

Master of Public Health
Integrative Learning Experience Report

***EXTREME HEAT, SOCIAL VULNERABILITY, AND
RESPIRATORY HEALTH IN KANSAS: A CENSUS TRACT-
LEVEL ANALYSIS***

by

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submitted in partial fulfillment of the requirements for the degree.

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Summary

This report is an in-depth review of my time as an intern at the Riley County Health Department (RCHD) and my work with the Kansas Department of Health and Environment (KDHE). Both experiences provided me with the opportunity to integrate knowledge gained from my Master of Public Health (MPH) coursework into professional public health work. My experience at RCHD assisted in the further development of my knowledge of public health needs and capacities throughout Kansas. With KDHE, I was able to conduct a preliminary study with the goal of understanding and interpreting the relationships between extreme heat, social vulnerability, and respiratory illness in the context of public health resource necessities.

Abstract

Extreme heat poses a significant threat to several aspects of human health through the impact of physical, social, and environmental risk factors. Reducing the impact of extreme heat is crucial to promoting health for all. Research has shown associations between rising global temperatures and negative respiratory health outcomes. Temperatures in Kansas have been rising steadily and are predicted to continue to do so. Drastic changes in temperature without ample time for human acclimation results in certain populations being more highly vulnerable to its effects. This preliminary study was conducted with the goal of geographically identifying populations most vulnerable to extreme heat in Kansas. This identification was done using readily available extreme heat, social vulnerability, and respiratory illness data. The data were analyzed and interpreted using geographic information system (GIS) mapping. Census tract-level data were visually explored to identify areas showing potentially associated extreme heat rates and COPD or asthma crude prevalence. Furthermore, using social vulnerability data, populations that are more likely to need related resources were identified. Results indicated that 49.5% of census tracts that are considered highly socially vulnerable show a higher crude prevalence of chronic obstructive pulmonary disease (COPD) and asthma. Also, 30% of these census tracts fall within geographic areas with a higher-than-average number of annual days with recorded extreme heat conditions. Findings concluded that social vulnerability is a potential determinant of respiratory health. Future work is a necessity in improving respiratory health in areas with high rates of extreme heat. Exploring social vulnerability data in this context allows for a more targeted approach to this work.

Subject Keywords: Asthma, Chronic Obstructive Pulmonary Disease, Social Vulnerability, Extreme Heat, Respiratory Health

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List of Abbreviations

| | |
|----------------|---|
| CASPER | Community Assessment for Public Health Emergency Response |
| CDC | Centers for Disease Control and Prevention |
| COPD | Chronic Obstructive Pulmonary Disease |
| CMRA | Climate Mapping for Resilience and Adaptation |
| DMP | Diagnostic Medicine/Pathobiology |
| EAG | Emergency Action Guide |
| EM | Emergency Management |
| EJI | Environmental Justice Index |
| EOP | Emergency Operations Plan |
| ER | Emergency Room |
| ESF | Emergency Support Functions |
| F | Fahrenheit |
| FHWC | Flint Hills Wellness Coalition |
| FEMA | Federal Emergency Management Agency |
| GIS | Geographic Information System |
| HIPAA | Health Insurance Portability and Accountability Act |
| ILE | Integrated Learning Experience |
| KDHE | Kansas Department of Health and Environment |
| KHI | Kansas Health Institute |
| KU | Kansas University |
| MPH | Master of Public Health |
| MSA | Multisectoral Approach |
| NOAA | National Oceanic and Atmospheric Administration |
| O ₃ | Ozone |

| | |
|------|--------------------------------------|
| PHEP | Public Health Emergency Preparedness |
| PM | Particulate Matter |
| RCHD | Riley County Health Department |
| RSV | Respiratory Syncytial Virus |
| SVI | Social Vulnerability Index |
| US | United States |

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Chapter 1 - Literature Review

Extreme heat is a substantial threat to human health, as it both directly and indirectly, impacts physical, social, and environmental health. Studies have shown that extreme heat events are associated with an increasing number of poor respiratory health outcomes, particularly in vulnerable populations (1). Globally, the severity and frequency of extreme heat days are increasing, making it a crucial effort to fully understand the relationships between extreme heat, social vulnerability, and respiratory health (2).

Historically there have been several studies conducted exploring the relationships between extreme heat and respiratory health. A national study was conducted in the United States (US) in 2022 analyzing respiratory-related hospitalizations in vulnerable populations due to increased outdoor temperatures. This study discovered a steady and significant increase in the relative risk of hospitalization in elderly populations as the average daily temperature increased (3). The analysis explored several pathways for the risk of respiratory-related hospitalization including statistical controls for particulate matter 2.5 (PM_{2.5}), PM₁₀, and ozone (O₃). The data presented concluded that the increased relative risk of respiratory-related hospitalizations due to increased average daily temperature cannot be solely attributed to air pollution (3). Therefore, though extreme heat is associated with increased levels of air pollution, more research to explore other potentially causative relationships between extreme heat and respiratory illness would be beneficial to vulnerable populations.

Social vulnerability is a major determinant of health. The Centers for Disease Control and Prevention (CDC) created the Social Vulnerability Index (SVI) to measure vulnerability across census tracts in the United States (US) when threatened with external stressors. The index considers 16 census variables which can be summarized into the following categories: socioeconomic status, household composition and disability, minority status and language, and housing and transportation (4). The SVI allows for informed policy development, decision-making, and preparedness efforts in several population circumstances. In an analysis of SVI and chronic respiratory disease mortality in the US, high overall SVI was associated with increased mortality related to a number of respiratory diseases including asthma and COPD (5). This result is one of many indicating a necessity for social vulnerability-targeted respiratory disease prevention efforts.

Further employing the use of social vulnerability values, the Environmental Protection Agency (EPA), analyzed social vulnerability in conjunction with projected increases in daily temperature and premature mortality across the US. Results indicated that US cities with the

highest projected increases in mortality due to extreme temperatures are more likely to be inhabited by socially vulnerable populations (6).

Geospatial information system (GIS) mapping is a useful tool for conducting a basic spatial analysis of extreme heat, social vulnerability, and respiratory health. However, there are limitations to be noted when attempting to control for confounding variables. For example, some common statistical methods that would be used to control for confounding variables, cannot be conducted through the software. Simultaneously, GIS does not account for unmeasured confounding variables, so the potential relationship presented by a map may be distorted if these variables were not measured during data collection or analysis (7,8). Results of mapping should be interpreted with thorough consideration of data completeness and accuracy. Furthermore, though GIS mapping is a useful tool for discovering spatial patterns and relationships, causation cannot be visually assumed. Causative relationships should be proven through further quantitative rigor. In conclusion, GIS mapping should be used as a part of a more complex approach to identifying geographic areas of most concern and of need of public health resources (9).

The relationships between extreme heat, social vulnerability, and respiratory health are complex and dynamic. Given these complex relationships, it is essential to conduct targeted public health intervention strategies to effectively address the multifaceted health risks associated with these factors. The National Oceanic and Atmospheric Administration (NOAA) reports that since the early 20th century, Kansas temperatures have risen approximately 1.5°F, and are predicted to continue rising (10). The literature indicates that there is a lack of heat-related mortality reporting methodology in Kansas, making it difficult to understand the direct impact of heat on mortality in the state (11). According to the most recently reported chronic disease indicator values, the 2021 age-adjusted prevalence of adult (18+) asthma in Kansas was 10.7%, which was 0.8% higher than the national average (12). In the same year, the age-adjusted prevalence of adult (18+) COPD was 5.8%, which was 0.2% higher than the national average. Though the Kansas values are not significantly higher than the national averages, these values have been continuously increasing, indicating that there is work to be done to decrease the burden of chronic respiratory disease in Kansas (12).

To ensure a lasting positive impact on public health in Kansas regarding any matter, the multisectoral approach (MSA) is a proven and necessary method. This method includes the convergence of multiple agencies, stakeholders, and objectives to promote various health initiatives (13). My integrated learning experience (ILE) gave me the opportunity to be exposed to the MSA and further understand the necessity for it. My ILE was conducted at two agencies

that demonstrate a copious amount of collaboration at the state and county levels to ensure public health for all in Kansas. As both KDHE and RCHD share an overarching goal of promoting public health for all within their jurisdictions, a cross-sectoral collaboration between the agencies is common. My work with both agencies allowed me to develop my knowledge of public health capacities at both the state and county levels.

KDHE is a state agency located in Topeka, Kansas created to protect, improve, and monitor the health and environment in Kansas. The agency is comprised of three divisions with separate but overlapping responsibilities. The Division of Public Health uses assessment, policy development, and assurance to promote and protect public health in Kansas. The Division of Environment uses regulations and programs to protect the Kansas environment. Lastly, the Division of Health Care Finance works with health policy to improve health for all in Kansas. Each division is further separated into bureaus with more specific responsibilities that assist in meeting the agency's mission. The official mission is stated as follows: "The Kansas Department of Health and Environment works to protect and improve the health and environment of all Kansans" (14).

RCHD, located in Manhattan, Kansas is a county agency created to serve Riley County through the promotion and protection of the community in several aspects. RCHD works toward a mission "to promote and protect the health and safety of our community through evidence-based practices, prevention, and education" (15). This accredited health department is made up of several different departments, some of which include clinic services, community health and wellness, Raising Riley, and emergency preparedness (15). The county agency partners with many community organizations and facilities to meet the public health needs of Riley County. The Public Health Emergency Preparedness (PHEP) department at RCHD is crucial to achieving the agency's mission. This department coordinates community response and preparation efforts for threats such as natural disasters and disease outbreaks. Another important responsibility of this department is community education concerning outbreaks, public health resources, and emergency procedures (16).

I had the pleasure of serving as a PHEP intern onsite at RCHD and conducting virtual work with KDHE involving data analysis. Majority of my time at RCHD was spent working with the department's PHEP coordinator, Ms. Skylar German, RCHD's Public Health Emergency Response Coordinator. Skylar earned her Master of Science in Public Health from Bournemouth University in England. Earlier, she earned her Bachelor of Science in Biology from Post University in Waterbury, Connecticut. Ms. German has been with RCHD previously, holding the

titles of Community Health Specialist and Contact Tracer, giving her an extensive public health background.

My experience with KDHE was mentored by Dr. Steven Corbett, holding the title of Senior Chronic Disease Epidemiologist. Dr. Corbett has an extensive background in public health, anthropology, and mentorship. He attended Kansas University (KU) where he most recently obtained his Ph.D. in biomedical anthropology. Prior to his current position, Dr. Corbett served as a faculty member at various universities and as a Senior Analyst at the Kansas Health Institute (KHI). My experiences, though very different, were complementary to my overall learning experience.

Chapter 2 - Learning Objectives and Project Description

I began my ILE in October of 2022 and ended my experience in February 2023. The initial part of my experience was conducted through RCHD, where I attended meetings, created educational materials, completed trainings, and participated in community engagement events. Following my first month with RCHD, I was able to do an introductory assessment of needs in the community, and apply this knowledge to my project, further informing my work with KDHE. In November 2022, I began working with both RCHD and KDHE simultaneously to achieve the following learning objectives:

1. Locate Kansas census tracts of focus to direct public health resources through a spatial analysis of extreme heat data and potentially related health outcomes.
2. Understand public health emergency preparedness and emergency response processes at the county level in Kansas.
3. Propose improvements in the distribution of public health emergency preparedness resources and education in Kansas.

My learning objectives were directly achieved through my final portfolio products summarized in table 2.1.

Table 2.1 Summary of Portfolio Products

| Portfolio Product | | Description |
|-------------------|---|--|
| A | Riley County CASPER Surveys | A collection of three ready-to-use surveys including questions related to demographic information, situational needs, and communications. These surveys are intended for use in Riley County to assess emergency preparedness needs and emergency response needs following a flood or tornado. |
| B | Riley County Emergency Preparedness Guide | An educational guide outlining need-to-know information for all in Riley County regarding thunderstorms, flooding, tornadoes, extreme heat, winter weather, wildfires, and bioterrorism. The guide was created with graphics and kid-friendly |

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| | | designs to encourage education at all ages within family structures. |
| C | GIS Maps | Kansas maps depicting social vulnerability, extreme heat, chronic obstructive pulmonary disease (COPD) crude prevalence, and asthma crude prevalence by census tract were created. |
| D | Research Poster | A research poster that was presented during Phi Zeta Day and Grad Forum at KSU. The poster showed results from the analysis of the GIS maps. |

Learning Objective 1 – Producing maps (Portfolio Product C) using ArcGIS Pro 3.0, was a substantial stride toward achieving my learning objectives. Using my knowledge gained through the initial assessment of community needs in Riley County, and my further exploration of data available in Kansas, I decided to focus my overarching ILE theme on extreme heat in Kansas. These maps culminated to be a spatial analysis concerning extreme heat, social vulnerability, and respiratory illness in Kansas by census tract. I conducted a preliminary study with the goal of exploring relationships between extreme heat and respiratory illness and aimed to define how SVI may impact these relationships. These potential relationships assisted in the identification of future public health steps to improve weather-related health outcomes.

Learning Objective 2 – Through the creation of Community Assessment for Public Health Emergency (CASPER) Surveys (Portfolio Product A), I was able to assess the likely needs of communities in Riley County through research. CASPER surveys are designed for public health officials to be able to conduct a thorough, but efficient community needs assessment following, or in preparation for an emergency event. My learning experience with RCHD helped me understand the current PHEP and public health emergency response resources and apply this knowledge to survey creation that would be most beneficial for the community being served. Similarly, the creation of the Riley County Emergency Preparedness Guide (Portfolio Product B) allowed me to apply county knowledge gained from earlier work in my ILE.

Learning Objective 3 – My research poster allowed me to identify and present suggestions for PHEP education and resources throughout Kansas. By identifying areas with the highest crude prevalence of asthma or COPD and understanding which of these areas also

have high SVI, I was able to identify areas of greatest concern for these diseases. Analyzing these areas of most concern with areas demonstrating historically high numbers of days over 100°F, helped me understand which census tracts in Kansas are most likely to need related resources and education.

I performed several activities indirectly related to my learning objectives, that provided me with extensive knowledge of public health systems and practices in Kansas. These activities are listed below in table 2.2.

Table 2.2 Summary of ILE Activities

| Dates | Location | Description |
|---|-------------|---|
| <p>Week 1 (10/17/2022- 10/21/2022)</p> | <p>RCHD</p> | <p>I was onboarded as an intern at RCHD. I was introduced to employees, given a tour of the buildings, and given brief overviews of each department’s responsibilities. I also attended two meetings held by Debbie Nuss from the Flint Hills Wellness Coalition (FHWC) outlining planning and budget options for the distribution of head lice kits in schools around Manhattan, KS.</p> |
| <p>Week 2 (10/24/2022 - 10/28/2022)</p> | <p>RCHD</p> | <p>I completed seven online Kansas trainings explaining public health in Kansas and the Health Insurance Portability and Accountability Act. During this week we also finished preparation for “Oktoberfest” as the event took place at the end of the week. I participated in this community outreach event by helping educate community members on the uses of RCHD’s mobile testing lab.</p> |
| <p>Week 3 (10/31/2022 - 11/4/2022)</p> | <p>RCHD</p> | <p>I began research and preparation to complete CASPER surveys for RCHD. I completed the surveys during this time frame, and they were fully approved by the PHEP department. I also completed four Federal Emergency Management Agency (FEMA) trainings to become more fully educated on the incident command system (ICS)</p> |

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| | | and the national incident management system (NIMS). |
| | KDHE | I received SVI data from Dr. Corbett and began to explore the different variables that it included. |
| Week 4 (11/7/2022 - 11/11/2022) | RCHD | I met with Riley County Emergency Management (EM) to facilitate my understanding of and begin planning for the Emergency Support Function (ESF) 8 meeting. I learned about this yearly Medicare requirement for healthcare facilities across Riley County. |
| | KDHE | I received asthma and COPD data from Dr. Corbett and began training online GIS training through Esri. |
| Week 5 (11/14/2022 - 11/18/2022) | RCHD | I met with Debbie Nuss individually to learn the process by which she updates the FHWC website to be prepared to assist with future website editing. Secondly, I received departmental survey data from Ms. Shanika Rose to complete a qualitative analysis of needs across RCHD. |
| | KDHE | I received and began sorting through Kansas heat data. |
| Week 6 (11/21/2022 - 11/23/2022) | RCHD | The PHEP department resumed previously halted epidemiology meetings. I took meeting minutes and learned of recent disease happenings in the county. I also completed data entry for RCHD's clinic family planning survey. |
| Week 7 (11/28/2022 - 12/3/2022) | RCHD | RCHD PHEP hosted a table at Manhattan's "howl and prowl" event where I conducted short zoonotic disease surveys to community members giving them an opportunity to become more educated about their pets and earn a prize. I also reviewed and made necessary edits to RCHD's emergency operations plan (EOP) document. |

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| <p>Week 8 (12/5/2022 - 12/9/2022)</p> | <p>RCHD</p> | <p>I began assisting RCHD PHEP with COVID-19, influenza, and respiratory syncytial virus (RSV) testing. I also reviewed and edited RCHD's emergency action guide (EAG) documentation.</p> |
| | <p>KDHE</p> | <p>I received environmental justice index (EJI) data and documentation for review from Dr. Corbett.</p> |
| <p>Week 9 (12/12/2022 - 12/16/2022)</p> | <p>RCHD</p> | <p>The ESF 8 meeting was hosted. I assisted with the preparation for the meeting and took meeting minutes for sharing with all attendees. I also participated in fit testing where several county employees were fitted with appropriate masks in preparation for potential air quality threats. Between these tasks, I also assisted with virus testing as needed.</p> |
| <p>Weeks 10 -15 (1/2/2023 - 2/17/2023)</p> | <p>KDHE</p> | <p>For weeks 10 through 15 of my ILE, I completed several Esri trainings and further sorted the data I was provided. Following this, I mapped and analyzed multiple data sets to conclude results for my reports.</p> |

Chapter 3 - Methods

For this analysis, all data were received or obtained from readily available resources to explore extreme heat, social vulnerability, and chronic respiratory illness at the census tract level in Kansas. These resources include KDHE and Climate Mapping for Resilience and Adaptation (CMRA). Maps were created using ArcGIS Pro 3.0 software using the steps outlined below. Steps with accompanying graphics are included in appendices 5 and 6.

Steps to creating a census tract level map using readily available data resources:

1. Open ArcGIS Pro 3.0 and create a new project. Name the project and save it in your preferred location.
2. Proceed to <https://www.census.gov/cgi-bin/geo/shapefiles/index.php> to download TIGER/Line® shapefiles for Kansas census tracts. The download information will include a .zip file and all of the files that will need to be extracted.
3. Once all files have been extracted, select all the files simultaneously and drag them onto your map. At this point, you will see a map of Kansas that is divided by census tract.
4. Next, prepare your chosen data for ArcGIS. Excel data can be downloaded from several sources. Once this data is downloaded onto your computer, create short column headings, and check to ensure there are no non-numerical values in columns where there should not be.
5. Your dataset should also include a column that allows for the spatial joining of layers. This should be an identifying numeric value that is consistent in each census tract in both the shapefile and your data file.
6. After preparation of your data file, this file should be saved as CSV (Comma delimited) (*.csv) in your chosen location.
7. Now, under the “Map” tab on ArcGIS Pro, click “Add Data”, and navigate to your CSV file to insert your data into the software. At this point, your data will be in your project as a table.
8. Next, right-click on your census tract layer and select “joins and relates” -> “add join”. This will create an “add join” pop-up. In this pop-up, “input table” should remain as your selected layer, “input join field” should be the column label of the numeric value mentioned in step 5, “join table” should be your CSV file, and “join table field” should be the name of the column in the CSV file that matches the numerical values in the “input join field”. Select “OK” to create the join.

9. To confirm the join, right-click on your layer and select “attribute table”. This should show you a table including the census tracts and the new fields from the data joined.
10. Once you have confirmed the join, right-click on your layer, and select “data” -> “export features”. Name your “output feature class” as you wish and select “run” to save the new join to your project.
11. Since we now have all the desired information in one layer, the original census tract layer can be removed. To do so, right-click on the layer and select “remove”.
12. You are now ready to symbolize your chosen variables. Right-click on your layer and chose “symbology”. Select your desired color scheme and adjust the “field” drop bar to show your desired variable. You should see changes based on your selections appear on the map in real time. Here, you can also edit intervals and their methodology, and view graphs as you wish.
13. Following the finalization of your map’s symbology, in order to present the map to your audience select “new layout” under the “insert” tab and select your desired layout.
14. Once the new screen appears select “map frame” under the “insert tab” and select your map. This will allow you to add your map to your new layout and crop as desired. Here you can also add a legend by selecting the “legend” tab and shaping it as desired.
15. After you have your desired layout select “export layout” under the “share” tab, select your desired file type, and click “export”.

I performed an introductory visual analysis to identify areas of concern in Kansas using the steps outlined below.

Steps to basic data exploration:

1. Select your layer(s) for analysis. Right-click on one of the layers and select “data engineering”. Your selected layers will appear in the “fields” column.
2. Right-click on your chosen layer and select the desired analysis point. Select “add to statistics and calculate” to calculate descriptive statistics.
3. At this point, you will see a histogram. Right-click on it and select “open histogram” to view an interactive version of it.
4. Select “properties” in the top left corner of the histogram screen to adjust the properties of the graph.
5. After achieving your desired format, select bins to show census tracts that fall within the range shown.

6. Once you have your descriptive statistics, you can use these values to query for additional information.
7. To create a new query, right-click on your chosen layer and select “properties”.
8. From there, select “definition query” from the left-hand panel.
9. Then, select a desired field for analysis and define the value you would like the software to look for. Next, click “apply” and then “OK”.
10. Results from the query should filter out census tracts displayed on your map to allow for identification based on the values you are seeking.

These steps allowed for the identification of patterns, the refining of visualization techniques, and an educated determination of related public health needs in Kansas.

Chapter 4 - Results

Riley County Health Department

My time with RCHD gave me the opportunity to experience several county-level aspects of public health. I observed several meetings including budget planning, epidemiological reporting, and emergency support functions. In addition to these meetings, I also had the opportunity to participate in two community outreach events, “Oktoberfest” and “howl and howl”. My role as a volunteer for “Oktoberfest” was to educate community members on the role of RCHD’s mobile testing lab. For the “howl and howl” event, I conducted short educational surveys that gave community members an opportunity to become more educated about zoonotic diseases in domestic animals.

I completed several online trainings through the state of Kansas. These trainings included the following: Overview of the Kansas System, Governance and Policy, Financial Management and Preparedness, Workforce Development, HIPAA Awareness, HIPAA Allowable Disclosures and Safeguards, and HIPAA Right to Access and Documentation. I also completed multiple online trainings through FEMA. These trainings included the following: Introduction to the Incident Command System, Basic Incident Command System for Initial Response, National Response Framework, An Introduction, and An Introduction to the National Incident Management System.

I worked to prepare three CASPER surveys for the PHEP department. One survey was created to assess emergency preparedness in Riley County. The other two surveys were created to be used as a community needs assessment following a tornado or flooding event. To further support emergency preparedness efforts in Riley County, I reviewed and edited the county’s EOP and EAG documentation. I also had the opportunity to participate in county fit testing and assist with virus testing.

Lastly, I completed inter-department work including data entry for RCHD’s clinic family planning survey. I also had the opportunity to complete a qualitative analysis for an RCHD needs survey. Overall, my time spent with RCHD provided me with an interesting and informative experience.

Kansas Department of Health and Environment

Throughout my time with KDHE, I sorted, analyzed, and produced maps from the data I was provided. This data included variables related to extreme heat, social vulnerability, COPD,

asthma, air quality, and environmental justice. I reviewed related documentation from readily available resources to fully understand the data.

