# Kansas Cancer Clusters: A Spatial Analysis of Kansas's County-Level Cancer Cases

#### THE UNIVERSITY OF KANSAS CANCER CENTER

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## Introduction

- Cancer incidence rates can vary widely across geographic regions, and identifying highincidence areas is essential for targeted public health interventions.
- Kansas has a diverse populations consisting

   of varying demographics and environmental
   factors that can influence cancer trends.
- Understanding the spatial clustering of
   cancer cases is critical for uncovering health
   trends, identifying potential risk factors, and
   guiding resource allocation for prevention
   and treatment.

#### Methods

- Overall cancer incidence case counts were obtained by county for the state of Kansas through OPTIK and the Kansas Cancer Registry for the year range 2016-2020
- County Population and Percentage 65
   and older were obtained from County
   Health Rankings for the year 2020
- Spatial Poisson discrete scan statistics
   were performed in SaTScan to identify
   areas with significantly elevated case
   counts and elevated areas were mapped
   in R using Leaflet





**County Population** 

LLR	Observed	Expected	Obs/Exp	<b>Relative Risk</b>	Population	Hierarchical	Gini
			<b>A</b>		► <b>●</b>		
183.27	41559	38888	1.069	1.147	1452766	Y	
117 62	7015	6567	1 205	1 220	245210		Т
142.03	/915	0307	1.203	1.229	243319		l
133.65	10725	9218	1.164	1.190	344360		Т
72.22	6700	5799	1.155	1.170	216653		Т
41.52	3512	3009	1.167	1.175	112421	Y	
23.43	1309	1078	1.214	1.218	40284		T
17.01	2296	2031	1.130	1.134	75883	Y	
16.79	1443	1236	1.168	1.171	46160		T
8.41	329	260	1.264	1.265	9722	Y	T
7.86	592	501	1.182	1.183	18717		T

**SatScan Clustering Outputs** 

#### **Overall Cancer Case Clusters 2016-2020**

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5	DECATUR	NORTON	PHILLIPS	SMITH	JEWELL	REPUBLIC	WASHINGTON	MARSHALL	NEMAHA	BROW	V DONI
			T.			CLOUD					ATCHISON
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			<u></u>		LINCOLN	OTTAWA		Manhage	makes	HAWNEE	LEA
	GOVE	TREGO	ELLIS	RUSSELL		SALINE		WAE	BAUNSEE	TOPEK	DOUGLA
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ASKELL			KIOWA		KINGMAN			E	ilk	WILSON	NEOSHO
SEWARD	MEADE	CLARK	COMANCHE	BARBER	HARPER	SUMNER	cowi	.EY	MO	NTGOMERY	LABETTE
	5					2	J.	CHAU	AUGUA		
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## Results

- 10 elevated case count clusters were identified with a p-value less than 0.05
- 4 Clusters were created by Secondary Hierarchical clustering
- 7 Clusters were created by Secondary Gini clustering

## Conclusions

- The clusters relative risk (RR) values range from
   1.134 to 1.265, which indicates a slightly increased
   risk of cancer incidence in the identified areas.
- This increased risk is not definitive as these risk values are close to 1.
- The clusters show no clear visual pattern with relation to the percentage of county population over the age of 65.

### **Future Directions**

- We know that incidence cancer is highly related to age therefore we have submitted a data request for cancer data by age groups and county to adjust for it in clustering.
- If obtainable additional covariates like race
   and ethnicity can be included into the
   SatScan clustering.

#### References

LINN

BOURBON

CRAWFORD

CHEROKEE

- 1. <u>https://www.satscan.org/</u>
- 2. <u>https://www.countyhealthrankings.org/</u>
- 3. <u>https://www.kumc.edu/kcr/</u>