MODELING IDAHO HEALTH

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Modeling Idaho COVID-19 Health Disparities

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Prepared For:

Bureau of Equity & Strategic Partnerships
Division of Public Heath
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List of Abbreviations

ACS	American Community Survey
BMI	Body Mass Index- (weight in kg/height in cm^2)
BRFSS	Behavioral Risk Factor Surveillance System
DM	Diabetes Mellitus, type 1 and type 2
CDC	Centers for Disease Control and Prevention
CKD	Chronic Kidney Disease
COPD	Chronic Obstructive Pulmonary Disease
COVID-19	Coronavirus disease 2019
HIV	Human immunodeficiency virus
HTN	Hypertension
ICU	Intensive Care Unit
IMCI	Institute for Modeling Collaboration and Innovation
MRE	Mean Relative Error
PHD	Public Health District (Idaho has seven public health districts)
RCDS	Research Computing and Data Services
SAE	Small area estimates
SDOH	Social determinants of health

Executive Summary

There is strong evidence that people with some health conditions have higher risk for severe COVID-19 disease, including hospitalization, intensive care unit admission, mechanical ventilation, and death. The *Modeling COVID-19 Health Disparities* project developed a modeling technique to identify populations at risk for severe COVID-19 disease and death at a county-level. Prior to this work, this data was available only by Idaho Public Health Districts (PHD).

Idaho adult health information is collected using the Behavioral Risk Factor Surveillance System (BRFSS). Each year, approximately 5,000 Idahoans (18 years of age and older) respond to the telephone based BRFSS survey. The Idaho BRFSS surveys results see: https://www.gethealthy.dhw.idaho.gov/idaho-brfss

Modeling COVID-19 Health Disparities used small-area estimate modeling techniques combining BRFSS data with American Community Survey (ACS) data to create county-level health conditions and health behavior measures associated with severe COVID-19 disease. Modeling and mapping health conditions and county-level social and economic information (e.g., poverty, lack of insurance, lower education, limited English speaking) allows state and local health officials, nonprofits, and policymakers to identity and take action to prevent disease and improve health.

Several factors increase the risk for severe COVID-19 disease. Obesity, diabetes mellitus (type 1 and type 2), respiratory disease (chronic obstructive pulmonary disease and asthma), heart disease (angina and heart attack), and chronic kidney disease (CKD), are well known to increase severe COVID-19 disease risk. Age further increases the risk of severe COVID-19 disease and death. Smoking, heavy drinking, and lack of physical activity can also contribute to poorer health and increased risk within populations. *Modeling COVID-19 Health Disparities* revealed disparities increasing the risk for severe COVID-19 disease among public districts and within public health districts. For more information on these findings see Modeling Idaho Health, (https://modelingidahohealth.org/). In addition, modeling methodology details, as well as supplemental maps and charts associated with this report can be found at https://modelingidahohealth.org/background).

Introduction and Purpose

It became clear early in the Coronavirus disease 2019 (COVID-19) pandemic that older age and certain medical conditions in people of all ages were associated with severe COVID-19 disease, defined as illness requiring hospitalization, intensive unit (ICU) admission, mechanical ventilation or resulting in death) (Kompaniyets, Pennington, Goodman et al., 2021). The risk of severe outcomes increases greatly among people with underlying health conditions ages ≥ 65 years (Ko et al., 2021). The COVID-19 pandemic is often termed the '*great revealer'* as it has brought to light racial, ethnic, and socioeconomic disparities in COVID-19 illnesses, hospitalizations and death (Webb Hooper, M., Nápoles, A. M., & Pérez-Stable, 2020)(Prevention CDC, 2022.)

The Center for Disease Control and Prevention (CDC) has identified underlying medical conditions placing people at higher risk for severe COVID-19 outcomes using rigorous systematic review methods (National Center for Immunization and Respiratory Diseases (NCIRD), 2023). The CDC categorized the list of underlying medical conditions that increase risk of severe COVID-19 illness as *higher risk* (conclusive, supported by published meta-analysis or CDC systemic review), *suggestive higher risk* (evidence mostly supported by cohort, case-control or cross-sectional studies), and *mixed evidence* (inconclusive) (National Center for Immunization and Respiratory Diseases (NCIRD), 2020).