To produce my intended products, I needed to learn the basics of ArcGIS Pro 3.0. I achieved this goal by completing multiple GIS trainings through Esri. These training courses included the following: GIS Basics, ArcGIS Pro Fundamentals, Getting Started with ArcGIS Pro, Getting Started with Spatial Analysis and Fundamentals of Mapping and Visualization. Through these trainings I was able to explore potential relationships between extreme heat, social vulnerability, and respiratory illness in Kansas. Initially, I analyzed SVI in Kansas.

Figure 3.1 demonstrates an initial map featuring 2021 SVI in Kansas. The average SVI value in Kansas is equal to 0.5 (SD=0.275). This value indicates a medium level of average vulnerability based on social factors for the state of Kansas in terms of external stressors. According to the data, more urban areas demonstrated higher social vulnerability values.

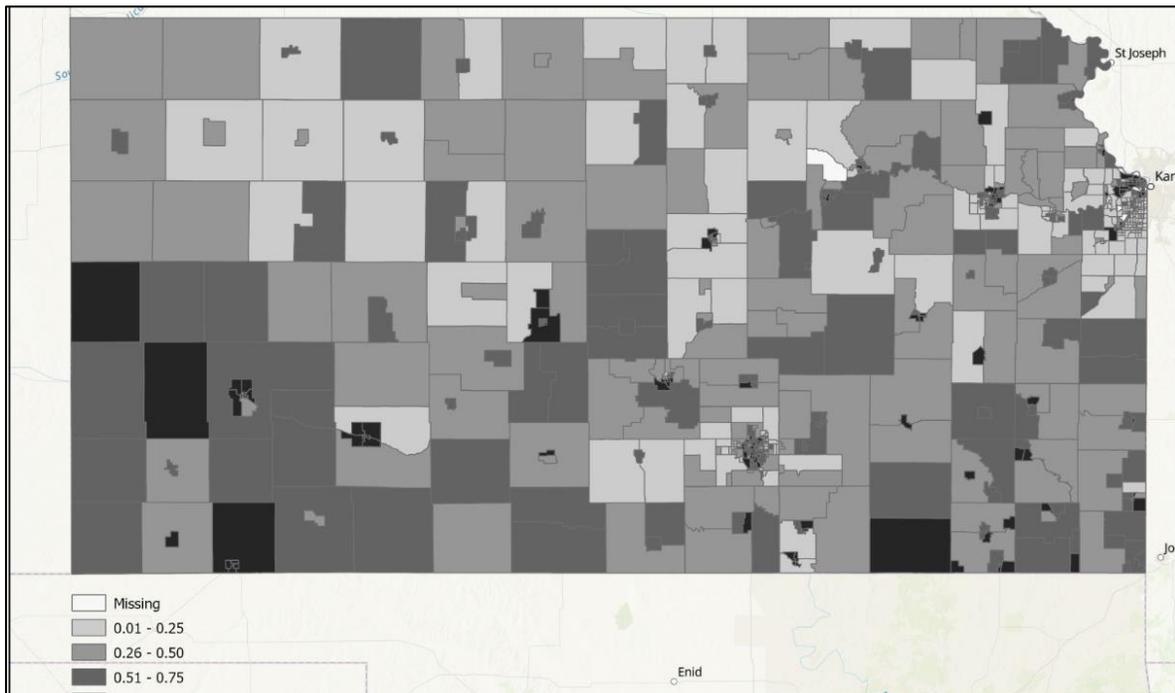


Figure 4.1 Kansas Social Vulnerability Index by Census Tract

A total of 50% of census tracts across Kansas have an SVI value that is greater than or equal to the average value of 0.5. From this, it can be inferred that in the event of a statewide extreme hazard, it is expected that approximately 50% of census tracts across Kansas would need an increased number of resources compared to the census tracts with lower vulnerability values. For emergencies like extreme heat, this is applicable and of concern in that these

events are typically more widespread, and related public health resources may be limited. In the event of more localized disasters, such as tornadoes or flooding, having 50% of census tracts being considered medium to highly socially vulnerable may not be of great concern due to a decreased likelihood of a depletion of resources.

Next, I mapped the 2021 COPD crude prevalence in Kansas (Figure 3.2). The average crude prevalence of COPD in Kansas across all age groups is 6.8%. A total of 50.1% of census tracts across Kansas have a crude prevalence of COPD that is greater than or equal to 6.8% (SD=1.97). Using the methodology outlined in Chapter 3, I discovered that out of all census tracts with a higher-than-average SVI value, 69.7% of these tracts also have an above-average COPD crude prevalence.

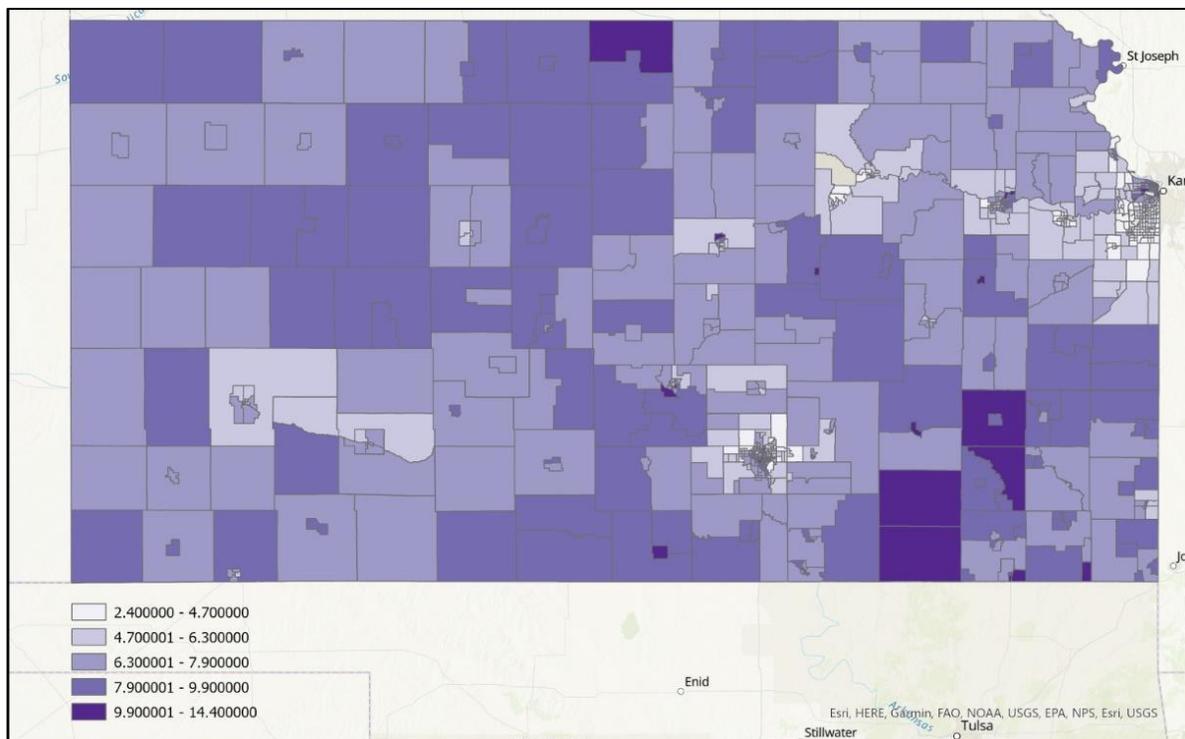


Figure 4.2 Kansas COPD Crude Prevalence by Census Tract

Continuing my exploration of chronic respiratory illness in Kansas, I next mapped 2021 asthma crude prevalence (Figure 3.3). The average crude prevalence of asthma across all age groups in Kansas is equal to 9.9%. It was found that 37.6% of the census tracts measured have an asthma crude prevalence that is greater than or equal to 9.9% (SD=1.17). After calculating the average crude prevalence for both asthma and COPD in Kansas, it was concluded that 72.4% of census tracts with higher-than-average asthma crude prevalence rates for KS also

demonstrated higher-than-average COPD crude prevalence using the query feature in ArcGIS Pro 3.0. The co-occurrence of higher-than-average asthma and COPD crude prevalence values were concentrated in southern Kansas, and clustered near some major cities including Kansas City, Wichita, and Garden City.

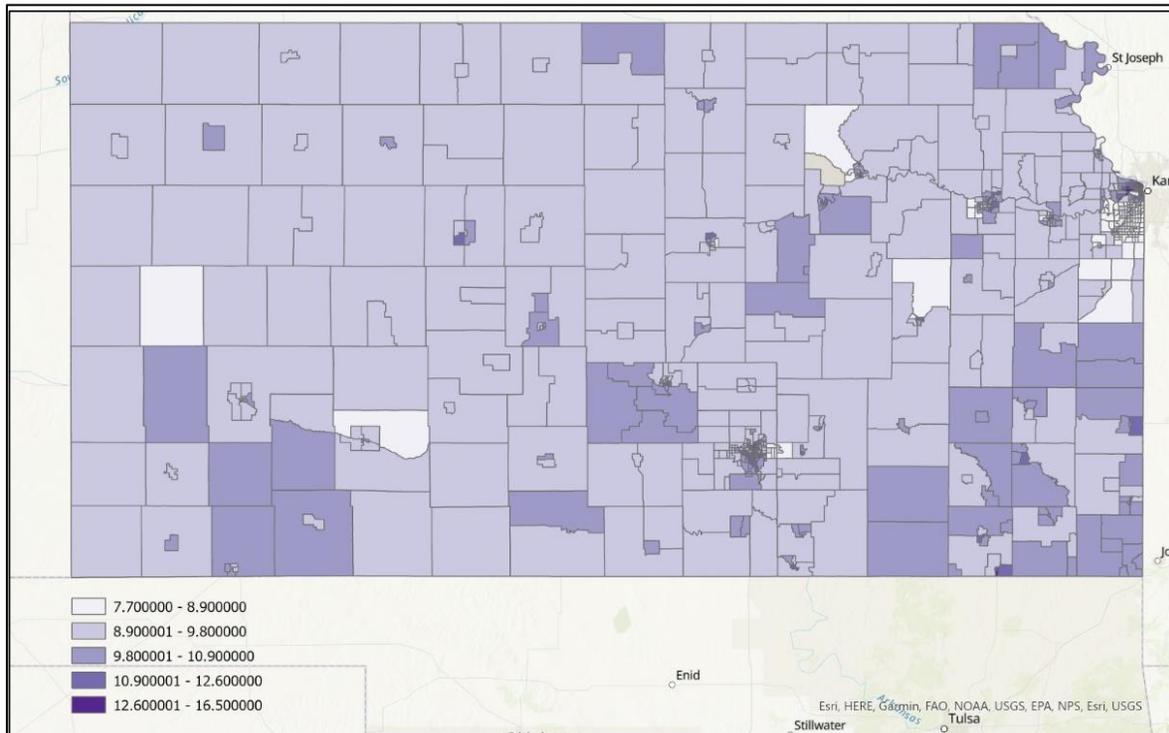


Figure 4.3 Kansas Asthma Crude Prevalence by Census Tract

It was calculated that 65% of census tracts with higher-than-average asthma crude prevalence values, also have high SVI values. Out of all census tracts that are considered highly socially vulnerable relative to other less vulnerable areas, 49.5% show a higher crude prevalence of COPD and Asthma.

Lastly, I mapped historic extreme heat values in Kansas (Figure 3.4) and found that 30.4% of census tracts that showed higher-than-average values for SVI, COPD, and asthma also fall within geographic areas with a higher-than-average number of annual days with recorded extreme heat conditions. Overall, in the previous century, southwestern and central KS demonstrated the highest average number of annual days with a temperature above 100° F.

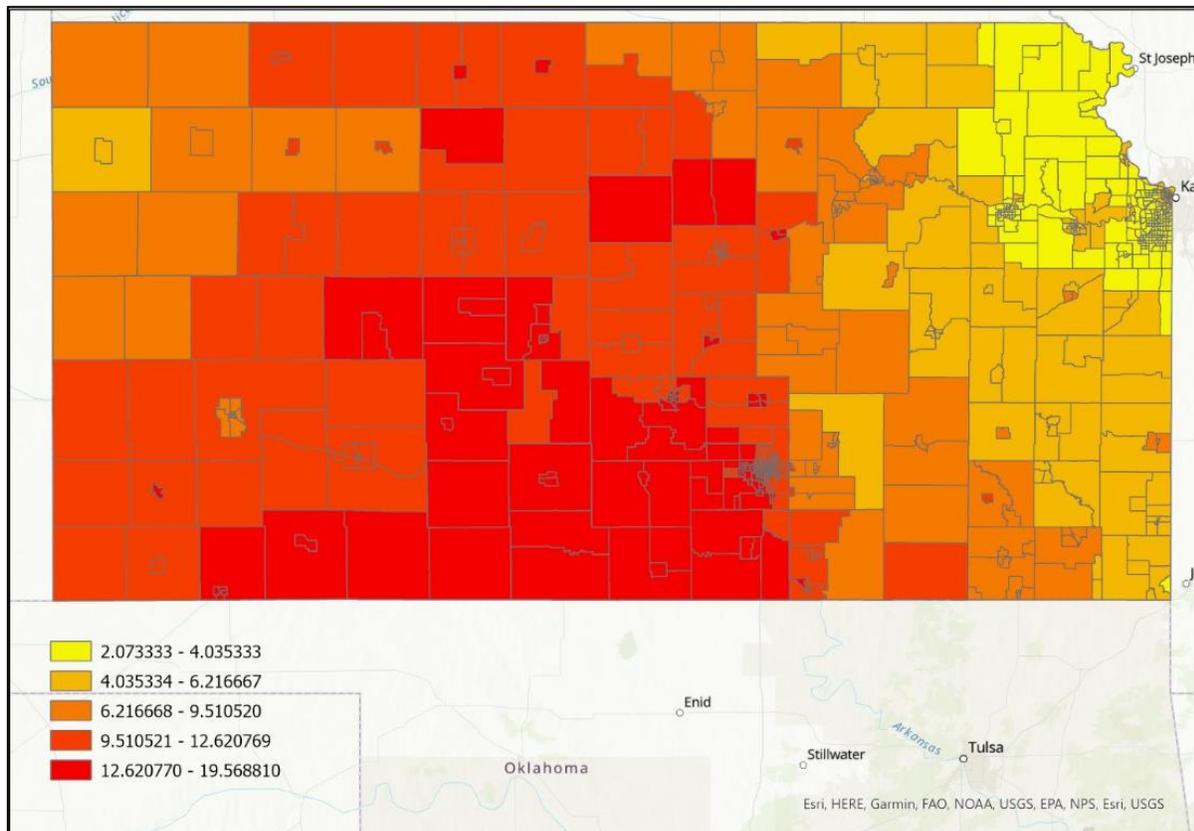


Figure 4.4 Twentieth Century Annual Number of Days with a Max Temperature >100°F

Chapter 5 - Discussion

This preliminary study contributes to the knowledge of heat-related health effects in Kansas. Through collaboration, county and state-level public health agencies can implement procedures and policies to improve weather-related negative health outcomes. Though there is more work to be done to produce stronger evidence of causative relationships between SVI, extreme heat, and chronic respiratory illness, this study indicates the importance of conducting such work. According to the Center for Climate and Energy Solutions, the first step in building heat resilience is identifying populations most vulnerable to its effects (2).

Initial results from this study indicate that southwestern and central Kansas are most likely to face negative respiratory health outcomes related to extreme heat. These geographic locations should be the initial target of preventative measures, policy development, and education resource distribution. An initial step in reducing the physical stressors of heat is providing public cooling centers. The centers could provide an opportunity for those without air conditioning to remain cool during extreme heat events (17). Several studies have demonstrated success in the use of cooling centers (17,18). Kansas does not currently have a statewide initiative for providing these centers. During extreme heat events, Kansas City, KS, does provide public cooling centers, but there is no data indicating the same procedure for areas in more rural areas of Kansas (19). As many of the census tracts demonstrating the most need for heat-related resources are in rural areas, creating designated centers would be an important step in reducing the impact of extreme heat in Kansas.

Education, perhaps one of the most powerful tools in public health, is a relatively inexpensive yet effective measure in decreasing the negative impacts of heat on those in Kansas that are most at risk. Understanding community sociodemographic information related to the SVI allows PHEP officials to prepare for the likely needs of their community. These officials can focus on distributing brochures and information through effective channels to inform vulnerable individuals of air conditioning resources, ways to stay cool, activities to avoid, and clothes to wear. Where funding is available, the SVI can also be used to target the distribution of resources such as fans and water (20).

The co-occurrence of COPD and asthma in 49.5% of census tracts demonstrates a need for continued research and health disparity monitoring. Limitations in this preliminary study leave room for future work in making inferences applicable to samples at the individual level. As public health focuses on population health, these results are an effective means of general resource distribution. There are a number of studies identifying extreme heat as an

exacerbating factor for respiratory illness (21). The results of this study could be more definitive if a temporal relationship between specific extreme heat events and emergency room (ER) visits was established. Another factor potentially limiting this study is the definition of extreme heat. Extreme heat in this case was defined as days exceeding a temperature of 100°F. In the context of human health, extreme heat temperature values can be much lower depending on relative humidity and duration of the heat event (22).

Future work would benefit from incorporating more extensively detailed measures of extreme heat. This would allow researchers to account for environmental differences across the geographic regions of Kansas. Also, potentially benefiting future work in this area would be collecting household data within census tracts. This would allow for a more localized and targeted approach to public health resource distribution to be used by county governments.

Increasingly inclusive studies accounting for all variables in the relationships between extreme heat, social vulnerability, and chronic respiratory illness would improve targeted public health intervention strategies. For example, extreme heat and chronic respiratory illness most notably demonstrate an indirect relationship. Extreme heat often worsens air quality, leading to increased exposure to harmful pollutants, which in turn may decrease lung function, exacerbating illnesses such as asthma and COPD (3). Simultaneously, air quality is a potential confounding factor in the relationship between social vulnerability and chronic respiratory illness as air pollution can be more prevalent in areas with high SVI values due to public transportation and industrial activity. Furthermore, those living in more socially vulnerable areas may have limited access to preventative and maintenance healthcare, which may increase the risk of poor respiratory health outcomes in general (23). Lastly, high social vulnerability can be indicative of lower-quality housing conditions including, but not limited to, lack of air conditioning and poor ventilation, increasing the risk of respiratory symptoms (24). Though SVI accounts for several related factors including transportation, age, and housing type, targeted public health interventions are more likely to succeed when considering all potentially confounding factors. Cross-sectional research, as employed in this preliminary study, can be useful in taking an introductory look at variable relationships. Conclusions are observational, represent a snapshot in time, and should not be used to distribute high stake or costly resources (25). Therefore, looking at extreme heat, SVI, and chronic respiratory illness is an important preliminary step, but there is more work to be done at the community level to positively impact related health strategies.

Overall, this preliminary study sheds light on the importance of addressing heat-related health effects in Kansas. By identifying vulnerable populations and implementing policies,

procedures, and educational resources, county and state-level public health agencies can work towards reducing the negative impact of extreme heat on respiratory health.

Chapter 6 - Competencies

Student Attainment of MPH Foundational Competencies

I had the opportunity to apply many of the MPH Foundation Competencies to my work with both agencies. As outlined in table 5.1, my most significantly attained competencies were competencies 1, 3, 4, 9, and 18.

Table 5.1 Summary of MPH Foundational Competencies

| Number and Competency | | Description |
|-----------------------|---|---|
| 1 | Apply epidemiological methods to the breadth of settings and situations in public health practice. | GIS mapping was used to analyze and visualize the Kansas population and heat data to look for and identify potential relationships. |
| 3 | Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming, and software, as appropriate. | GIS software was used to conduct analyses based on data from a variety of sources. Census tract-level associations were identified and explored. |
| 4 | Interpret results of data analysis for public health research, policy, or practice. | Maps were created and the discovered results were interpreted to various audiences through research poster presentations. Results were applied to public health practice to inform professionals of the next steps. |
| 9 | Design a population-based policy, program, project, or intervention. | An emergency preparedness guide was created with an understanding of the needs of the community through county population data. Additionally, a spatial analysis of Kansas population data was conducted to assess public health needs. |
| 18 | Select communication strategies for different audiences and sectors. | My project results were presented with the intention of appealing to non-public health professionals to facilitate clarity and understanding. |

The following descriptions outline my achievement of the listed competencies during my ILE.

Competency 1 – GIS mapping allowed for the achievement of this competency. Through the mapping with GIS software, I was able to visualize and analyze COPD, asthma, heat, and social vulnerability data. Through visualization, I found census tracts with high disease crude

prevalence. I also spatially analyzed this data in parallel to extreme heat and social vulnerability data to locate areas where of most concern for public health policy and resource distribution. In summary, the epidemiological methods of spatial analysis and disease mapping were applied to conclude the results of my data exploration.

Competency 3 – Using GIS computer-based software I was able to conduct spatial and statistical analyses to allow for a visual understanding of chronic respiratory illness, social vulnerability, and extreme heat in Kansas. I combined several sources of data, chose variables of focus, and used quantitative techniques to identify census tract-level associations.

Competency 4 – The maps created allowed me to identify patterns and interpret results to multiple audiences. These results were included in poster presentations to audiences from several different academic backgrounds. Visual representations, in this case, maps and a poster, allowed for results to be understood and applied for research, policy, or practice.

Competency 9 – Creating a Riley County Emergency Preparedness Guide required that I understand the educational needs of Riley County in relation to this topic. Using county data, I identified topics and formatting preferences and created the booklet to benefit the community’s knowledge and safety practices. Furthermore, conducting a spatial analysis of population data allowed me to assess the public health needs of census tracts in Kansas concerning extreme heat and chronic respiratory health resources. Including SVI in this analysis facilitated my understanding of potential factors associated with the high crude prevalence of respiratory illnesses.

Competency 18 – Recognizing the importance of communicating information successfully to a multitude of audiences, when creating a research poster and an emergency preparedness guide, it was important to include easy-to-understand information. Both products were created with the intention of being reader-friendly regardless of background knowledge.

Table 5.2 MPH Foundational Competencies and Course Taught In

| 22 Public Health Foundational Competencies Course Mapping | MPH 701 | MPH 720 | MPH 754 | MPH 802 | MPH 818 |
|--|----------------|----------------|----------------|----------------|----------------|
| Evidence-based Approaches to Public Health | | | | | |
| 1. Apply epidemiological methods to the breadth of settings and situations in public health practice | x | | x | | |
| 2. Select quantitative and qualitative data collection methods appropriate for a given public health context | x | x | x | | |
| 3. Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate | x | x | x | | |
| 4. Interpret results of data analysis for public health research, policy or practice | x | | x | | |

| 22 Public Health Foundational Competencies Course Mapping | MPH 701 | MPH 720 | MPH 754 | MPH 802 | MPH 818 |
|--|------------------------------|--------------------|--------------------|--------------------|--------------------|
| Public Health and Health Care Systems | | | | | |
| 5. Compare the organization, structure and function of health care, public health and regulatory systems across national and international settings | | x | | | |
| 6. Discuss the means by which structural bias, social inequities and racism undermine health and create challenges to achieving health equity at organizational, community and societal levels | | | | | x |
| Planning and Management to Promote Health | | | | | |
| 7. Assess population needs, assets and capacities that affect communities' health | | x | | x | |
| 8. Apply awareness of cultural values and practices to the design or implementation of public health policies or programs | | | | | x |
| 9. Design a population-based policy, program, project or intervention | | | x | | |
| 10. Explain basic principles and tools of budget and resource management | | x | x | | |
| 11. Select methods to evaluate public health programs | x | x | x | | |
| Policy in Public Health | | | | | |
| 12. Discuss multiple dimensions of the policy-making process, including the roles of ethics and evidence | | x | x | x | |
| 13. Propose strategies to identify stakeholders and build coalitions and partnerships for influencing public health outcomes | | x | | x | |
| 14. Advocate for political, social or economic policies and programs that will improve health in diverse populations | | x | | | x |
| 15. Evaluate policies for their impact on public health and health equity | | x | | x | |
| Leadership | | | | | |
| 16. Apply principles of leadership, governance and management, which include creating a vision, empowering others, fostering collaboration and guiding decision making | | x | | | x |
| 17. Apply negotiation and mediation skills to address organizational or community challenges | | x | | | |
| Communication | | | | | |
| 18. Select communication strategies for different audiences and sectors | DMP 815, FNDH 880 or KIN 796 | | | | |
| 19. Communicate audience-appropriate public health content, both in writing and through oral presentation | DMP 815, FNDH 880 or KIN 796 | | | | |
| 20. Describe the importance of cultural competence in communicating public health content | | x | | | x |
| Interprofessional Practice | | | | | |
| 21. Perform effectively on interprofessional teams | | x | | | x |
| Systems Thinking | | | | | |
| 22. Apply systems thinking tools to a public health issue | | | x | x | |

Student Attainment of MPH Emphasis Area Competencies

The competencies listed in table 5.3 are those which were achieved and applied through my MPH emphasis area coursework. My epidemiology coursework proved to be most beneficial to completing my ILE. The courses MPH 754 and DMP 854 gave me a strong foundation in the understanding of disease surveillance (competency 4) and the analysis of risk factors. I applied knowledge from both courses when making population inferences based on the data analyzed.

