling for risk factors from available data

Summary of which counties have the highest incidence of cancer (after accounting for behaviors and demographics)

After adjusting for the same behavioral risk factors and demographic characteristics as in the state-level modeling, 13 of Iowa's 99 counties had a cancer incidence rate that was significantly higher than expected, and no counties had a lower than expected rate

- 6 northwestern counties plus Linn county had a significantly higher than expected rate of prostate cancer, and 5 counties had a significantly lower than expected rate

- 2 Iowa counties (Tama and Johnson) had a significantly higher than expected rate of pre-menopausal breast cancer, and 8 counties had a lower than expected rate

- 3 counties (Harrison, Warren and Washington) had a significantly higher than expected rate of post-menopausal breast cancer, and 5 counties had a lower than expected rate

- The high rates in the identified counties **cannot** sufficiently be explained by the behavioral risk factors and demographic characteristics we had available to us
  - These counties represent the biggest opportunities to explore other types of risk factors (genetic, environmental, provider screening patterns, etc.)

Follow our Website for more Information

https://hhs.iowa.gov/health-prevention/cancer

https://iphprp.org/cancer-drivers-in-iowa/

Key Drivers of Cancer in Iowa Project Team