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An important data source for self-reported health conditions is the Behavior Risk Surveillance System (BRFSS). BRFSS monitors modifiable health risk behaviors, perceptions, and medical conditions in the adult population in all 50 states. Many of the medical conditions and health behaviors reported in the BRFSS survey are associated with severe COVID-19 disease. Due to sampling methods and sample size limitations, the Idaho BRFSS data are calculated for each of the seven Idaho Public Health Districts (PHD) and a few metropolitan areas, but they are unavailable for each of the 44 counties in Idaho. The result is that local (county-level) data on conditions that increase severe COVID disease are not available to inform public health action and guide resource investment to identify and eliminate health disparities associated with poor COVID-19 disease outcomes. Scientifically derived county-level risk factor data for COVID-19 disease is important to drive public health action to improve health conditions, provide needed evidence for health improvement funding, policy and programing, and to monitor and evaluate the progress of public health actions over time.

A small area estimation approach has been used to estimate county-level prevalence of BRFSS health conditions (Kong & Zhang, 2020) and also for selected conditions associated with severe disease outcomes (Razzaghi et al., 2020). For this study we expanded upon the work done by Razzaghi et al (2020) and identified twelve (12) BRFSS indicators for county level modeling. Eleven of the 12 BRFSS risk indicators selected were categorized as having a conclusive increase in risk for at least one severe COVID-19 outcome, including asthma, cerebrovascular disease (stroke), chronic kidney disease (CKD), respiratory disease (COPD- Chronic obstructive pulmonary disease, emphysema or chronic bronchitis), diabetes (type 1 and type 2), heart conditions

(angina, heart attack and a combined measure of the two), mental health conditions (depressive disorders), obesity (Body Mass Index (BMI) $\geq$30 kg/m^2), and smoking (most days or every day). We included the BRFSS risk indicator, overweight (BMI $\geq$25 kg/m^2 but <30 kg/m^2), categorized as a suggestive higher risk and hypertension, categorized as inconclusive. Although the evidence for hypertensive is classified at this time as inconclusive, we included it because it is a most common medical condition, and it is a common co-morbidity of several medical conditions. To visualize the modeled estimates, we created a user-friendly interactive website (Modeling Idaho Health, https://modelingidahohealth.org) composed of the 12 county-level indicators and for one composite risk of five medical conditions widely accepted to demonstrate a strong and reproduceable relationship for severe COVID-19 disease risk including obesity, diabetes, heart disease (angina and heart attack), respiratory disease (COPD and asthma), and chronic kidney disease (Razzaghi et al., 2020).

We identified four social determinants of health (SDOH) (termed *drivers of health*) from the 2020 American Community Survey (ACS) that are widely accepted as associated with poor overall health outcomes: poverty (percent below poverty level, ages 18+ years), education obtainment (percent with less than high school diploma, ages 18+), insurance status (percent uninsured, ages 19 - 64 years), and limited English (percent limited English speaking households). The four drivers of health are also displayed on the interactive platform Modeling Idaho Health by county and PHD. While we did not conduct an analysis of any associations between the BRFSS indicators and the selected social determinants of health (SDOH), we did use the American Community Survey (ACS) SDOHs as part of our small area estimation modeling methodology. Additionally, we chose to use the ACS SDOHs (*drivers of health)* rather than similar BRFSS measures because the ACS offers a more comprehensive view of Idaho SDOH.

The purpose of *Modeling Idaho COVID-19 Disparities* was to seek to fill a needed gap for Idaho county-level estimates of medical conditions and health behaviors associated with severe COVID-19 disease and to identify COVID-19 related health disparities across Idaho PHDs and counties. To accomplish this purpose, we completed the following:

1. Identified BRFSS risk factors related to severe COVID-19 disease;
2. Developed a novel methodology to create county level estimates for each of the indicators and one composite estimate for risk factors highly associated with for severe COVID-19 disease;
3. Identified and mapped four county-level SDOH; and
4. Created an interactive website to visualize and rank 12 health and behavior indicators, a composite indicator of five highly associated factors, and the four drivers of health.