The courses BIOL 530, DMP 710, and DMP 850 played a crucial role in shaping my understanding of competencies 1,2,3, and 5. I gained knowledge of pathogens, host response to pathogens, ecological influences, and disease vectors, which I am confident I can apply in the professional field of public health.

Table 5.3 Summary of MPH Emphasis Area Competencies

| MPH Emphasis Area: | | |
|-----------------------|---------------------------------------|--|
| Number and Competency | | Description |
| 1 | Pathogens/pathogenic mechanisms | Evaluate modes of disease causation of infectious agents. |
| 2 | Host response to pathogens/immunology | Investigate the host immune response to infection. |
| 3 | Environmental/ecological influences | Examine the influence of environmental and ecological forces on infectious disease. |
| 4 | Disease surveillance | Analyze disease risk factors and select appropriate surveillance. |
| 5 | Disease vectors | Investigate the role of vectors, toxic plants and other toxins in infectious diseases. |

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Appendix 1: RCHD CASPER Surveys

Riley County CASPER Preparedness

| Demographic Information | |
|---|--|
| Q1. Type of structure <input type="checkbox"/> Single family <input type="checkbox"/> Multiple unit <input type="checkbox"/> Mobile home <input type="checkbox"/> Other (please specify) _____ <input type="checkbox"/> DK <input type="checkbox"/> RF | Q8. How often in the past 12 months would you say your HH was worried or stressed about having enough money to buy nutritious meals? Would you say your HH was worried or stressed <input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Q2. Including yourself, how many people live in your HH? _____ <input type="checkbox"/> DK <input type="checkbox"/> RF | Q9. Does your current homeowner's insurance policy cover 1. Flood damage <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 2. Fire damage <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 3. Tornado damage <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 4. Straight wind damage <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Q3. Including yourself, how many people living in your HH are <input type="checkbox"/> Less than 2 years old <input type="checkbox"/> 2-17 years <input type="checkbox"/> 18-64 years <input type="checkbox"/> 65+ years <input type="checkbox"/> DK <input type="checkbox"/> RF | Q10. Have you or a member of your HH ever been told by a healthcare professional that he/she has 1. Asthma/COPD/Emphysema <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 2. Diabetes <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 3. Developmental disability <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 4. Hypertension/heart disease <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 5. Immunosuppressed <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 6. Physical disability <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 7. Psychosocial/mental illness <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Q4. What race does majority of your HH identify with? <input type="checkbox"/> Asian <input type="checkbox"/> American Indian/Alaska Native <input type="checkbox"/> Black or African American <input type="checkbox"/> White <input type="checkbox"/> Native Hawaiian or Other Pacific Islander <input type="checkbox"/> Hispanic or Latino <input type="checkbox"/> DK <input type="checkbox"/> RF | Q11. Do you or does any member of your HH need 1. Daily medication <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 2. Dialysis <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 3. Home health care <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 4. Oxygen supply <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 5. Wheelchair/cane/walker <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 6. Other type of special care <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Q5. What is the main language spoken in your HH? <input type="checkbox"/> English <input type="checkbox"/> Spanish <input type="checkbox"/> Other (please specify) _____ <input type="checkbox"/> DK <input type="checkbox"/> RF | Q12. In the past 5 years, have you or anybody in your HH taken training in 1. First aid <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 2. CPR <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 3. CERT <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Q6. What is the marital status of your head of HH? <input type="checkbox"/> Married/unmarried couple <input type="checkbox"/> Separated/divorced <input type="checkbox"/> Widowed <input type="checkbox"/> Never married <input type="checkbox"/> DK <input type="checkbox"/> RF | Q13. In the past year, have you reviewed, created, or practiced emergency plans with your HH? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Q7. How often in the past 12 months would you say your HH was worried or stressed about having enough money to pay your rent/mortgage? Would you say your HH was worried or stressed <input type="checkbox"/> Always <input type="checkbox"/> Usually <input type="checkbox"/> Sometimes <input type="checkbox"/> Rarely <input type="checkbox"/> Never <input type="checkbox"/> DK <input type="checkbox"/> RF | Q14. How would you classify your HH's overall emergency preparedness? <input type="checkbox"/> Not at all prepared <input type="checkbox"/> Slightly prepared <input type="checkbox"/> Moderately prepared <input type="checkbox"/> Very prepared <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Communications | |
| Q15. Do you or does anyone in your HH have any of the following? 1. Impaired hearing <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 2. Impaired vision <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 3. Developmental/cognitive disability <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 4. Difficulty understanding English <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 5. Difficulty understanding written material <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF | |
| Q16. What is your HH's main source of information about disasters or emergency events? (Check one) <input type="checkbox"/> Newspaper <input type="checkbox"/> TV <input type="checkbox"/> Radio <input type="checkbox"/> Internet/Online news <input type="checkbox"/> Friends/Family/Word of mouth <input type="checkbox"/> social media <input type="checkbox"/> Text message/Cell phone alert <input type="checkbox"/> Church/Place of worship <input type="checkbox"/> Other (please specify) _____ <input type="checkbox"/> DK <input type="checkbox"/> RF | Q17. Is your HH aware of the following materials to better prepare you and your family for a natural disaster or other significant event? 1. Ready.gov resources <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 2. Educational booklet [handout] <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Situational Preparedness | |
| Q18. Does your HH have any of the following emergency plans 1. Emergency communication plan such as a list of numbers and designated out-of-town contact <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 2. Designated meeting place immediately outside your home or close by in your neighborhood <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 3. Designated meeting place outside of your neighborhood in case you cannot return home <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF | |

| | |
|--|---|
| <p>Q27. What is your HH's current source of important information? <input type="checkbox"/>Newspaper <input type="checkbox"/>TV <input type="checkbox"/>Radio <input type="checkbox"/>Internet/Online news <input type="checkbox"/>Friends/Family/Word of mouth <input type="checkbox"/>social media <input type="checkbox"/>Text message/Cell phone alert <input type="checkbox"/>Church/Place of worship <input type="checkbox"/>Other (please specify) _____ <input type="checkbox"/>DK <input type="checkbox"/>RF</p> | <p>Q28. Has your HH received information from the health department regarding any of the following? 1. Mold/mildew cleanup <input type="checkbox"/>Yes <input type="checkbox"/>No <input type="checkbox"/>DK <input type="checkbox"/>RF 2. Cistern treatment <input type="checkbox"/>Yes <input type="checkbox"/>No <input type="checkbox"/>DK <input type="checkbox"/>RF 3. Food/water distribution <input type="checkbox"/>Yes <input type="checkbox"/>No <input type="checkbox"/>DK <input type="checkbox"/>RF 4. Medical care access <input type="checkbox"/>Yes <input type="checkbox"/>No <input type="checkbox"/>DK <input type="checkbox"/>RF 5. Other services (please specify) _____ <input type="checkbox"/>Yes <input type="checkbox"/>No <input type="checkbox"/>DK <input type="checkbox"/>RF</p> |
| Miscellaneous | |
| <p>Q29. How would you describe the damage to you home? <input type="checkbox"/>Not at all damaged <input type="checkbox"/>Minorsly damaged <input type="checkbox"/>Moderately damaged <input type="checkbox"/>Severely damaged <input type="checkbox"/>DK <input type="checkbox"/>RF</p> | <p>Q31. Did you or members of your HH hear about this survey prior to us talking to you today? (If yes, proceed to question 32) <input type="checkbox"/>Yes <input type="checkbox"/>No <input type="checkbox"/>DK <input type="checkbox"/>RF</p> |
| <p>Q30. Have you seen mold or smelled moldy/musty air in your home since the flood? <input type="checkbox"/>Yes <input type="checkbox"/>No <input type="checkbox"/>DK <input type="checkbox"/>RF</p> | <p>Q32. How did you or you HH member(s) hear about it? (Check all that apply) <input type="checkbox"/>social media <input type="checkbox"/>Website <input type="checkbox"/>Press release <input type="checkbox"/>E-mail <input type="checkbox"/>Family/Friend/Neighbor <input type="checkbox"/>Radio <input type="checkbox"/>Other (please specify) _____ <input type="checkbox"/>DK <input type="checkbox"/>RF</p> |
| <p>Q33. What is your HH's greatest need right now? <input type="checkbox"/>No current needs <input type="checkbox"/>Food <input type="checkbox"/>Electricity <input type="checkbox"/>Water <input type="checkbox"/>Medical care <input type="checkbox"/>Medications <input type="checkbox"/>Transportation <input type="checkbox"/>Physical help with cleanup and repairs <input type="checkbox"/>Financial help <input type="checkbox"/>Trash removal <input type="checkbox"/>Shelter <input type="checkbox"/>Mental health needs <input type="checkbox"/>Other (please specify) _____ <input type="checkbox"/>DK <input type="checkbox"/>RF</p> | |

Riley County CASPER Tornado

| Demographic Information | |
|---|---|
| Q1. Type of structure <input type="checkbox"/> Single family <input type="checkbox"/> Multiple unit <input type="checkbox"/> Mobile home <input type="checkbox"/> Other (please specify) _____ <input type="checkbox"/> DK <input type="checkbox"/> RF | Q7. Since the tornado, how concerned would you say your HH is about having enough money to buy nutritious meals? <input type="checkbox"/> Not at all concerned <input type="checkbox"/> Slightly concerned <input type="checkbox"/> Moderately concerned <input type="checkbox"/> Very concerned <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Q2. Including yourself, how many people live in your HH? _____ <input type="checkbox"/> DK <input type="checkbox"/> RF | Q8. Does your homeowner's insurance policy cover 1. Flood damage <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 2. Fire damage <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 3. Tornado damage <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 4. Straight wind damage <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Q3. Including yourself, how many people living in your HH are <input type="checkbox"/> Less than 2 years old <input type="checkbox"/> 2-17 years <input type="checkbox"/> 18-64 years <input type="checkbox"/> 65+ years <input type="checkbox"/> DK <input type="checkbox"/> RF | Q9. Have you or a member of your HH ever been told by a healthcare professional that he/she has 1. Asthma/COPD/Emphysema <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 2. Diabetes <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 3. Developmental disability <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 4. Hypertension/heart disease <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 5. Immunosuppressed <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 6. Physical disability <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 7. Psychosocial/mental illness <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF *If yes, have you or a member of your HH noticed worsening of chronic conditions following the tornado? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Q4. What race does majority of your HH identify with? <input type="checkbox"/> Asian <input type="checkbox"/> American Indian/Alaska Native <input type="checkbox"/> Black or African American <input type="checkbox"/> White <input type="checkbox"/> Native Hawaiian or Other Pacific Islander <input type="checkbox"/> Hispanic or Latino <input type="checkbox"/> DK <input type="checkbox"/> RF | Q10. Do you or does any member of your HH need 1. Daily medication <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 2. Dialysis <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 3. Home health care <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 4. Oxygen supply <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 5. Wheelchair/cane/walker <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 6. Other type of special care <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Q5. What is the main language spoken in your HH? <input type="checkbox"/> English <input type="checkbox"/> Spanish <input type="checkbox"/> Other (please specify) _____ <input type="checkbox"/> DK <input type="checkbox"/> RF | Q11. In the past 5 years, have you or anybody in your HH taken training in 1. First aid <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 2. CPR <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 3. CERT <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Q6. Since the tornado, how concerned would you say your HH is about having enough money to pay your rent/mortgage? <input type="checkbox"/> Not at all concerned <input type="checkbox"/> Slightly concerned <input type="checkbox"/> Moderately concerned <input type="checkbox"/> Very concerned <input type="checkbox"/> DK <input type="checkbox"/> RF | Q12. Have the members of your HH received a tetanus shot in the last 10 years? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Situational Needs Assessment | |
| Q13. Was anyone in your HH injured during the tornado? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF | Q17. Does your HH currently have a 3-day supply of drinking water other than tap? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Q14. Have you or anyone in your HH become ill due to or since the tornado? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF | Q18. Does your HH current have a 3-day supply of non-perishable food? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Q15. Are you or anyone in you HH having trouble getting the care they need? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF | Q19. Does each person in your HH who takes prescribed medication currently have a 7-day supply? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Q16. Has there been an increase in insect bites/stings since the tornado? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF | Q20. Does your HH currently have a first aid kit? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Communications | |
| Q21. Do you or does anyone in your HH have any of the following? 1. Impaired hearing <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 2. Impaired vision <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 3. Developmental/cognitive disability <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 4. Difficulty understanding English <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 5. Difficulty understanding written material <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF | Q23. What is your HH's current source of important information? <input type="checkbox"/> Newspaper <input type="checkbox"/> TV <input type="checkbox"/> Radio <input type="checkbox"/> Internet/Online news <input type="checkbox"/> Friends/Family/Word of mouth <input type="checkbox"/> social media <input type="checkbox"/> Text message/Cell phone alert <input type="checkbox"/> Church/Place of worship <input type="checkbox"/> Other (please specify) _____ <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Q22. Does your HH currently have a working telephone? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF | |

Miscellaneous

| | |
|--|---|
| <p>Q23. Does your HH currently have a working toilet? <input type="checkbox"/>Yes <input type="checkbox"/>No <input type="checkbox"/>DK <input type="checkbox"/>RF</p> | <p>Q25. Does your HH currently have working electricity? <input type="checkbox"/>Yes <input type="checkbox"/>No <input type="checkbox"/>DK <input type="checkbox"/>RF</p> |
| <p>Q24. Does your HH currently have means of regular waste disposal? <input type="checkbox"/>Yes <input type="checkbox"/>No <input type="checkbox"/>DK <input type="checkbox"/>RF</p> | <p>Q26. Did you or members of your HH hear about this survey prior to us talking to you today? (If yes, proceed to question 27) <input type="checkbox"/>Yes <input type="checkbox"/>No <input type="checkbox"/>DK <input type="checkbox"/>RF</p> |
| <p>Q27. How did you or you HH member(s) hear about it? (Check all that apply) <input type="checkbox"/>social media <input type="checkbox"/>Website <input type="checkbox"/>Press release <input type="checkbox"/>E-mail <input type="checkbox"/>Family/Friend/Neighbor <input type="checkbox"/>Radio <input type="checkbox"/>Other (please specify)_____ <input type="checkbox"/>DK <input type="checkbox"/>RF</p> | |
| <p>Q28. What is your HH's greatest need right now? <input type="checkbox"/>No current needs <input type="checkbox"/>Food <input type="checkbox"/>Electricity <input type="checkbox"/>Water <input type="checkbox"/>Medical care <input type="checkbox"/>Medications <input type="checkbox"/>Transportation <input type="checkbox"/>Physical help with cleanup and repairs <input type="checkbox"/>Financial help <input type="checkbox"/>Trash removal <input type="checkbox"/>Shelter <input type="checkbox"/>Mental health needs <input type="checkbox"/>Other (please specify) _____ <input type="checkbox"/>DK <input type="checkbox"/>RF</p> | |

Riley County CASPER Flooding

| Demographic Information | |
|---|---|
| Q1. Type of structure <input type="checkbox"/> Single family <input type="checkbox"/> Multiple unit <input type="checkbox"/> Mobile home <input type="checkbox"/> Other (please specify) _____ <input type="checkbox"/> DK <input type="checkbox"/> RF | Q7. Since the flood, how concerned would you say your HH is about having enough money to buy nutritious meals? <input type="checkbox"/> Not at all concerned <input type="checkbox"/> Slightly concerned <input type="checkbox"/> Moderately concerned <input type="checkbox"/> Very concerned <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Q2. Including yourself, how many people live in your HH? _____ <input type="checkbox"/> DK <input type="checkbox"/> RF | Q8. Does your current homeowner's insurance policy cover 1. Flood damage <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 2. Fire damage <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Q3. Including yourself, how many people living in your HH are <input type="checkbox"/> Less than 2 years old <input type="checkbox"/> 2-17 years <input type="checkbox"/> 18-64 years <input type="checkbox"/> 65+ years <input type="checkbox"/> DK <input type="checkbox"/> RF | Q9. Have you or a member of your HH ever been told by a healthcare professional that he/she has 1. Asthma/COPD/Emphysema <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 2. Diabetes <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 3. Developmental disability <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 4. Hypertension/heart disease <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 5. Immunosuppressed <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 6. Physical disability <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 7. Psychosocial/mental illness <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF *If yes, have you or a member of your HH noticed worsening of chronic conditions following the flood? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Q4. What race does majority of your HH identify with? <input type="checkbox"/> Asian <input type="checkbox"/> American Indian/Alaska Native <input type="checkbox"/> Black or African American <input type="checkbox"/> White <input type="checkbox"/> Native Hawaiian or Other Pacific Islander <input type="checkbox"/> Hispanic or Latino <input type="checkbox"/> DK <input type="checkbox"/> RF | Q10. Do you or does any member of your HH need 1. Daily medication <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 2. Dialysis <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 3. Home health care <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 4. Oxygen supply <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 5. Wheelchair/cane/walker <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 6. Other type of special care <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |
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| Q6. Since the flood, how concerned would you say your HH is about having enough money to pay your rent/mortgage? <input type="checkbox"/> Not at all concerned <input type="checkbox"/> Slightly concerned <input type="checkbox"/> Moderately concerned <input type="checkbox"/> Very concerned <input type="checkbox"/> DK <input type="checkbox"/> RF | Q12. Have the members of your HH received a tetanus shot in the last 10 years? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |
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| Q15. Are you or anyone in you HH having trouble getting the care they need? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF | Q21. Does each person in your HH who takes prescribed medication currently have a 7-day supply? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Q16. Has there been an increase in insect bites/stings since the flood? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF | Q22. Does your HH currently have a first aid kit? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Q17. Does your HH currently have a working toilet? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF | Q23. Does your HH currently have working electricity? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Q18. Does your HH currently have means of regular waste disposal? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF | Q24. Has your HH noticed an increase in the number of rats/mice? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |
| Communications | |
| Q25. Do you or does anyone in your HH have any of the following? 1. Impaired hearing <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 2. Impaired vision <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 3. Developmental/cognitive disability <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 4. Difficulty understanding English <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF 5. Difficulty understanding written material <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF | Q26. Does your HH currently have a working telephone? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DK <input type="checkbox"/> RF |

| | |
|--|---|
| <p>Q27. What is your HH's current source of important information? <input type="checkbox"/>Newspaper <input type="checkbox"/>TV <input type="checkbox"/>Radio <input type="checkbox"/>Internet/Online news <input type="checkbox"/>Friends/Family/Word of mouth <input type="checkbox"/>social media <input type="checkbox"/>Text message/Cell phone alert <input type="checkbox"/>Church/Place of worship <input type="checkbox"/>Other (please specify) _____ <input type="checkbox"/>DK <input type="checkbox"/>RF</p> | <p>Q28. Has your HH received information from the health department regarding any of the following? 1. Mold/mildew cleanup <input type="checkbox"/>Yes <input type="checkbox"/>No <input type="checkbox"/>DK <input type="checkbox"/>RF 2. Cistern treatment <input type="checkbox"/>Yes <input type="checkbox"/>No <input type="checkbox"/>DK <input type="checkbox"/>RF 3. Food/water distribution <input type="checkbox"/>Yes <input type="checkbox"/>No <input type="checkbox"/>DK <input type="checkbox"/>RF 4. Medical care access <input type="checkbox"/>Yes <input type="checkbox"/>No <input type="checkbox"/>DK <input type="checkbox"/>RF 5. Other services (please specify) _____ <input type="checkbox"/>Yes <input type="checkbox"/>No <input type="checkbox"/>DK <input type="checkbox"/>RF</p> |
| Miscellaneous | |
| <p>Q29. How would you describe the damage to you home? <input type="checkbox"/>Not at all damaged <input type="checkbox"/>Minorly damaged <input type="checkbox"/>Moderately damaged <input type="checkbox"/>Severely damaged <input type="checkbox"/>DK <input type="checkbox"/>RF</p> | <p>Q31. Did you or members of your HH hear about this survey prior to us talking to you today? (If yes, proceed to question 32) <input type="checkbox"/>Yes <input type="checkbox"/>No <input type="checkbox"/>DK <input type="checkbox"/>RF</p> |
| <p>Q30. Have you seen mold or smelled moldy/musty air in your home since the flood? <input type="checkbox"/>Yes <input type="checkbox"/>No <input type="checkbox"/>DK <input type="checkbox"/>RF</p> | <p>Q32. How did you or you HH member(s) hear about it? (Check all that apply) <input type="checkbox"/>social media <input type="checkbox"/>Website <input type="checkbox"/>Press release <input type="checkbox"/>E-mail <input type="checkbox"/>Family/Friend/Neighbor <input type="checkbox"/>Radio <input type="checkbox"/>Other (please specify) _____ <input type="checkbox"/>DK <input type="checkbox"/>RF</p> |
| <p>Q33. What is your HH's greatest need right now? <input type="checkbox"/>No current needs <input type="checkbox"/>Food <input type="checkbox"/>Electricity <input type="checkbox"/>Water <input type="checkbox"/>Medical care <input type="checkbox"/>Medications <input type="checkbox"/>Transportation <input type="checkbox"/>Physical help with cleanup and repairs <input type="checkbox"/>Financial help <input type="checkbox"/>Trash removal <input type="checkbox"/>Shelter <input type="checkbox"/>Mental health needs <input type="checkbox"/>Other (please specify) _____ <input type="checkbox"/>DK <input type="checkbox"/>RF</p> | |

Appendix 2: Overview of Riley County Emergency Operations Plan

RCHD EOP



Emergency Operations Plan

FOR OFFICIAL USE ONLY

NOTICE: This document contains information pertaining to the deployment, mobilization, and tactical operations of Riley County Health Department in response to emergencies. It is exempt from public disclosure under Kansas state law.

