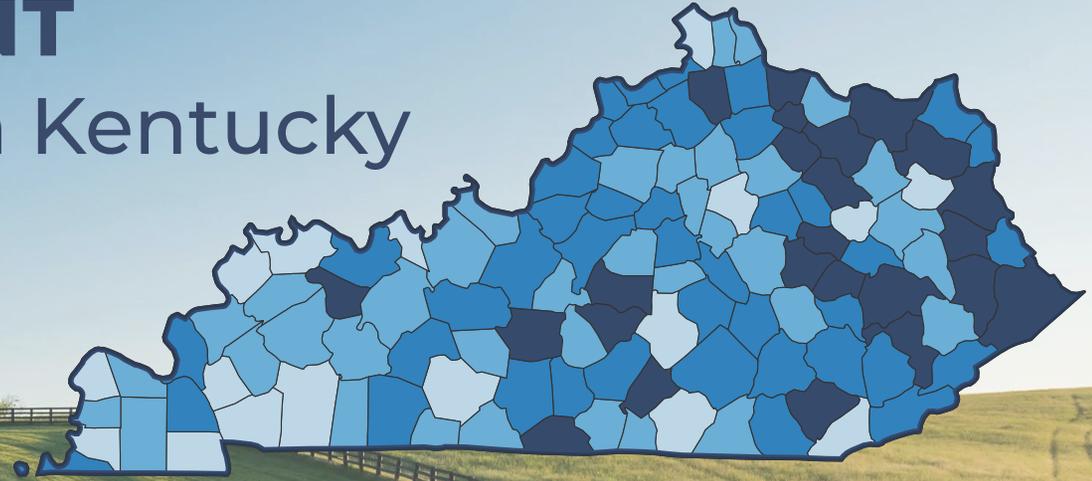


# 2021 KENTUCKY CANCER NEEDS ASSESSMENT

The Story of Cancer in Kentucky



# EXECUTIVE SUMMARY

**OVERALL CANCER BURDEN:** Kentucky consistently bears one of the highest cancer burdens in the nation. In the most recent data (2014-2018), KY ranked first in overall age-adjusted cancer incidence rate (new cancer cases) and mortality rate (deaths), and among the top five states for multiple specific cancer sites.

**DISPARITIES:** Geographic disparities include elevated mortality among rural or Appalachian KY for several of the top 20 cancers, including the four sites with available screenings. Racial disparities exist in mortality for breast, prostate, colorectal, liver, myeloma, stomach and uterine (primarily of the endometrium) cancers.

**SOCIAL DETERMINANTS:** Low education and high poverty contribute to KY's high cancer burden, including high poverty rates among rural, Appalachian, Black and Hispanic Kentuckians. Forty of the 120 counties—mostly in Appalachia—have had “persistent poverty” across the past four decades. Despite higher poverty, the percentage of uninsured is lower than the US due to Medicaid expansion, except for Hispanic Kentuckians.

**RISK REDUCTION:** KY has higher incidence of tobacco-related, obesity-related and HPV-related cancers than the US, especially lung, colorectal, oral, cervical and kidney cancers. KY ranks 2nd highest among states for smoking and 7th highest for adult obesity. Only about half of KY's youth are vaccinated against HPV, with lower coverage in rural areas. Environmental exposures are linked to six common cancers in KY.

**SCREENING:** Long-standing statewide efforts have led to KY being on par with the US in colorectal, breast and cervical cancer screening, although greater needs persist in rural and Appalachian areas. KY found early success in lung cancer screening since approval in 2015, now ranking 2nd highest in the US, but rates remain low with 4 out of 5 unscreened. Early detection improves survival for screenable cancers.

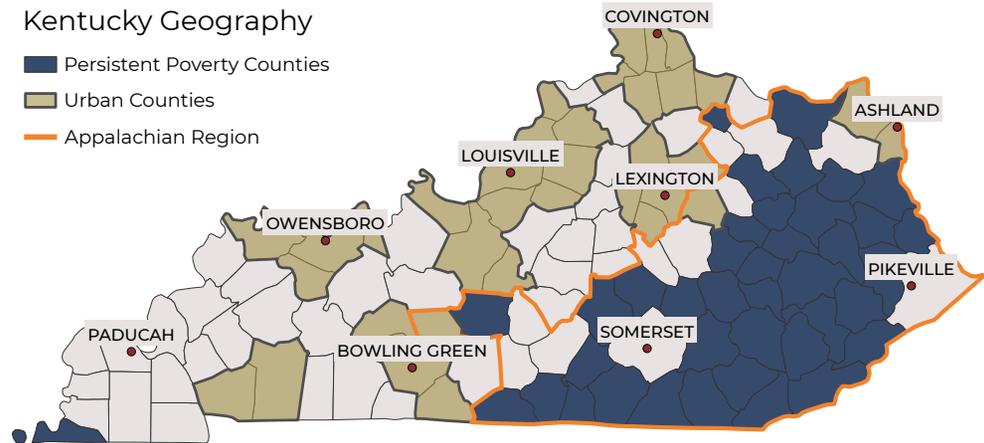
**TREATMENT AND SURVIVAL:** Recent advances in precision medicine have improved the effectiveness of cancer treatments, but are underutilized in KY. Similar to the US, relative survival for cancer—both overall and for major cancer sites—has improved over time. Survivors have a range of wellness, mental health, social support, financial and other needs.

**CALL TO ACTION:** Rewriting the story of cancer in KY will require a multi-faceted collaborative approach among partners across the state. This KY Cancer Needs Assessment is intended to inform planning for individual organizations and collaborative initiatives.

## PURPOSE: To tell the current story of cancer in Kentucky.

Combining data and community perspectives, this story describes how social determinants of health, behaviors and biology intersect to produce the current state of cancer burden and disparities in Kentucky, and it highlights opportunities to rewrite the story.

### Kentucky Geography



Source: USDA; Appalachian Regional Commission

## Kentucky is among the Top 5 worst states for:

All site cancer incidence and mortality	Leukemia mortality
Lung Cancer incidence and mortality	Non-Hodgkin lymphoma mortality
Colorectal cancer incidence and mortality	Adults who currently smoke
Oral cancer incidence and mortality	Adults with no physical activity
Kidney cancer incidence and mortality	Youth obesity
Cervical cancer incidence	New Hepatitis C infections
Brain cancer incidence	People living in poverty
Melanoma mortality	Adults without a bachelor's degree

# Kentucky Cancer At-A-Glance, Incidence & Mortality

## Rankings

"Within KY" = rankings of cancer site rates within Kentucky  
 "Among US States" = KY's national ranking for each cancer site

Colored blocks indicate a significantly higher rate for the first group in each comparison (column) than the second.

RANKINGS			
INCIDENCE		MORTALITY	
Within KY	Among US States	Within KY	Among US States

DISPARITIES									
INCIDENCE					MORTALITY				
KY All vs US All	Black KY vs US All	Black KY vs White KY	Rural KY vs Urban KY	App KY vs Non-App KY	KY All vs US All	Black KY vs US All	Black KY vs White KY	Rural KY vs Urban KY	App KY vs Non-App KY
All Cancer Sites									
Female Breast									
Prostate									
Lung and Bronchus									
Colon and Rectum									
Melanoma of the Skin									
Corpus Uteri									
Urinary Bladder									
Kidney and Renal Pelvis									
Non-Hodgkin Lymphoma									
Leukemia									
Thyroid									
Oral Cavity and Pharynx									
Pancreas									
Cervix Uteri									
Ovary									
Liver and IBD									
Brain and ONS									
Myeloma									
Stomach									
Testis									
Esophagus									
Uterus, NOS									

\* = Ranked lower than 20th

# Kentucky Cancer At-A-Glance, Opportunities for Action

Colored blocks indicate evidence-based risk reduction strategy or clinical practice

	OPPORTUNITIES FOR ACTION								
	RISK REDUCTION						CLINICAL		
	Tobacco	Obesity	HPV	Hepatitis	HIV	Environment	Genetic Testing	Screening	Precision Med
Female Breast									
Prostate									
Lung and Bronchus									
Colon and Rectum									
Melanoma of the Skin									
Corpus Uteri									
Urinary Bladder									
Kidney and Renal Pelvis									
Non-Hodgkin Lymphoma									
Leukemia									
Thyroid									
Oral Cavity and Pharynx									
Pancreas									
Cervix Uteri									
Ovary									
Liver and IBD									
Brain and ONS									
Myeloma									
Stomach									
Testis									
Esophagus									
Uterus, NOS									

IBD = Intrahepatic Bile Duct; NOS = Not Otherwise Specified

# Kentucky Behavioral Risk Factors & Screenings At-A-Glance

Colored blocks indicate a significantly higher proportion for the first group in each comparison (column) than the second.

Adult Risk Factors	All Race KY vs US	Black KY vs US	White KY vs US	Hispanic KY vs US	Female KY vs US	Male KY vs US	Rural vs Urban KY	App vs Non-App KY	Youth Risk Factors								
	All Race KY vs US	Black KY vs US	White KY vs US	Hispanic KY vs US	Female KY vs US	Male KY vs US	Rural vs Urban KY	App vs Non-App KY	All Race KY vs US	Black KY vs US	White KY vs US	Hispanic KY vs US	Female KY vs US	Male KY vs US			
Currently smokes tobacco	█	█	█		█	█		█	No physical activity (youth)	█	█	█	█	█			
Currently uses smokeless tobacco	█		█			█	█	█	Obese (BMI 30+, youth)	█	█	█	█	█	█		
No physical activity	█	█	█		█	█	█	█	Overweight or obese (BMI 25+, youth)	█	█	█	█	█	█		
Did not meet CDC Physical Activity guidelines	█		█		█	█	█	█	Eats no fruits per day (youth)	█	█	█		█	█		
Obese (BMI 30+)	█	█	█		█	█	█	█	Eats no vegetables per day (youth)	█	█	█	█	█	█		
Overweight or obese (BMI 25+)	█	█	█		█	█		█	Currently vapes (youth)						█		
Eats no fruits per day	█		█		█	█			Ever vaped (youth)								
Eats no vegetables per day									Cancer Screenings								
Had at least 1 drink, last 30 days									All Race KY vs US	Black KY vs US	White KY vs US	Hispanic KY vs US	Female KY vs US	Male KY vs US	Rural vs Urban KY	App vs Non-App KY	
Unhealthy drinking			█	█		█			Met USPSTF Lung Cancer guidelines								
Average <6 hours of sleep per night	█	█	█		█	█			Met USPSTF CRC guidelines								█
									Met USPSTF Breast Cancer guidelines						█	█	
									Pap test in last 3 years						█	█	

# Contents



## Section 1

---

### Introduction

- 7 Purpose
- 7 Top 10 Incidence
- 8 Top 10 Mortality
- 9 KY CNA Framework
- 11 KY CNA Use Guide

## Section 2

---

### Social Determinants of Health

- 13 Society
- 18 Community
- 20 Environment

## Section 3

---

### Cancer-related Outcomes

- 26 Risk Reduction
- 31 Screening & Diagnosis
- 37 Treatment
- 40 Survivorship

## Section 4

---

### Call to Action

- 46 Summary
- 48 Community Prioritization
- 49 A Call to Action
- 50 Data Gaps
- 51 Research Opportunities

## Section 5

---

### Acknowledgments & Citations

- 53 Acknowledgments
- 55 Data Sources
- 57 Research Cited

# INTRODUCTION

Kentucky has the nation's highest rates of cancer incidence and mortality during the 5-year period from 2014-2018, with a yearly average of 27,441 new cases and 10,141 deaths.



# 2021 Kentucky Cancer Needs Assessment

## PURPOSE

In 2021, a Steering Committee of several collaborating organizations conducted a comprehensive Kentucky Cancer Needs Assessment (KY CNA). The purpose of this statewide KY CNA is to tell the current story of cancer in Kentucky. The KY CNA also highlights opportunities to rewrite the story.

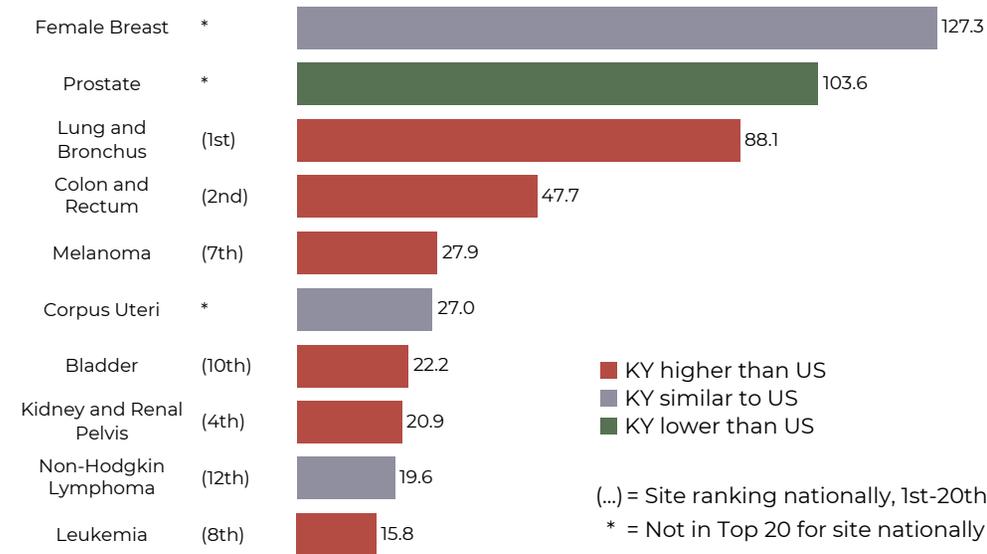
## KENTUCKY HAS THE WORST CANCER BURDEN AMONG US STATES

Kentucky has a population of 4.4 million people and experiences, on average, 27,441 new cancer cases and 10,141 cancer deaths each year. Kentucky ranks highest among all states for both cancer incidence and mortality. Age-adjusted incidence rates (**Figure 1**) are significantly higher in KY versus the US for six of the top 10 cancers, most notably lung cancer (79% higher in KY, ranked highest among US states), followed by colorectal cancer (27% higher, ranked 2nd highest) and melanoma (18% higher, ranked 7th highest).

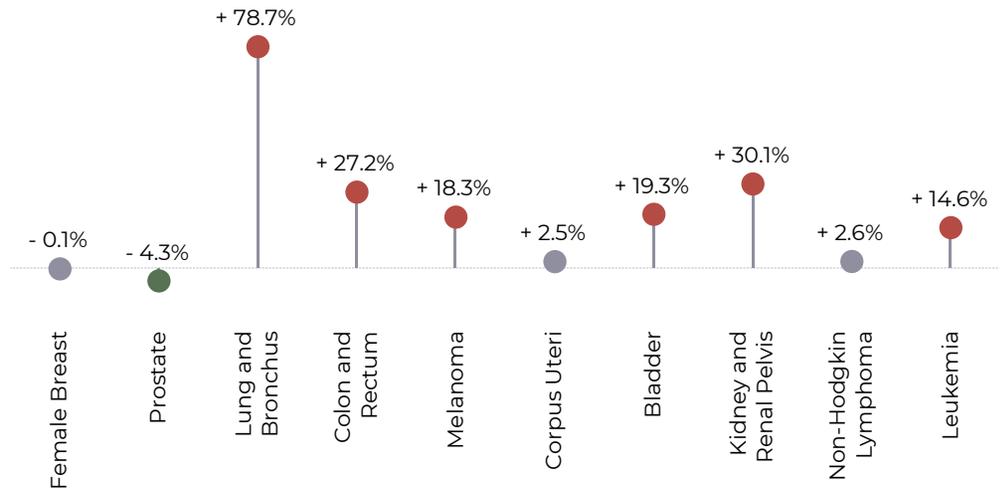
Age-adjusted mortality rates (**Figure 2**) are also significantly higher for six of the top 10 cancers in KY versus the US, particularly lung cancer (82% higher, ranked highest among US states), colorectal cancer (25% higher, ranked 4th highest) and leukemia (15% higher, ranked 4th highest). In addition, KY has significant cancer-related disparities among rural, Appalachian, Black and Hispanic populations, which are highlighted throughout the KY CNA.

**FIGURE 1. TOP 10 CANCER INCIDENCE IN KENTUCKY**

### Age-Adjusted Incidence

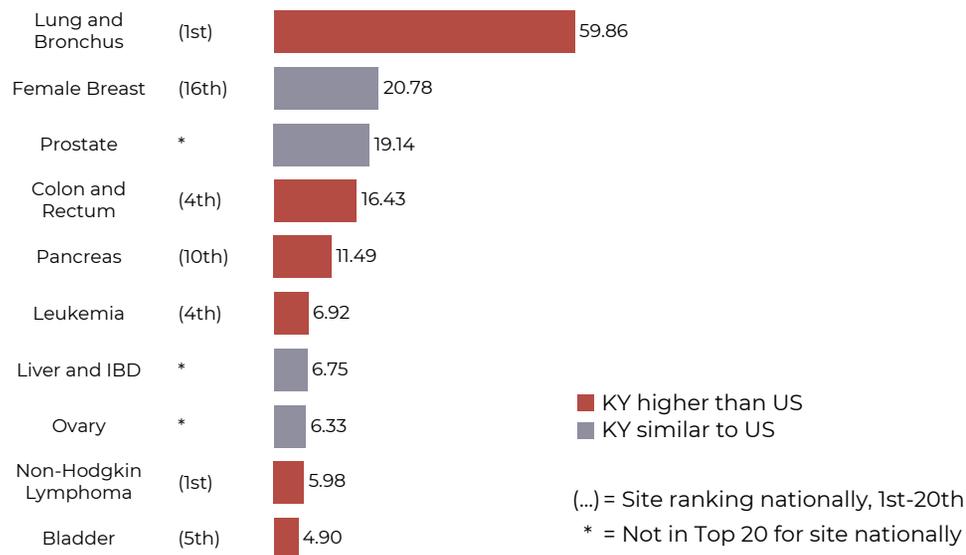


### Percent Difference in Rates, KY vs US

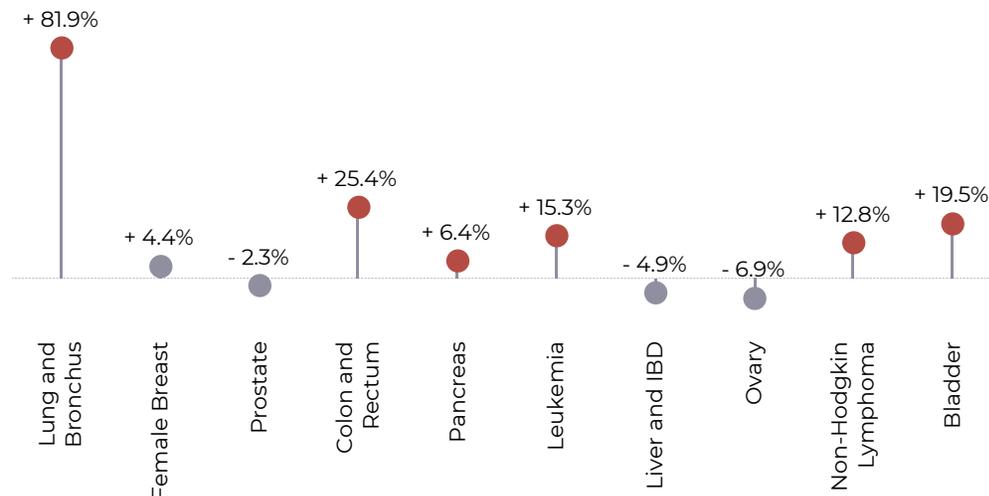


**FIGURE 2. TOP 10 CANCER MORTALITY IN KENTUCKY**

**Age-Adjusted Mortality**



**Percent Difference in Rates, KY vs US**



**WHY IS OUR CANCER BURDEN SO HIGH?**

Drawing inspiration from several existing frameworks, we created the **Multilevel Determinants of Cancer-related Outcomes Framework** to guide planning of which data to include in the KY CNA, and to organize a coherent story of how social determinants of health, behaviors and biology intersect to produce the current state of cancer burden and disparities in Kentucky (**Figure 3**).

**Social Determinants of Health (SDOH)** reflect the context in which an individual lives. SDOH include three components that interact with each other:

- **Society** encompasses social context (culture; social norms; the meaning of socially-constructed concepts like race, ethnicity and gender; etc.), economic conditions (median income, unemployment, etc.), institutions (education system, criminal justice system, etc.) and policies (Affordable Care Act, Medicaid, institutional policies, etc.).
- **Community** includes the health care system (primary care, hospitals, cancer clinics and other facilities) and inter-personal relationships (family, neighborhoods, etc.).
- **Environment** consists of both the natural environment (water, air, soil, etc.) and substances that individuals are exposed to through these means, as well as “built” environment constructed by humans (roads, sidewalks, parks, buildings, etc.).

**Individual Factors** refer to an individual's internal makeup and actions; specifically, how a person's individual demographics (age; biological sex; self-identified gender, race, and ethnicity; etc.) and behaviors (all of the actions people do every day) interact with their internal Biology (biologic functioning and genes within one's body) with the potential to produce mutations in the body that can result in cancer.

SDOH, individual behaviors and internal biology all interact with each other to produce population-level **Cancer-related Outcomes**, spanning the cancer care continuum from Risk Reduction (primary prevention) to Screening (secondary prevention), Diagnosis, Treatment, Survivorship and End of Life.

Within a given society or community, SDOH have varying degrees of health equity (or inequities) in how they do or do not create external constraints on an individual's possible behaviors throughout their lifespan, dependent on the social groups the individual belongs to (such as rural/urban or Appalachian/non-Appalachian residence, or their racial and/or ethnic background). Thus, the **degree of health equity** in SDOH largely determines the resulting **degree of health disparities** observed across social groups for population-level Cancer-related Outcomes.

### WHAT CAN WE DO ABOUT IT?

The KY CNA provides actionable information that can be used by a wide range of stakeholders to rewrite the story of cancer in Kentucky. **Figure 3** points out how collective actions can impact Cancer-related Outcomes, with **Upstream Actions** targeting changes in the broad context of SDOH, and **Downstream Actions** targeting individual-level behavior changes. The KY CNA focuses primarily on **evidence-based guidelines and practices** across the cancer care continuum, with examples provided in **Figure 4**.

The **Call to Action** section of this report outlines examples of how organizations and people can use the KY CNA in many ways to address identified needs and respond to community-driven priorities and solutions. The KY CNA will guide development of Kentucky's next statewide Cancer Action Plan (KY CAP) for 2022-2027. In addition, public and private organizations and entities from multiple sectors can use the KY CNA to inform their strategic planning, program planning and evaluation activities; to engage community members; to educate decision makers; and to stimulate new collaborative research.