Methods

Two primary sets of data are used for our spatial microsimulation/IPF model construction. 1) Idaho 2020 BRFSS Survey responses. The BRFSS survey data consists of individual reported health conditions, health behaviors and perceptions, with geographic identification based on Idaho public health districts (PHD). 2) 2019 American Community Survey (ACS) data, at a county level (U.S. Census, 2020), is used for our constraining variables. To utilize cross-tabulated population data across a set of ACS variable constraints (education, age, sex, and race), we use cross-tabulated ACS data from the National Center for Health Statistics (National Center for Health Statistics, 2020). Our focus for this analysis was a set of twelve (12) separate variables which are associated with COVID-19, including: angina, diabetes, heart attack, heart disease (angina or heart attack), hypertension, kidney disease, obesity, overweight, respiratory disease (chronic obstructive pulmonary disease-COPD or asthma), smoking, and stroke. We additionally constructed a combined risk variable, which assessed the likelihood of a county having any one of the five leading COVID-19 health associations reported in the BRFSS survey (obesity, diabetes, respiratory disease (COPD or asthma), kidney disease, and heart disease (angina or heart attack). Using the BRFSS and ACS datasets, we established a transformed data structure for use in our modeling methodology.

Our approach uses a small area estimation approach, called iterative proportional fitting. This technique integrates our two datasets (BRFSS data at a regional public health district level, and ACS data at a county level), by using the ACS data to "constrain" the BRFSS data (Figure 1). Each district represents an independent IPF model for each variable in question.

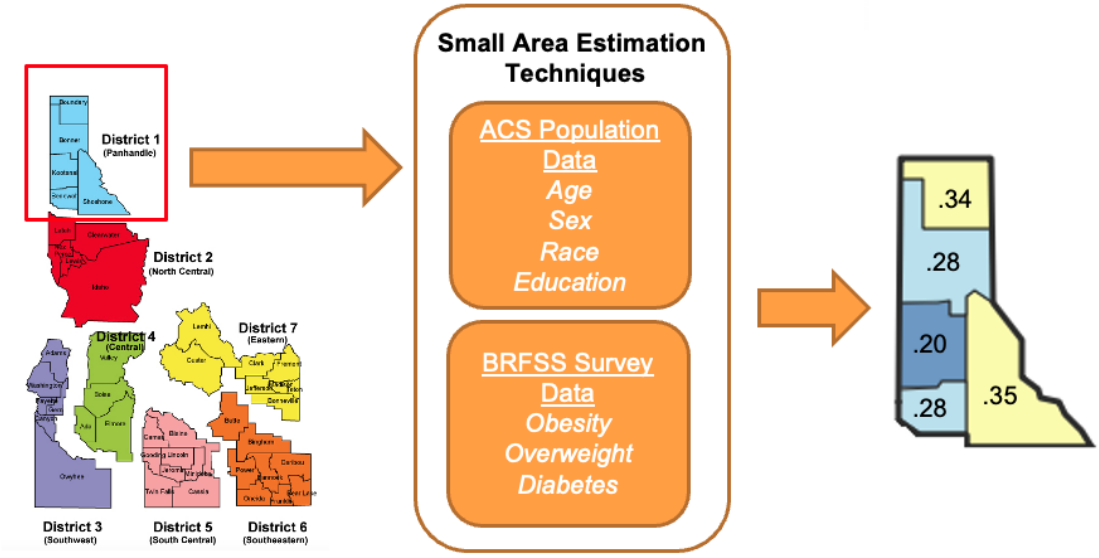

Figure 1. Generalized modeling strategy. Each public health district, for each variable, is a model run. For each model, we use ACS data to "constrain" BRFSS data at a regional scale. Using this approach, we can estimate county values.

We developed four (4) differing modeling approaches (which are run at the public health district level, for each BRFSS health variable), which vary the way that we select constraining variables. We then evaluate the models via internal and external validation, to determine the best model to use. For more information regarding our modeling development, you can refer to our publication on this approach in the journal, Population, Space and Place (Seamon et al, 2023). Our four-model framework provides a broad structure for evaluating constraint selection, in combination with qualitative and quantitative constraint grouping, which mimics the multi-level regression technique used by Zhang et al. (2015).

Model Validation

Validation techniques are an important step for model construction, to confirm that results are based on verifiable scientific conclusions. Validation reinforces the integrity of microsimulation models and is necessary for comparing outputs with prior observations and expectations. We applied two approaches: internal and external validation. Internal validation is defined as the process in which aggregated level outputs are compared with input constraints. Internal validation confirms that the simulated populations in each area match the total populations (implied by the constraints) with the level of correspondence between the aggregate input data and aggregated results of spatial microsimulation (Edwards and Clarke, 2009). Conversely, external validation utilizes direct estimates for comparison to modeled estimates and is evaluated using Pearson's product-moment correlation coefficient.