Last Updated: 11/30/2022

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Appendix 3: Riley County Emergency Action Guide



Riley County Health Department Emergency Action Guide

Last Updated: 12/5/2022

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Figure 1: Riley County Health Department Campus Outdoor Assembly Areas

Figure 2: Clinic & Administration Building, First Floor

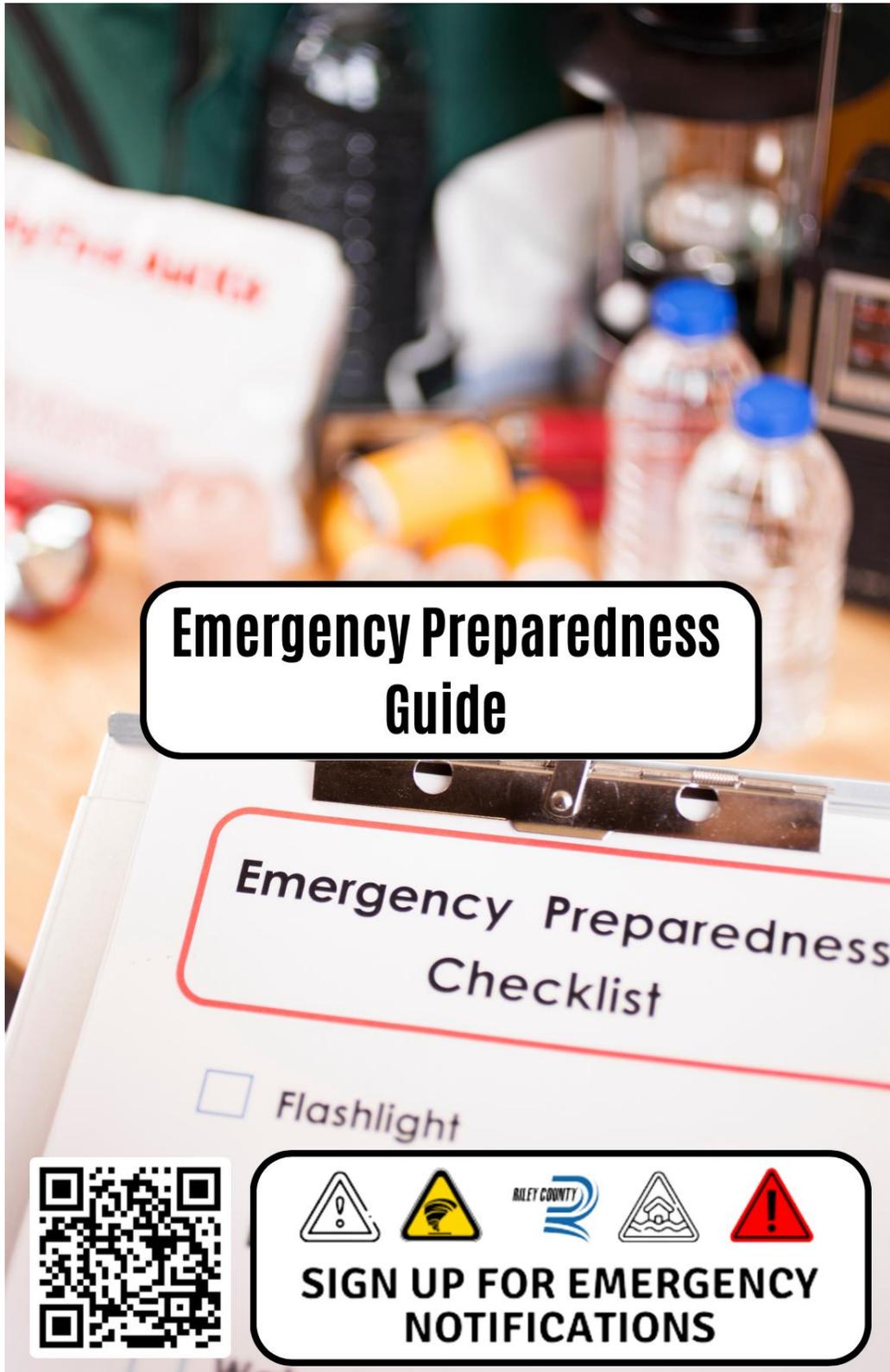
Figure 3: Clinic & Administration Building, Second Floor

Figure 4: Family & Child Resource Center, First Floor

Figure 5: Family & Child Resource Center, Second Floor

| | | | |
|---|----------------------|---|----------------------|
|  | Evacuation Map |  | Fire Extinguisher |
|  | Fire Exit Path |  | Emergency Pull Box |
|  | Tornado Safe Zone |  | Defibrillator (AED) |
|  | Tornado Refuge Area |  | Intercom (w/ zone #) |
|  | Tornado Shelter Path | | |

Appendix 4: Riley County Emergency Preparedness Guide

A graphic for an emergency preparedness guide. It features a background image of emergency supplies like water bottles and a flashlight. Overlaid on this is a white rounded rectangle with the text "Emergency Preparedness Guide". Below that is a clipboard with a red-bordered label that says "Emergency Preparedness Checklist". Under the label, there is a checkbox next to the word "Flashlight". At the bottom left is a QR code. At the bottom right is a black-bordered box containing four warning icons (a white triangle with an exclamation mark, a yellow triangle with a black exclamation mark, the Riley County logo, and a red triangle with a white exclamation mark), followed by the text "SIGN UP FOR EMERGENCY NOTIFICATIONS".

Emergency Preparedness Guide

Emergency Preparedness Checklist

Flashlight




SIGN UP FOR EMERGENCY NOTIFICATIONS

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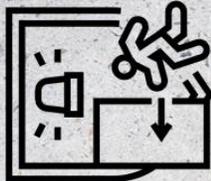
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Preparing for thunderstorms



Terms to know

Severe thunderstorm watch:
severe thunderstorms are likely to occur

Severe thunderstorm warning:
severe thunderstorms have been spotted, and people in the path of the storm are in danger

Thunderstorms:

- Include powerful winds
- Create lightning and hail
- Cause flash flooding and tornadoes

Take an Active Role in Your Safety
 Go to Ready.gov and search for thunderstorm, lightning, or hail.
 Download the FEMA app to get more information about preparing for thunderstorm, lightning, or hail.

Know your risk and sign up for your community's warning system



Cut down trees that may be in danger of falling on your home



Make an emergency plan that identifies sturdy buildings to take shelter in



DID YOU KNOW?

Lightning is a leading cause of injury and death from weather-related hazards



Staying safe during a thunderstorm



Avoid running water



If boating or swimming, get to land immediately



Avoid using electronic devices connected to an electrical outlet



Unplug appliances and other electric devices



Watch for fallen power lines and trees

Staying safe during a thunderstorm

Pay attention to authorities and weather forecasts for information on whether it is safe to go outside and other important instructions

Floods



Floods are the most common natural disaster in the United States

If you are under a flood warning



Know your risk and sign up for your community's warning system



Make a plan for your household



Find a safe shelter right away



Move to higher ground or a higher floor



Purchase flood insurance



Go to ready.gov and search for flood. Download the FEMA app to get more information about preparing for a flood. Find Emergency Safety Tips under Prepare.



Staying safe during a flood



Evacuate if told to evacuate



Contact your healthcare provider if you are sick and need medical attention. Call 9-1-1 in the event of a medical emergency



Stay off bridges over fast-moving water



Stay inside your car if it is trapped in a building. Get on the roof if water is rising inside the car



Listen to local alerting systems for current emergency information and instructions regarding flooding



Get to the highest level if trapped in a building. Only get on the roof if necessary and once there, signal for help. Do not climb into a closed attic to avoid getting trapped by rising flood water.



DID YOU KNOW?

When flooding is imminent or predicted, National Flood Insurance Program (NFIP) policyholders are eligible to receive up to \$1000 to purchase loss avoidance supplies

Staying safe after a flood



Pay attention to authorities for information and instructions. Return home only when authorities say it is safe.

Avoid driving except in emergencies

Be aware that snakes and other animals may be in your house

People with asthma and other lung conditions and/or immune suppression should not enter buildings with indoor water leaks or mold growth that can be seen or smelled. Children should not take part in disaster cleanup work

Wear heavy work gloves, protective clothing and boots during clean up and use appropriate face coverings or masks if cleaning mold or other debris

Avoid wading in flood water, which can be contaminated and contain dangerous debris. Underground or downed power lines can also be electrically charged the water.

Do not touch electrical equipment if it is wet or if you are standing in water. Turn off the electricity to prevent electric shock if it is safe to do so.

Tornadoes

When under a tornado or severe weather warning:

Go to a shelter such as a safe room, basement, storm cellar, or a small interior room on the lowest level of a sturdy building

Visit local news websites and social media accounts for up-to-date information

Stay away from windows, doors, and outside walls

Watch out for flying debris that can cause injury or death

Do not go under an overpass or bridge. You're safer in a low, flat location

If you can't stay at home, make plans to go to a public shelter

Use your arms to protect your head and neck



DID YOU KNOW?

Almost every state in the U.S. is subject to tornadoes

Preparing for a tornado

Know your area's risk and sign up for your community's warning system

Know the signs of a tornado

Pay attention to weather reports

Identify and practice going to a safe shelter

Plan for your pet(s)

Prepare for a long-term stay at home or sheltering in place

Staying safe during a tornado

Immediately go to a safe location that you have identified

Pay attention to local alerting systems

Protect yourself

Do not try to outrun a tornado in a vehicle

Staying safe after a tornado

Pay attention to local officials for updated information

Stay clear of fallen power lines or broken utility lines

Contact your healthcare provider if you are sick and need medical attention. Call 9-1-1 in the event of a medical emergency

Wear appropriate gear during clean-up

Extreme heat

Preparing for extreme heat

Extreme heat is a period of high heat and humidity with temperatures above 90 degrees for at least two to three days

Learn to recognize the signs of heat illness

Use window reflectors specifically designed to reflect heat back outside

Do not rely on a fan as your primary cooling device

Add insulation to keep the heat out

Identify places in your community where you can go to get cool

Install window air conditioners and insulate around them

Cover the windows with drapes or shades

Use a powered attic ventilator, or attic fan, to regulate the heat level of a building's attic by clearing out hot air

Weather-strip doors and windows

DID YOU KNOW?

Extreme heat is responsible for the highest number of annual deaths among all weather-related hazards

If you are unable to afford your cooling costs, weatherization, or energy-related home repairs, contact the Low-Income Home Energy Assistance Program (LIHEAP) for help at 1-866-674-6327

Staying safe during extreme heat

Never leave people or pets in a closed car on a warm day

If air conditioning is not available in your home, go to a cooling center

Take cool showers or baths

Wear loose, lightweight, light-colored clothing

Use your oven less to help reduce the temperature in your home

Drink plenty of fluids to stay hydrated

Avoid high energy activities or work outdoors, during midday heat, if possible

Watch for heat cramps, heat exhaustion, and stroke

Consider pet safety. If they are outside, make sure they have plenty of cool water and access to comfortable shade

If using a mask, use one that is made of breathable fabric such as cotton, instead of polyester

Recognizing the signs of heat cramps, heat exhaustion, and heat stroke

| | What to look for | What to do |
|------------------------|--|---|
| Heat cramps | <ul style="list-style-type: none"> • Heavy sweating during intense exercise • Muscle pain or spasms | <ul style="list-style-type: none"> • Stop physical activity and move to a cool place • Drink water or a sports drink • Wait for cramps to go away before you do any more physical activity |
| Heat exhaustion | <ul style="list-style-type: none"> • Heavy sweating • Cold, pale, and clammy skin • Fast, weak pulse • Nausea or vomiting • Muscle cramps • Tiredness or weakness • Dizziness • Headache • Fainting (passing out) | <ul style="list-style-type: none"> • Move to a cool place • Loosen your clothes • Put cool, wet clothes on your body or take a cool bath • Sip water |
| Heat stroke | <ul style="list-style-type: none"> • High body temperature (103°F or higher) • Hot, red, dry, or damp skin • Fast, strong pulse • Headache • Dizziness • Nausea • Confusion • Losing consciousness (passing out) | <ul style="list-style-type: none"> • Call 911 right away, heat stroke is a medical emergency • Move the person to a cooler place • Help lower the person's temperature with cool cloths or a cool bath • Do not give the person anything to drink |

Winter weather

Terms to know



Winter storm warning:
Issued when hazardous winter weather in the form of heavy snow, heavy freezing rain, or heavy sleet is imminent or occurring. Winter Storm Warnings are usually issued 12 to 24 hours before the event is expected to begin.



Winter storm watch:
Alerts the public to the possibility of a blizzard, heavy snow, heavy freezing rain, or heavy sleet. Winter Storm Watches are usually issued 12 to 48 hours before the beginning of a Winter Storm.



Winter weather advisory:
Issued for accumulations of snow, freezing rain, freezing drizzle, and sleet which will cause significant inconveniences and, if caution is not exercised, could lead to life-threatening situations



If you are unable to afford your cooling costs, weatherization, or energy-related home repairs, contact the Low-income Home Energy Assistance Program (LIHEAP) for help at 1-866-674-6327

Preparing for winter

Prepare your home to keep out the cold with insulation, caulking, and weather stripping

Create a winter emergency supply kit

Learn how to keep your pipes from freezing

Have extra batteries for radios/flashlights

Install and test smoke alarms and carbon monoxide detectors with battery backups

Gather supplies in case you need to stay home for several days without power



Staying safe during winter weather

Your stay off roads is possible. If trapped in your car, then stay inside text

Limit your time outside. If you need to go outside, then wear layers of warm clothing. Watch for signs of frostbite and hypothermia

Reduce the risk of heart attack by avoiding overexertion when shoveling snow and walking in the snow



DID YOU KNOW?

You should have chimney or flue professionally inspected annually. Contact your local fire department for inspector recommendations or search online.



Frostbite

Frostbite causes loss of feeling and color around the face, fingers, and toes

Signs: numbness, white or grayish-yellow skin, firm or waxy skin

Actions: Go to a warm room. Soak in warm water. Use body heat to warm. Do not massage or use a heating pad



Hypothermia

Hypothermia is an unusually low body temperature. A temperature below 95 degrees is an emergency.

Signs: shivering, exhaustion, confusion, fumbling hands, memory loss, slurred speech, or drowsiness

Actions: Go to a warm room. Warm the center of the body first. Keep dry and wrapped up in warm blankets, including head and neck

Wildfires

Recognize warnings and alerts

Sign up for community alerts and pay attention to air quality alerts

Make an emergency plan

Have a plan that is understood by the entire family in case there is a need for quick evacuation

Review important documents

Strengthen your home

Know your evacuation zone

Gather supplies



DID YOU KNOW?

85% of wildfires are caused by humans

Staying safe during a wildfire

Pay attention to emergency alerts and notifications

Evacuate immediately if authorities tell you to do so

If trapped, call 9-1-1 and give your location, turn on lights to help rescuers find you

Use an N95 mask to protect yourself from smoke inhalation

Shelter in place, if possible

Returning home after a wildfire

- Do not return home until authorities say it is safe to do so
- Avoid hot ash, charred trees, smoldering debris, and live embers
- When cleaning, wear protective clothing (long-sleeved shirt, long pants, work gloves, and sturdy thick-soled shoes) during

Staying safe during clean-up efforts

- Use a respirator to limit your exposure
- Wet debris to minimize breathing dust particles
- Document property damage with photographs and contact your insurance company for assistance
- Send text messages or use social media to reach out to family and friends. Make calls only in emergencies

Take an Active Role in Your Safety

Go to [Ready.gov](https://www.fema.gov) and search for wildfire. Download the FEMA app to get more information about preparing for a wildfire.

Bioterrorism

Biological agents are organisms or toxins that can kill or disable people, livestock, and crops. A biological attack is the deliberate release of germs or other biological substances that can make you sick.

Preparing for a biological threat

Make a family emergency plan

Check with your doctor to make sure everyone in your family has up-to-date immunizations

Consider installing a High-Efficiency Particulate Air (HEPA) filter in your furnace duct, which will filter out most biological agents that may enter your home.

HAZARD

A biological attack may or may not be immediately obvious. In most cases, local health care workers will report a pattern of unusual illness or there will be a wave of sick people seeking emergency medical attention. You would be alerted through an emergency radio or TV broadcast, a telephone call, or a home visit from an emergency response worker.

During a biological threat

The first evidence of an attack may be when you notice symptoms of the disease caused by exposure to an agent. In the event of a biological attack, public health officials may not immediately be able to provide information on what you should do. It will take time to figure out exactly what the illness is, how it should be treated, and who is in danger.

Watch tv, listen to the radio, or check the internet for official news and information

If you become aware of a suspicious substance, quickly get away

Cover your mouth and nose with layers of fabric that can filter the air but still allow breathing

If you have been exposed to a biological agent, remove, and bag your clothes and personal items. Follow instructions for official disposal of contaminated items

Avoid crowds

Wash your hands with soap and water frequently and do not share food or utensils

Follow instructions of doctors and other public health officials

Family Communication Plan

Meeting Places

Neighborhood: _____

Community: _____

Family/Friends In Town

Name: _____

Home #: _____ Cell #: _____

Work/School#: _____

Email: _____

Name: _____

Home #: _____ Cell #: _____

Work/School#: _____

Email: _____

Name: _____

Home #: _____ Cell #: _____

Work/School#: _____

Email: _____

Neighborhood Contact

Name: _____

Home #: _____ Cell #: _____

Work/School#: _____

Email: _____

Important local phone numbers



Riley County Health
Department
(785)-776-4779

Riley County
Emergency
Management
(785)-537-6333



Pottawatomie
County Health
Department
(785)-457-3719

Pottawatomie
County
Emergency
Management
(785)-457-3358



Geary County Health
Department
(785)-762-5788

Geary County
Emergency
Management
(785)-238-1290

Police/Fire _____

Ambulance _____

Poison Control Center 1-800-222-1222

Doctor _____

Hospital _____

Local weather _____

Road conditions _____

Utilities _____

Water _____

Electricity _____

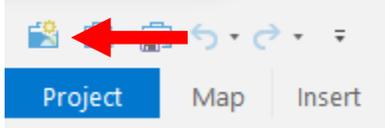
Gas _____

Telephone _____

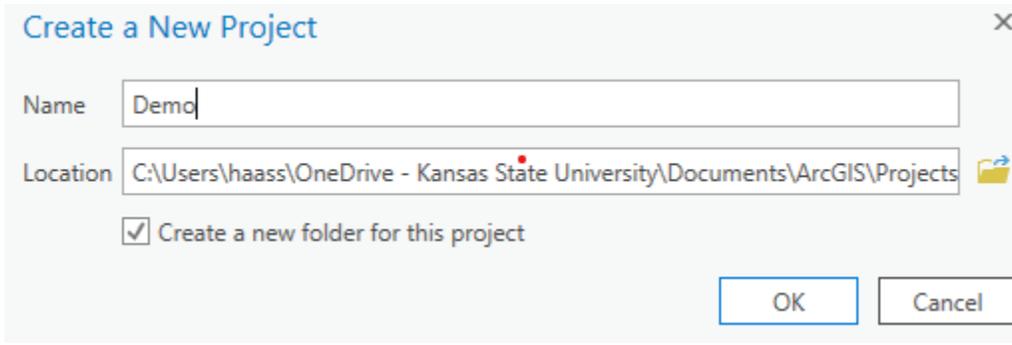
Other _____

Appendix 5: Steps to Creating a Census Tract Level Map using Readily Available Data Resources

1. Open ArcGIS Pro 3.0 and create a new project by selecting the following icon.



2. Name the project, select your preferred location, and select "OK" to save.



3. Proceed to <https://www.census.gov/cgi-bin/geo/shapefiles/index.php> to download TIGER/Line® shapefiles for Kansas census tracts.

An official website of the United States government

United States
Census
Bureau

TIGER/Line® Shapefiles

Select the year and layer you are interested in from the dropdown menus below and click "Submit" for a list of the available geographic areas.

[TIGER/Line Shapefiles Main](#)
[Access our FTP site for additional](#)

Select year: **Click the drop-down menu to select your chosen year.**

Select a layer type: **Click the drop-down menu to select your chosen layer**

Select submit when you are finished.

Source: US Census Bureau, Geography Division

CONNECT WITH US
Information Quality | Data Linkage Infrastructure | Data Protection and Privacy Policy | Accessibility | FOIA | Inspector General | No FEAR Act | U.S. Department of Commerce | USA.gov

Measuring America's People, Places, and Economy



2021 TIGER/Line® Shapefiles: Census Tracts

Return to: [Main Download Page](#) | [TIGER/Line Shapefiles Main](#)

Census Tract

Select a State:

Click the drop-down menu to select your chosen state. Select download to download the necessary shape files to your computer.

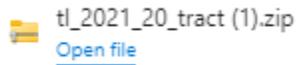
Source: US Census Bureau, Geography Division

CONNECT WITH US

[Information Quality](#) | [Data Linkage Infrastructure](#) | [Data Protection and Privacy Policy](#) | [Accessibility](#)
[No FEAR Act](#) | [U.S. Department of Commerce](#) | [USA.gov](#)

Measuring America's People, Places, and Economy

- The downloaded information will include a .zip file and all of the files that will need to be extracted.

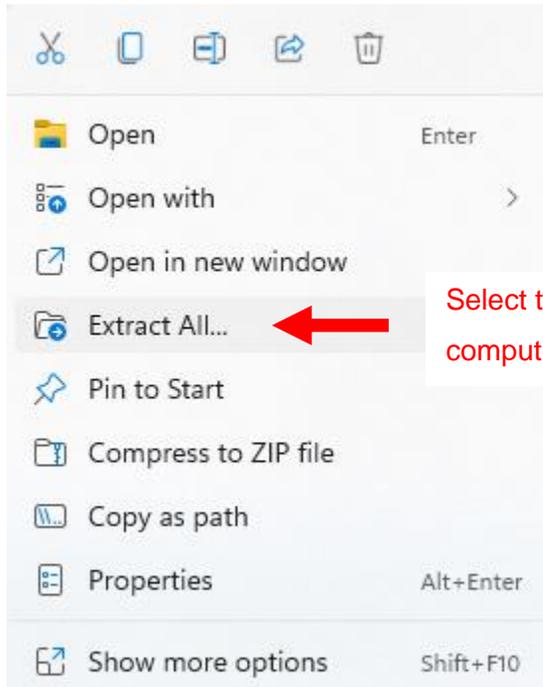


Select "Open file" to view the folder's contents.

Your folder should contain all of the following file types.

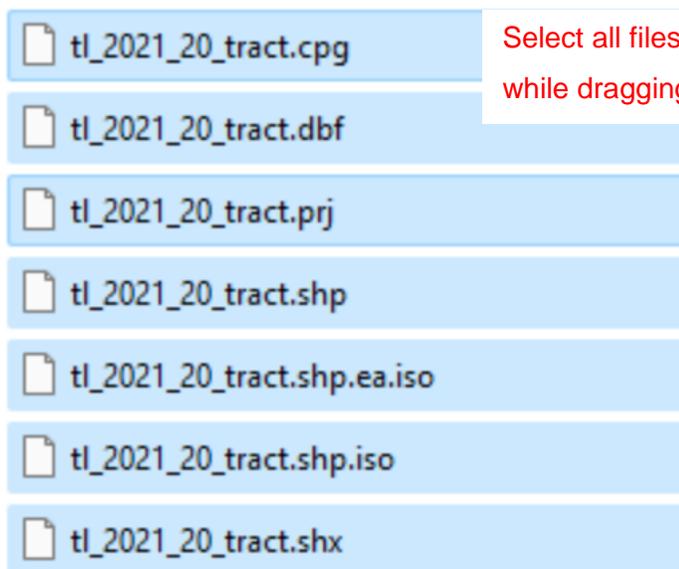
| | |
|-----------------------------|--------------|
| tl_2021_20_tract.cpg | CPG File |
| tl_2021_20_tract.dbf | DBF File |
| tl_2021_20_tract.prj | PRJ File |
| tl_2021_20_tract.shp | SHP File |
| tl_2021_20_tract.shp.ea.iso | XML Document |
| tl_2021_20_tract.shp.iso | XML Document |
| tl_2021_20_tract.shx | SHX File |

5. Once you confirm that your folder is complete. Locate the .zip file on your computer and right-click to open the following task menu.