**FIGURE 3. MULTILEVEL DETERMINANTS OF CANCER-RELATED OUTCOMES FRAMEWORK**

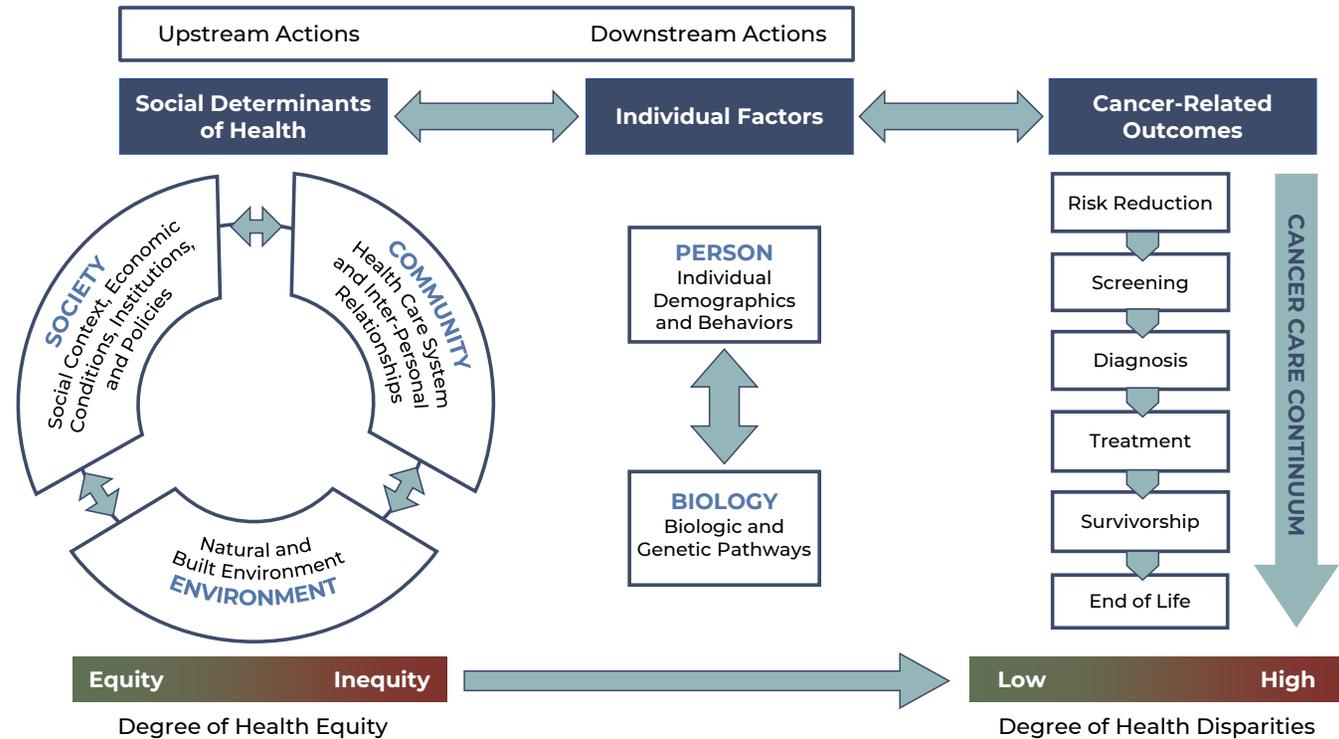
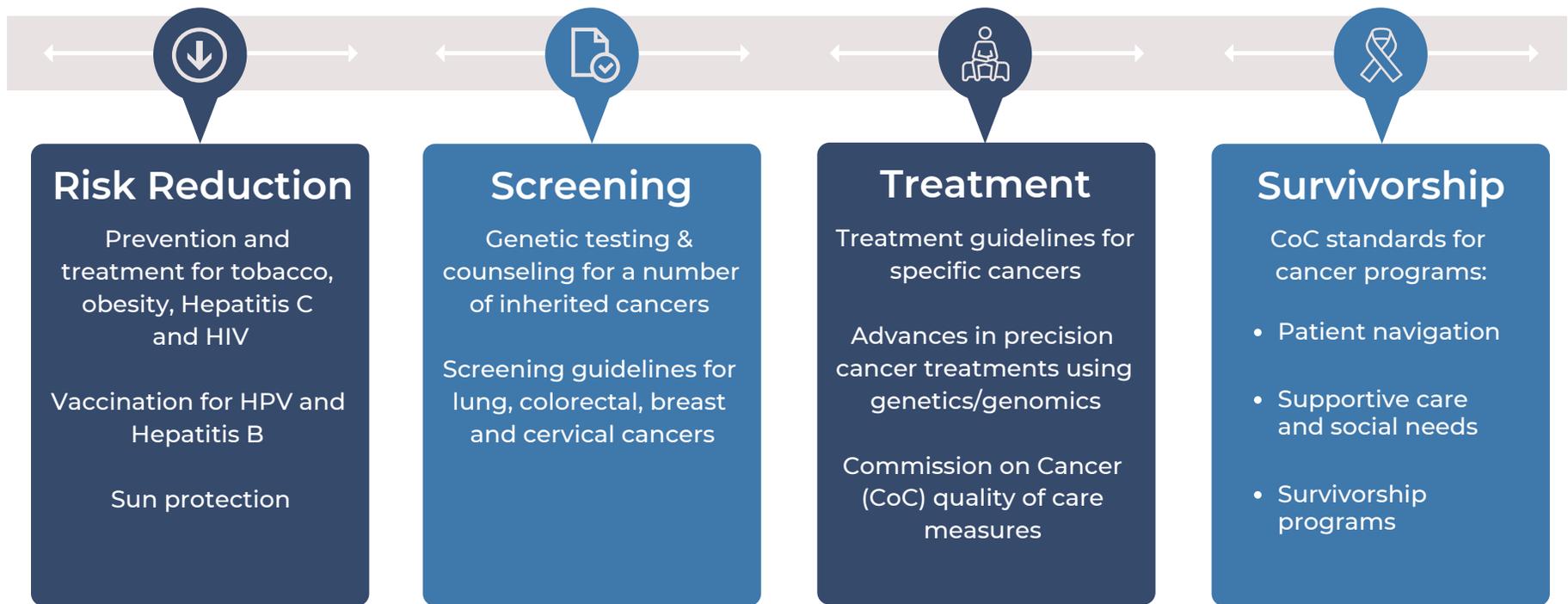


FIGURE 4. EXAMPLES OF EVIDENCE-BASED GUIDELINES AND PRACTICES



## CNA RESOURCES

**Data Sources.** The KY CNA combines data from the Kentucky Cancer Registry (KCR) with multiple existing data sources. Focus groups with lay community members from diverse demographic groups and regions complement the existing data with lived experiences. In addition, 111 organizational representatives and 51 lay community members participated in a series of community prioritization activities—called concept mapping—which provided community-driven insights on high priority needs and strategies to address them.

**Appendices and Toolkit.** The KY CNA includes an appendix with data tables corresponding to the data visualizations included in this report. Following release of this report, supplemental appendices will be made available with additional data visualizations, a report of the focus group findings, and a report of the concept mapping prioritization activities. In addition, a KY CNA toolkit will be provided with standalone graphics that can be used for presentations, newsletters, and social media dissemination.

**Data Portal.** In addition to this report, the KY CNA web-based data portal provides interactive tools for users to select indicators and generate custom maps and tables, as well as links to the KCR website and KY CAP.

# KENTUCKY CNA USE GUIDE

This document uses certain colors to represent the populations of different geographic and racial groups being considered:

 United States	 Kentucky
 Rural KY	 Appalachian KY
 Black KY	 Hispanic KY

Group comparisons in this document are made between the following pairs:

- KY compared to US
- Rural KY (RUCC > 3) compared to Urban KY
- Appalachian KY compared to Non-Appalachian KY
- Black KY compared to White KY
- Hispanic KY compared to Non-Hispanic KY

At times, group comparisons are analyzed for significant differences using non-overlapping 95% confidence intervals. Significance is denoted as follows:

- \* = Significantly higher than all sex, all race US
- ▲ = Significantly higher than comparison group
- ▼ = Significantly lower than comparison group

On all data maps featuring gradient scales, the gradient is oriented so that the light end represents areas that are doing better, and the dark end represents areas that are doing worse. For example:

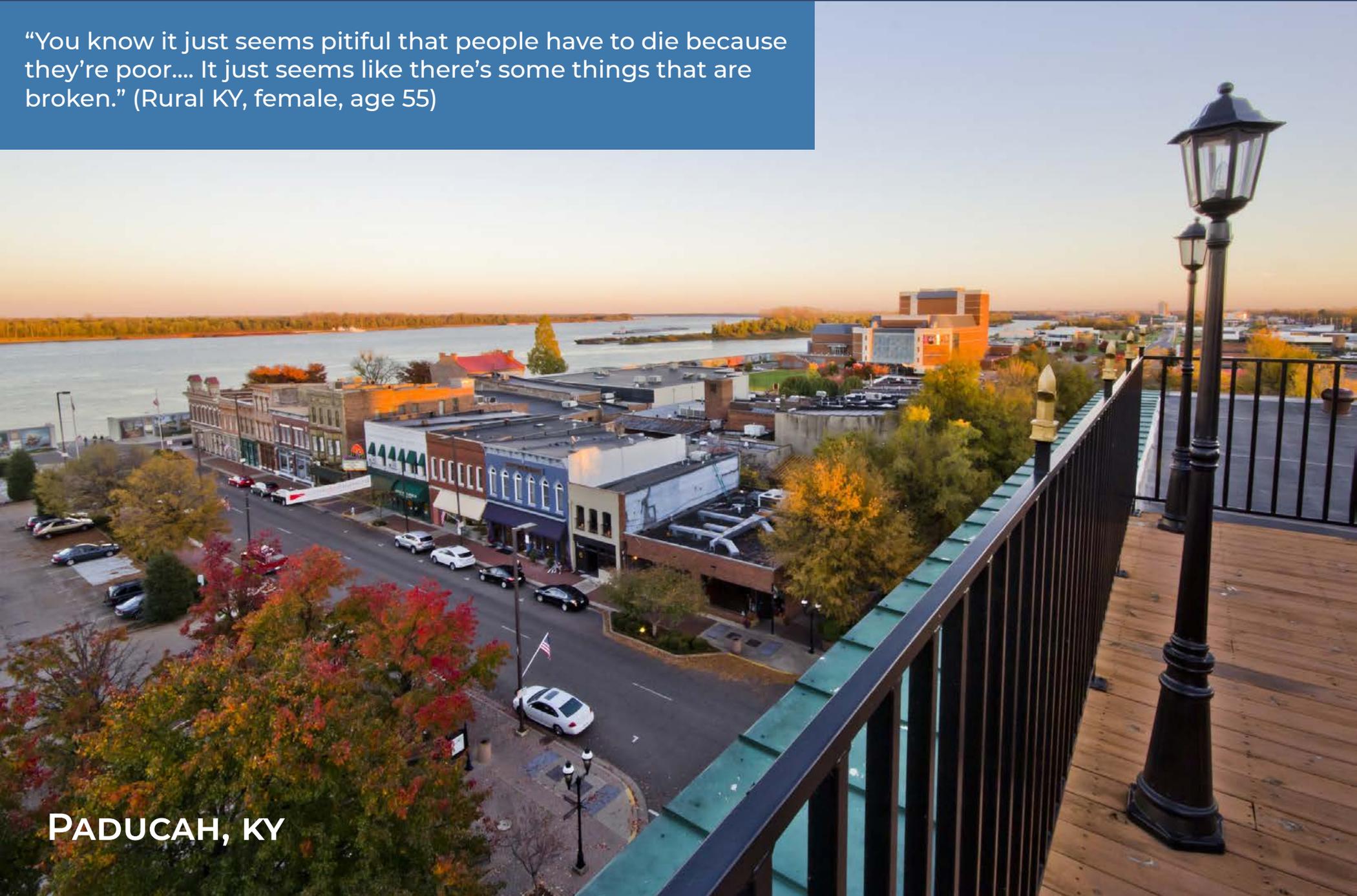


## Abbreviations and Acronyms

ACS	American Community Survey
BRFSS	Behavioral Risk Factor Surveillance System (CDC)
CDC	Centers for Disease Control & Prevention
CHFS	Kentucky Cabinet for Health & Family Services
CHRR	County Health Rankings & Roadmaps
ERS	Economic Research Service (USDA)
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
HP 2030	Healthy People 2030
HRSA	Health Resources and Services Administration
KCR	Kentucky Cancer Registry
KFF	Kaiser Family Foundation
KyBRFS	Kentucky Behavioral Risk Factor Survey
NFHL	National Flood Hazard Layer (FEMA)
NIH	National Institutes of Health
NIS-Teen	National Immunization Survey—Teen (CDC)
NNDSS	National Notifiable Disease Surveillance System (CDC)
SEER	Surveillance, Epidemiology, and End Results Program
USDA	United States Department of Agriculture
USPSTF	United States Preventive Services Task Force
YRBS	Youth Risk Behavior Surveillance System (CDC)

# SOCIAL DETERMINANTS OF HEALTH

“You know it just seems pitiful that people have to die because they’re poor.... It just seems like there’s some things that are broken.” (Rural KY, female, age 55)



PADUCAH, KY

# SOCIAL DETERMINANTS OF HEALTH — SOCIETY

## Kentucky Fast Facts

**26%**  
of the population makes up the Appalachian region



**41%**  
of the population is rural



Kentucky is the **26th** most populous state

population: **4,449,052**  
across 120 counties



Average Income in KY is

**\$50,589**

which is

**20% LOWER**  
than the U.S. average

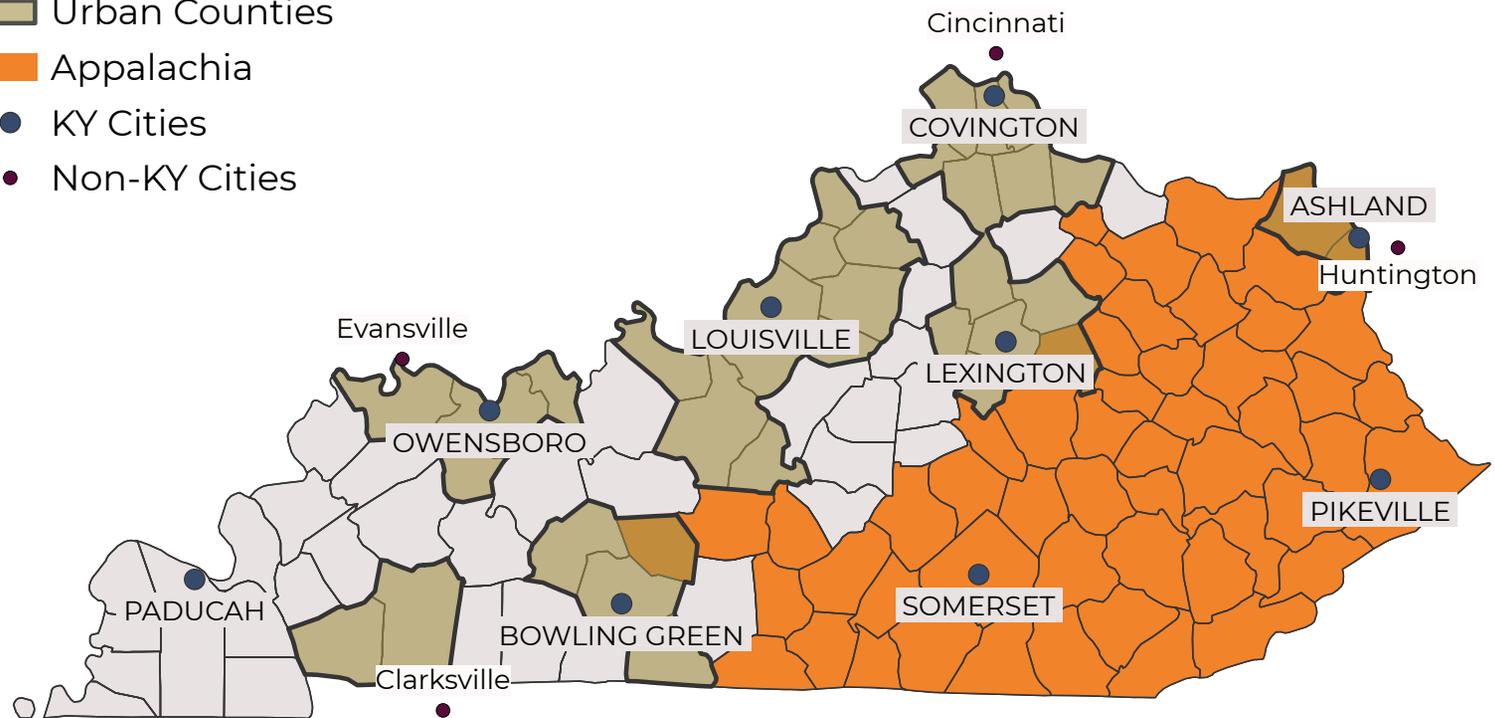


The Appalachian region is made up of **54 counties**

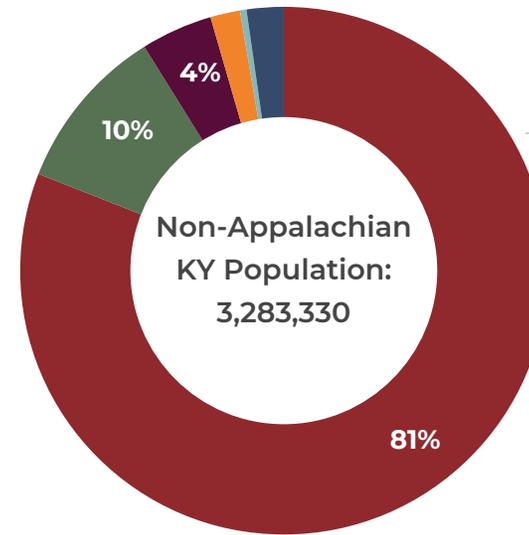
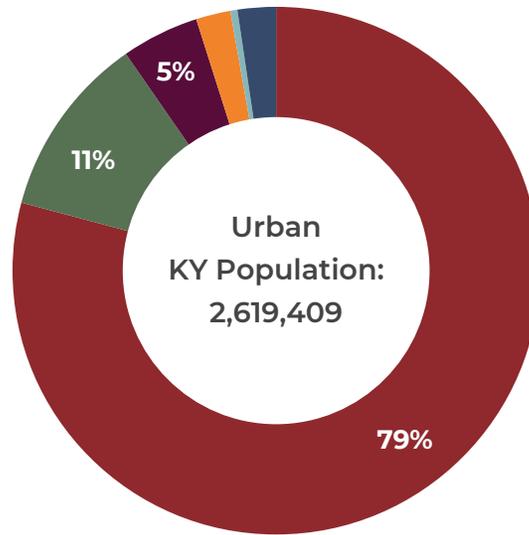
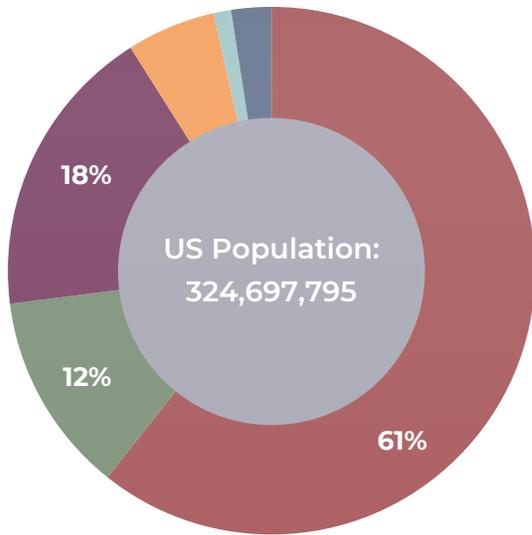
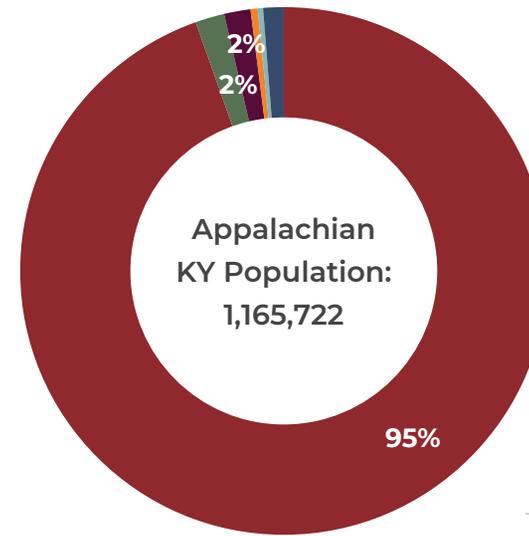
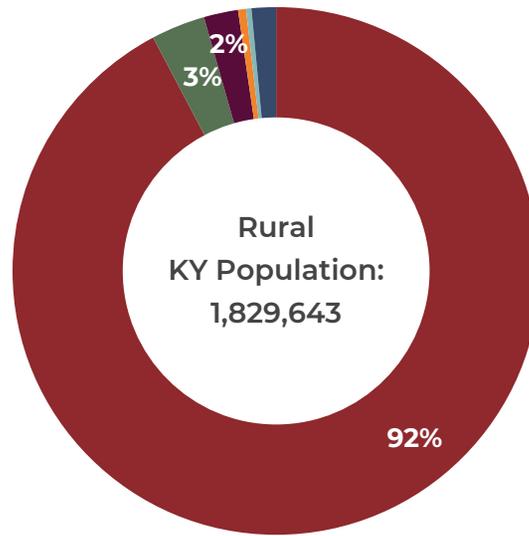
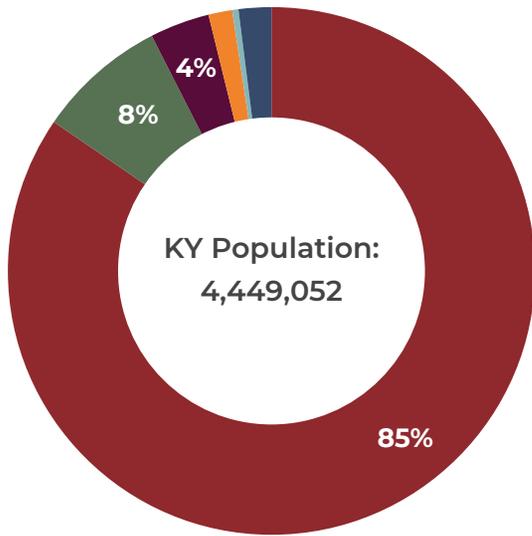


population: **1,165,722**

-  Urban Counties
-  Appalachia
-  KY Cities
-  Non-KY Cities



# SOCIAL DETERMINANTS OF HEALTH — SOCIETY



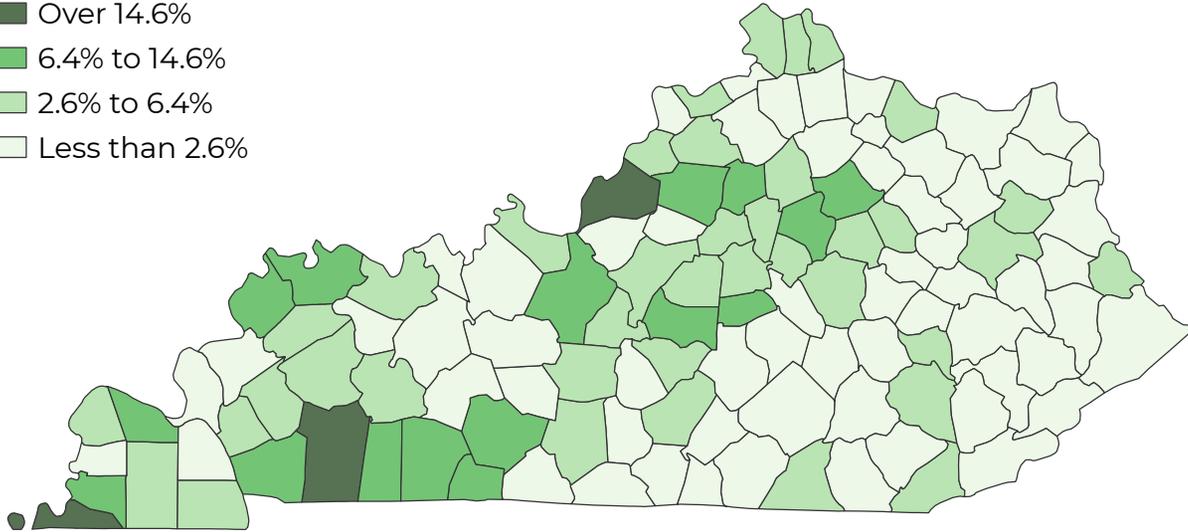
**Other Demographics**

	US	KY
Female	51%	51%
Under 18	23%	23%
65 or Older	16%	16%
Foreign Born	14%	4%
Rural	14%	41%