Once we constructed the models, assessed validation, and chose the optimized model, we then used the model to estimate county level values, using the techniques of integerization and expansion. (Seamon et al, 2023, Whitworth, 2017)

Results

Of the four models constructed, the dynamic models (models where we used a logistic regression to dynamically select the most impactful ACS groupings to constrain the BRFSS data) performed consistently better given internal and external validation measures. Internal validation measures (mean relative error, MRE) across all four models, for all 12 variables, were highest for counties with populations below 5,000, including Camas, Clark, and Clearwater counties. Higher populated counties had lower mean relative error (MRE typically below .25). We also evaluated model performance with direct survey sample observations, which provided similar results

External validation was additionally performed using separate small area estimation research from the CDC's PLACES program (http://cdc.gov/places), which is based on the methodology structured by Zhang et al. (2014). Comparisons of all 12 variables between external sources and our dynamic base model results indicated close alignment, with absolute correlations (r) of the top seven most populated counties ranging from .79 to .85. Given that the dynamic base (dynamic constraining with no grouping of ACS data) model was the most parsimonious, this was selected as the optimum model choice.

Results from our optimally selected model, for all 12 COVID-19 associated variables (obesity, overweight, depressive disorder, diabetes, heart disease (a combined factor of reported angina and heart attack), respiratory disease (COPD, emphysema or chronic bronchitis), chronic kidney disease, smoking, asthma, hypertension) are found on the Modeling Idaho Health website, https://modelingidahohealth.org. We found consistent health condition disparities between PHDs and among the counties within the PHDs, with the greatest prevalence of risk factors in small, rural counties versus urban areas.

This study did not model health conditions by older age, the strongest risk factor associated with severe COVID-19 disease. Multimorbidity, having more than one medical condition, is a common risk factor for severe COVID-19 outcomes and it increases with age. Over half (51.8%) of the US adult population have at least one of ten health conditions (arthritis, cancer, chronic obstructive pulmonary disease, coronary heart disease, current asthma, diabetes, hepatitis, hypertension, stroke, and weak or failing kidneys) and 27.2% have more than one. Chronic condition prevalence increases with age, rurality, and public medical insurance and is higher among some race and ethnic groups (Boersma et al., 2020). To explore multimorbidity risks by county and PHD, we modeled the combined prevalence of the five risks highly associated with severe COVID-19 disease. Analyzing combined risk provides as additional perspective of risk for severe COVID-19 that is different than looking at each individual risk factor alone. For example, in Twin Falls County, 30% of people report obesity, 7% report diabetes, 5% report heart disease, 5% report respiratory disease and 3% report kidney disease, for a combined total of 50%. (Figure2).

To explore the prevalence of multimorbidity we applied Razzaghi's (2020) approach of estimating the prevalence of at least one the following health conditions by county: obesity, diabetes, heart disease (reported angina and heart attack), respiratory (or pulmonary) disease and chronic renal disease. Overall, 31% of Idaho BRFSS respondents reported at least one of these five medical conditions believed to increase severe COVID-19 disease. We estimated that Elmore County had the lowest prevalence of the five conditions (28%) and Adams County had the highest prevalence (46%). (Figure 4). Overall, PHD 3 reported the highest prevalence of at least one chronic condition, and PHD 4 reported the lowest. (Figures 3 and 4).)