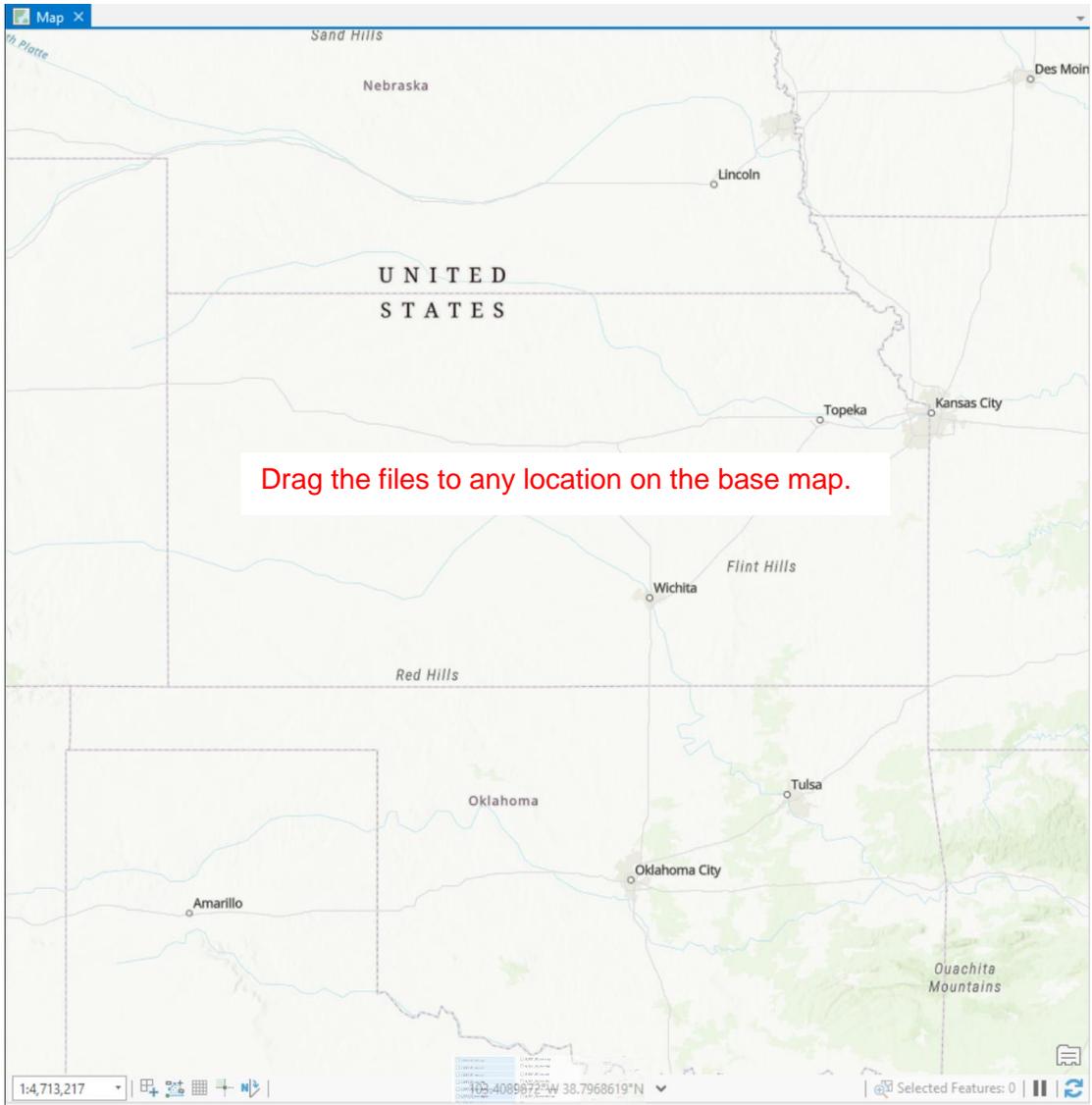


Select this option to extract the files onto your computer.

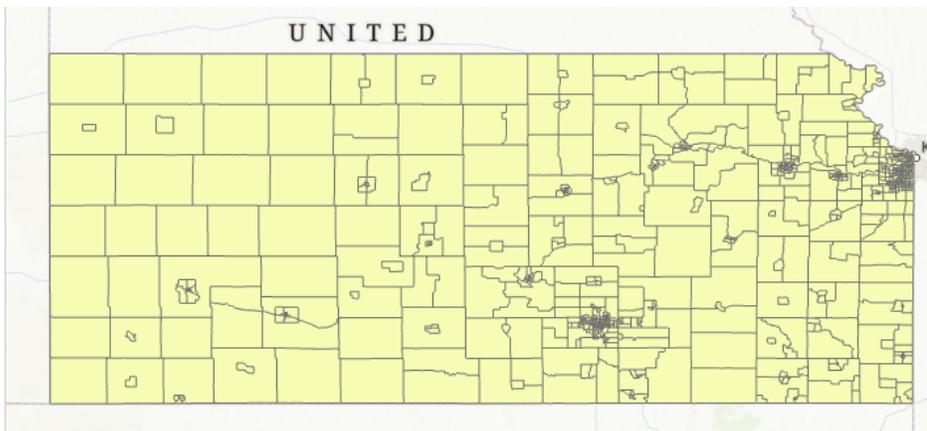
6. Once all files have been extracted, select all the files simultaneously and drag them onto your map.



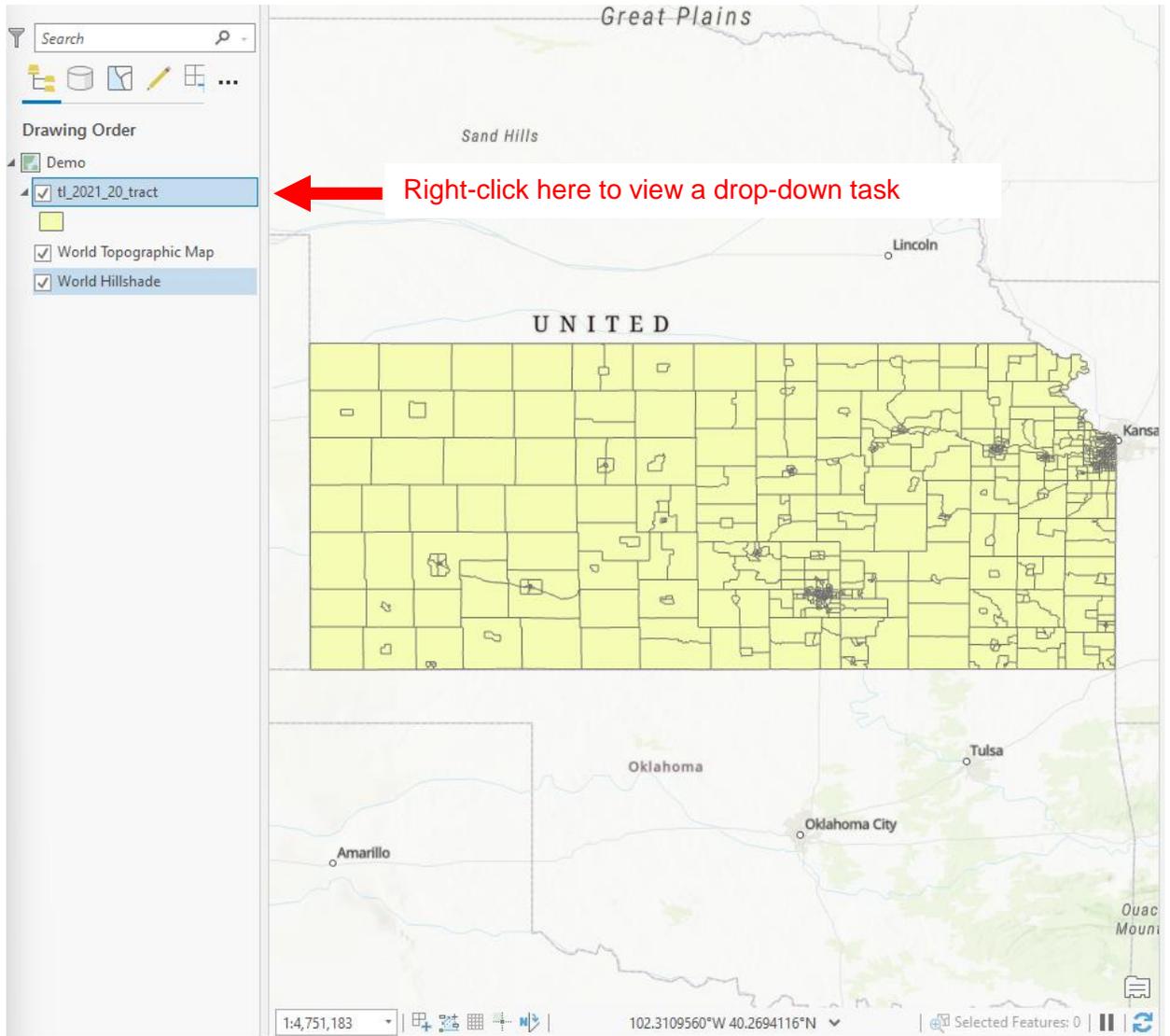
Select all files simultaneously by left clicking while dragging the cursor over all the files.



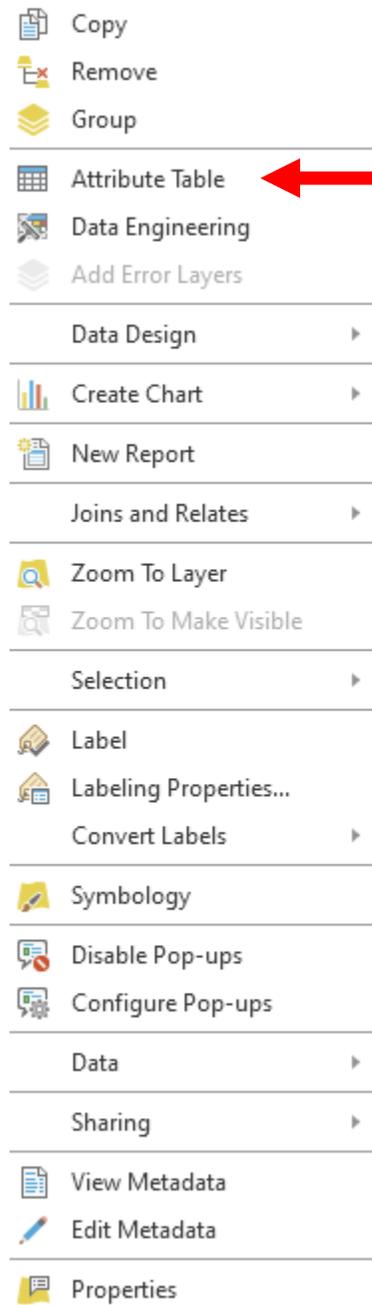
At this point, you will see a map of Kansas that is divided by census tract. Your map will look similar to the one below.



7. Confirm the successful transfer of all census tract information by right-clicking your new layer name and selecting “attribute table”.



You should see the following menu:



Select here to view the census data that is currently being stored by the software.

The attribute table should be located below the map in the following format:

| FID | Shape | STATEFP | COUNTYFP | TRACTCE | GEOID | NAME | NAMELSAD | MTFCC | FUN |
|-----|---------|---------|----------|---------|-------------|------|-------------------|-------|-----|
| 0 | Polygon | 20 | 147 | 475300 | 20147475300 | 4753 | Census Tract 4753 | G5020 | S |
| 1 | Polygon | 20 | 125 | 951300 | 20125951300 | 9513 | Census Tract 9513 | G5020 | S |
| 2 | Polygon | 20 | 013 | 480600 | 20013480600 | 4806 | Census Tract 4806 | G5020 | S |
| 3 | Polygon | 20 | 013 | 480700 | 20013480700 | 4807 | Census Tract 4807 | G5020 | S |
| 4 | Polygon | 20 | 013 | 480800 | 20013480800 | 4808 | Census Tract 4808 | G5020 | S |
| 5 | Polygon | 20 | 125 | 950300 | 20125950300 | 9503 | Census Tract 9503 | G5020 | S |
| 6 | Polygon | 20 | 125 | 950100 | 20125950100 | 9501 | Census Tract 9501 | G5020 | S |
| 7 | Polygon | 20 | 125 | 950200 | 20125950200 | 9502 | Census Tract 9502 | G5020 | S |
| 8 | Polygon | 20 | 125 | 950700 | 20125950700 | 9507 | Census Tract 9507 | G5020 | S |
| 9 | Polygon | 20 | 125 | 950800 | 20125950800 | 9508 | Census Tract 9508 | G5020 | S |
| 10 | Polygon | 20 | 125 | 950400 | 20125950400 | 9504 | Census Tract 9504 | G5020 | S |
| 11 | Polygon | 20 | 125 | 950500 | 20125950500 | 9505 | Census Tract 9505 | G5020 | S |

- Next, prepare your chosen data for ArcGIS. Excel data can be downloaded from several sources. Once this data is downloaded onto your computer, create short column headings, and check to ensure there are no non-numerical values in columns where there should not be.

9. Your dataset should also include a column that allows for the spatial joining of layers. This should be an identifying numeric value that is consistent in each census tract in both the shapefiles and your data file. See below for an example.

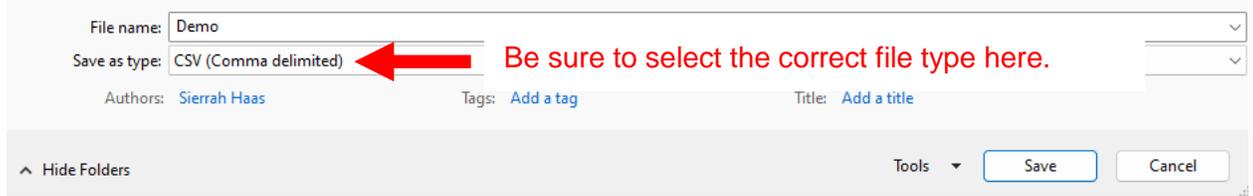
ArcGIS attribute table including GEOID.

| | FID | Shape | STATEFP | COUNTYFP | TRACTCE | GEOID | NAMELSAD | MTFCC | FUN |
|----|-----|---------|---------|----------|---------|-------------|----------|-------------------|---------|
| 1 | 0 | Polygon | 20 | 147 | 475300 | 20147475300 | 4753 | Census Tract 4753 | G5020 S |
| 2 | 1 | Polygon | 20 | 125 | 951300 | 20125951300 | 9513 | Census Tract 9513 | G5020 S |
| 3 | 2 | Polygon | 20 | 013 | 480600 | 20013480600 | 4806 | Census Tract 4806 | G5020 S |
| 4 | 3 | Polygon | 20 | 013 | 480700 | 20013480700 | 4807 | Census Tract 4807 | G5020 S |
| 5 | 4 | Polygon | 20 | 013 | 480800 | 20013480800 | 4808 | Census Tract 4808 | G5020 S |
| 6 | 5 | Polygon | 20 | 125 | 950300 | 20125950300 | 9503 | Census Tract 9503 | G5020 S |
| 7 | 6 | Polygon | 20 | 125 | 950100 | 20125950100 | 9501 | Census Tract 9501 | G5020 S |
| 8 | 7 | Polygon | 20 | 125 | 950200 | 20125950200 | 9502 | Census Tract 9502 | G5020 S |
| 9 | 8 | Polygon | 20 | 125 | 950700 | 20125950700 | 9507 | Census Tract 9507 | G5020 S |
| 10 | 9 | Polygon | 20 | 125 | 950800 | 20125950800 | 9508 | Census Tract 9508 | G5020 S |
| 11 | 10 | Polygon | 20 | 125 | 950400 | 20125950400 | 9504 | Census Tract 9504 | G5020 S |
| 12 | 11 | Polygon | 20 | 125 | 950500 | 20125950500 | 9505 | Census Tract 9505 | G5020 S |

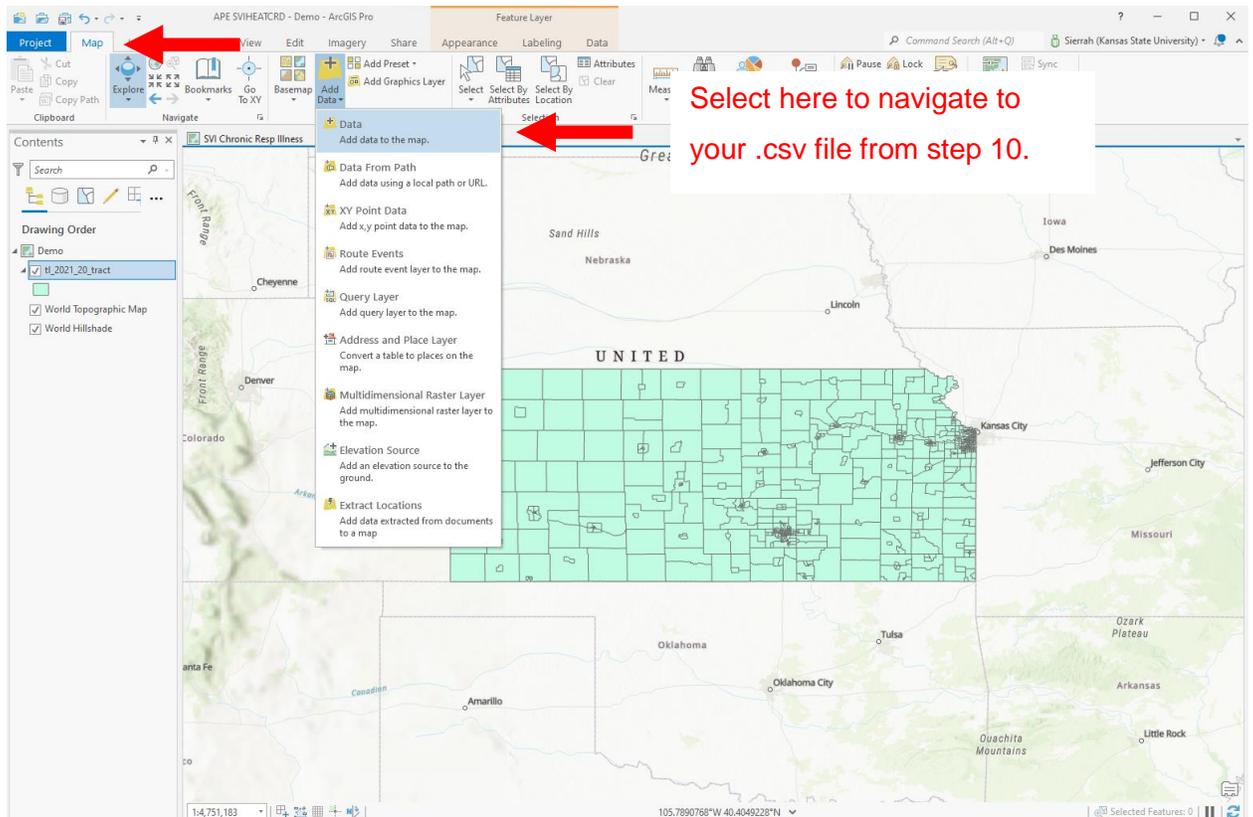
Excel table including GEOID.

| | A | B | C | D | E | F |
|----|----------|----------|-------|-------|-----------|------------------|
| 1 | OBJECTID | OBJECTID | GEOID | Tr | untyGE | CountyNa |
| 2 | | 1 | 26419 | 2E+10 | Census Tr | 20001 Allen Cou |
| 3 | | 2 | 26420 | 2E+10 | Census Tr | 20001 Allen Cou |
| 4 | | 3 | 26421 | 2E+10 | Census Tr | 20001 Allen Cou |
| 5 | | 4 | 26422 | 2E+10 | Census Tr | 20001 Allen Cou |
| 6 | | 5 | 26423 | 2E+10 | Census Tr | 20001 Allen Cou |
| 7 | | 6 | 26424 | 2E+10 | Census Tr | 20003 Anderson |
| 8 | | 7 | 26425 | 2E+10 | Census Tr | 20003 Anderson |
| 9 | | 8 | 26426 | 2E+10 | Census Tr | 20005 Atchison C |
| 10 | | 9 | 26427 | 2E+10 | Census Tr | 20005 Atchison C |
| 11 | | 10 | 26428 | 2E+10 | Census Tr | 20005 Atchison C |
| 12 | | 11 | 26429 | 2E+10 | Census Tr | 20005 Atchison C |
| 13 | | 12 | 26430 | 2E+10 | Census Tr | 20007 Barber Co |
| 14 | | 13 | 26431 | 2E+10 | Census Tr | 20007 Barber Co |
| 15 | | 14 | 26432 | 2E+10 | Census Tr | 20009 Barton Co |
| 16 | | 15 | 26433 | 2E+10 | Census Tr | 20009 Barton Co |
| 17 | | 16 | 26434 | 2E+10 | Census Tr | 20009 Barton Co |
| 18 | | 17 | 26435 | 2E+10 | Census Tr | 20009 Barton Co |
| 19 | | 18 | 26436 | 2E+10 | Census Tr | 20009 Barton Co |
| 20 | | 19 | 26437 | 2E+10 | Census Tr | 20009 Barton Co |
| 21 | | 20 | 26438 | 2E+10 | Census Tr | 20009 Barton Co |
| 22 | | 21 | 26439 | 2E+10 | Census Tr | 20009 Barton Co |
| 23 | | 22 | 26440 | 2E+10 | Census Tr | 20011 Bourbon C |

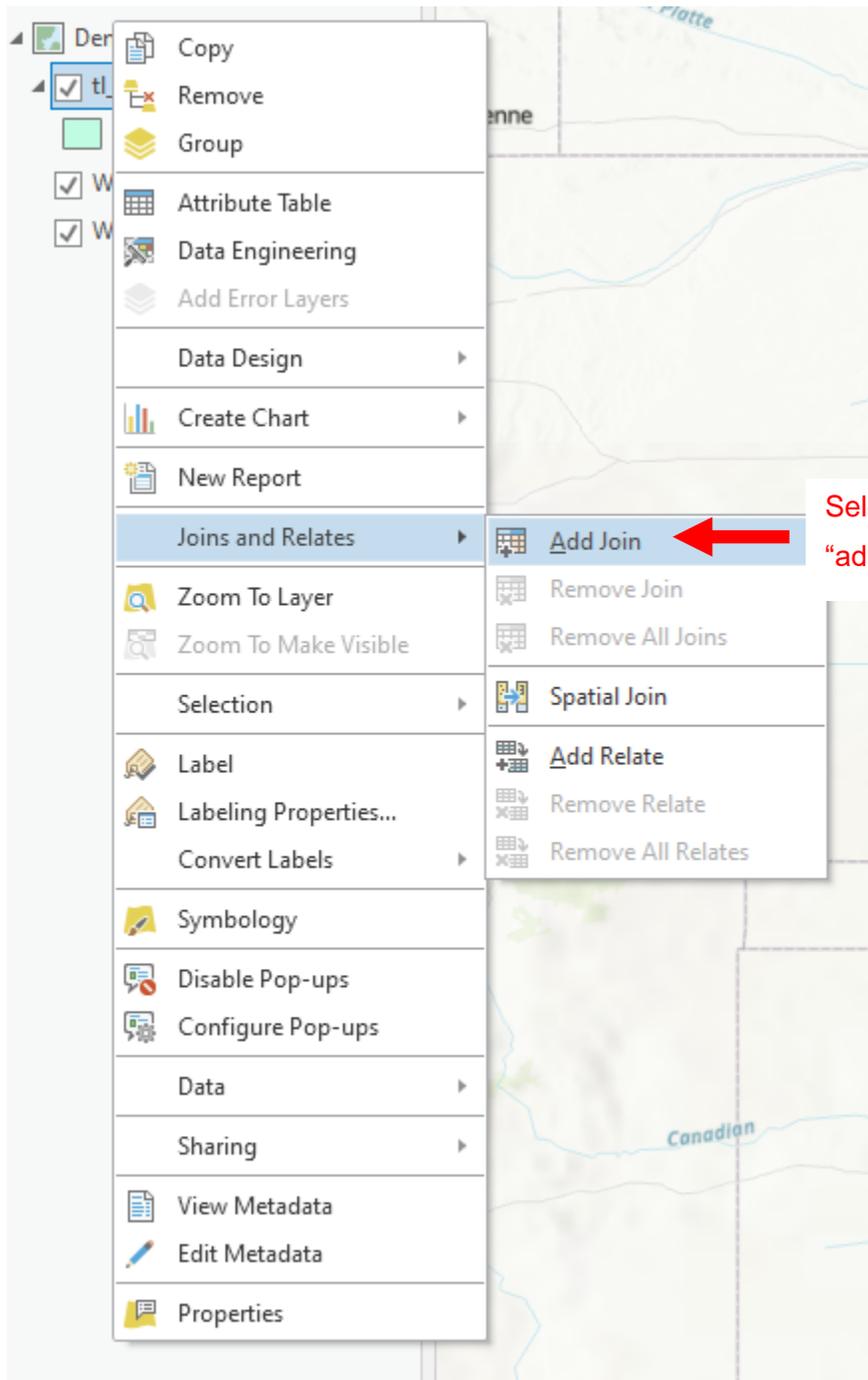
10. After preparation of your data file, this file should be saved as CSV (Comma delimited) (*.csv) in your chosen location.