# SOCIAL DETERMINANTS OF HEALTH — SOCIETY

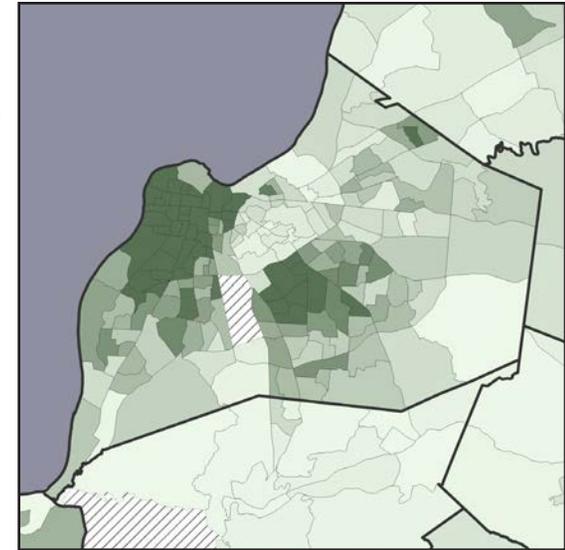
## Black Population as % of Total

- Over 14.6%
- 6.4% to 14.6%
- 2.6% to 6.4%
- Less than 2.6%



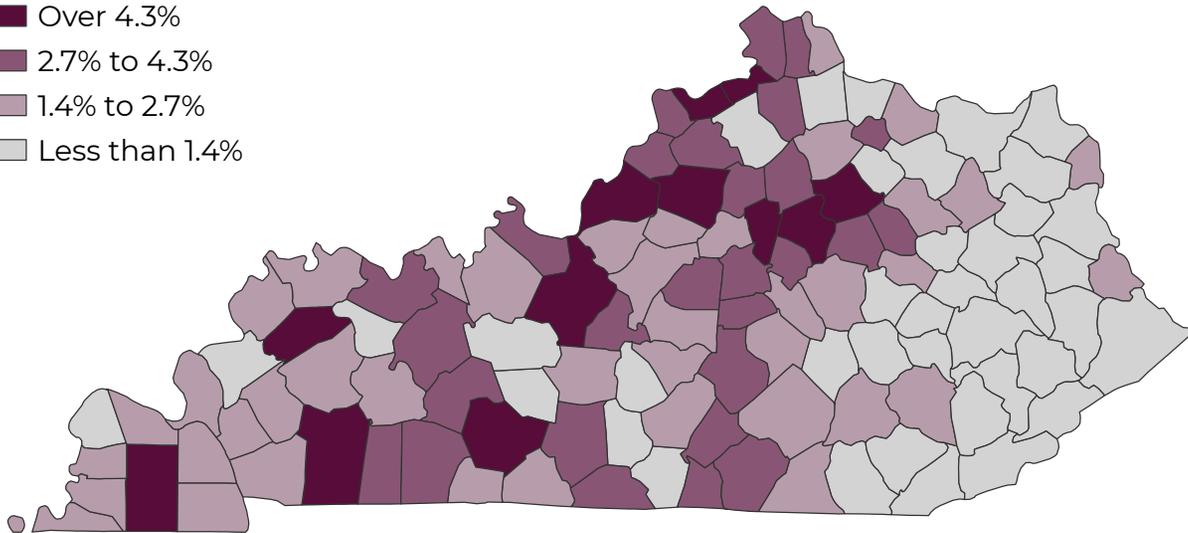
Jefferson County  
(46.5% of KY Black Population)

Max:  
99.2%



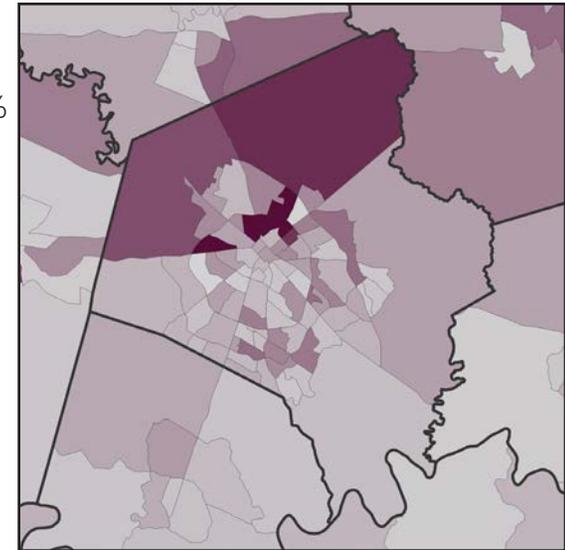
## Hispanic Population as % of Total

- Over 4.3%
- 2.7% to 4.3%
- 1.4% to 2.7%
- Less than 1.4%



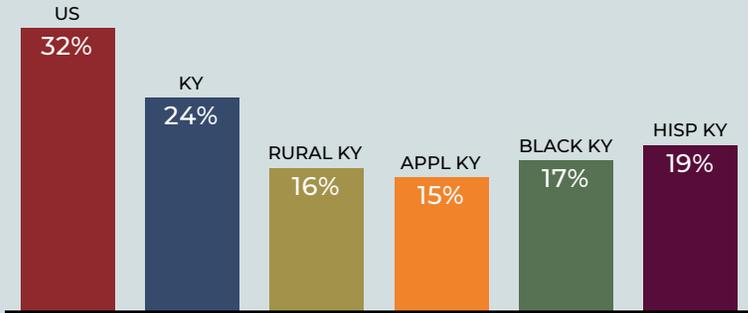
Fayette County  
(14.1% of KY Hispanic Population)

Max:  
45.5%

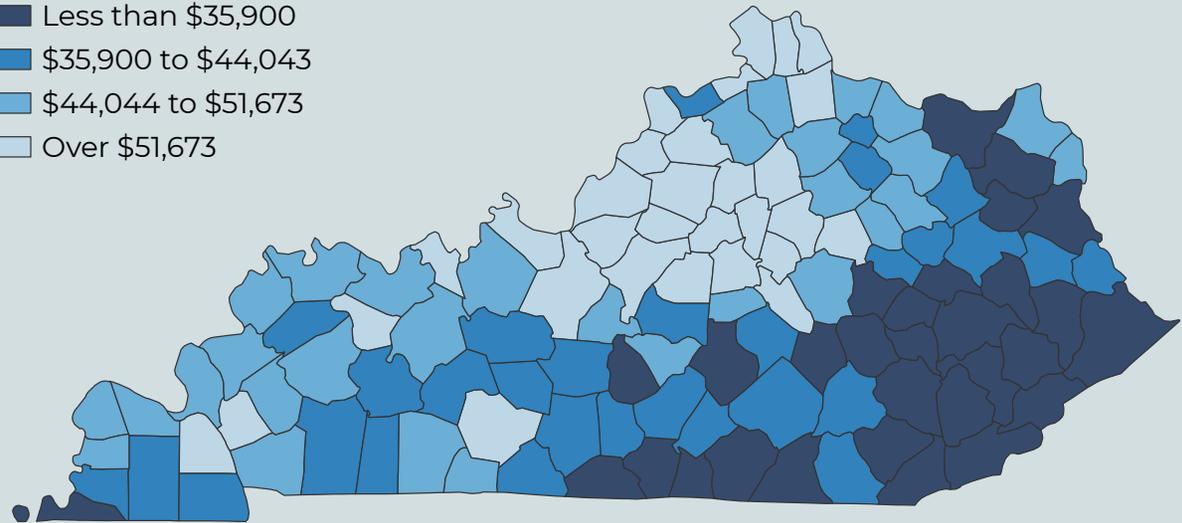
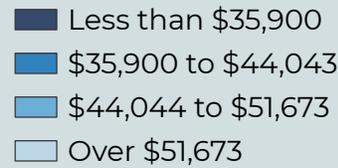


# SOCIAL DETERMINANTS OF HEALTH — SOCIETY

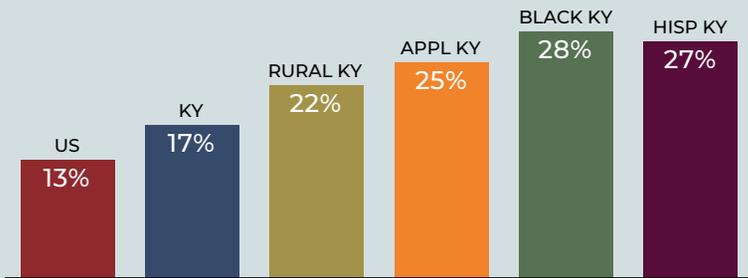
## Graduated College



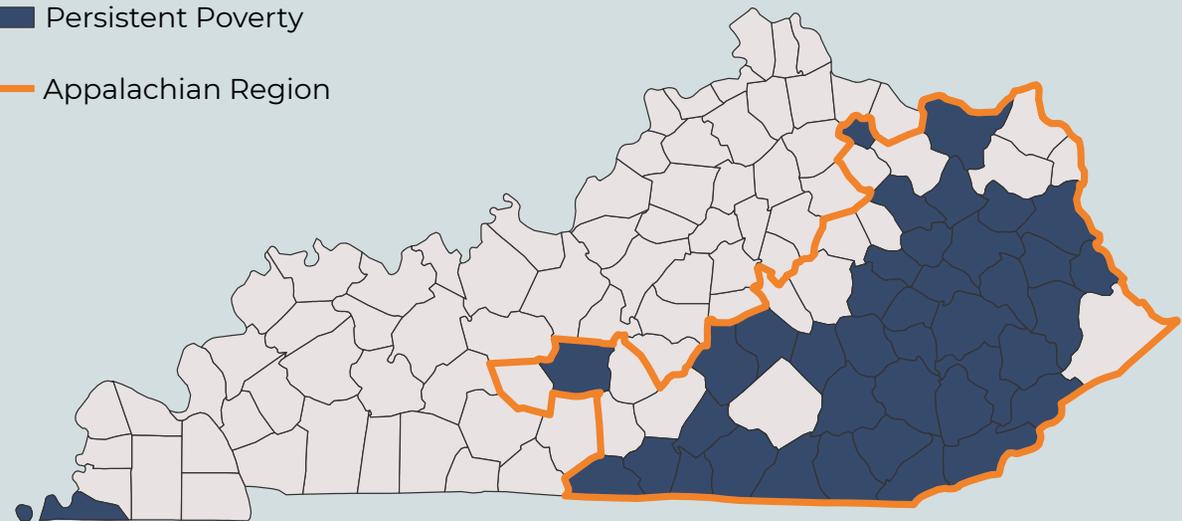
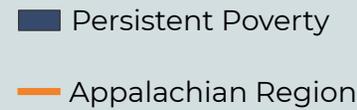
## Median Income



## Living Below Poverty



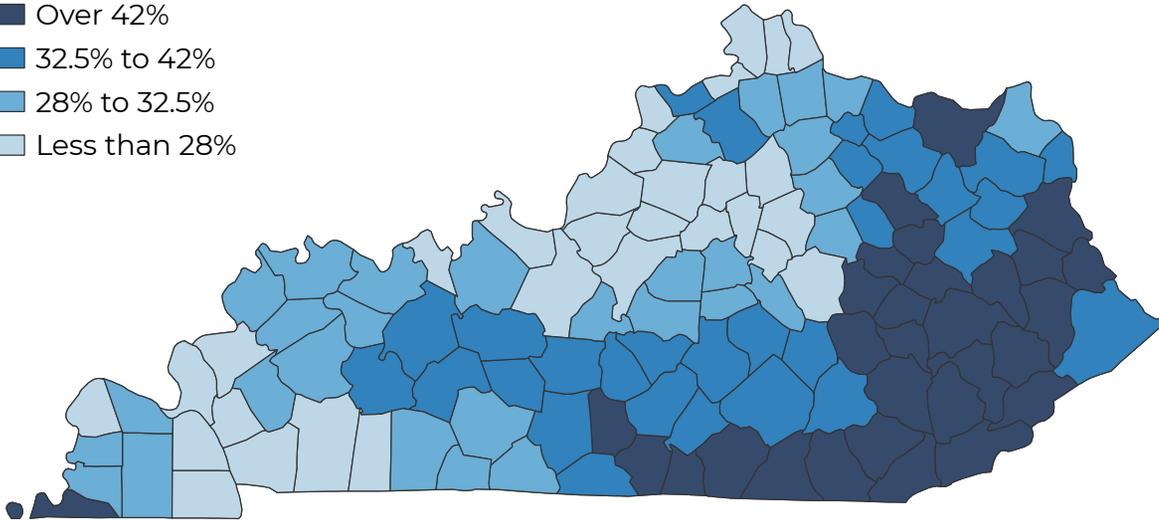
## Persistent Poverty Counties



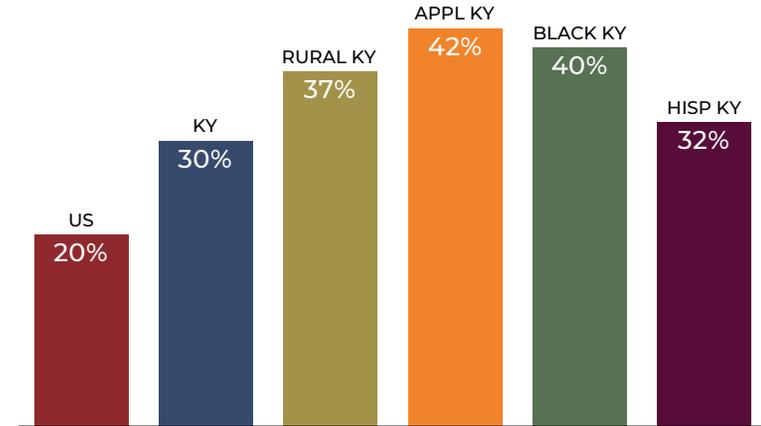
# SOCIAL DETERMINANTS OF HEALTH — SOCIETY

## Enrolled in Medicaid (2019 average)

- Over 42%
- 32.5% to 42%
- 28% to 32.5%
- Less than 28%



## Enrolled in Medicaid (2019 average)



61% reduction in uninsured



January 1, 2014

Before Medicaid Expansion | After Medicaid Expansion



Medicaid expansion in KY helped close the Black-White gap in uninsured.



23% of Hispanic Kentuckians remain uninsured

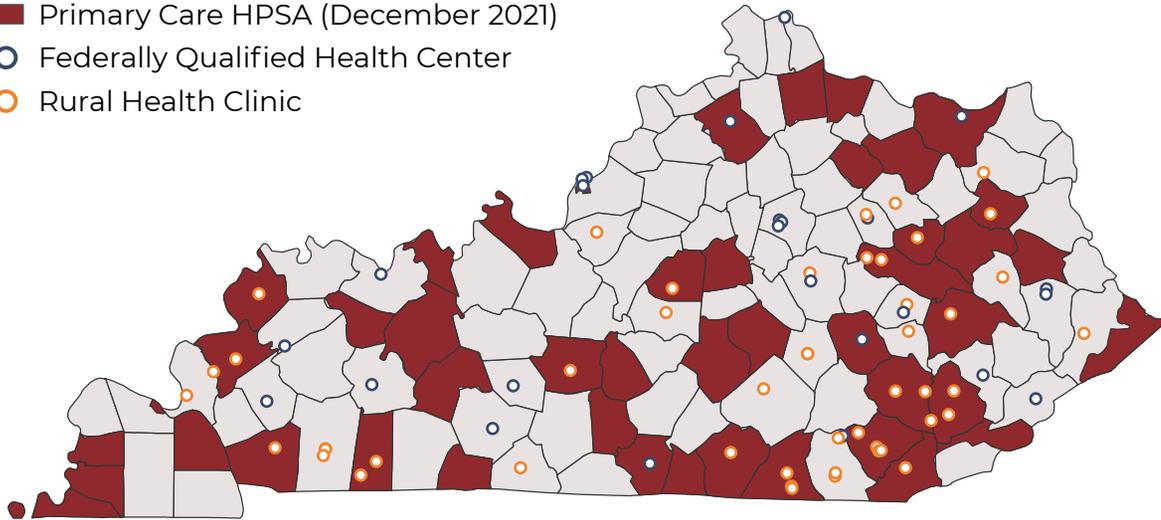


Coverage inequities between Black and White populations have recently reemerged

# SOCIAL DETERMINANTS OF HEALTH — COMMUNITY

## Health Professional Shortage Areas

- Primary Care HPSA (December 2021)
- Federally Qualified Health Center
- Rural Health Clinic



### What is a geographic Health Professional Shortage Area (HPSA)?

A shortage of providers for an entire group of people within a defined geographic area.

## Kentucky Colon Cancer Screening & Prevention Program (KCCSP)



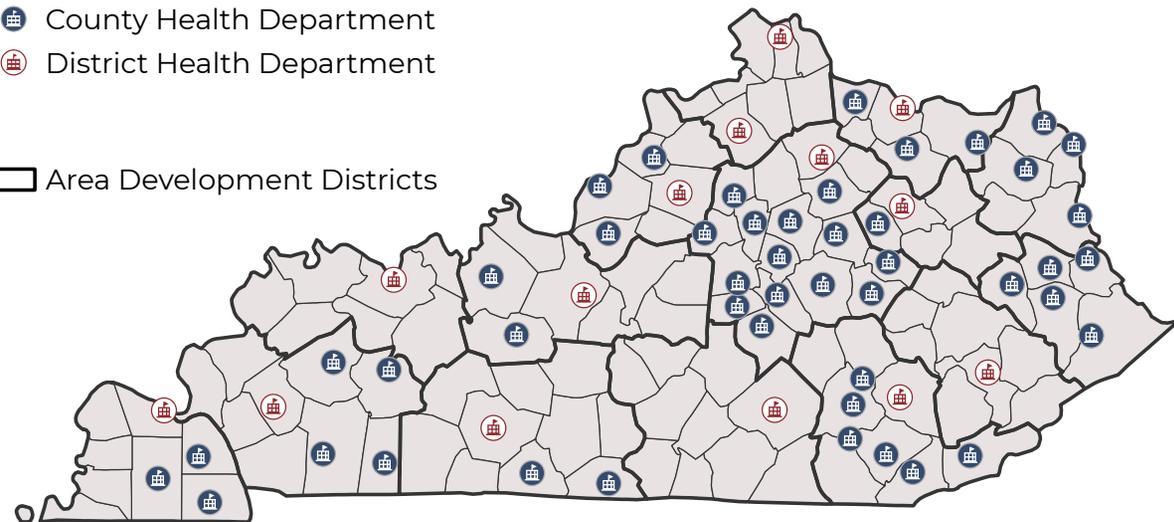
**ELIGIBLE PARTICIPANTS:** Individuals, ages 45 to 75, who are uninsured or underinsured and with individual income at or below 300% of the FPL. High-risk individuals may qualify at a younger age.



**SERVICES OFFERED:** Stool-based testing available for participants statewide. Colonoscopy available for certain high-risk individuals.

## Kentucky Public Health Services

- Ⓒ County Health Department
- Ⓒ District Health Department
- Area Development Districts



# SOCIAL DETERMINANTS OF HEALTH — COMMUNITY

## CHNA

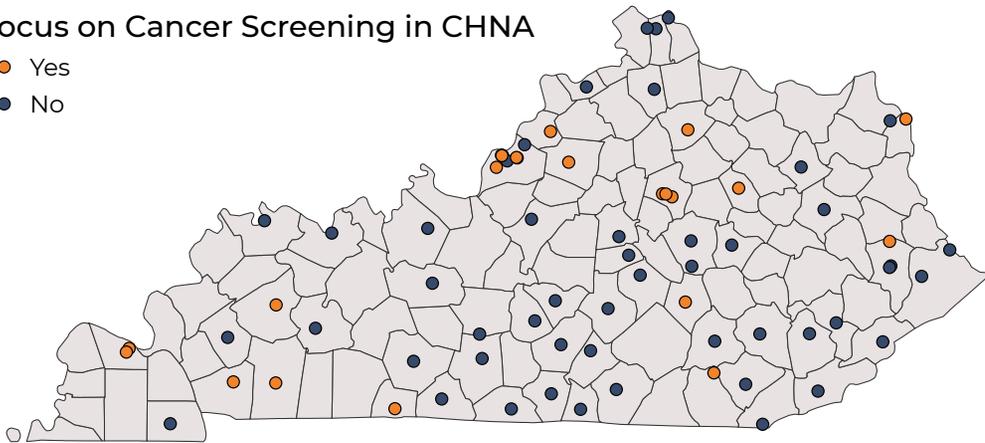
### Community Health Needs Assessment

The Affordable Care Act requires all non-profit and tax-exempt hospitals to perform a CHNA every three years (some for-profit hospitals will choose to complete one as well). The purpose of a CHNA is to:

- Identify and analyze the health needs—both real and perceived—in the hospital's service area
- Assess the current efforts targeting these health needs in the community and prioritize ones to focus on
- Formulate a plan for how to address the prioritized needs over the next 3 years

### Focus on Cancer Screening in CHNA

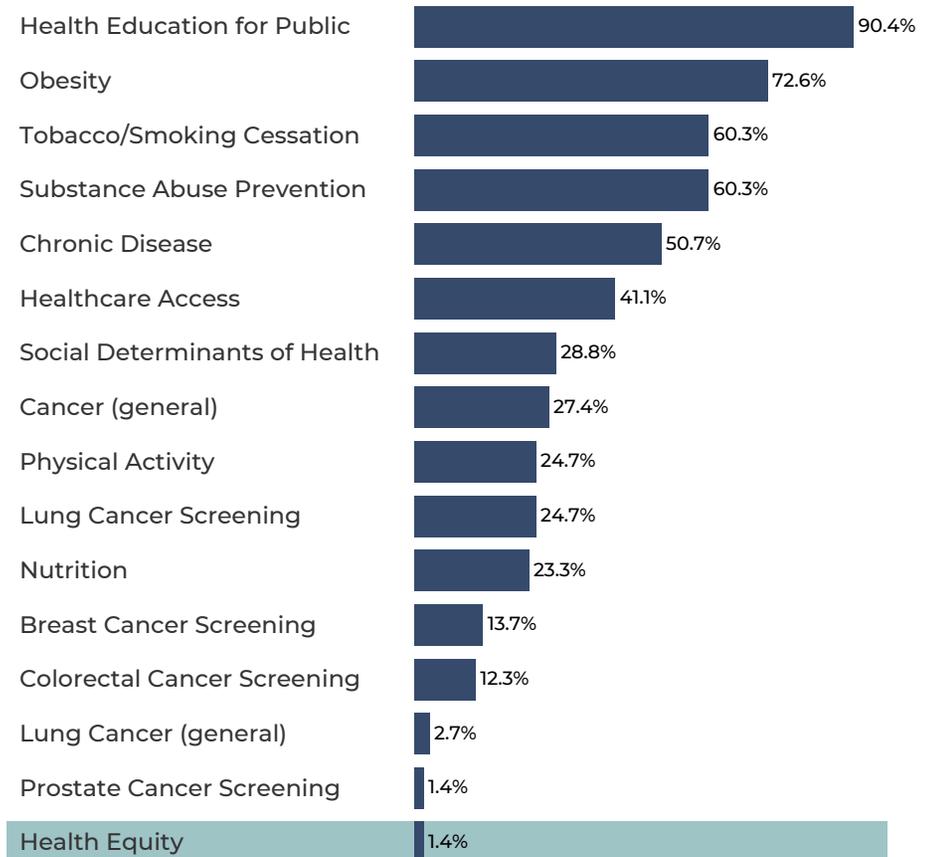
- Yes
- No



### Hospital CHNAs in Kentucky



### Priorities and Strategies on CHNAs



# SOCIAL DETERMINANTS OF HEALTH — ENVIRONMENT

## Examples of Environmental Risks

For information about more hazardous substances and their potential for causing cancer, visit ToxFAQs at [www.cdc.gov/TSP](http://www.cdc.gov/TSP)

### Radon

Naturally occurring odorless and colorless radioactive gas

Inhaled through the air in all environments, but indoor settings with high concentrations and long exposure times, such as schools and homes, are a particular concern

Exposures in indoor settings can be lessened using mitigation systems to ventilate gas

High levels of exposure can increase risk of lung cancer

### Arsenic

Occurs naturally and through man-made processes

Exposed by ingesting small amounts in food and water, or breathing contaminated air

Reduce exposure by using clean water sources in areas of high contamination, or wearing masks and carefully handling items from high-risk workplaces

Can increase the risk of certain cancers, such as lung, bladder and skin

### Polychlorinated biphenyls

Man-made compounds formerly used in some electrical devices and appliances (banned in US in 1977, but remains in older equipment and contaminated environments)

Exposed by eating food or breathing air that is contaminated, or contacting compounds leaking from older equipment

Limit exposure by heeding safety advisories and avoiding unsafe handling of older appliances and electrical equipment