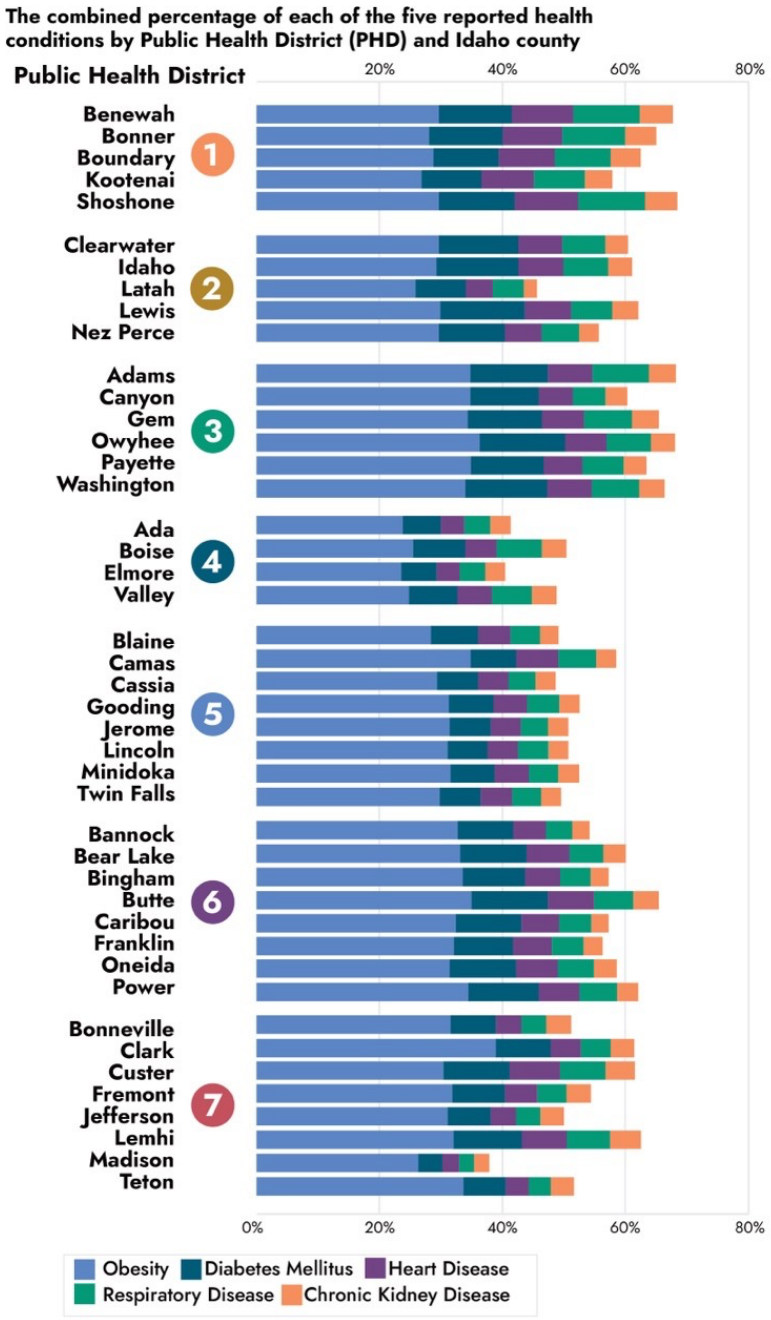

Figure 2. This chart shows the combined percentage of each of the five health conditions in a particular county and allows for individual county comparison of specific health conditions.