11. Now, under the “Map” tab on ArcGIS Pro, click “Add Data”, and navigate to your CSV file to insert your data into the software. At this point, your data will be in your project as a table.



12. Next, right-click on your census tract layer and select “joins and relates” -> “add join”.
This will create an “add join” pop-up.



In this pop-up, “input table” should remain as your selected layer, “input join field” should be the column label of the numeric value mentioned in step 9, “join table” should be your CSV file, and “join table field” should be the name of the column in the CSV file that matches the numerical values in the “input join field”. Select “OK” to create the join. Below is an example of the table you should see, along with example inputs.

Add Join ? x

Input Table
tl_2021_20_tract

! Input Join Field
GEOID

Join Table
Demo.csv

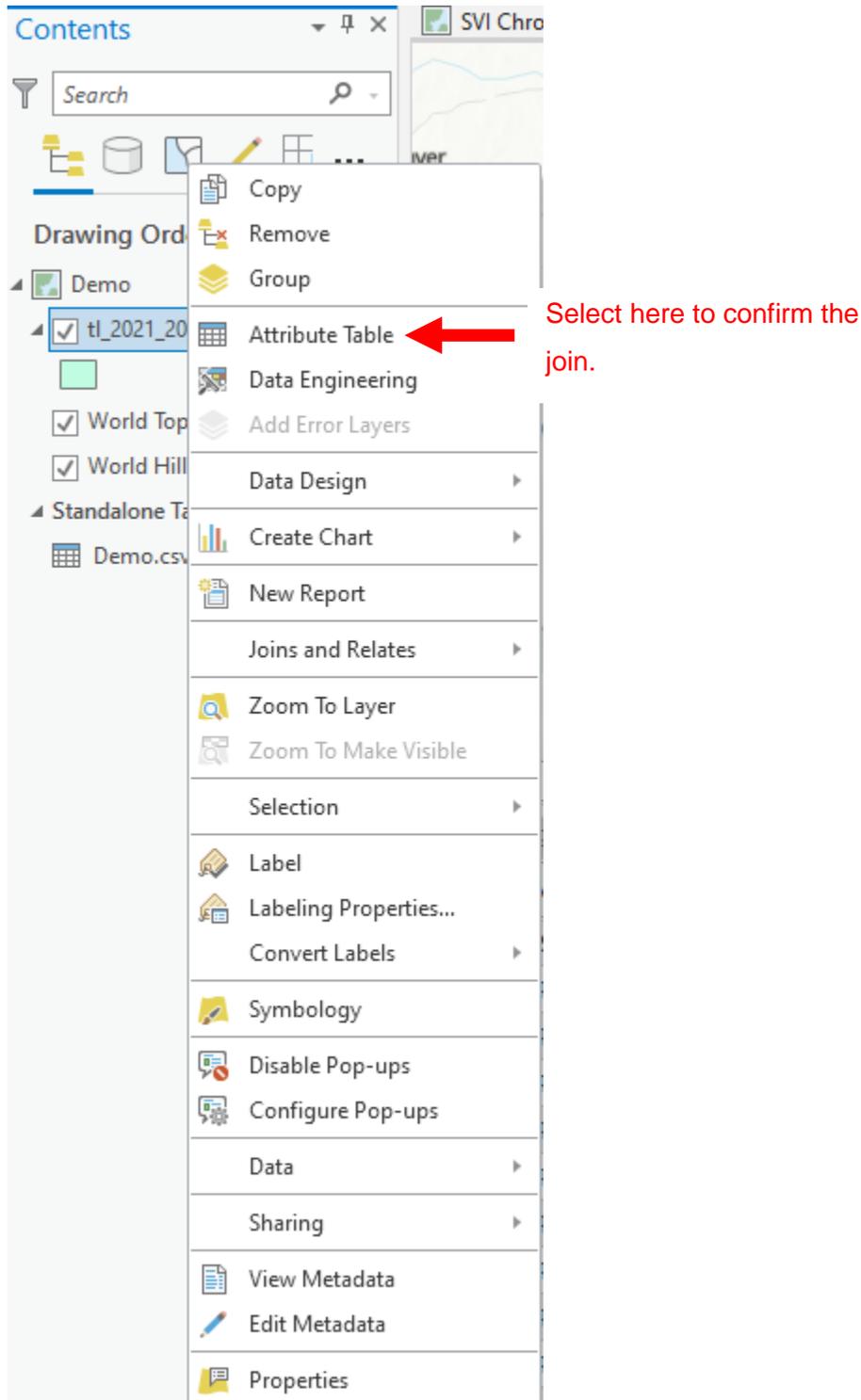
Join Table Field
GEOID

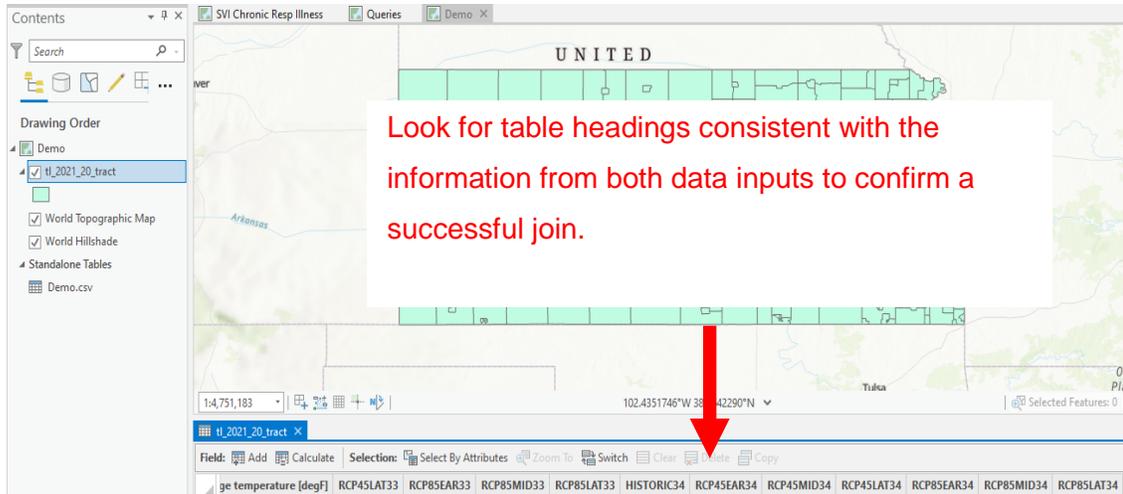
Keep All Target Features
 Index Joined Fields

Validate Join

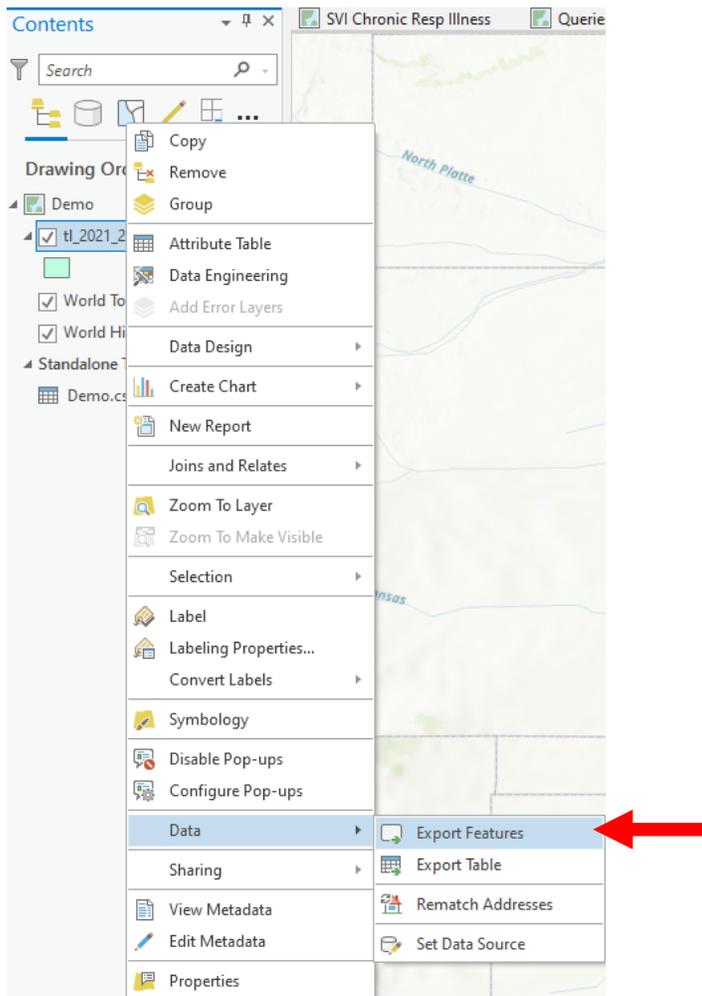
OK

13. To confirm the join, right-click on your layer and select “attribute table”. This should show you a table including the census tracts and the new fields from the data joined.





14. Once you have confirmed the join, right-click on your layer, and select “data” -> “export features”.



Name your “output feature class” as you wish and select “run” to save the new join to your project.

Export Features

Parameters Environments

Input Features
tl_2021_20_tract

Output Location
APE SVIHEATCRD.gdb

Output Name
Demo

Expression
Load Save Remove

Where Select a field

+ Add Clause

Fields

Field Map

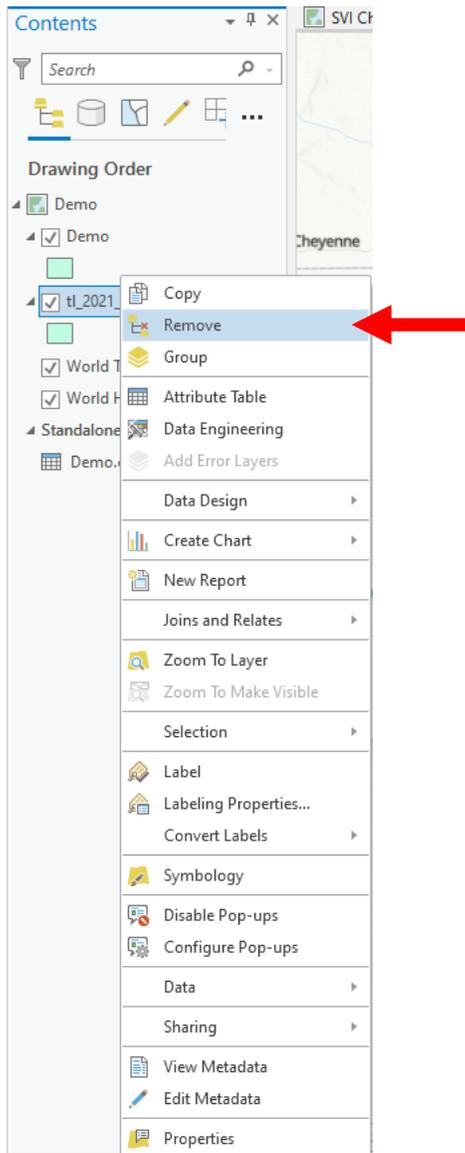
| Output Fields (+) | Source | Properties |
|-------------------|--------------------------|--------------------------|
| STATEFP | Merge Rule | First |
| COUNTYFP | tl_2021_20_tract | tl_2021_20_tract.STATEFP |
| TRACTCE | tl_2021_20_tract.STATEFP | tl_2021_20_tract.STATEFP |

OK

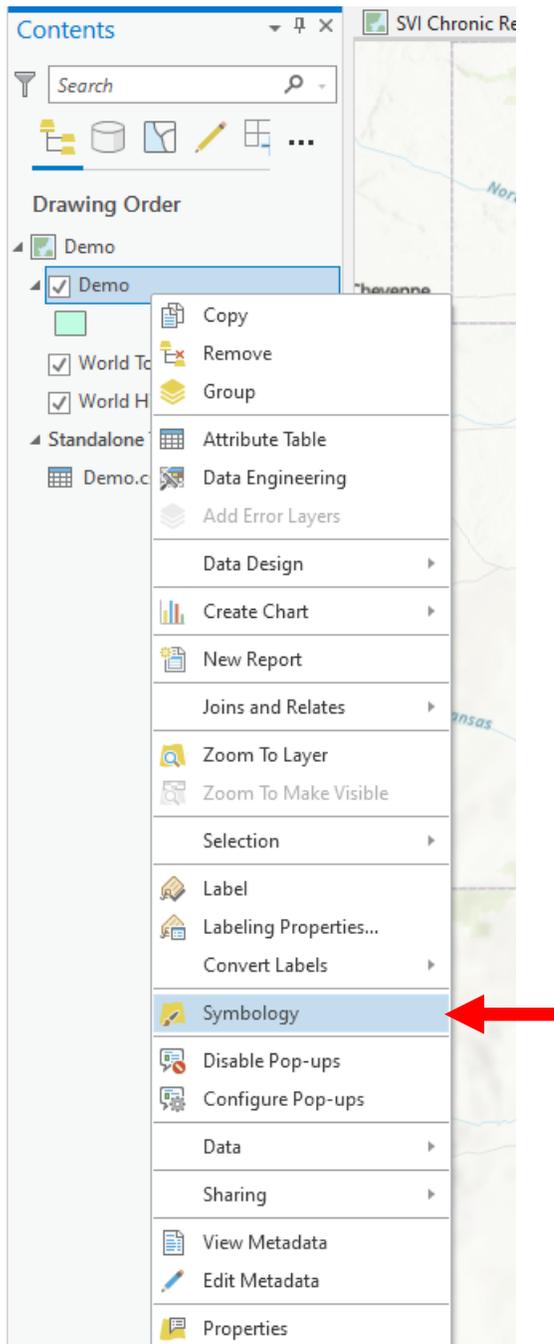
Select a location for saving.

Name your layer.

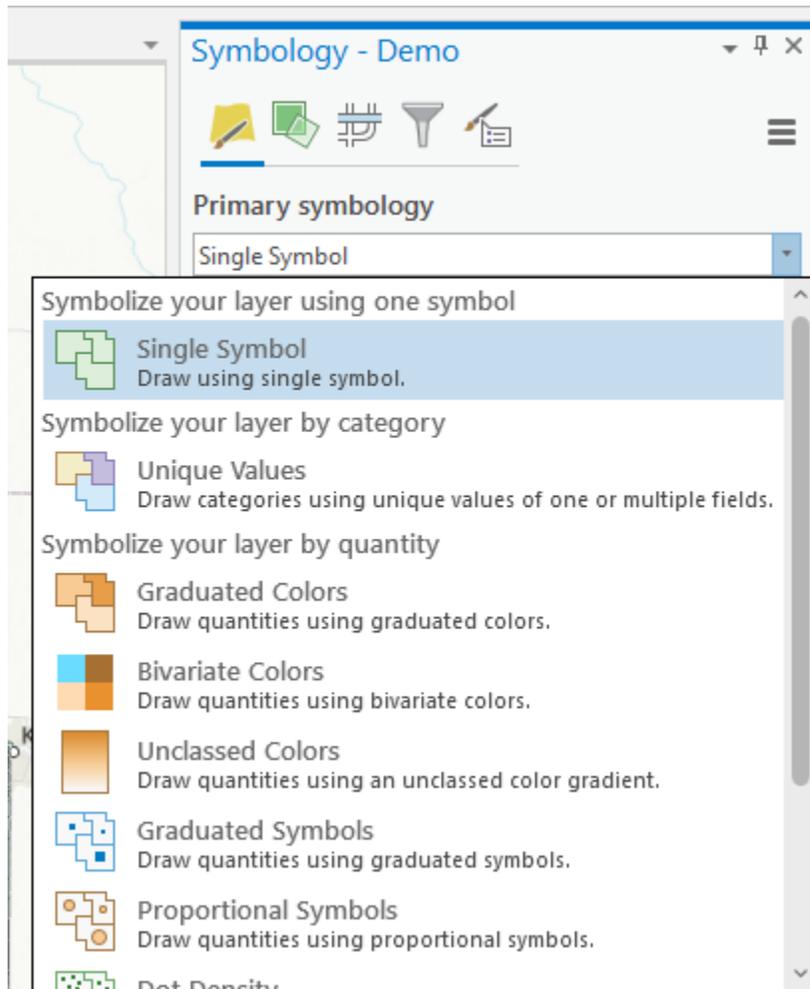
15. Since we now have all the desired information in one layer, the original census tract layer can be removed. To do so, right-click on the layer and select “remove”.



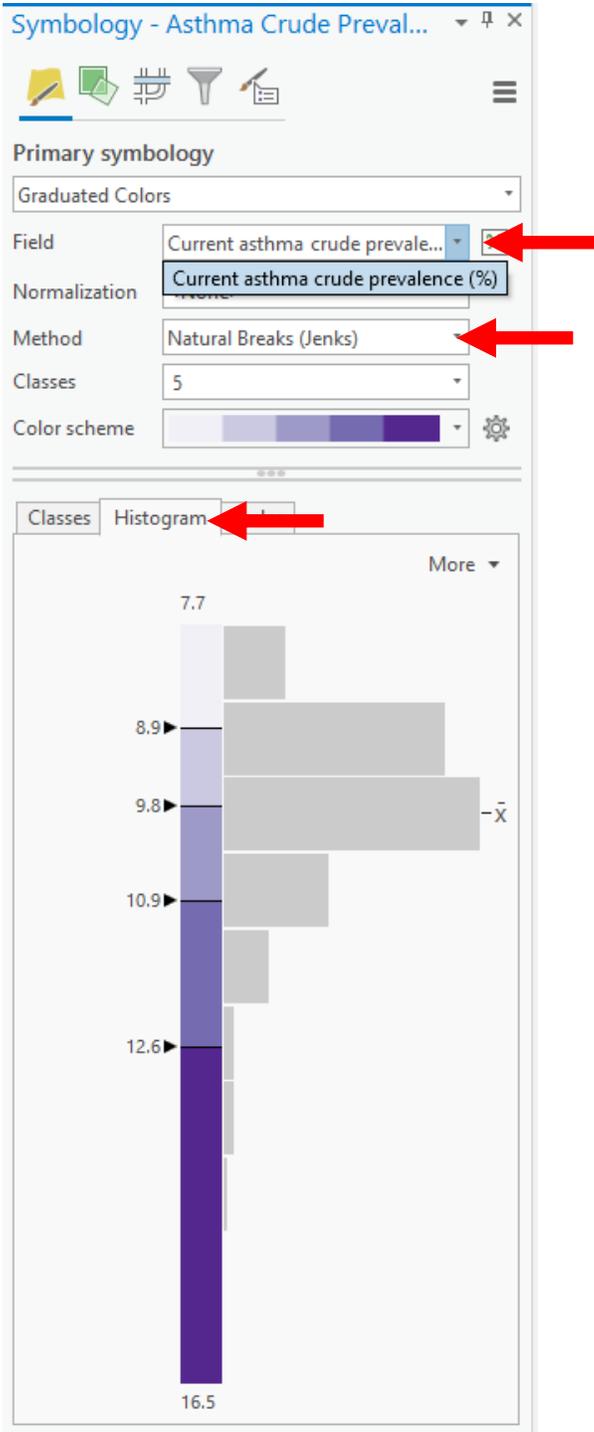
16. You are now ready to symbolize your chosen variables. Right-click on your layer and chose “symbology”.



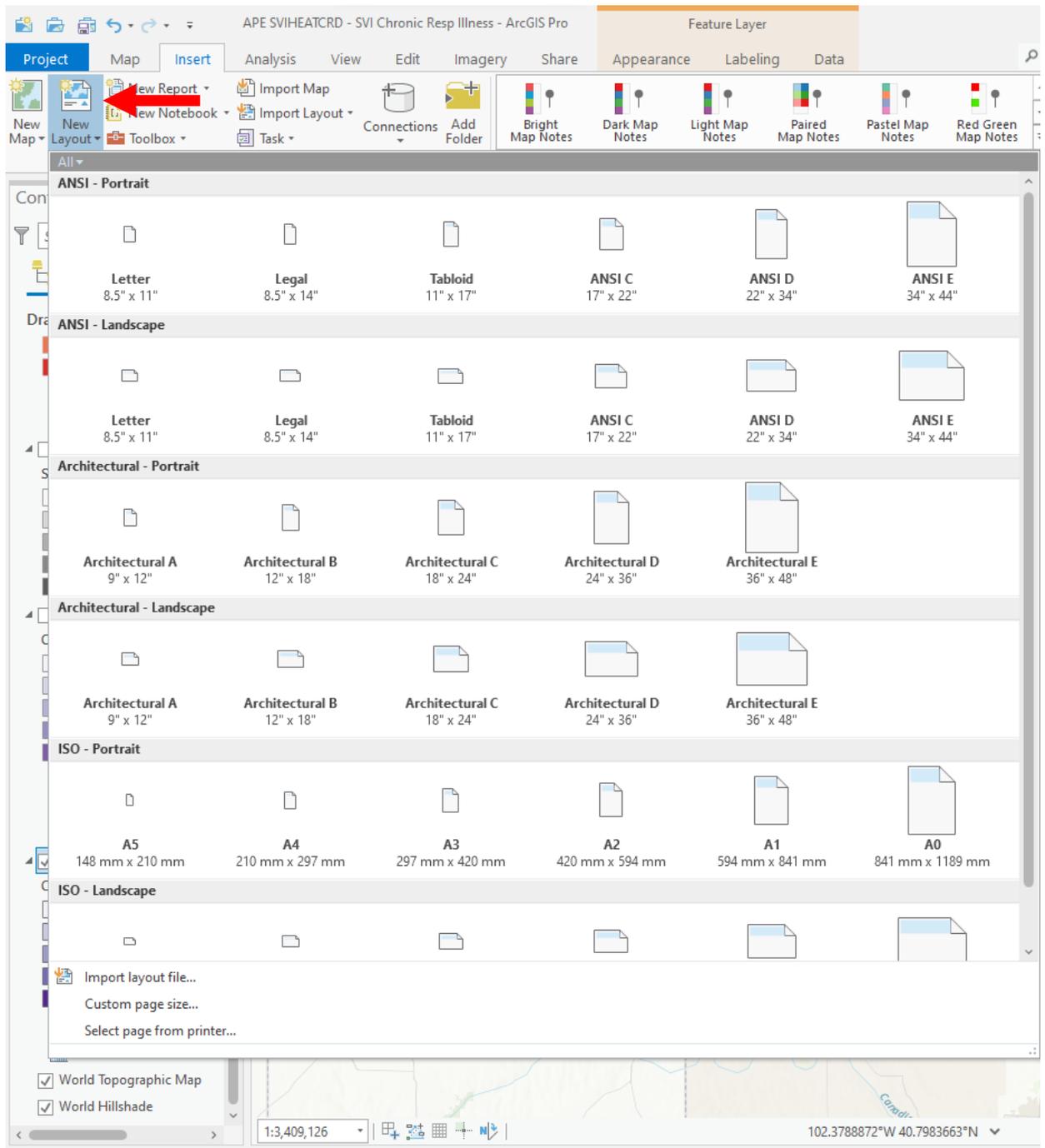
You will now see the screen below. Select your desired color scheme.