Increases risks of liver, gallbladder and brain cancers

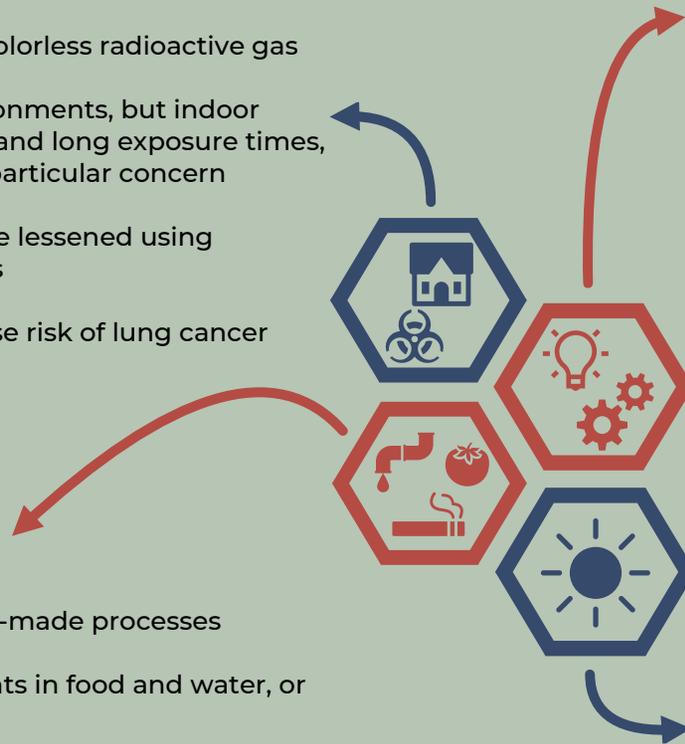
### UV Radiation

Electromagnetic radiation put off by the sun and certain man-made sources

Enters skin cells through unprotected exposure to UV rays

Minimize exposures outside by covering exposed skin when possible or using high SPF sunscreen

Prolonged and frequent exposure can increase risk of skin cancers, including melanoma



# SOCIAL DETERMINANTS OF HEALTH — ENVIRONMENT



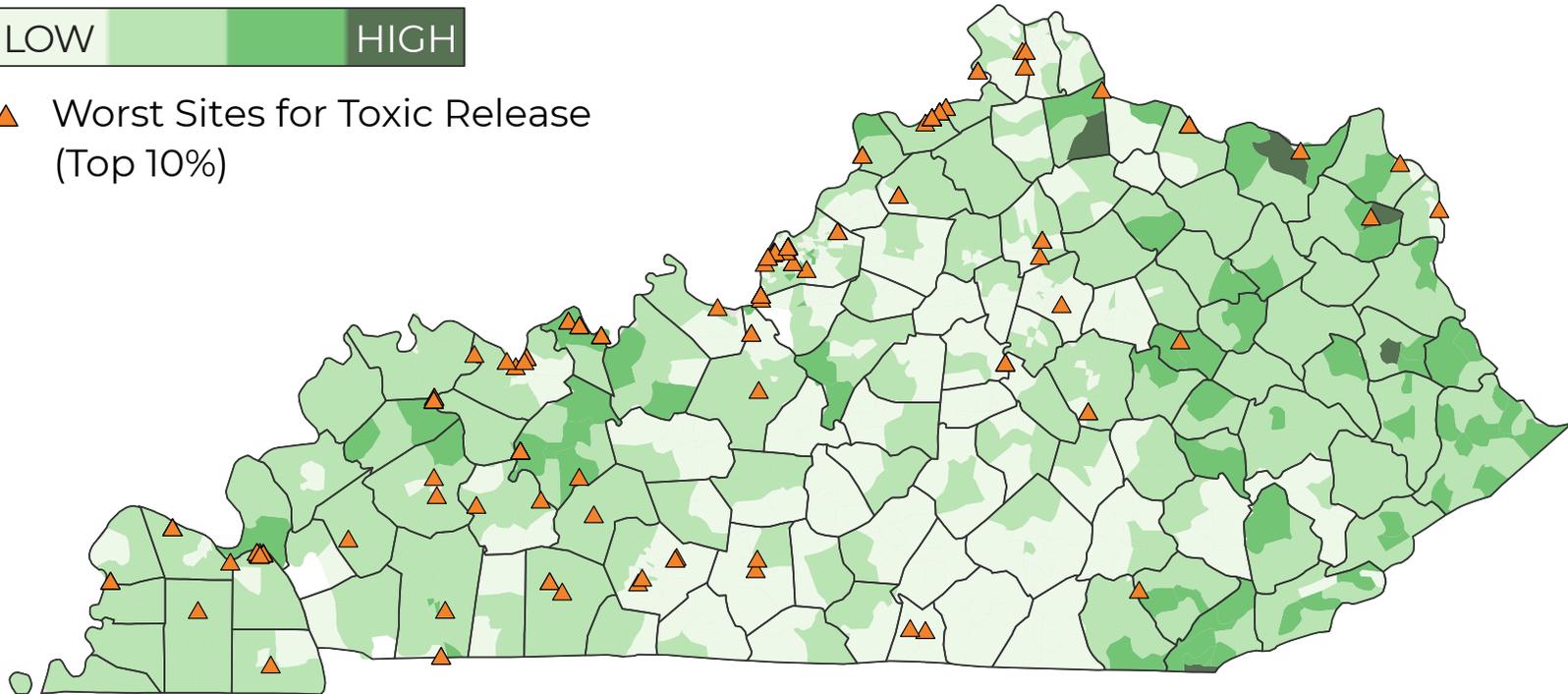
Natural disasters have the potential to disrupt and contaminate water supplies. They can cause power outages at water treatment facilities and introduce waste and other impurities into drinking water.

There is also a risk to air quality from bacteria found in floodwaters and mold in damaged structures.

## Flood Risk



▲ Worst Sites for Toxic Release (Top 10%)



# SOCIAL DETERMINANTS OF HEALTH — ENVIRONMENT

## ACCESS TO EXERCISE OPPORTUNITIES

A census tract lacks access to exercise opportunities if its residents do not live close to a park or some other recreational facility.

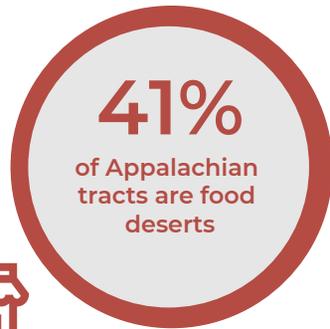
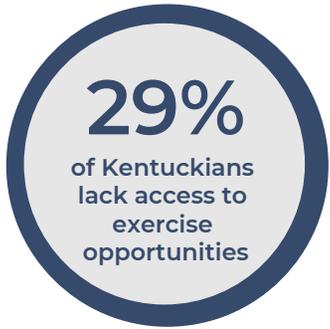


## FOOD DESERT USING VEHICLE ACCESS

A food desert is a census tract characterized by low-income residents and lack of near access to healthy foods by foot (urban) or personal vehicle (rural).

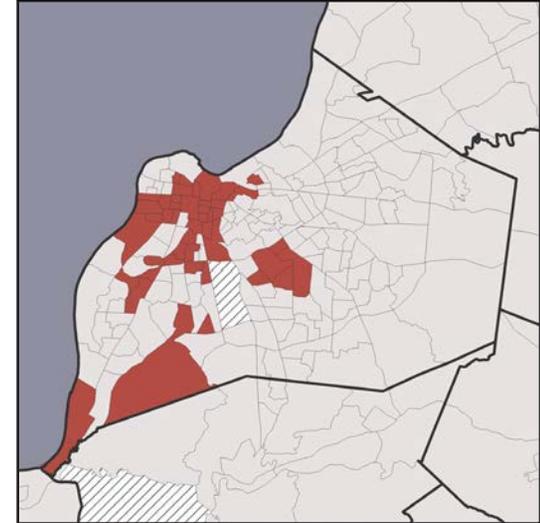
41%

of Appalachian tracts are food deserts

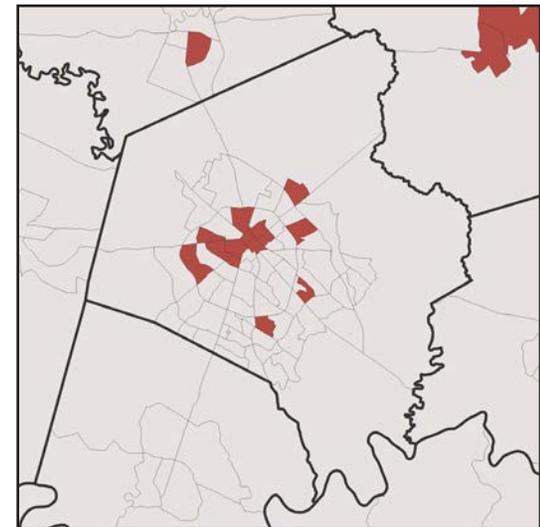


## Urban Food Deserts

### Jefferson County (Louisville)

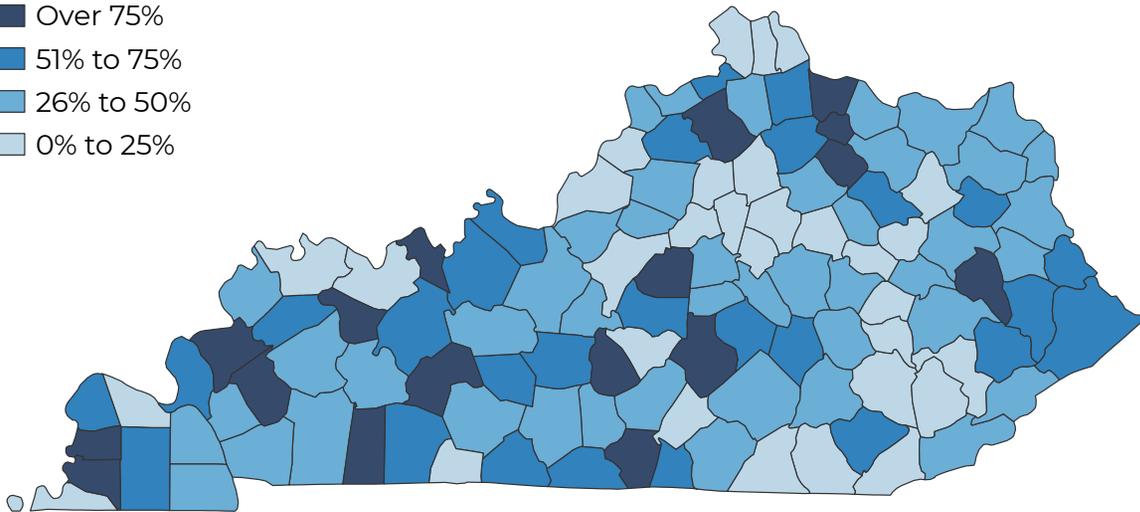


### Fayette County (Lexington)



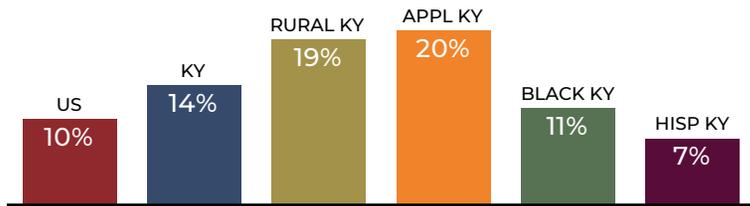
## Lack Access to Exercise Opportunities

- Over 75%
- 51% to 75%
- 26% to 50%
- 0% to 25%

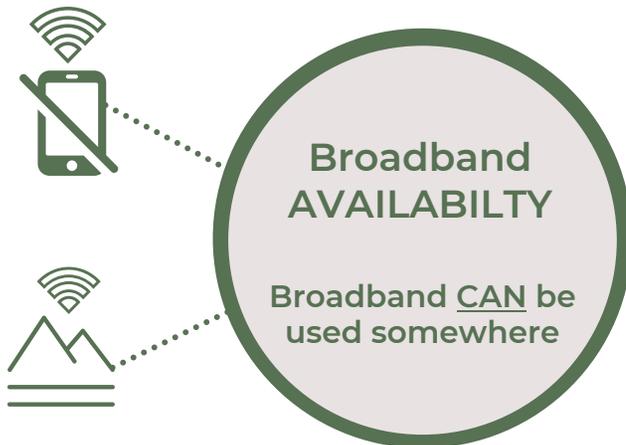
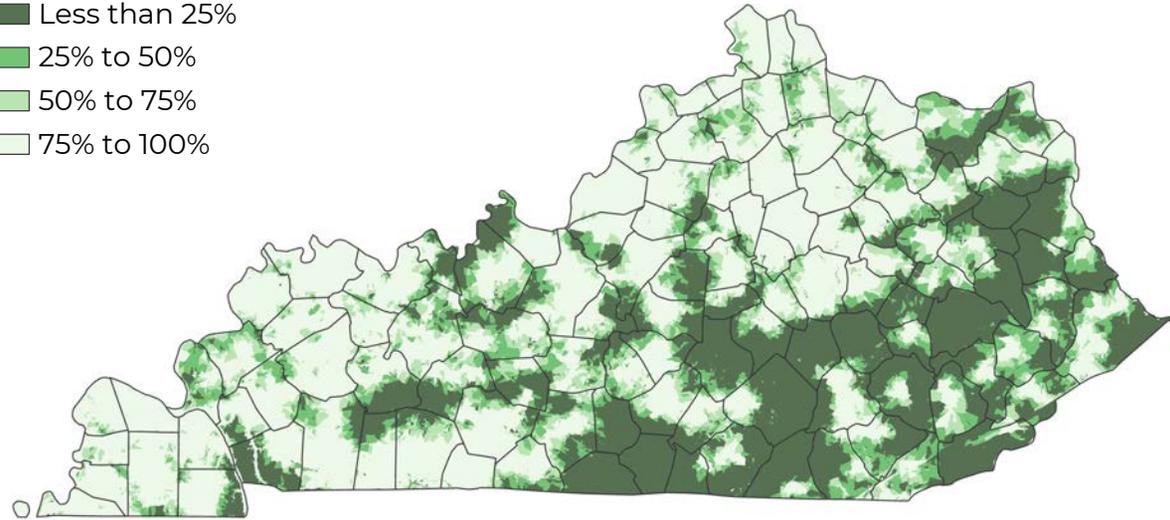


# SOCIAL DETERMINANTS OF HEALTH — ENVIRONMENT

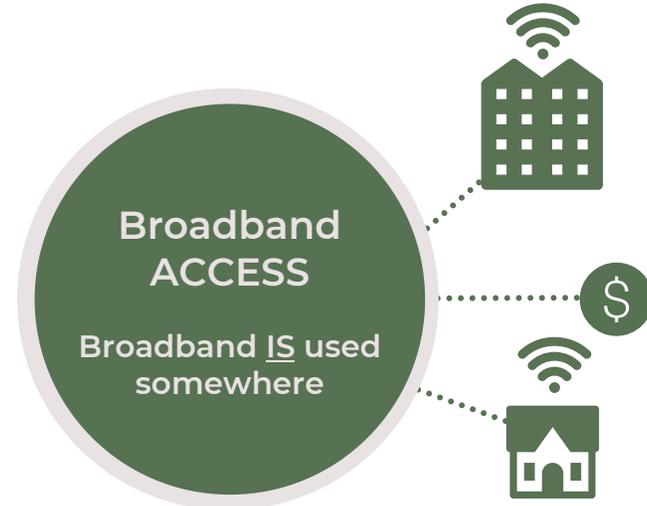
## No Internet-Enabled Devices



## Residents with Mobile 5G Access



VS



Though broadband may be *available* in certain locations, the cost of *accessing* it through one's home or business may still create a barrier to use.

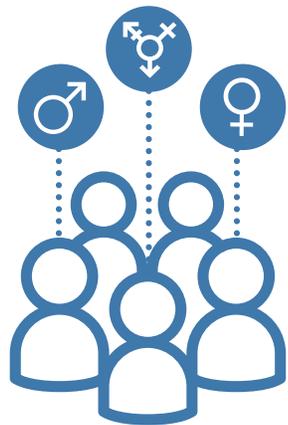
# SOCIAL DETERMINANTS OF HEALTH — OTHER NEEDS

Focus Groups helped identify other areas of concern that are harder to capture with the available data, such as:

## Transportation and Childcare Issues

“ I remember having clients that didn't have bus fare, so they couldn't get [to cancer screenings], or they didn't have childcare, so they couldn't make appointments. There are always blocks to people getting help.”

(Urban KY, female, age 73)



## Societal Views on Gender

“ [A surgeon I met with after my diagnosis] said, 'I don't understand why a young, pretty woman like you wouldn't want to have [breast reconstruction].' There is pressure to meet traditional gender stereotypes in reconstruction, and how you deal with that sort of thing. And also with fertility issues.... People offer a lot of opinions that are surprising—that they feel like it's their business to tell you what to do with your body. That's a big issue for women, even still today.”

(Rural KY, female, age 44)

## Financial Cost of Healthy Choices

“ It's expensive eating healthy. Our family tries to buy a lot of fresh fruits and vegetables, and my husband comments about how much it costs. And it is expensive if you want to be healthy.”

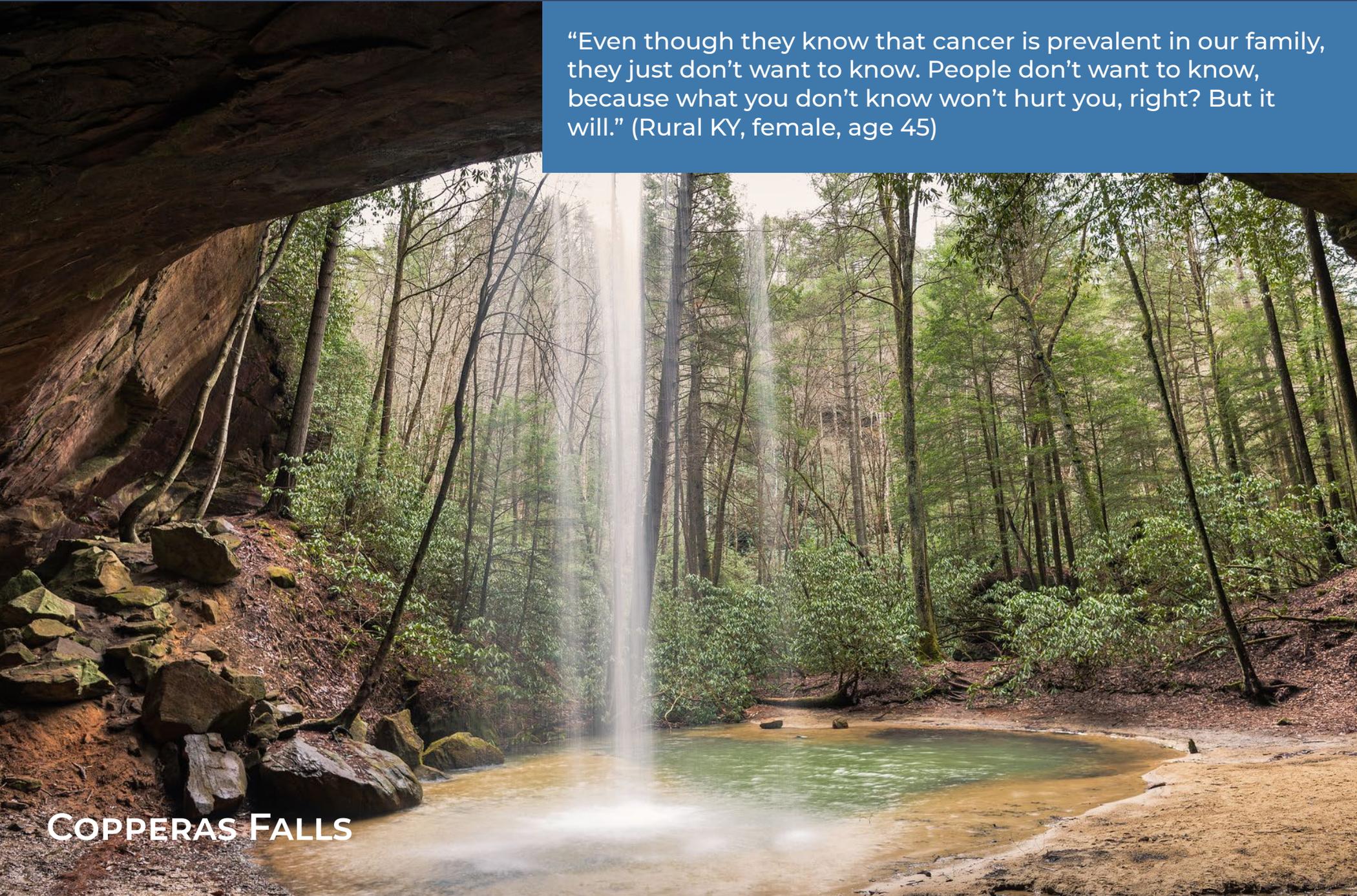
(Urban KY, female, age 31)



# CANCER-RELATED OUTCOMES

“Even though they know that cancer is prevalent in our family, they just don’t want to know. People don’t want to know, because what you don’t know won’t hurt you, right? But it will.” (Rural KY, female, age 45)

COPPERAS FALLS



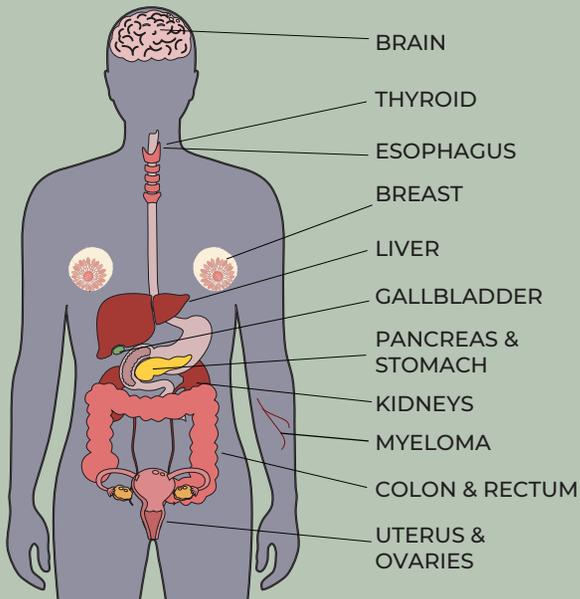
# RISK REDUCTION — OVERVIEW

## Risk Factor-related Cancers

Cancers in sites that demonstrate significant association with a given risk factor



### Obesity-related Cancers



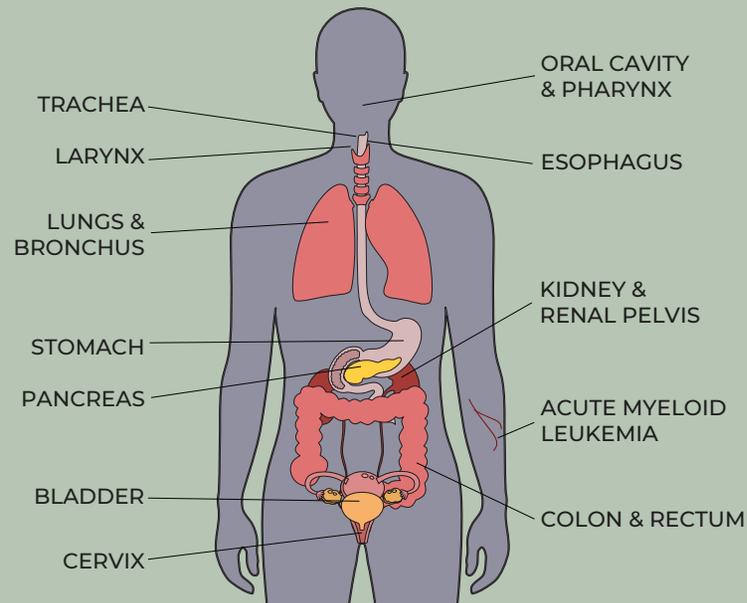
13 Cancer Sites

From 2014-2018, Kentucky had:

- 52,154 new cases
- 18,797 new deaths



### Tobacco-related Cancers



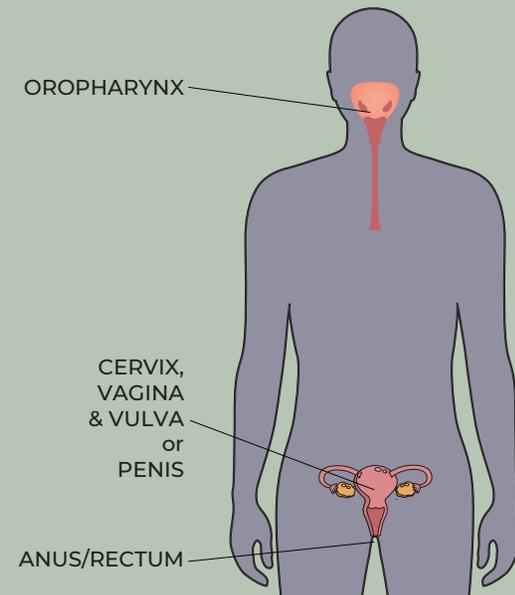
12 Cancer Sites

From 2014-2018, Kentucky had:

- 65,435 new cases
- 32,297 new deaths



### HPV-related Cancers



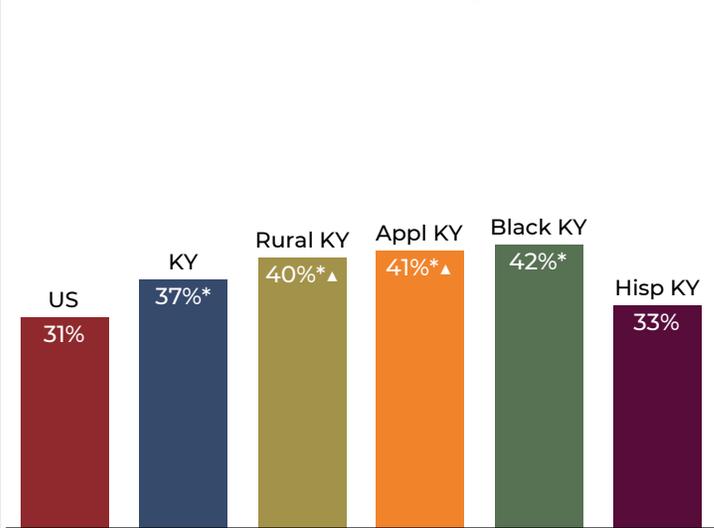
6 Cancer Sites

From 2014-2018, Kentucky had:

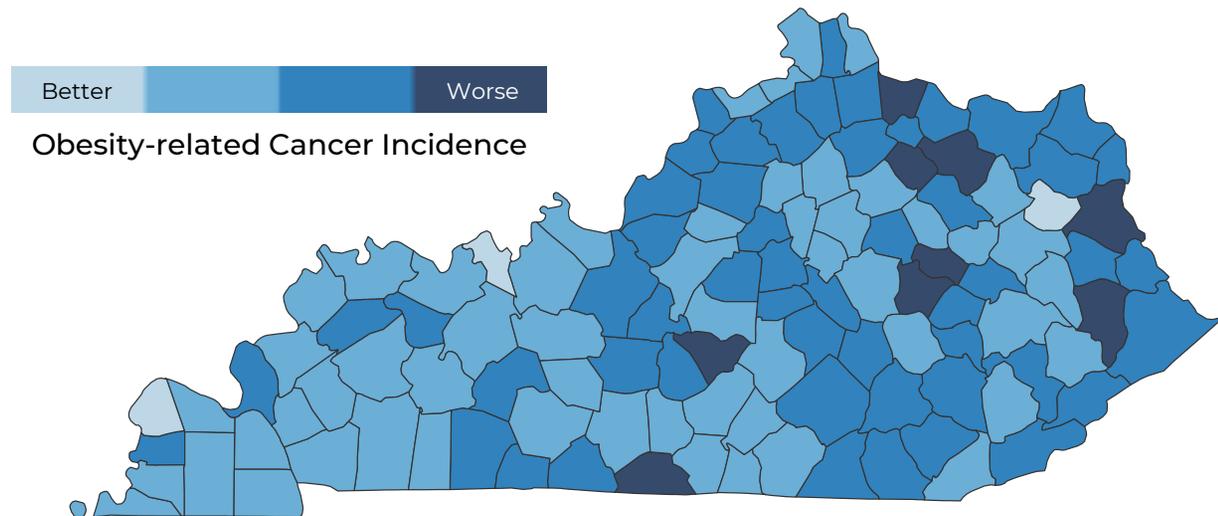
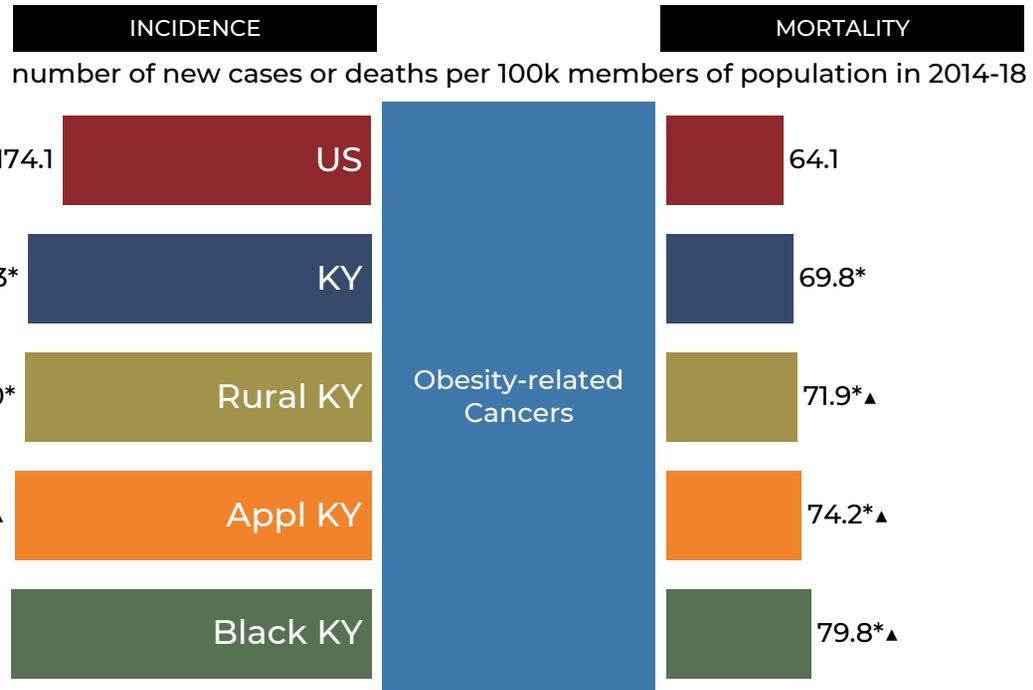
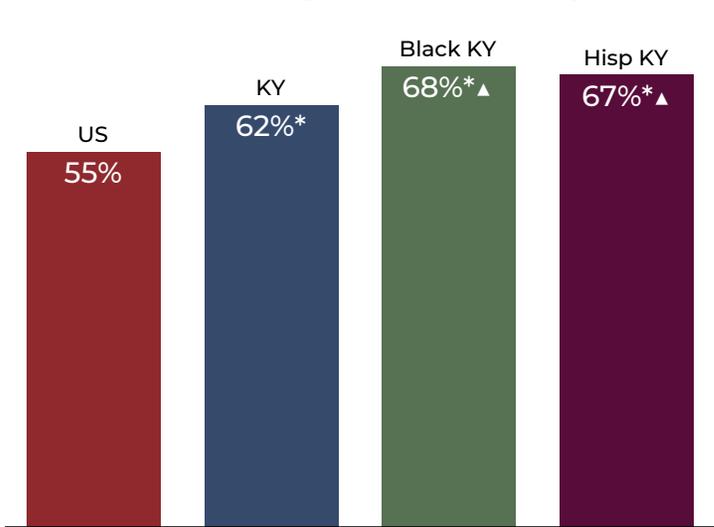
- 4,258 new cases
- 1,297 new deaths

# RISK REDUCTION — OBESITY-RELATED CANCERS

## Adult Obesity

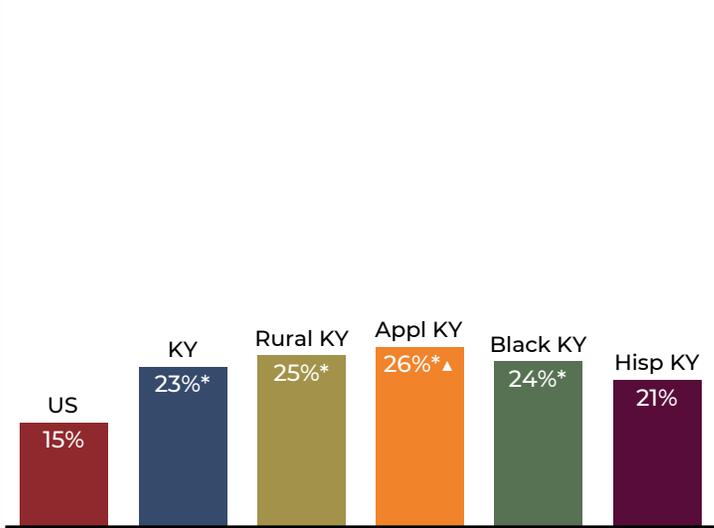


## Youth Physical Inactivity

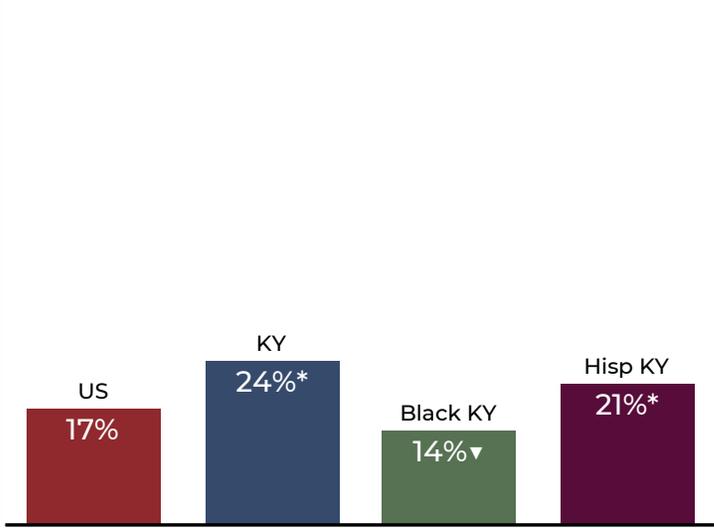


# RISK REDUCTION — TOBACCO-RELATED CANCERS

## Adult Currently Smoke

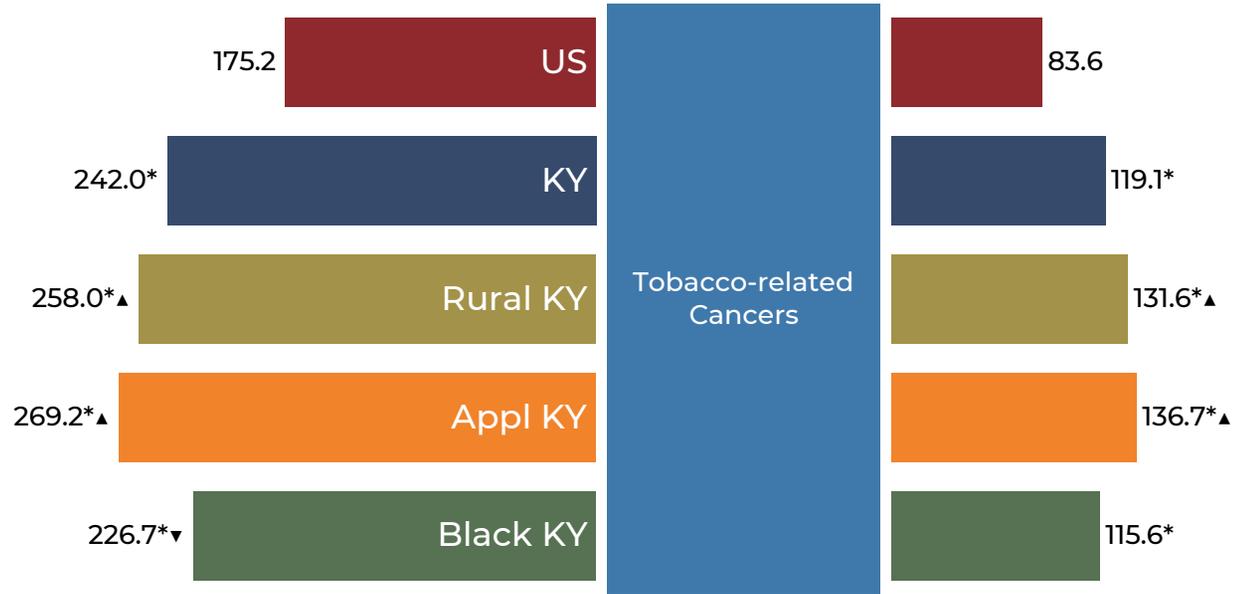


## Youth Currently Smoke

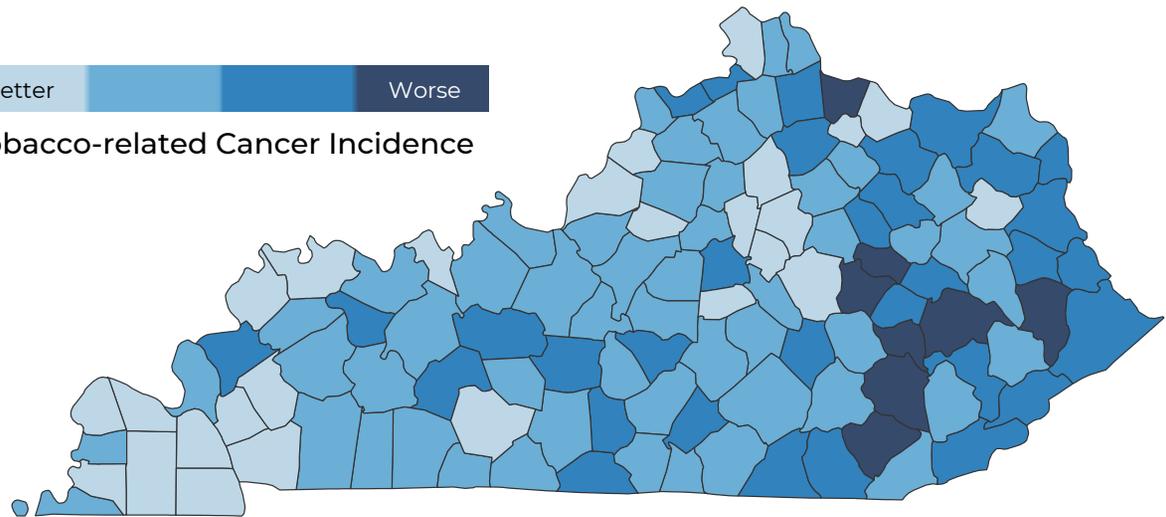


### INCIDENCE

number of new cases or deaths per 100k members of population in 2014-18

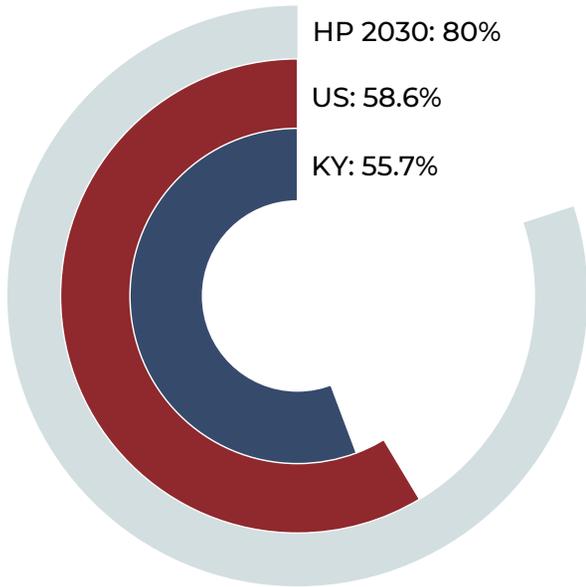


Better  Worse  
Tobacco-related Cancer Incidence

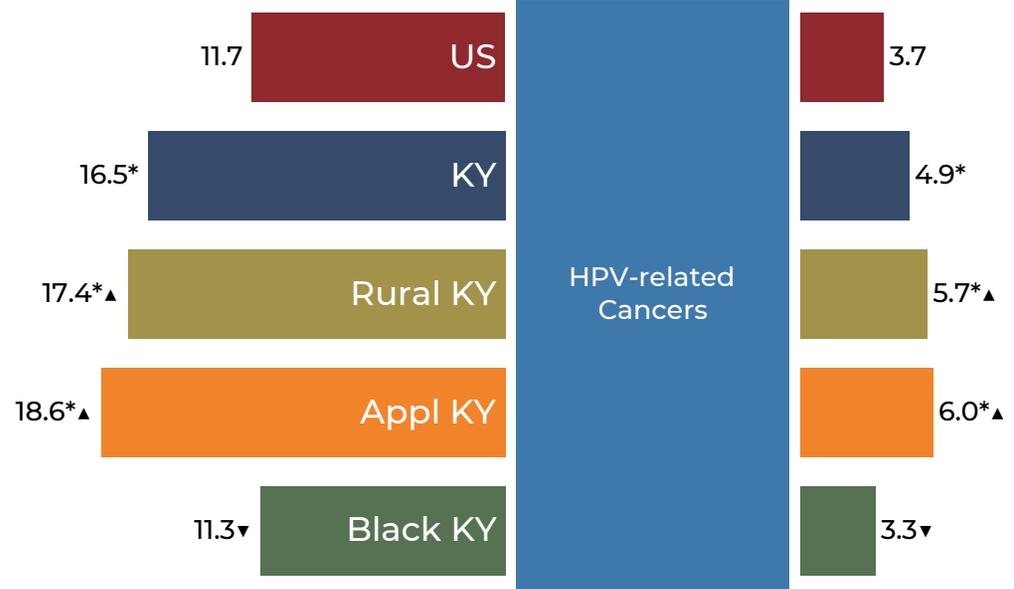


# RISK REDUCTION — HPV-RELATED CANCERS

HPV Vaccination  
Up-to-Date (all doses)  
Ages 13-17



**INCIDENCE**  
number of new cases or deaths per 100k members of population in 2014-18



63.1%



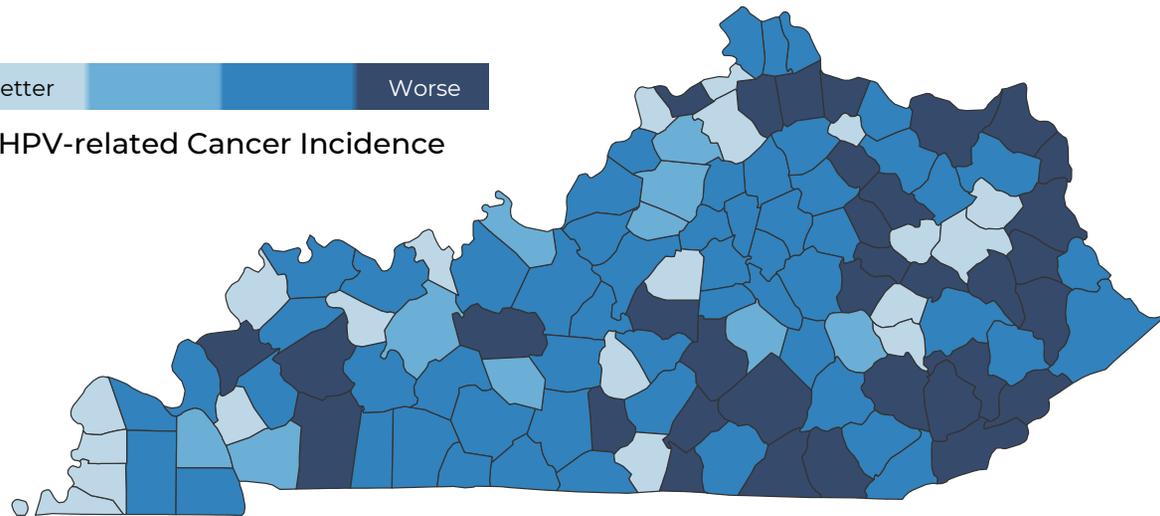
53.1%



49.5%

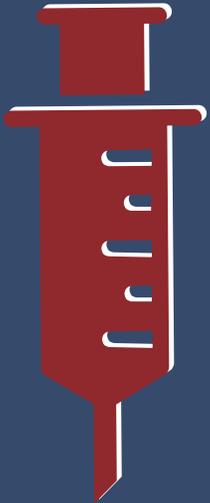


Better  Worse  
HPV-related Cancer Incidence



NIS-Teen, 2020 • KCR/SEER, 2014-2018  
See legend on p. 11 for meaning of symbols \* and ▲  
Note: Incidence and mortality rates age-adjusted

# RISK REDUCTION — INJECTION DRUG USE

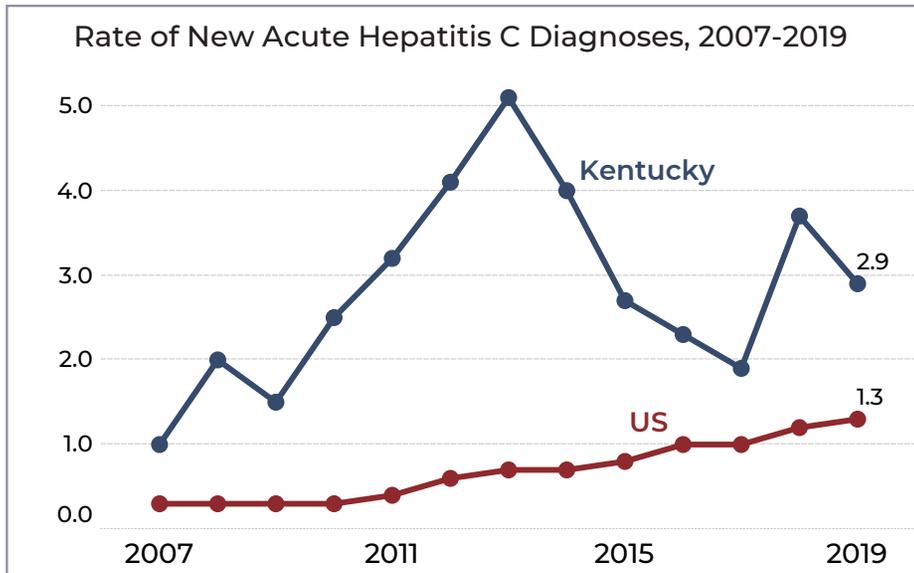
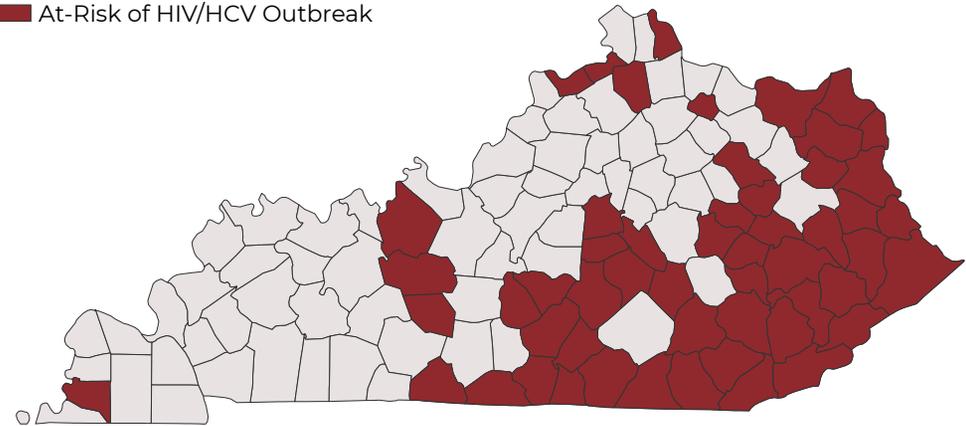


The Opioid Crisis of the early 2000's hit KY hard, leading to some of the nation's worst fatal drug overdose rates year after year. Resulting restrictions on opioid pain medication turned many to injecting heroin.

Today, people who inject drugs (PWID) are driving increases in Hepatitis C and HIV in KY—viruses with known links to certain cancers, such as liver and Non-Hodgkin lymphoma.

## Vulnerable to Outbreaks Among PWID

■ At-Risk of HIV/HCV Outbreak

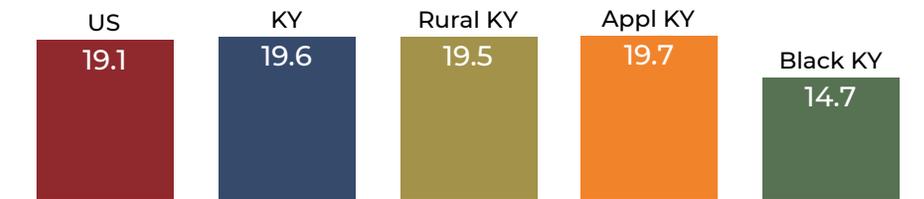


## Current Rates to Monitor for Future Impact

### Liver Cancer Incidence



### Non-Hodgkin Lymphoma Incidence



# SCREENING & DIAGNOSIS — GENETIC TESTING

## Genetic testing can detect inherited risk of cancer

Genetic testing can help identify mutations in your DNA that have a known association with certain cancers.