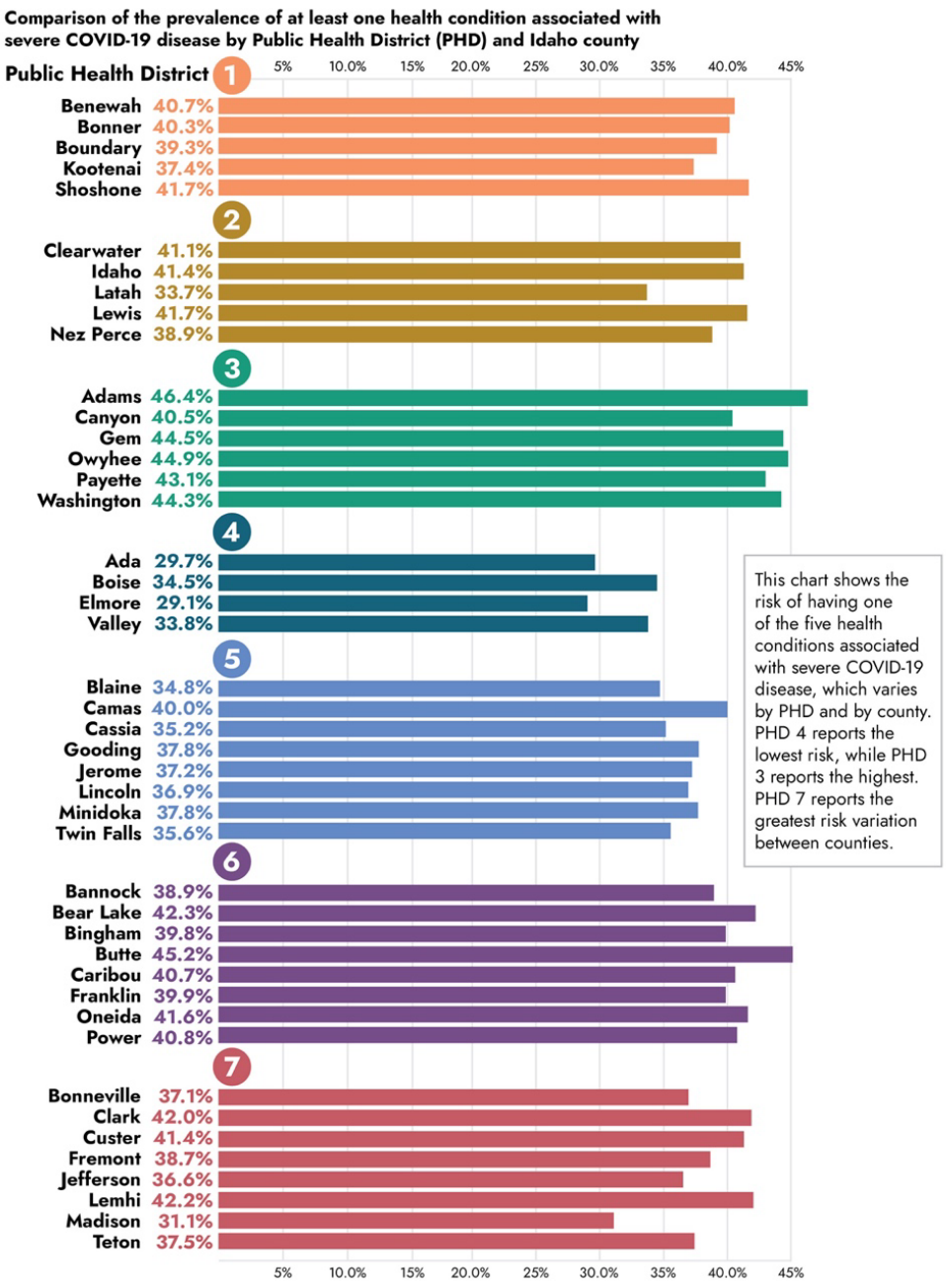

Figure 3. Chart shows the risk of having one five health conditions associated with severe COVID-19 disease, which varies by PHD and county.

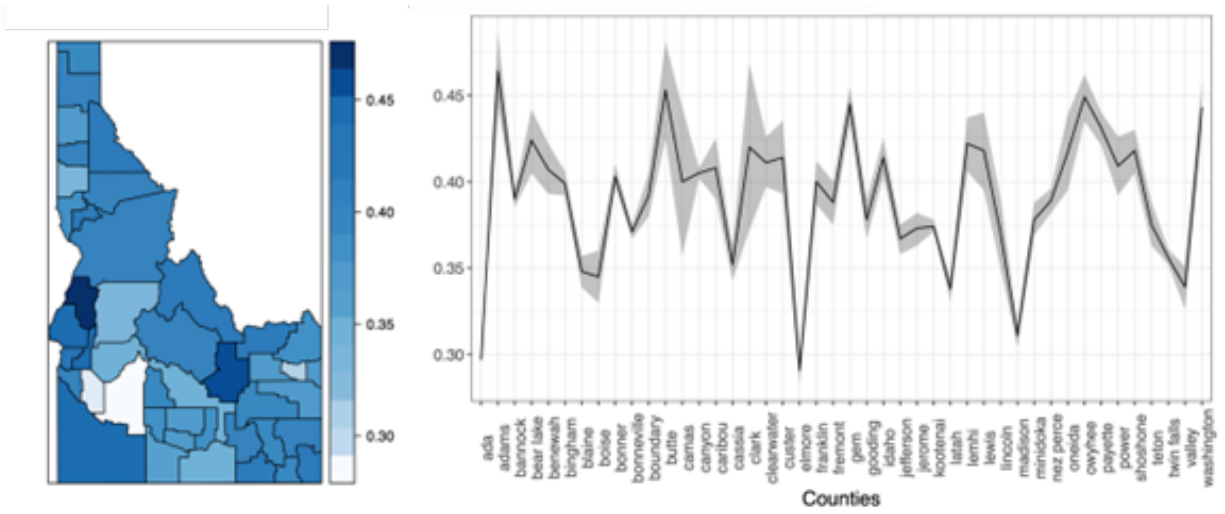

Figure 4. Map showing the percentage of adults in Idaho counties who report having at least one of the five health conditions that increase risk for severe COVID-19 disease.