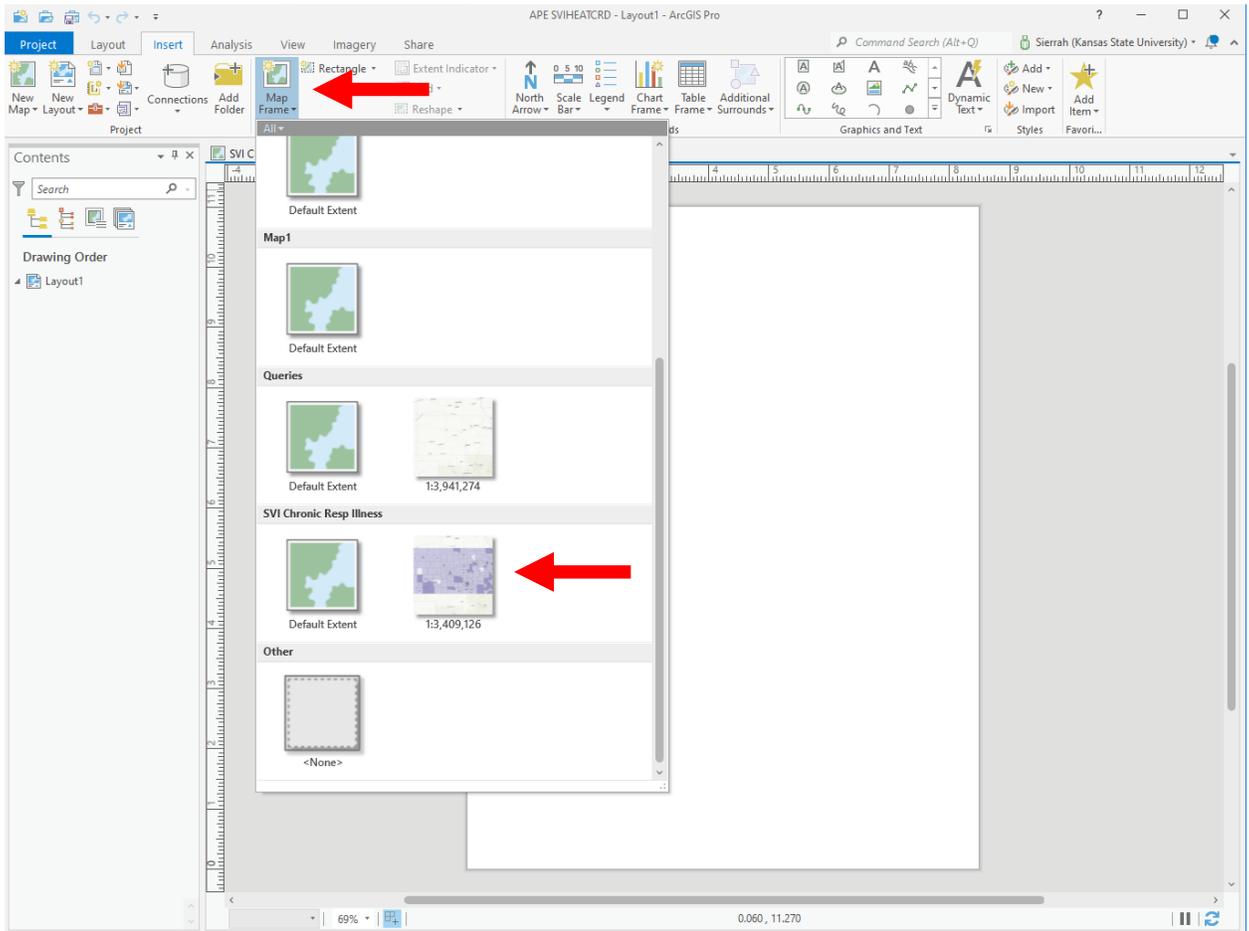
Adjust the “field” by using the drop-down bar to show your desired variable. You should see changes based on your selections appear on the map in real time. Here, you can also edit intervals and their methodology, and view graphs as you wish.



17. Following the finalization of your map's symbology, in order to present the map to your audience select "new layout" under the "insert" tab and select your desired layout.



18. Once the new screen appears select “map frame” under the “insert tab” and select your map. This will allow you to add your map to your new layout and crop as desired.



Here you can also add a legend by selecting the “legend” tab and shaping it as desired.



19. After you have your desired layout select “export layout” under the “share” tab, select your desired file type, and click “export”.



SVI Chronic Resp Illness Queries Demo Layout1 X

Asthma Crude Prevalence
Current asthma crude prevalence (%)

| |
|-----------------------|
| 7.700000 - 8.900000 |
| 8.900001 - 9.800000 |
| 9.800001 - 10.900000 |
| 10.900001 - 12.000000 |
| 12.000001 - 18.500000 |

Export: CGIA, Ballis, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA

Export Layout Layout1

Properties

File Type: JPEG

Name: C:\Users\haass\Desktop\Layout1.jpg

Clip to graphics extent:

Quality: Low ————— Max

Resolution: 300 DPI
Height: 3300 Width: 2550

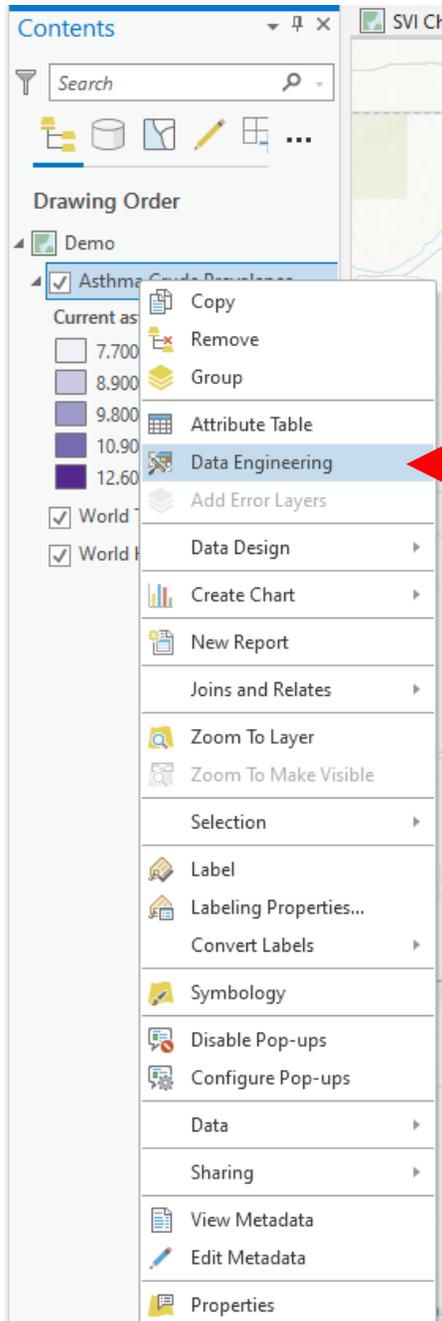
Color depth: 24-bit True Color

Embed color profile:

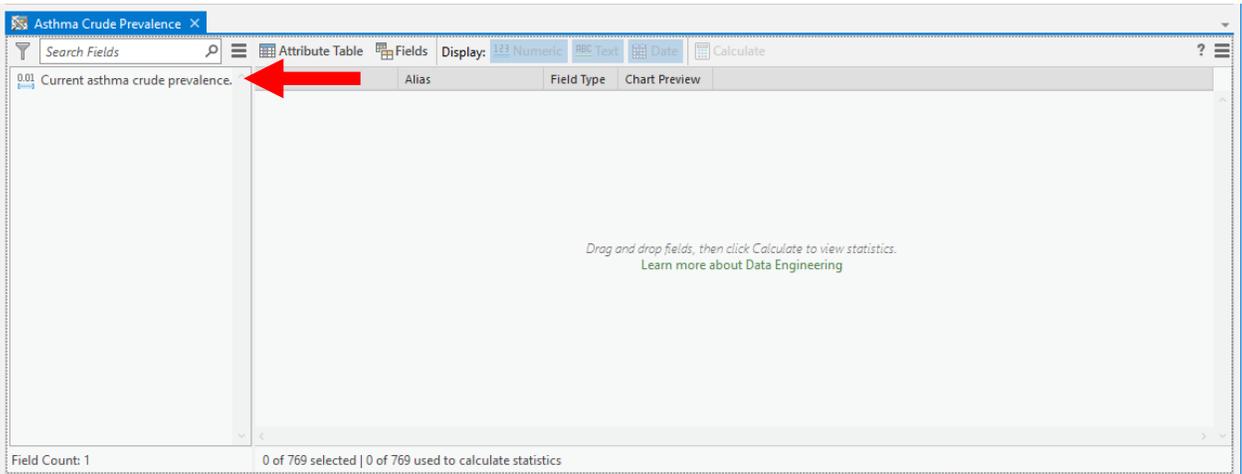
Export

Appendix 6: Steps to Basic Data Exploration

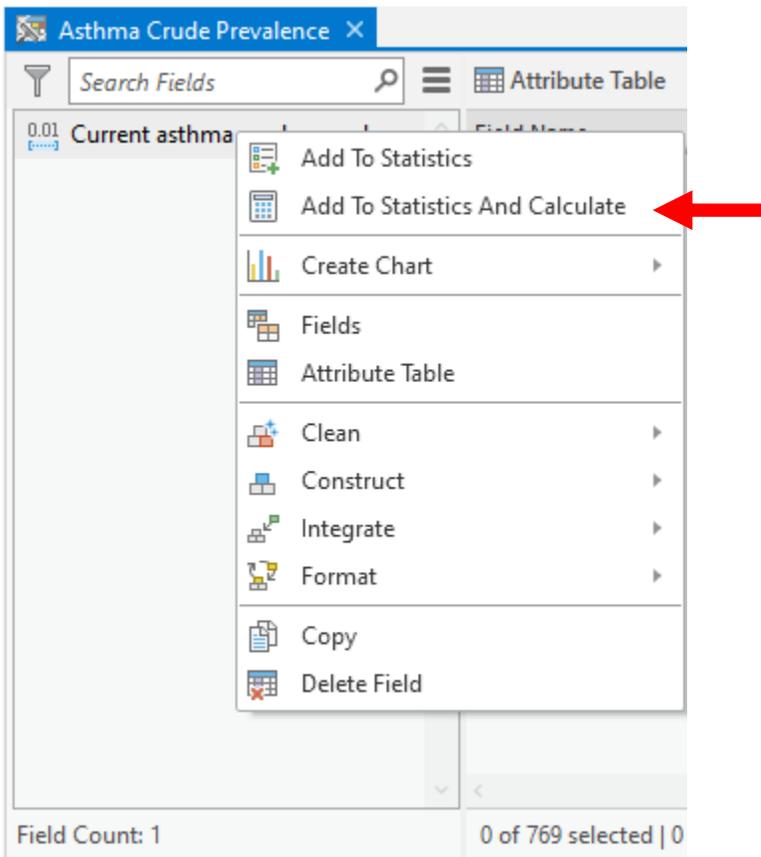
1. Select your layer(s) for analysis. Right-click on one of the layers and select “data engineering”.



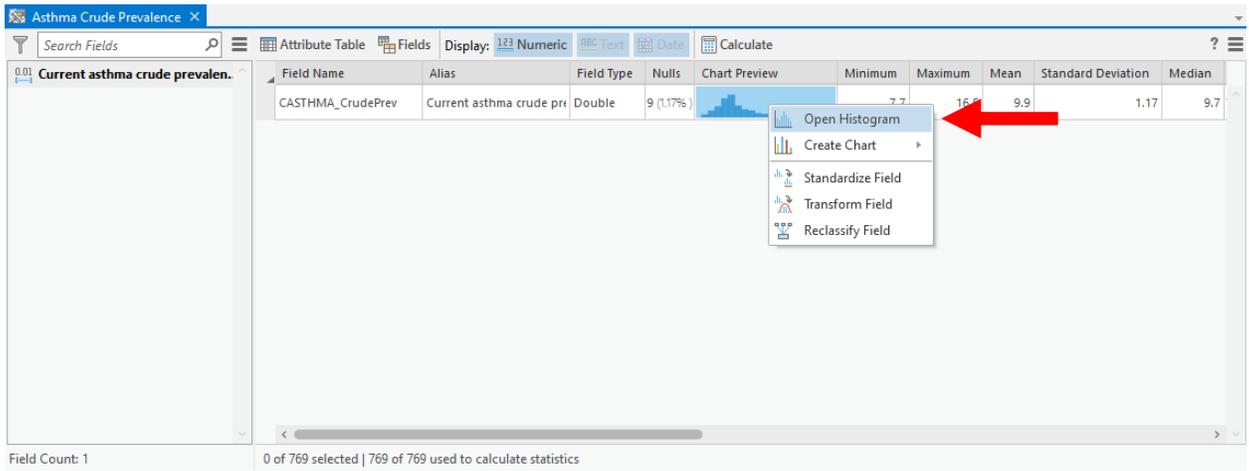
Your selected layers will appear in the “fields” column.



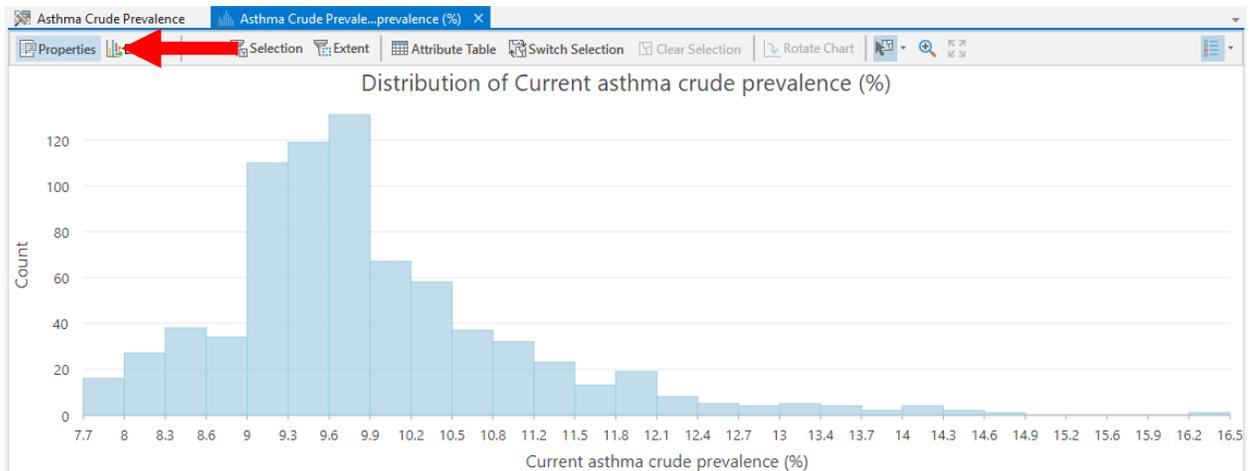
2. Right-click on your chosen layer and select the desired analysis point. Select “add to statistics and calculate” to calculate descriptive statistics.



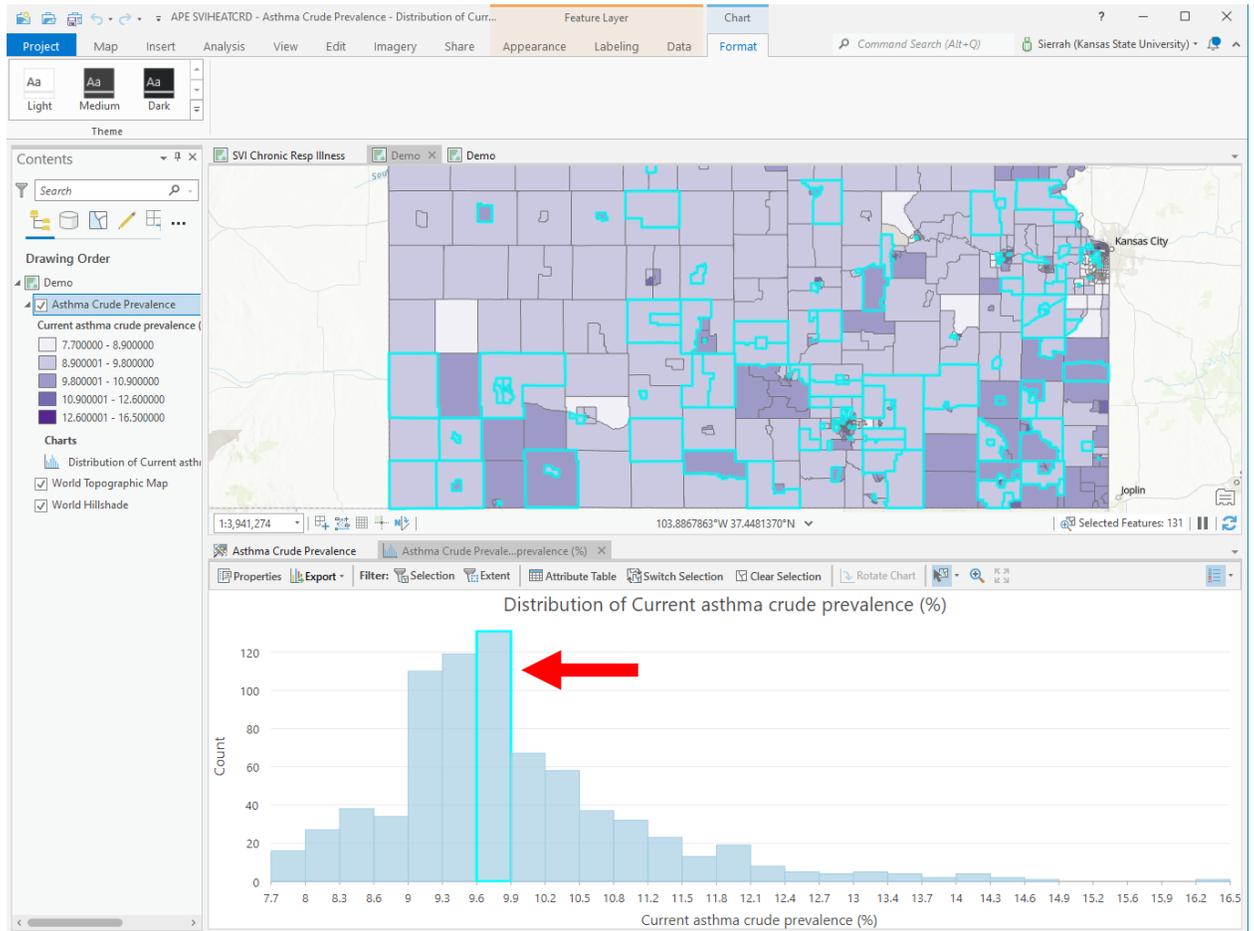
- At this point, you will see a histogram. Right-click on it and select “open histogram” to view an interactive version of it.



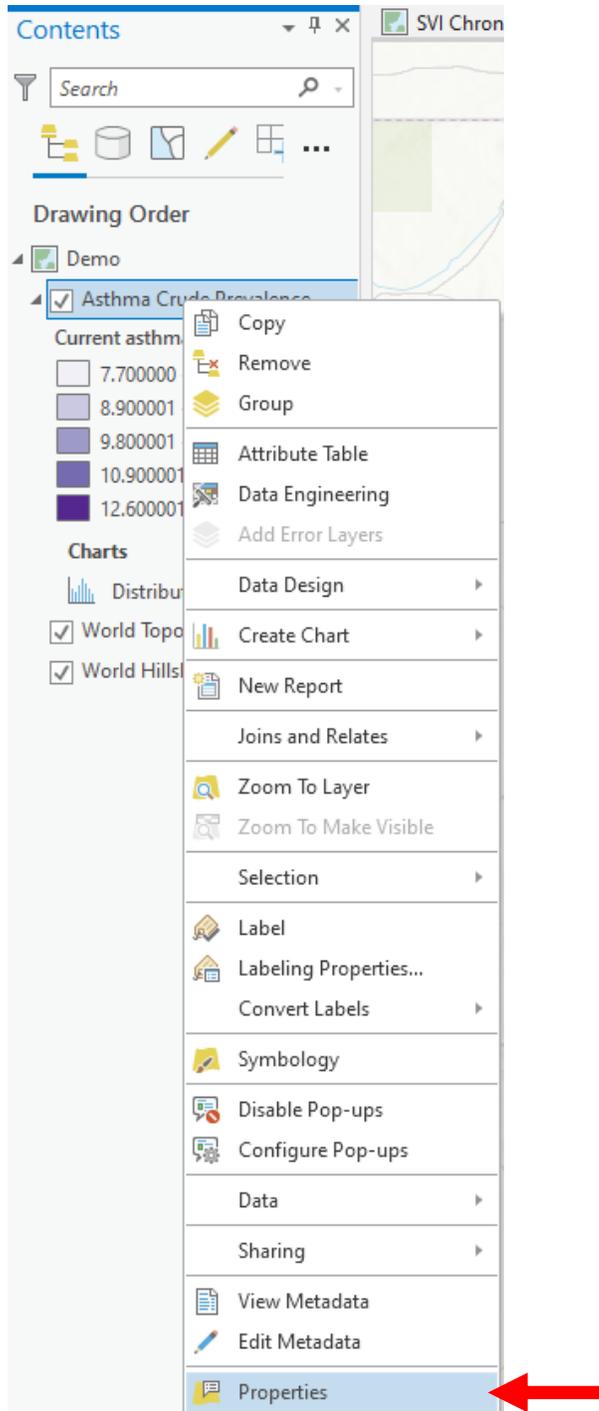
- Select “properties” in the top left corner of the histogram screen to adjust the properties of the graph.