### Examples of Genetic Mutations

#### PTEN

Increased risk of breast, endometrial, kidney, thyroid and colorectal cancers

Associated with Cowden syndrome

#### BRCA 1 or BRCA 2

Increased risk of breast, ovarian, prostate and pancreatic cancers

Associated with Hereditary Breast and Ovarian Cancer Syndrome

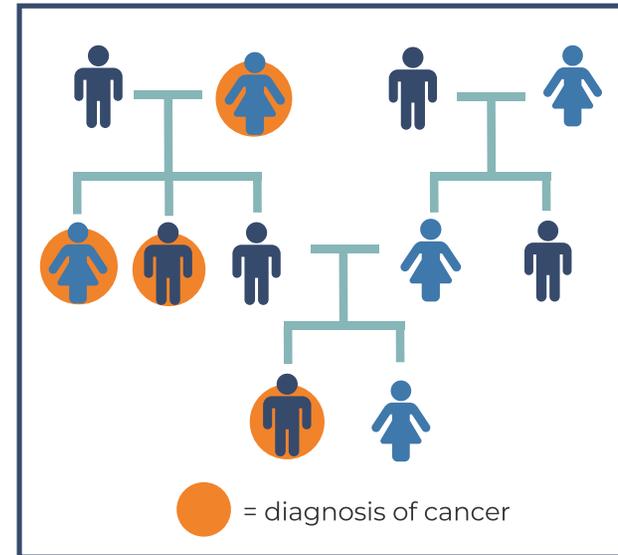
#### MLH1, MSH2, MSH6, PMS2 or EPCAM

Increased risk of colorectal, endometrial, ovarian, stomach, and other cancers.

Associated with Lynch syndrome.



\*See Appendix I for additional mutations with known risks



### Characteristics of inherited cancers

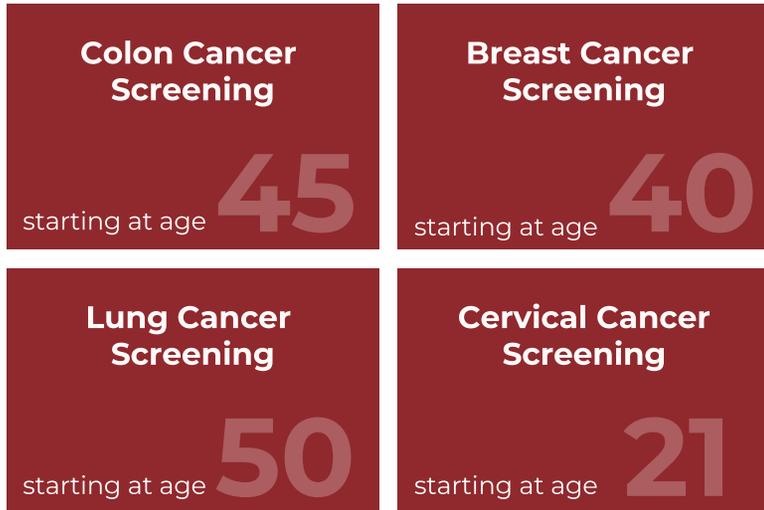
- Developing cancer at an early age (under 50s)
- Multiple generations with cancer
- Rare cancers (ex: ovarian, male breast, pancreatic)
- Family history of cancers with a known hereditary link (ex: breast/ovarian/prostate)



Genetic testing after a cancer diagnosis may also inform treatment options and can alert family members to their own inherited risks.

# SCREENING & DIAGNOSIS — SCREENING RATES

There are four recommended cancer screenings based on sex and age



## Kentucky Women's Cancer Screening Program (KWCSF)



**ELIGIBLE PARTICIPANTS:** Women, ages 21 and older, who are uninsured and with a household income at or below 250% of the Federal Poverty Line.

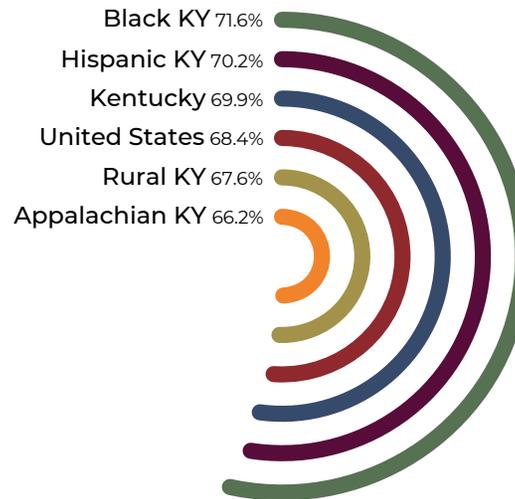


**SERVICES OFFERED:** Breast and cervical cancer screenings; diagnostic follow-up and case management. Available through select local health departments and contracted providers across the state.

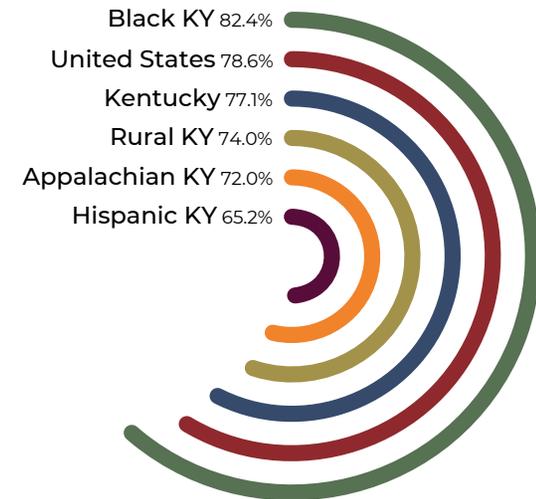


**ADDITIONAL FOLLOW UP:** Can assist in applying for services of the Breast and Cervical Cancer Treatment Program, as needed.

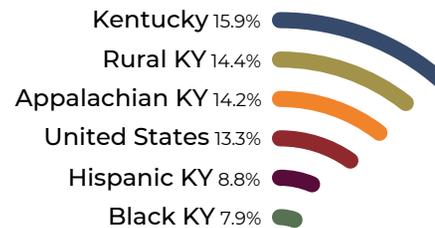
### Colorectal Screening Rates



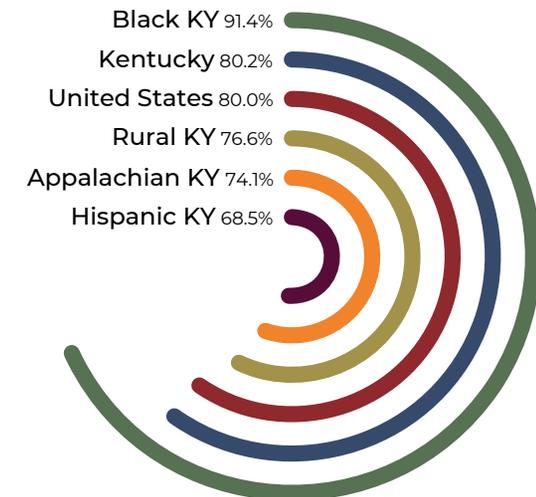
### Breast Screening Rates



### Lung Screening Rates



### Had Pap in Last 3 Years

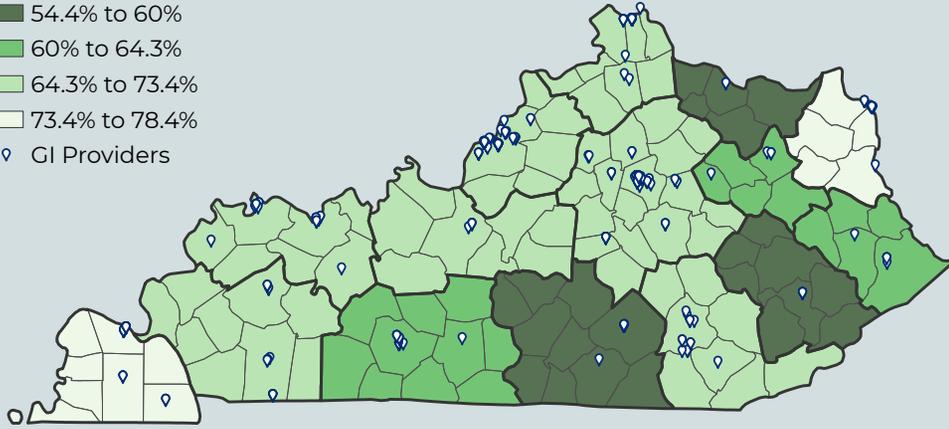


Screening rates for colorectal, breast and lung based on USPSTF recommendations

# SCREENING & DIAGNOSIS — SCREENING RATES

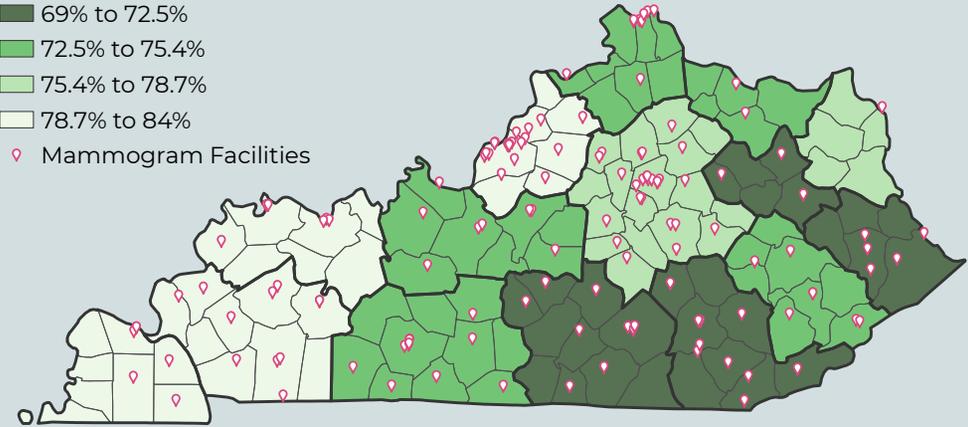
## Met Colorectal Screening Recs

- 54.4% to 60%
- 60% to 64.3%
- 64.3% to 73.4%
- 73.4% to 78.4%
- 📍 GI Providers



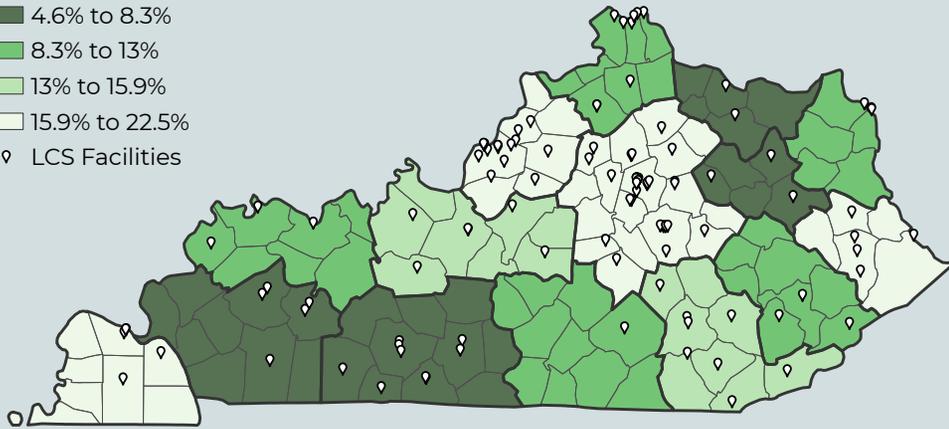
## Met Breast Screening Recs

- 69% to 72.5%
- 72.5% to 75.4%
- 75.4% to 78.7%
- 78.7% to 84%
- 📍 Mammogram Facilities



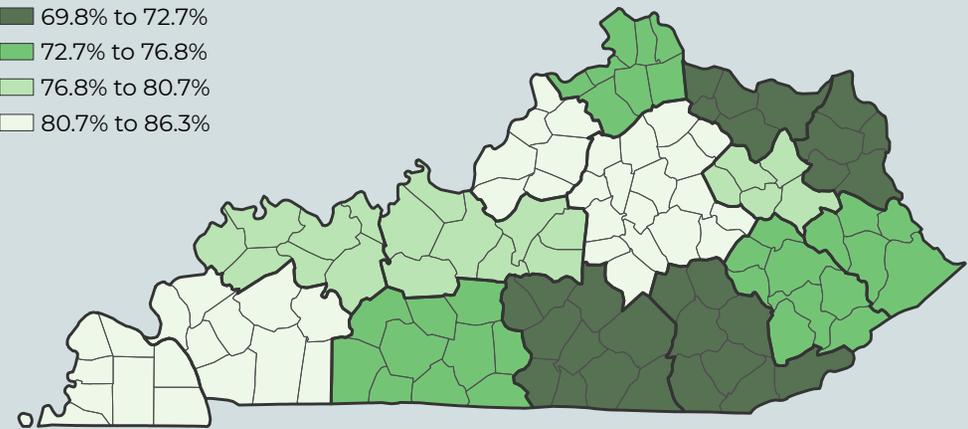
## Met Lung Screening Recs

- 4.6% to 8.3%
- 8.3% to 13%
- 13% to 15.9%
- 15.9% to 22.5%
- 📍 LCS Facilities



## Had Pap in Last 3 Years

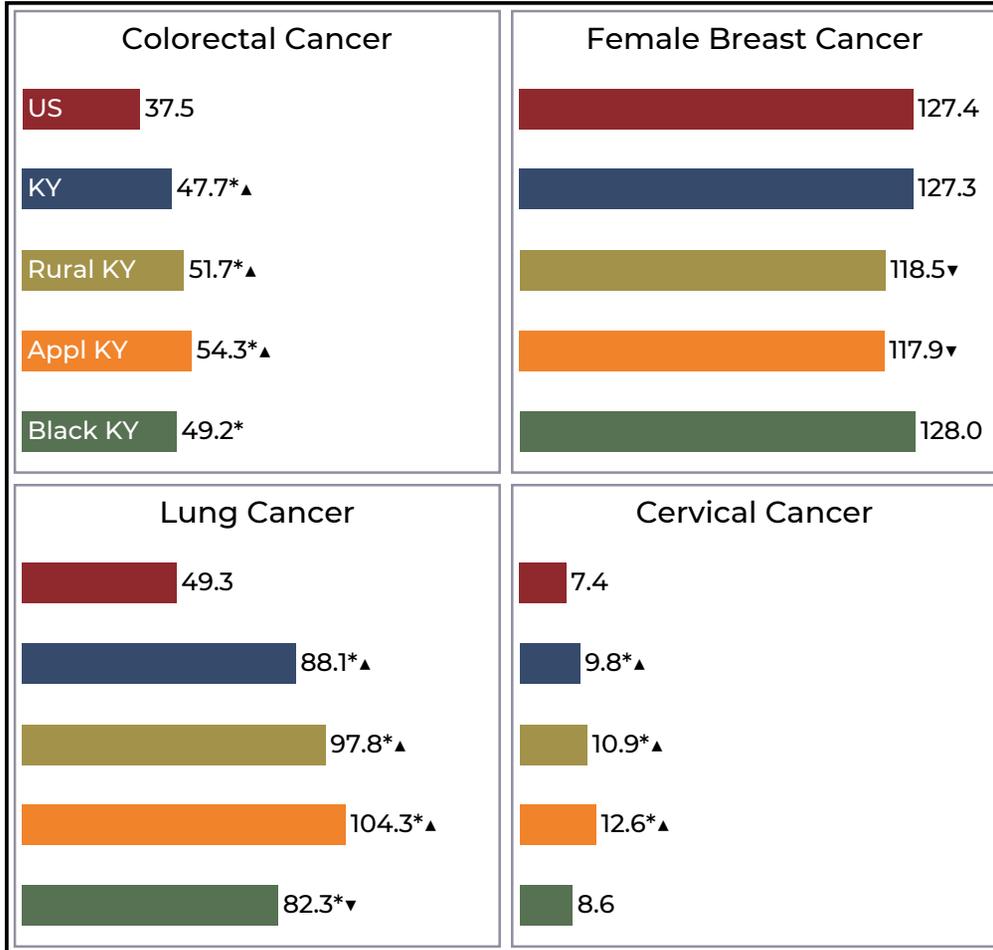
- 69.8% to 72.7%
- 72.7% to 76.8%
- 76.8% to 80.7%
- 80.7% to 86.3%



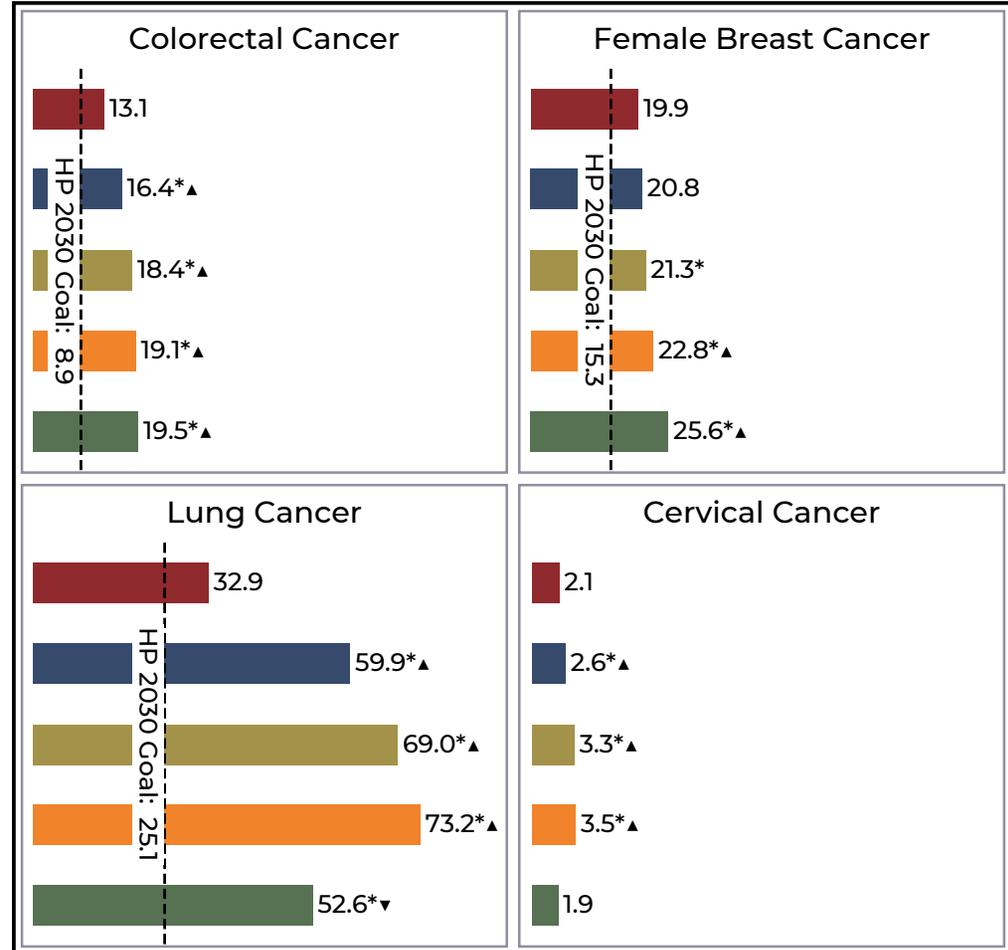
# SCREENING & DIAGNOSIS — INCIDENCE & MORTALITY

“[Sometimes] people say, ‘Don't ask how they died,’ but I think that that's important—when you find out somebody's experience. Because even if it's fear that causes you to get screened, it could save your life.” (Urban KY, female, age 45)

## Incidence



## Mortality



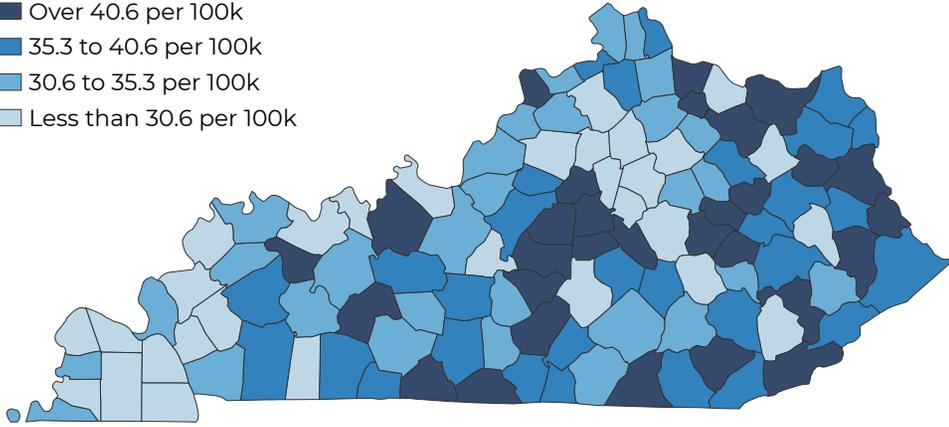
Comparison groups: Rural KY vs Urban KY; Appalachian KY vs Non-Appalachian KY; Black KY vs White KY; Hispanic KY vs Non-Hispanic KY

\* = Significantly higher than all sex, all race US; ▲ = Significantly higher than comparison group; ▼ = Significantly lower than comparison group

# SCREENING & DIAGNOSIS — INCIDENCE & MORTALITY

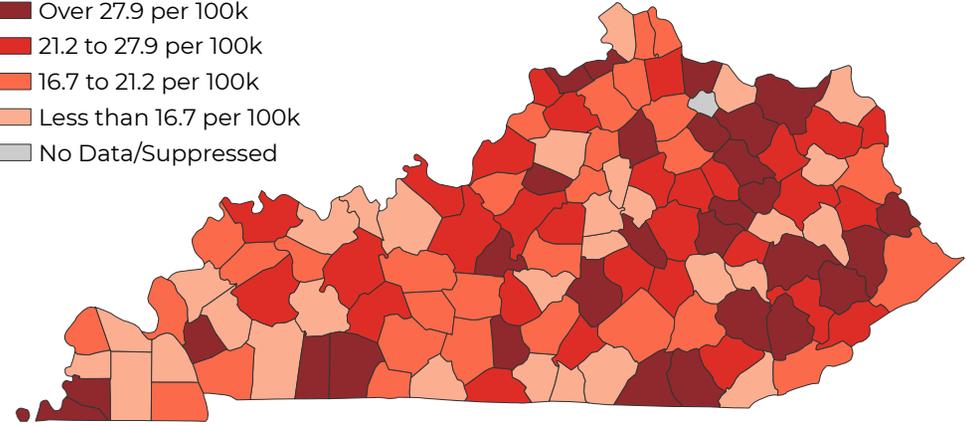
### Colorectal Cancer Incidence Rate

- Over 40.6 per 100k
- 35.3 to 40.6 per 100k
- 30.6 to 35.3 per 100k
- Less than 30.6 per 100k



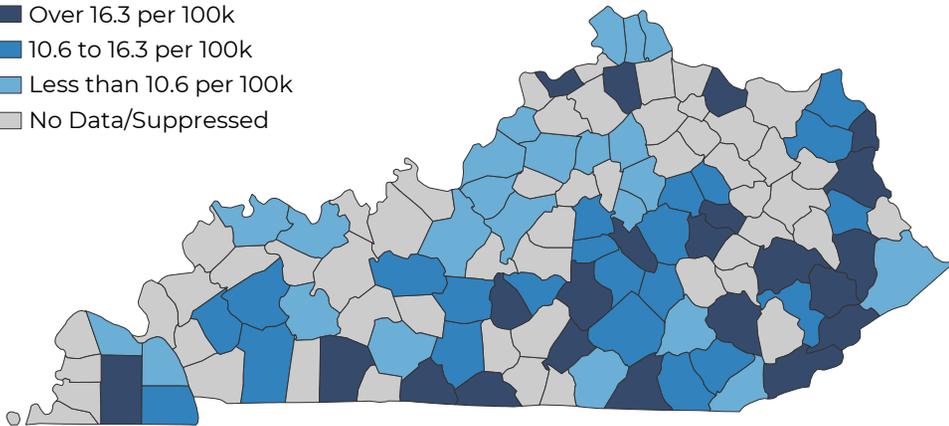
### Female Breast Cancer Mortality Rate

- Over 27.9 per 100k
- 21.2 to 27.9 per 100k
- 16.7 to 21.2 per 100k
- Less than 16.7 per 100k
- No Data/Suppressed