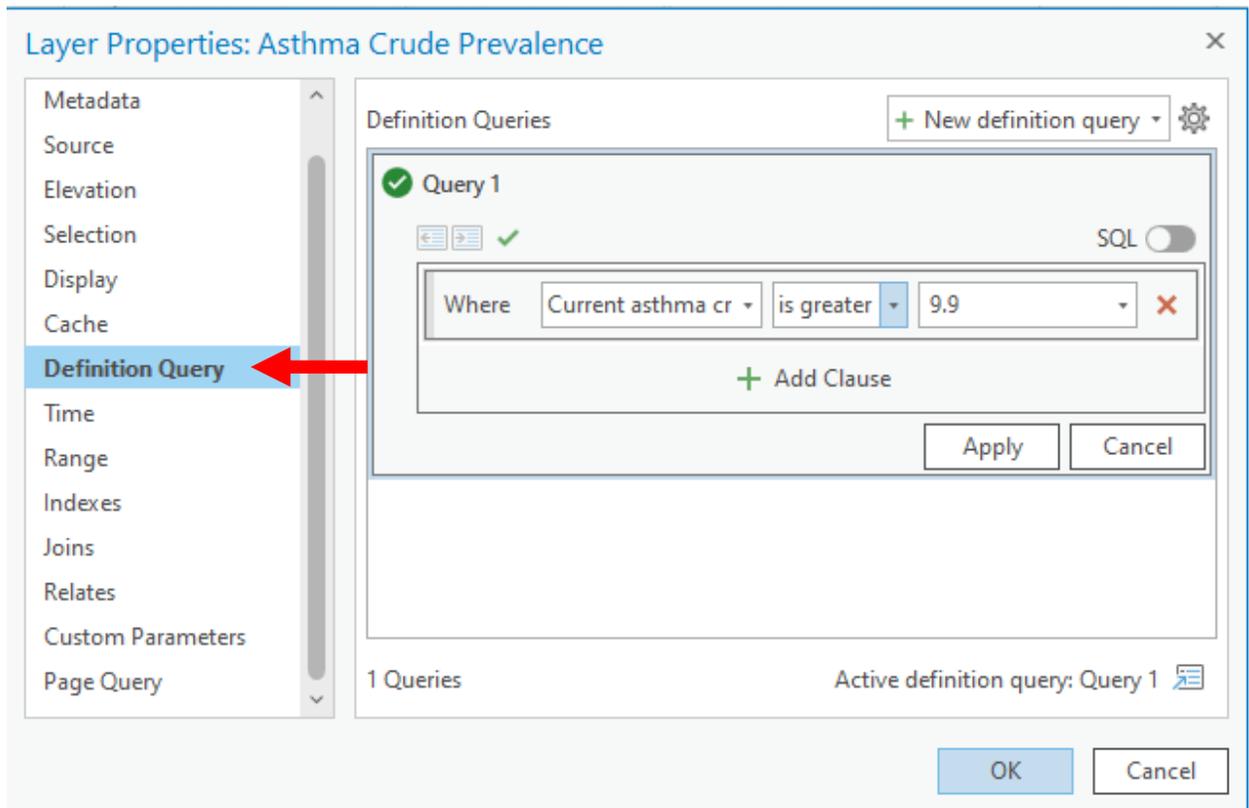
5. After achieving your desired format, select bins to show census tracts that fall within the range shown.



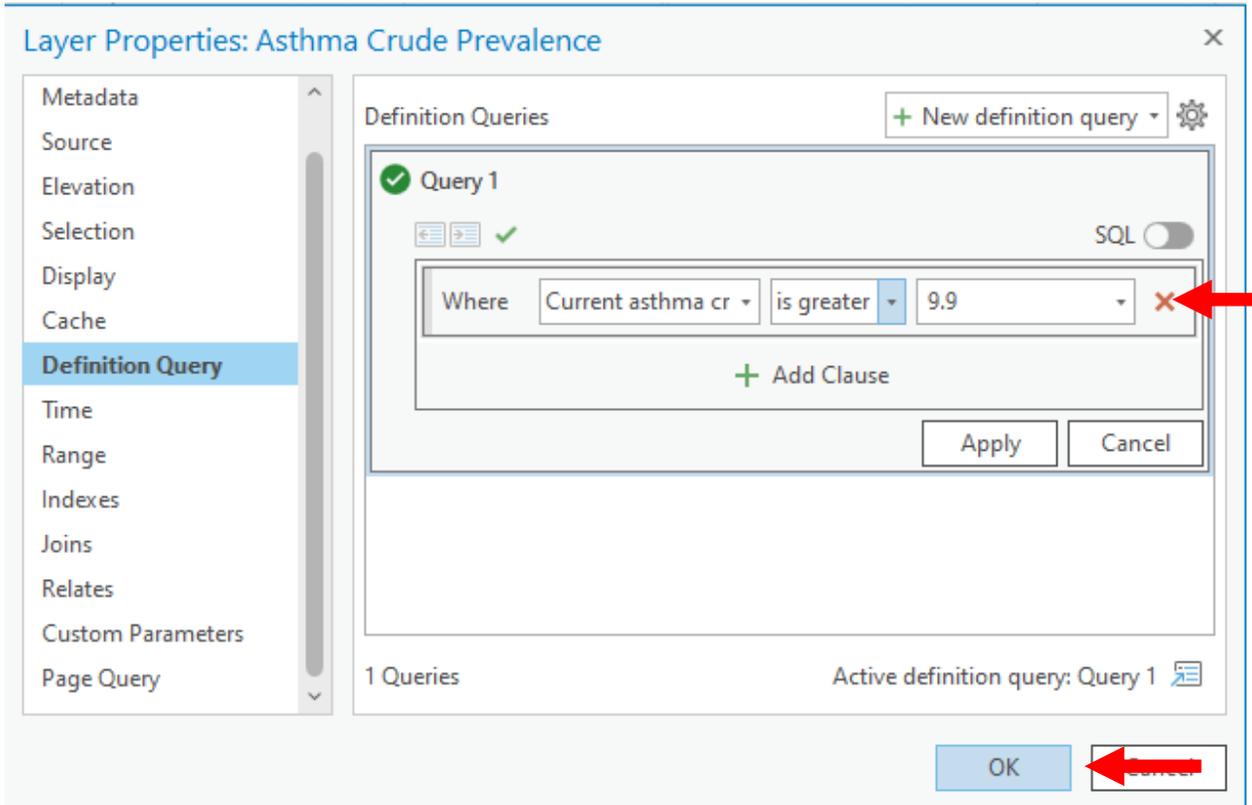
- Once you have your descriptive statistics, you can use these values to query for additional information. To create a new query, right-click on your chosen layer and select “properties”.



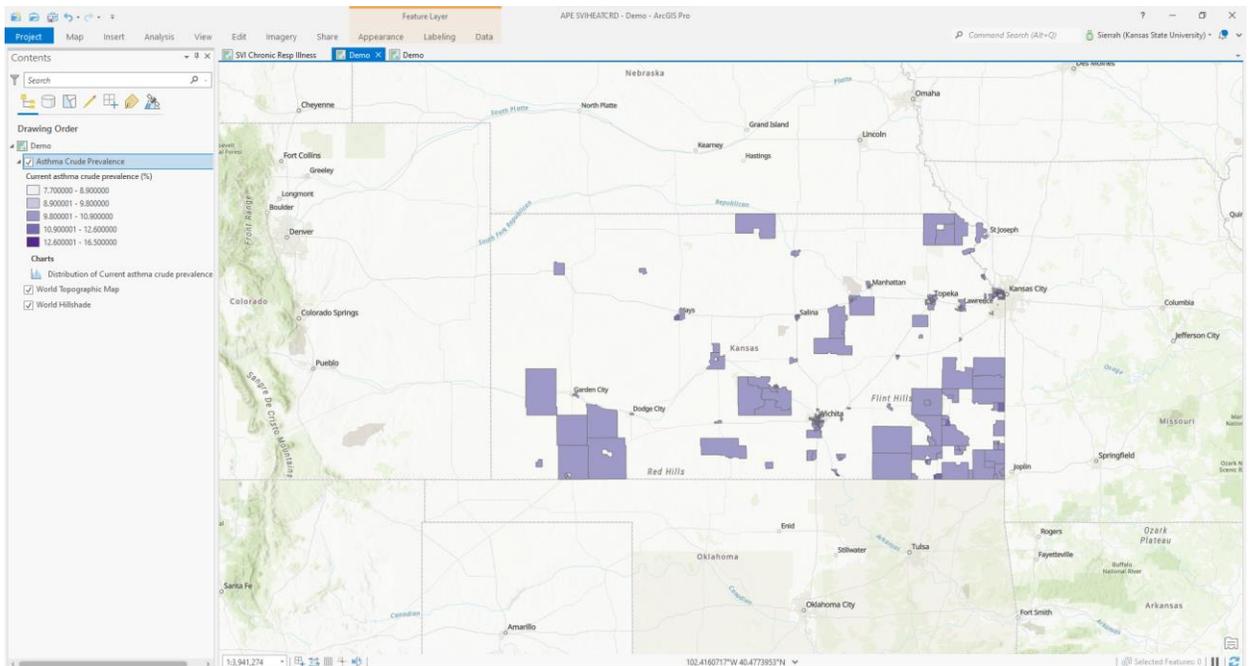
7. From there, select “definition query” from the left-hand panel.



8. Then, select a desired field for analysis and define the value you would like the software to look for. Next, click “apply” and then “OK”.



9. Results from the query should filter out census tracts displayed on your map to allow for identification based on the values you are seeking. See the example below.

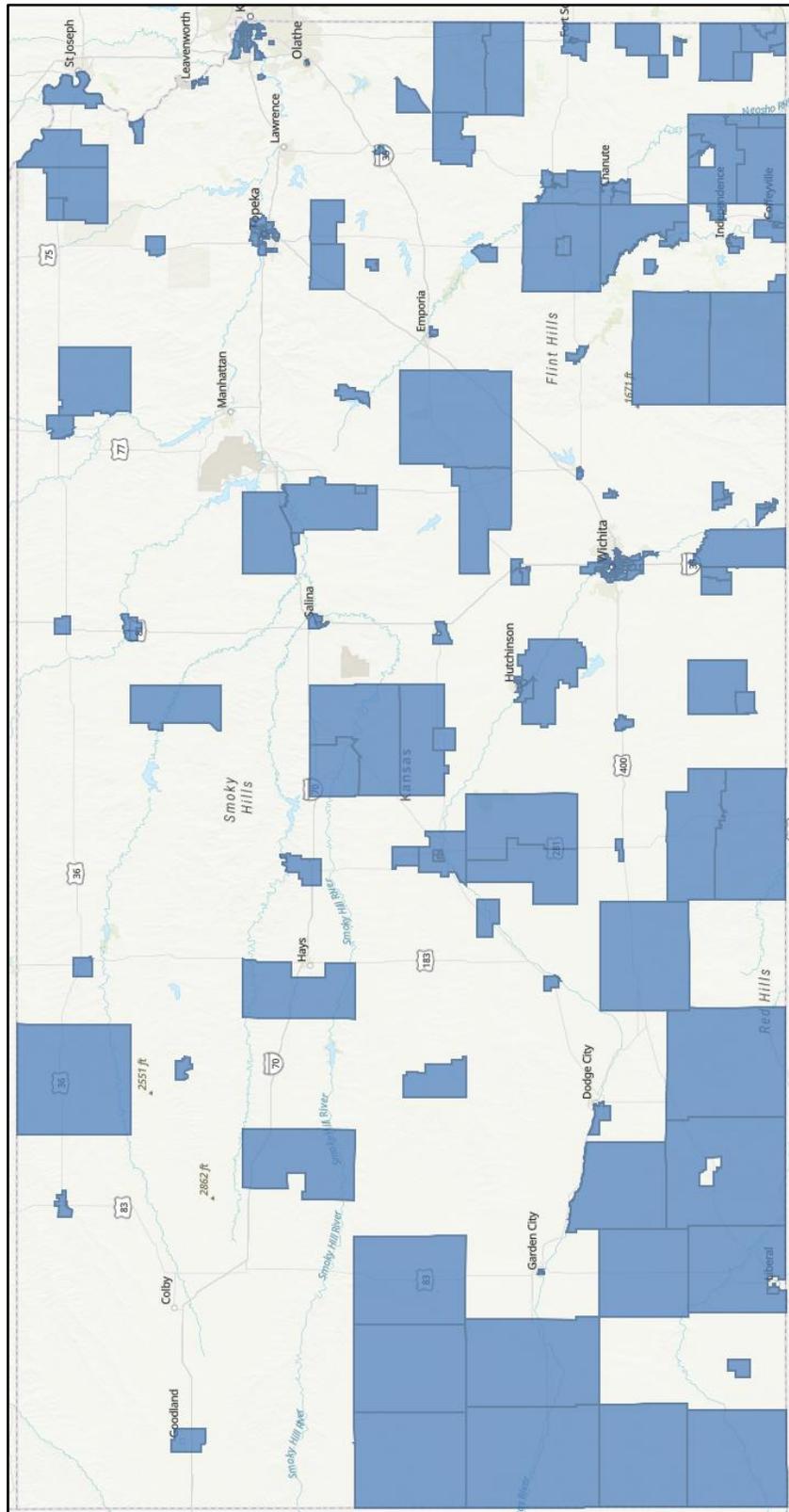


Appendix 7: Query Maps

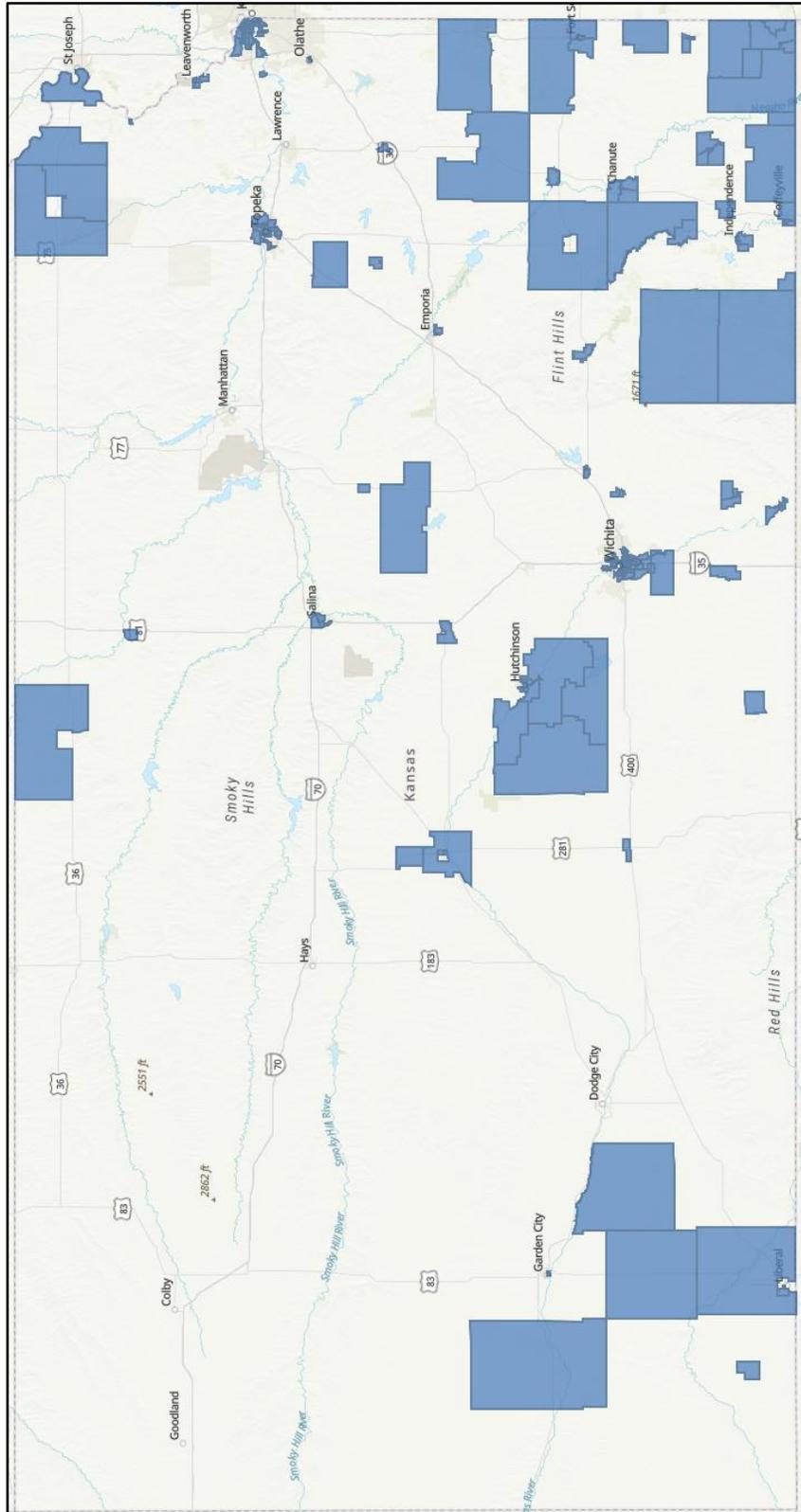
This map highlights the census tracts with a higher-than-average SVI in Kansas.



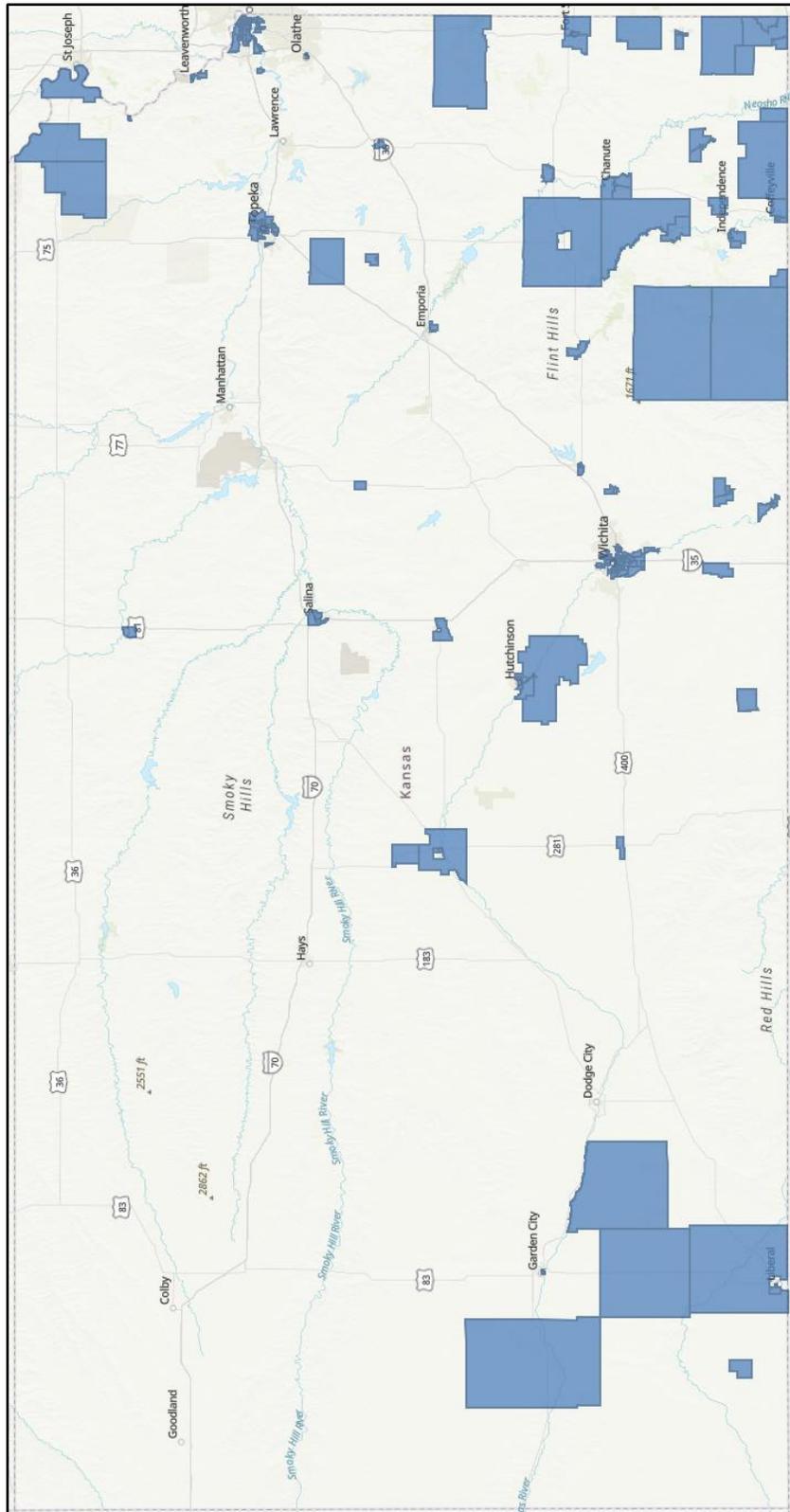
This map highlights census tracts with higher-than-average SVI and COPD crude prevalence in Kansas.



This map highlights census tracts with higher-than-average COPD and asthma crude prevalence in Kansas.



This map highlights census tracts with higher-than-average SVI, COPD crude prevalence, and asthma crude prevalence in Kansas.



Appendix 8: Poster

Extreme Heat, Social Vulnerability, and its Impact on Respiratory Health

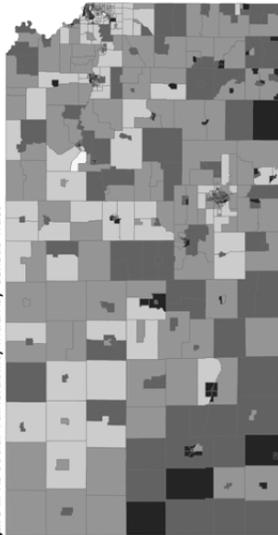
Sierrah Haas¹, Steven Corbett, Ph.D., MA², Elynn R. Mulcahy, Ph.D., MPH³

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Social Vulnerability Index

The CDC-created Social Vulnerability Index (SVI) allows for the identification of communities most vulnerable to external stressors including extreme heat. The index takes into account several factors related to socioeconomic status, household characteristics, race, housing type, and transportation access (1).

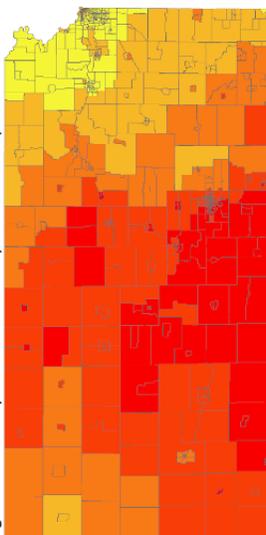
Figure 1. KS Social Vulnerability Index by Census Tract



Extreme Heat

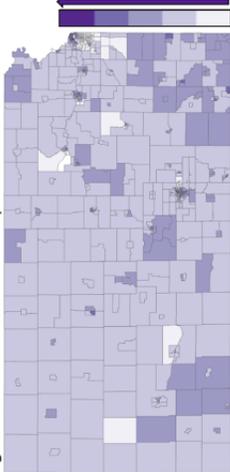
Extreme heat can be linked to poor air quality due to increases in particulate matter levels and ground-level ozone (2). These factors have the potential to decrease lung function and exacerbate chronic respiratory illnesses such as asthma and COPD. In 2016, it was reported that a majority of KS had warmed at least 0.5°F over the 20th century (3,4).

Figure 2. 20th Century Annual Number of Days with a Max Temperature >100



Asthma Crude Prevalence

Figure 3. KS Asthma Crude Prevalence by Census Tract



*Class intervals for figures 2-4 were created using the Jenks natural breaks classification method to assist with map readability.

Methods

- Data were obtained from readily-available data resources such as KDHE & CMRA.
- Census tract-level data were visually inspected to identify areas of concern for historically extreme heat rates and COPD or asthma crude prevalence.
- KS SVI and heat data were explored to inform the necessary directory of public health resources related to chronic respiratory conditions.
- Maps were created using ArcGIS Pro 3.0 mapping software.

Discussion

- Results indicate that there may be a greater risk of heat-related health issues for residents in southwestern and central KS.
- Social vulnerability is a likely determinant of respiratory health.
- The co-occurrence of COPD and asthma in 49.5% of census tracts demonstrates a need for continued research and health disparity monitoring.

Conclusion

- This preliminary study demonstrates that there is work to be done in creating resources for those most likely to be negatively impacted by extreme heat in KS.

Results

49.5% of census tracts that are considered highly socially vulnerable show a higher crude prevalence of COPD and Asthma. 30% of these census tracts fall within geographic areas with a higher-than-average number of annual days with recorded extreme heat conditions.

In the previous century, southwestern and central KS have demonstrated the highest average number of annual days with a temperature above 100° F.

72.4% of census tracts with higher-than-average asthma crude prevalence rates for KS also demonstrated higher than average COPD crude prevalence.



Scan here to see references and map scales.

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