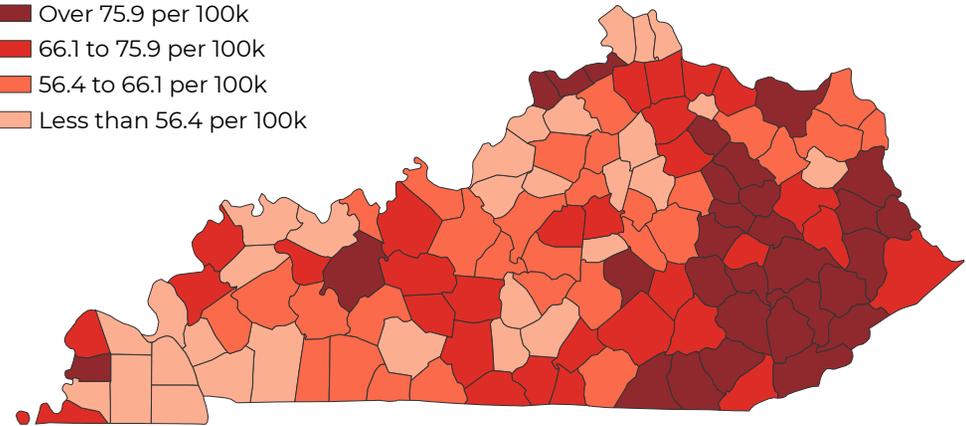
### Cervical Cancer Incidence Rate

- Over 16.3 per 100k
- 10.6 to 16.3 per 100k
- Less than 10.6 per 100k
- No Data/Suppressed



### Lung Cancer Mortality Rate

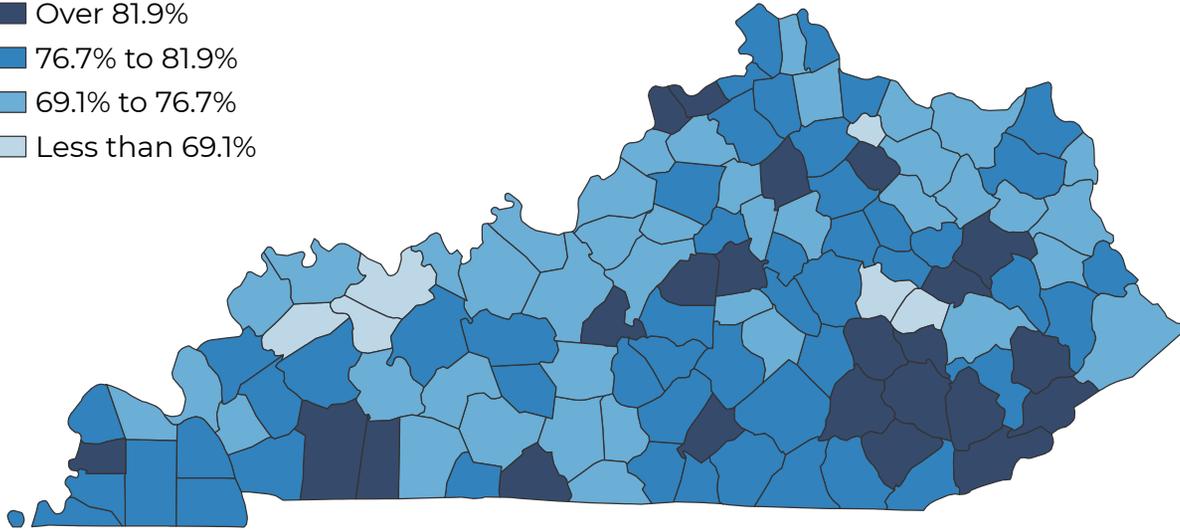
- Over 75.9 per 100k
- 66.1 to 75.9 per 100k
- 56.4 to 66.1 per 100k
- Less than 56.4 per 100k



# SCREENING & DIAGNOSIS — LATE-STAGE DIAGNOSIS

## Late-stage Lung Cancer Diagnosis

- Over 81.9%
- 76.7% to 81.9%
- 69.1% to 76.7%
- Less than 69.1%

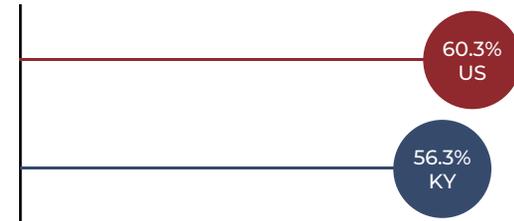


## Relative Survival by Stage of Diagnosis in KY

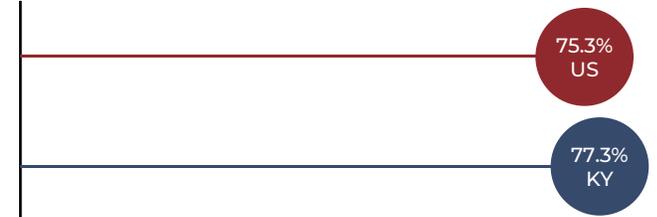
	Early Stage (Local)	Late Stage (Regional)	Late Stage (Distant)
Colon and Rectum	90.1%	72.8%	13.6%
Lung and Bronchus	54.5%	30.8%	5.1%
Female Breast	99.7%	84.1%	27.7%
Cervix Uteri	92.1%	58.3%	13.9%

## Percent Late-Stage Diagnosis for Screenable Cancers

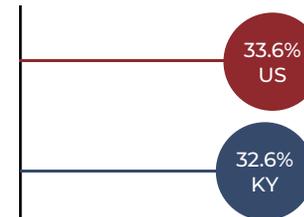
### Colorectal Cancer



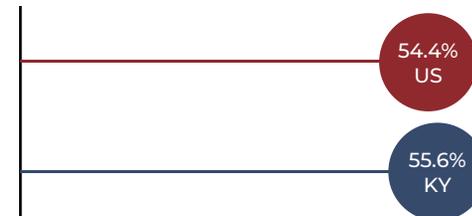
### Lung Cancer



### Female Breast Cancer



### Cervical Cancer



# TREATMENT — CANCER CARE FACILITIES

# CoC

## Commission on Cancer

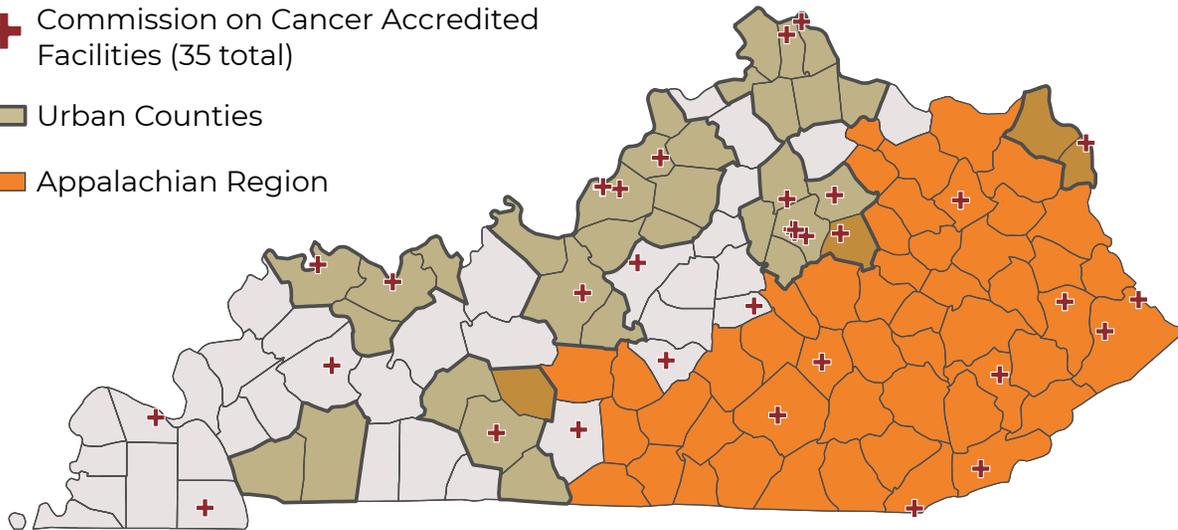
The Commission on Cancer (CoC) establishes standards for cancer programs to provide high-quality coordinated care while improving survival and quality of life for patients.

Over 1,500 programs in the US (35 in Kentucky) have received CoC accreditation for their performance and continued excellence on these standards.

 Commission on Cancer Accredited Facilities (35 total)

 Urban Counties

 Appalachian Region



## Examples of CoC Quality of Care Measures (with % expected performance rate)



Systemic chemotherapy is administered within 4 months to day preoperatively or day of surgery to 6 months postoperatively, or it is recommended for surgically resected cases with pathologic, lymph node-positive (pN1) and (pN2) non-small cell lung cancer **(85%)**

At least 12 regional lymph nodes are removed and pathologically examined for resected colon cancer **(85%)**



Radiation therapy is administered within 1 year (365 days) of diagnosis for women under age 70 receiving breast-conserving surgery for breast cancer **(90%)**

# TREATMENT — PRECISION MEDICINE

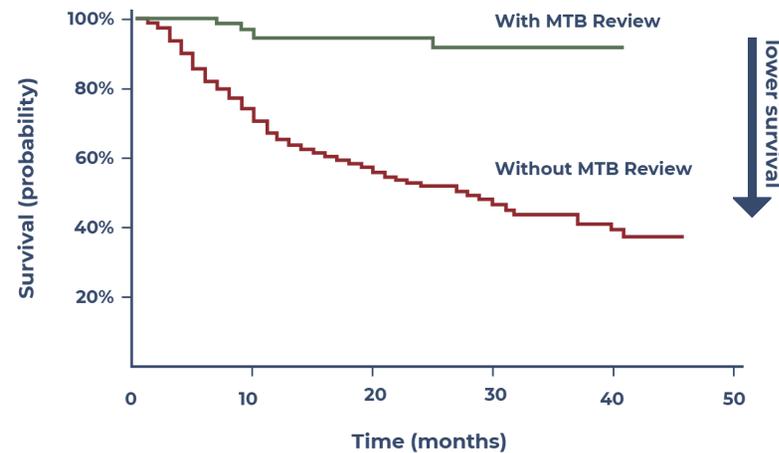
## New, targeted approaches to cancer treatment

People are different; so are their cancers. Precision medicine allows doctors to match the characteristics of a patient and their cancer to the best available treatment options.

A **Molecular Tumor Board (MTB)** is an expert healthcare team that comes together to interpret test results related to the characteristics of a patient and their cancer.

MTB reviews have shown promise in improving patient survival.

Overall Survival of NSC Lung Cancer Patients, KY 2017-19



## Advantages of Precision Medicine

Research shows potential advantages of precision medicine vs. standard treatment approaches.



**Increase survival**



**Decrease toxicity**



**Improve quality of life**

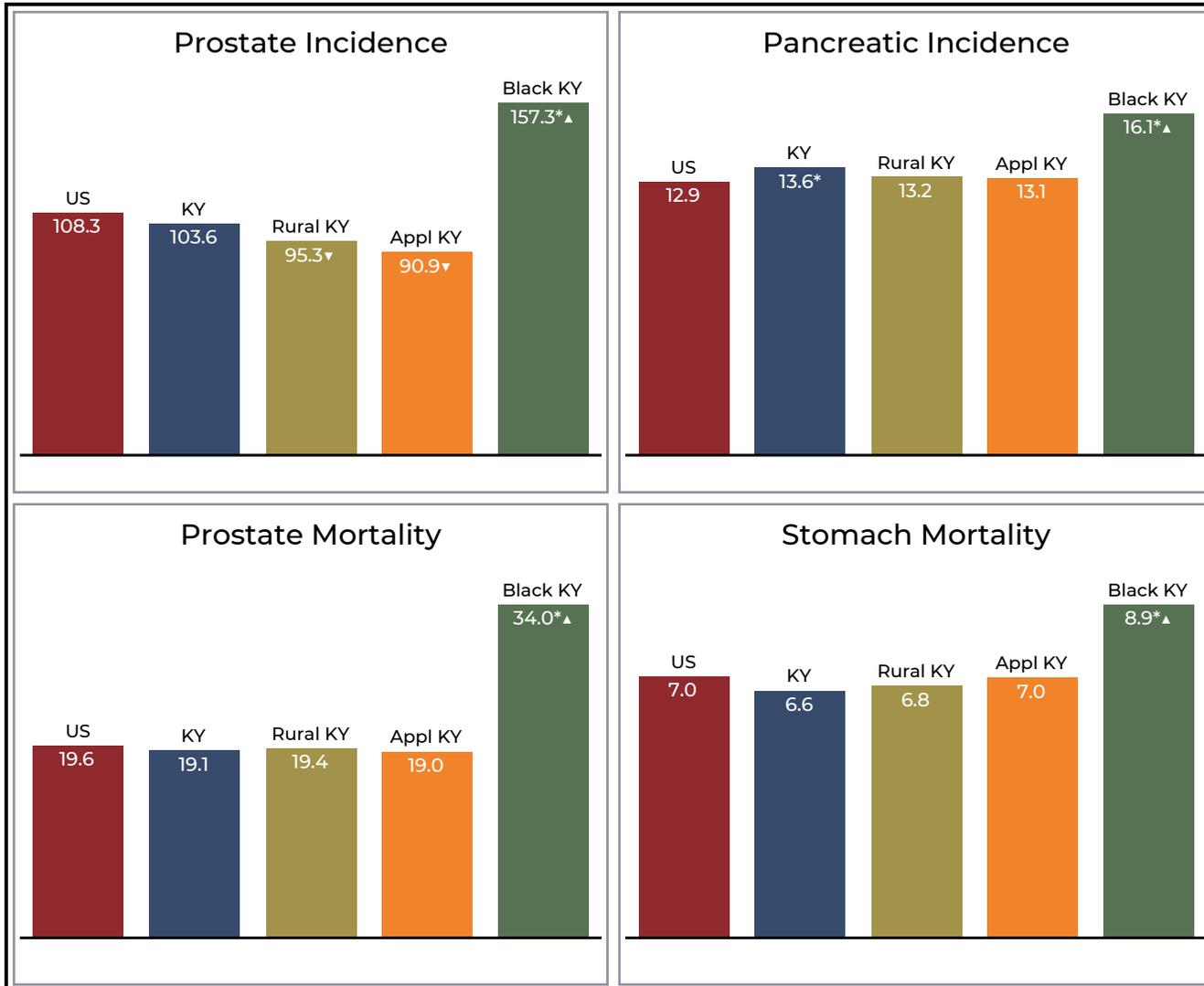
## Disparities in Research

**Why are minority and low-income patients with cancer underrepresented in precision medicine studies?**

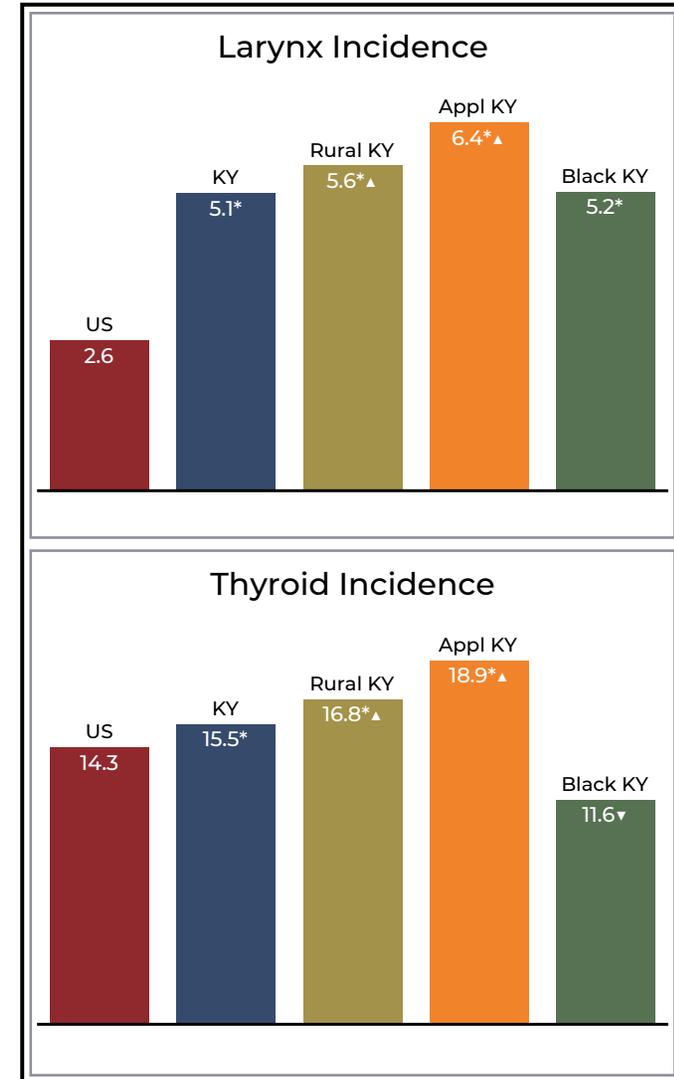
Likely because they are less often presented with the choice. Research from 2020 shows high study participation among these groups in Kentucky when given the option.

# TREATMENT — OTHER CANCER RATE DISPARITIES

## Racial Disparities



## Geographic Disparities



Comparison groups: Rural KY vs Urban KY; Appalachian KY vs Non-Appalachian KY; Black KY vs White KY; Hispanic KY vs Non-Hispanic KY

\* = Significantly higher than all sex, all race US; ▲ = Significantly higher than comparison group; ▼ = Significantly lower than comparison group

# SURVIVORSHIP — RELATIVE SURVIVAL

## Relative Survival

The percentage of people with cancer still living five years after diagnosis compared to a matching cancer-free population.



This gives a measure of survival that factors out other causes of death. Relative survival can be measured for either a general cancer diagnosis or for specific cancer sites.

## All Site Relative Survival

67.9%

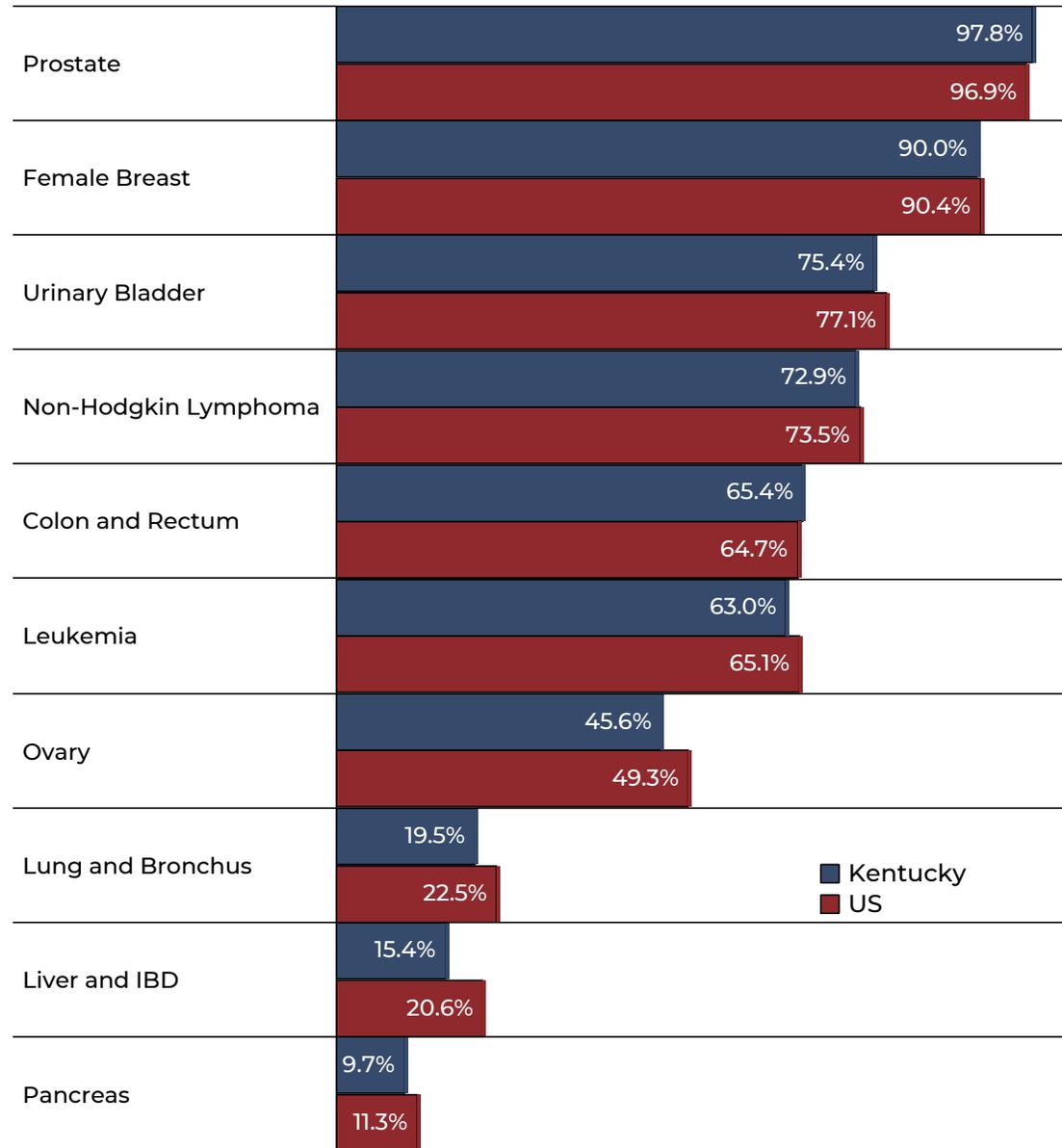


63.1%



5-year relative survival across all cancers is significantly worse in Kentucky than the rest of the U.S.

## Relative Survival of Top 10 Cancers for Mortality



# SURVIVORSHIP — RELATIVE SURVIVAL DISPARITIES



Kentucky is worse than the US in

liver (25% worse)

lung (13% worse)



Appl KY is worse than Non-Appl KY in

lung (20% worse)

prostate (3% worse)

female breast (4% worse)



Rural KY is worse than Urban KY in

lung (19%)

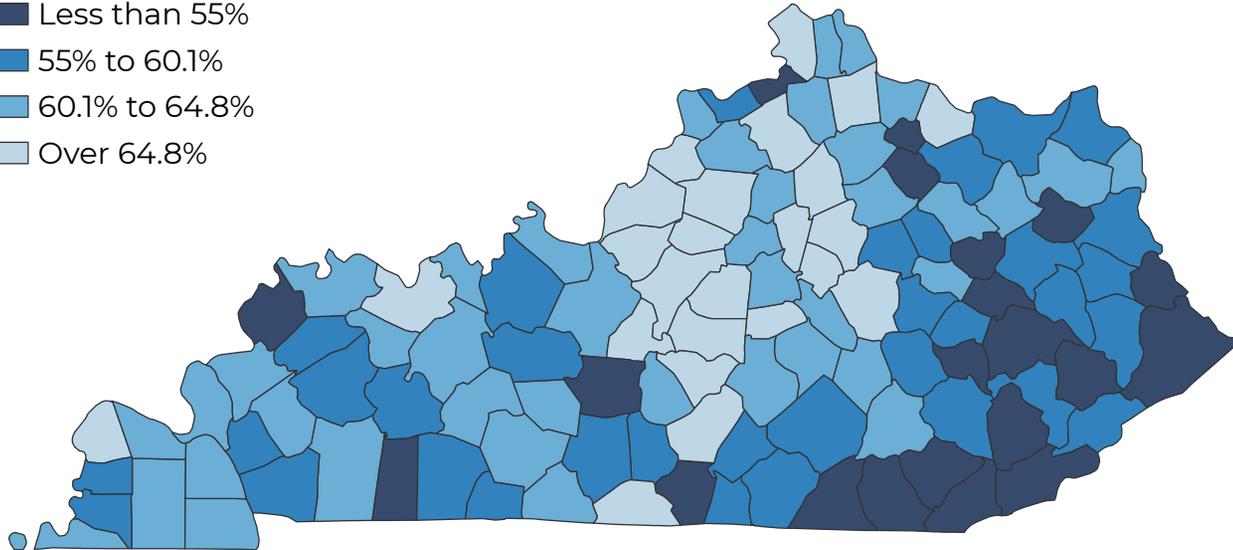


Black KY is worse than White KY in

female breast (10% worse)

## Relative Survival, All Cancer Sites

- Less than 55%
- 55% to 60.1%
- 60.1% to 64.8%
- Over 64.8%



# SURVIVORSHIP — NEEDS OF CANCER SURVIVORS

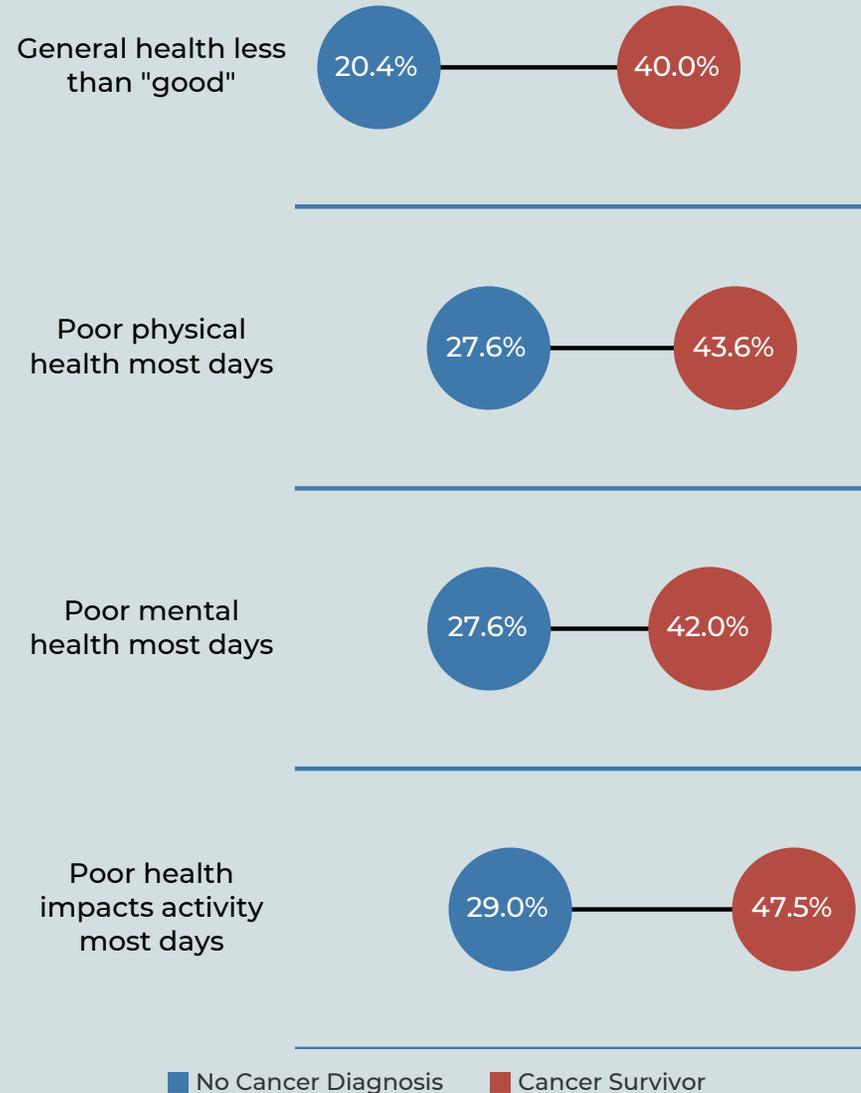
## Health-related Quality of Life (HRQOL)



An individual's perceived physical and mental health over time.

Cancer survivors in Kentucky report significantly worse HRQOL than those without a cancer diagnosis.

## Health-related Quality of Life in KY



## Risk Factors in KY Cancer Survivors



20.5% currently smoke



9.4% with unhealthy drinking habits



34.0% currently obese



71.2% currently overweight or obese



16.6% sleep less than 6 hours a night

# SURVIVORSHIP — NEEDS OF CAREGIVERS

**Data on caregiver needs is not widely available. Testimony from focus group participants helps provide insight into areas of concern.**

“ I’ve never heard of support groups for caregivers. We asked my mom if she needed mental health counseling because of the stress of taking care of my dad and the fear that she lived with every day. She was starting to have nightmares about mixing up his medicine.... Because the focus was on the patient from the doctor’s point of view, there wasn’t anybody focusing on my mom and maybe her need of some help. ”

(Rural KY, female, age 55)



“ [Getting support as a caregiver was] nothing that I actually thought about then.... I wish I would have.... I just felt that I was doing what I was supposed to do as a daughter or for your friend who needs you. That's what you're supposed to do: be there for your friend. But having gone through it, I realized it takes a great toll, because you're literally watching someone depart this life. ”

(Urban KY, female, age 56)

“ There are tons of support groups out there for the caregivers, you just have to ask, but people don’t.... We're so focused on the sick person that you don't want to spend any time on yourself. But if you don't take care of yourself, you're not going to be able to take care of them. ” (Urban KY, female, age 65)



# CALL TO ACTION: REWRITING THE STORY



“A lot of people just don’t understand why screening is important. People will only go to the doctor if they feel like they’re dying, if they’re really sick. They don’t understand about these preventive measures.” (Rural KY, female, age 30)

MAMMOTH CAVE

# GUIDE FOR NEXT STEPS

---

---

Follow the steps below and use the contents in this section to impact change in your community and across the state.

## Summaries of Findings



Read the recap of key findings from the Social Determinants of Health and Cancer-related Outcome sections, which include data from existing sources and focus group interviews

Review input from stakeholder organizations and community members on ranking top needs in Kentucky and prioritizing strategies to address cancer-related needs

## Community Prioritization of Needs



## A Call to Action



Explore ways to use the results of the Kentucky Cancer Needs Assessment to help rewrite the story of cancer in your community and across the state

# SUMMARY — SOCIAL DETERMINANTS OF HEALTH

---



## Key Needs Insights from Existing Data

---

### Society

- ▶ Rural, Appalachian, Black, and Hispanic KY have higher rates of poverty than US
- ▶ 1 in 3 counties have >20% of people living in persistent poverty since 1980 (mostly in rural Appalachia)
- ▶ Fewer KY adults have a college degree than US (even lower among rural, Appalachian, Black, and Hispanic Kentuckians)
- ▶ 1 in 4 KY Hispanics uninsured; other KY population groups similar or better than US
- ▶ Approximately 1 in 3 in KY are on Medicaid

### Community

- ▶ 1 in 3 in KY counties are health professional shortage areas for primary care

### Environment

- ▶ Some cancers linked to environmental exposures are more common in KY than US (e.g., lung, kidney, melanoma, leukemia, bladder)
- ▶ Significant food deserts exist in Appalachia and the urban core of KY's largest cities
- ▶ Rural and Appalachian KY have less access to broadband and internet-connected devices than the rest of the state



## Community-Driven Solutions Insights from Focus Groups

---

### Society

- ▶ Providing education on and opportunities for making healthcare more affordable
- ▶ Focusing on mental health and removing stigmas

### Community

- ▶ Improving access to and availability of quality healthcare facilities, providers and support staff
- ▶ Encouraging an atmosphere of trust in healthcare settings
- ▶ Developing broad, community-based strategies for disseminating health information
- ▶ Supporting culturally appropriate health information, providers and services
- ▶ Improving access to advancements in healthcare service and treatment options (e.g. telehealth, genetic testing, etc.)

### Environment

- ▶ Crafting policies to promote and protect health in the physical environment (e.g. smoke-free, clean water, etc.)
- ▶ Building infrastructure and economic policies that promote healthy living (e.g. affordable healthy foods and high-speed internet, area for physical activity, etc.)

# SUMMARY — CANCER-RELATED OUTCOMES



## Key Needs Insights from Existing Data

### Risk Reduction

- ▶ About 1 in 4 KY adults currently smoke, with higher rates in Appalachia (2nd worst state in US)
- ▶ 1 in 5 KY youth and 2 in 5 KY adults are obese (among worst in US)
- ▶ 1 in 3 KY adults physically inactive outside of work (3rd worst in US)
- ▶ Only half of KY youth are up-to-date on HPV vaccine
- ▶ Higher rates of cancers and cancer deaths related to tobacco, obesity and HPV in KY than the rest of US
- ▶ New Hepatitis C virus infection is among the highest in US (linked with opioid injection use and a known cause of liver cancer)

### Screening & Diagnosis

- ▶ Rates worse in Rural KY for cervical screening and in Appalachian KY for cervical and colorectal screening
- ▶ Lung cancer screening rates are better than US, but only about 1 in 5 eligible KY adults are getting screened, and lower for Black KY
- ▶ Disparities in cancer mortality exist in Rural and Appalachian KY for lung, colorectal and cervical cancers

### Treatment

- ▶ Racial disparities in cancer mortality exist for breast, prostate, colorectal, uterine and liver cancers in Black KY
- ▶ Precision medicine shows promise for improved survival

### Survivorship

- ▶ Disparities in relative survival exist for lung cancer (rural and Appalachian KY) and breast cancer (Black KY)
- ▶ Cancer survivors have significant quality of life needs



## Community-Driven Solutions Insights from Focus Groups

### Risk Reduction

- ▶ Better educating individuals on cancer risks and risk reduction strategies
- ▶ Building health promotion into multiple aspects of the community (e.g. employer-based, local organizations, schools, etc.)
- ▶ Educating on why and how to stop smoking and providing assistance to be successful
- ▶ Addressing stigma and fatalistic beliefs about cancer

### Screening & Diagnosis

- ▶ Making cancer screenings more accessible
- ▶ Addressing knowledge and attitude barriers to getting screened for cancer

### Treatment

- ▶ Providing additional supports for cancer patients (e.g. mental health, spiritual care, transportation, etc.)
- ▶ Better educating cancer patients on the specifics of their diagnosis and treatment

### Survivorship

- ▶ Coordinating cancer care to better serve patients
- ▶ Providing appropriate and accessible end of life options for cancer patients

# COMMUNITY PRIORITIZATION OF NEEDS & STRATEGIES

Stakeholder organizations and community members sorted and rated the key CNA findings into six identified themes. Two themes reflected needs. The needs they rated and discussed as most important are listed in blue box.



## Top Needs

**Social:** Persistent poverty · Racial, Rural and Appalachian disparities  
**Risk:** Smoking · Obesity · HPV · Environmental exposures  
**Screening:** Lung cancer

Four themes reflected strategies to address the needs. Ordering of strategies follows perceived importance ratings. Items in **BOLD** rated as potentially easy to address.

### EQUITABLE ACCESSIBILITY

- 1. Clear communication between healthcare providers and patients**
2. Access to needed doctors and specialists
- 3. Communication across multiple doctors about a patient's care**
4. Insurance coverage of pre-existing conditions
5. Out-of-pocket costs for cancer care
6. Established relationship and trust with a healthcare provider
- 7. Bringing cancer screening to local communities**
8. General trust or confidence in healthcare

### OUTREACH, EDUCATION & INTEGRATIVE SUPPORT

1. Financial support for cancer treatment
2. Advocates or navigators to guide patients through cancer treatment
- 3. Information on how to use insurance benefits**
- 4. Information on ways to reduce risks of getting cancer**
5. Mental health, spiritual support, and other assistance programs for cancer patients/caregivers
- 6. Information on who should get cancer screening and when**

### PROACTIVE BEHAVIORS FOR IMPROVED HEALTH

- 1. Smoke-free policies for second-hand smoke exposure**
2. Access to places to be active or exercise (ex. parks, sidewalks, gyms,)
3. Health habits formed as children
4. Building skills for healthy behaviors (ex. physical activity, sleep, healthy eating)

### CONCERNS, BELIEFS & STIGMAS

1. Reduce pollution in water, air, or soil that can cause cancer
2. Reduce stigma around mental health
- 3. Include additional priority health issues**
4. Address belief that changing behavior won't make a difference
- 5. Reduce fear or avoiding cancer screenings**
6. Cultural beliefs about seeking healthcare

# A CALL TO ACTION

KY CNA findings will be used by the KY Cancer Consortium to inform development of the new KY Cancer Action Plan (CAP). Others can also use the KY CNA for planning, research and more!



**?** How can I use the KY CNA findings?

Use CNA toolkit for social media, newsletters and presentations



Use data in grant applications



Enhance data with community member lived experiences and social needs



Dive deeper into local and regional data on CNA web portal



Stimulate new research to fill data gaps



Inform local and state governmental leaders



Use for local health department and community hospital CHNAs



Stimulate town hall conversations



Guide program planning and strategic plans



Use CNA web portal to monitor data and track impact of efforts



# DATA GAPS

---



## Areas where existing data is missing or incomplete

---

### Data on cancer needs in the Hispanic community

- ▶ With a growing Hispanic KY population, KyBRFS needs to be collected in Spanish for non-English speakers for accurate data on this group. Kentucky does not currently publish Hispanic cancer incidence and mortality rates due to challenges with accurate Hispanic ethnicity information and unstable population estimates..

### Data on the LGBTQ community and their cancer needs

- ▶ Very little data exists anywhere about the LGBTQ community, much less cancer-specific data. An important step is to modify data collection to include more than two genders.

### Screening surveillance

- ▶ Tracking how a community and different population subgroups are doing on cancer screenings is of high importance. Larger KyBRFS sample sizes for minority populations and improved measures that match USPSTF recommendations for lung and cervical cancer screenings are needed to accomplish this.

### Cancer survivor data

- ▶ Additional data is needed on the following for cancer survivors in Kentucky: physical, mental, spiritual and financial health; separation of melanoma from non-melanoma skin cancer diagnoses; breakdowns of other non-skin cancer site diagnoses. Data pertaining to the caregivers of cancer survivors would also be beneficial.

# RESEARCH OPPORTUNITIES

---



## Addressing evidence and practice gaps through research

---

### New scientific discoveries and knowledge

- ▶ Advance scientific understanding of risk factors that contribute to the development of cancer and ways to reduce their impact on individual cancer risk
- ▶ Develop new technologies for early detection of additional cancer sites with high mortality
- ▶ Discover more effective cancer treatments, including precision medicine approaches
- ▶ Advance scientific understanding of treatment side effects and management

### Evidence-based interventions

- ▶ Produce and disseminate evidence-based interventions for risk reduction behaviors
- ▶ Generate and disseminate strategies to improve the implementation of evidence-based clinical guidelines for cancer screening, treatment, and supportive care
- ▶ Generate and disseminate innovative strategies to overcome patient barriers to accessing and adhering to screening, treatment and survivorship care (e.g., patient navigation, telehealth, financial assistance, transportation support)

### Social determinants of health and health equity

- ▶ Design and evaluate policy interventions to increase access to early childhood education, higher education and economic development in low-income, rural, Appalachian, Black and Hispanic communities
- ▶ Identify and evaluate interventions to address social determinants of health (e.g., transportation, digital connectivity, environmental justice) in low-income, rural, Appalachian, Black and Hispanic communities

# ACKNOWLEDGEMENTS & CITATIONS



Kentucky has shown early successes in increasing lung cancer screening since it was approved in 2015—currently ranking 2nd highest and 3rd fastest growing in the US, and leading to a decline in the percentage of late-stage lung cancer diagnoses in the state.

# ACKNOWLEDGEMENTS

---

---

*Thank you to all of the community partners and stakeholders who have been instrumental in producing this needs assessment. Rewriting the story of cancer in Kentucky will take all of our efforts, and we are excited to have such a strong network engaged in the work.*

## Kentucky Cancer Needs Assessment Steering Committee:

### University of Kentucky, Markey Cancer Center, Community Impact Office (CIO)

Pamela Hull, Lovoria Williams, Caree McAfee, Todd Burus, Natalie Wilhite, Jessica Thompson

### Kentucky Cancer Registry (KCR), UK Markey

Bin Huang, Jaclyn McDowell

### Kentucky Cancer Consortium (KCC), UK Markey

Jennifer Redmond Knight, Elaine Russell

### Kentucky Cancer Program East (KCP-East), UK Markey

Mindy Rogers

### KCP-West, University of Louisville

Connie Sorrell, Elizabeth Westbrook, Jamie Smith

### American Cancer Society

Rachael King, Elizabeth Holtsclaw, Julie Waters

### Foundation for Healthy Kentucky

Allison Adams

### Kentucky Department for Public Health

Janie Cambron, Vivian Lasley-Bibbs, Emily Messerli,  
Ellen Barnard, Sarojini Kanotra, Carissa Adams,  
Carrie Conia, Elizabeth Owens

### University of Louisville

Stephanie Boone

# ACKNOWLEDGEMENTS

---

---

## Additional Input and Assistance Provided By:

### Kentucky Cancer Registry

Eric Durbin, Chaney Kieckbusch

### UK Superfund Research Center (UKSRC)

Kelly Pennell, Anna Hoover

### UK Markey, Precision Medicine Center

Jill Kolesar

### UK Markey, Cancer Clinic Services

Justine Pickarski, Michael Gosky

### UK Center for Appalachian Research in Environmental Sciences (UK-CARES)

Ellen Hahn, Kelly Kennoy, Stacy Stanifer

### KCP-West, University of Louisville

Jaime Daniel, Jaime Knight, Pam Temple-Jennings, Angie Timmons

### KCP-East, UK Markey

Joetta Choate, Angie Combs, Carolyn Gyurik, Wynona Padgett, Tonya Pauley, Jeff Russell, Mary Schneider, Amy Steinkuhl, Ashley Teague, Khadijah Wallace, Jennifer Wilson

### UK Markey, Community Impact Office

Christine Stroebel, Madeline Brown, Jane Morgan, Lee Park, Keeghan Francis, Haseeb Ahmad, Alex Chang

## The KY CNA effort was supported in part by the following grants:

UK Markey, NIH Grant #: P30 CA177558

KCC/KCR, CDC Grant #: 6NU58DP006313-04-02

UKSRC, NIH Grant #: P42 ES007380

UK-CARES, NIH Grant #: P30 ES026529

# DATA SOURCES

---

## Surveillance, Epidemiology, and End Results Program (SEER), National Cancer Institute, National Institutes of Health

SEER is an authoritative source of information on cancer incidence and survival in the United States. SEER currently collects and publishes cancer incidence and survival data from population-based cancer registries covering approximately 48% of the U.S. population. The **Kentucky Cancer Registry (KCR)** has been reporting data into the SEER program since 2001.



## American Community Survey, 5-Year Estimates, 2015-2019 (ACS, 5-Year, 2015-2019), U.S. Census Bureau

ACS is a nationally representative sample of households that are randomly selected to participate. This survey provides population estimates of demographic information for various geographic areas.

## Behavioral Risk Factor Surveillance System (BRFSS), Centers for Disease Control and Prevention (CDC)

BRFSS is a representative survey of adults in all states that collects data about health-related risk behaviors, use of preventative services, and chronic health conditions. The **Kentucky Behavioral Risk Factor Survey (KyBRFS)** is the state-specific version of the BRFSS for Kentucky.



## County Health Rankings and Roadmaps (CHRR), National Center for Health Statistics

This resource compiles and calculates county-level community health data from a variety of sources, including estimates of life expectancy based on data from the National Vital Statistics System.

## Economic Research Service, U.S. Department of Agriculture (USDA ERS)

The mission of USDA's Economic Research Service is to anticipate trends and emerging issues in agriculture, food, the environment, and rural America and to conduct high-quality, objective economic research to inform and enhance public and private decision making. ERS research and analysis covers a broad range of economic and policy topics, including food/nutrition and poverty.



## Federal Communications Commission (FCC)

The Federal Communications Commission regulates interstate and international communications by radio, television, wire, satellite, and cable in all 50 states, the District of Columbia and U.S. territories. An independent U.S. government agency overseen by Congress, the Commission is the federal agency responsible for implementing and enforcing America's communications law and regulations.

# DATA SOURCES

---

## National Immunization Survey-Teen (NIS-Teen), CDC

NIS-Teen is an annual, nationally representative phone survey that collects immunization information on adolescents aged 13-17 years living in the U.S. and verifies immunization histories from health care providers.



## Youth Risk Behavior Surveillance System (YRBS), CDC

YRBSS is a self-administered national school-based survey system that collects data regarding health-related risk behaviors among 9th through 12th grade students.

## Other Sources Used:

- Commission on Cancer, American College of Surgeons
- Health Resources & Services Administration (HRSA), Department of Health & Human Services
- Healthy People 2030 (HP 2030), US Department of Health & Human Services
- Kaiser Family Foundation (KFF)
- Kentucky Cabinet for Health and Family Services (KY CHFS)
- National Flood Hazard Layer, Federal Emergency Management Agency (FEMA NFHL)
- National Notifiable Diseases Surveillance System, CDC (CDC NNDSS)
- United States Preventive Services Task Force (USPSTF)

For data tables and additional information informing the contents of this document, please refer to [2021 Kentucky Cancer Needs Assessment: Appendix I](#)

# RESEARCH CITED

---

---

- Alcaraz, K. I., Wiedt, T. L., Daniels, E. C., Yabroff, K. R., Guerra, C. E., & Wender, R. C. (2020). Understanding and addressing social determinants to advance cancer health equity in the United States: A blueprint for practice, research, and policy. *CA: a cancer journal for clinicians*, 70(1), 31–46. <https://doi.org/10.3322/caac.21586>
- Fedewa, S. A., Bandi, P., Smith, R. A., Silvestri, G. A., & Jemal, A. (2022). Lung Cancer Screening Rates During the COVID-19 Pandemic. *Chest*, 161(2), 586–589. <https://doi.org/10.1016/j.chest.2021.07.030>
- Hiatt, R. A., & Breen, N. (2008). The social determinants of cancer: a challenge for transdisciplinary science. *American journal of preventive medicine*, 35(2 Suppl), S141–S150. <https://doi.org/10.1016/j.amepre.2008.05.006>
- Huang, B., Chen, Q., Allison, D., El Khouli, R., Peh, K. H., Mobley, J., Anderson, A., Durbin, E. B., Goodin, D., Villano, J. L., Miller, R. W., Arnold, S. M., & Kolesar, J. M. (2021). Molecular Tumor Board Review and Improved Overall Survival in Non-Small-Cell Lung Cancer. *JCO precision oncology*, 5, PO.21.00210. <https://doi.org/10.1200/PO.21.00210>
- Institute of Medicine (2013). *Delivering High-Quality Cancer Care: Charting a New Course for a System in Crisis*. The National Academies Press. <https://doi.org/10.17226/18359>
- Ojha, S., Pennell, K., Robinson, A., Rezaei, N., Hoover, A., Li, Y., Powell, C., & Moseley, H.. (2021). *A Geospatial and Binomial Logistic Regression Model to Prioritize Sampling for Per- and Polyfluorinated Alkyl Substances (PFAS) in Public Water Systems-Dataset (Version 1)*. figshare. <https://doi.org/10.6084/m9.figshare.16560144.v1>
- Riggs, M. J., Huang, B., Chen, Q., Bocklage, T., Schuh, M. R., Poi, M., Villano, J. L., Cavnar, M. J., Arnold, S. M., Miller, R. W., Ueland, F. R., & Kolesar, J. M. (2020). Factors Predicting Participation in the Prospective Genomic Sequencing Study, Total Cancer Care (TCC), in Kentucky. *The Journal of rural health : official journal of the American Rural Health Association and the National Rural Health Care Association*, 38(1) <https://doi.org/10.1111/jrh.12492>
- Riggs, M. J., Lin, N., Wang, C., Piecoro, D. W., Miller, R. W., Hampton, O. A., Rao, M., Ueland, F. R., & Kolesar, J. M. (2020). DACH1 mutation frequency in endometrial cancer is associated with high tumor mutation burden. *PloS one*, 15(12), e0244558. <https://doi.org/10.1371/journal.pone.0244558>
- Van Handel, M. M., Rose, C. E., Hallisey, E. J., Kolling, J. L., Zibbell, J. E., Lewis, B., Bohm, M. K., Jones, C. M., Flanagan, B. E., Siddiqi, A. E., Iqbal, K., Dent, A. L., Mermin, J. H., McCray, E., Ward, J. W., & Brooks, J. T. (2016). County-Level Vulnerability Assessment for Rapid Dissemination of HIV or HCV Infections Among Persons Who Inject Drugs, United States. *Journal of acquired immune deficiency syndromes (1999)*, 73(3), 323–331. <https://doi.org/10.1097/QAI.0000000000001098>
- Warnecke, R. B., Oh, A., Breen, N., Gehlert, S., Paskett, E., Tucker, K. L., Lurie, N., Rebbeck, T., Goodwin, J., Flack, J., Srinivasan, S., Kerner, J., Heurtin-Roberts, S., Abeles, R., Tyson, F. L., Patmios, G., & Hiatt, R. A. (2008). Approaching health disparities from a population perspective: the National Institutes of Health Centers for Population Health and Health Disparities. *American journal of public health*, 98(9), 1608–1615. <https://doi.org/10.2105/AJPH.2006.102525>