We also modeled the prevalence of two commonly related conditions, overweight and diabetes. In doing so, we saw greater prevalence of the two combined conditions in some counties over others (Figure 5). For example, the prevalence of one chronic condition was 45% in Owyhee County, compared to 32% in Madison county, indicating risk but less risk than some other counties. When combining the prevalence of overweight and diabetes, Owyhee County had the highest combined risk of both diabetes and overweight of all counties (12%) compared to a state average of 7.6%. Further investigation of the prevalence of multimorbidity is important to better elucidate risk for severe COVID-19 disease and the disparate risk for poor health outcomes overall.

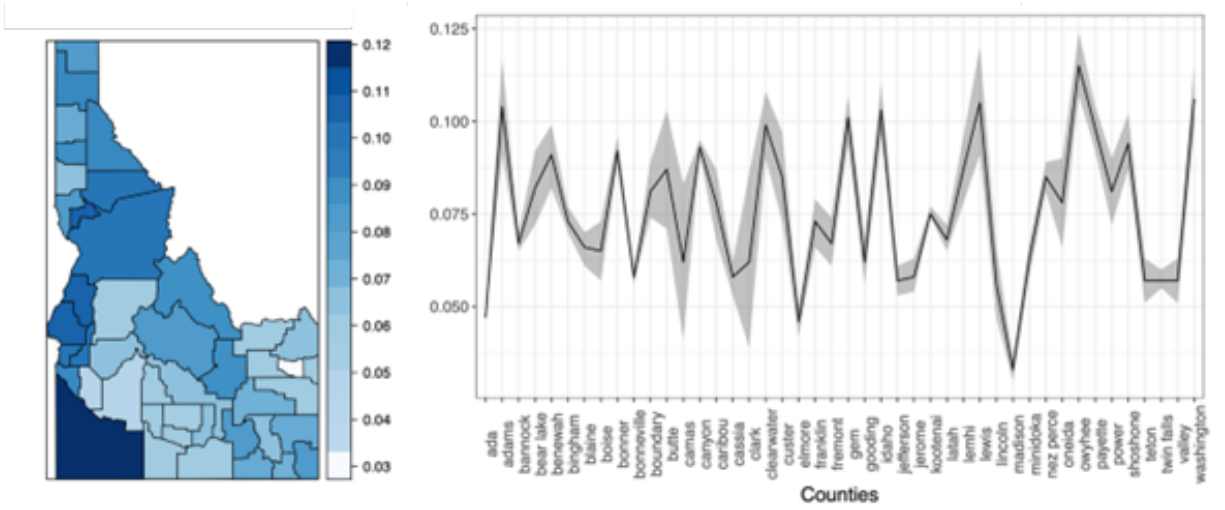

Figure 5. Map showing the percentage of adults in Idaho counties who report being BOTH overweight and having diabetes.

Discussion and Opportunities

Our findings suggest that the developed modeling approach is a reliable and effective technique to downscale BRFSS survey questions to a refined spatial scale. Our methodology, which combines a logistical regression model fitting strategy with spatial microsimulation/small area estimation, allows us to construct a number of differing constrain driven models, which we then evaluate for accuracy.

The results of our model highlights health disparities between PHDS, as well as counties within each PHD. For example, risks for underlying medical conditions which may increase severe COVID-19 risk were most pronounced in PHD 3 and least in PHD 4. This information enhances the ability of public health professionals to more confidently identify critical health issues that potentially worsen COVID-19 disease risk, and to identify counties within a PHD at greatest risk for particular health conditions. From a data access and analysis perspective, our interactive website *Modeling Idaho Health* (https://modelingidahohealth.org) provides helpful spatial representation of medical conditions and county level rankings of disease risk, and additionally allows for data download.

The drivers of health maps and rankings provide a clear visual of some of the social and economic challenges impacting many Idaho counties. This data provides an opportunity for Idaho parties invested in improving health outcomes to identify and prioritize strategic actions at a more granular (local) level than previously possible. From our modeling efforts, it is evident that health disparities exist across counties and PHDs and are most notable in counties that report greater poverty, less education, less insurance coverage, and greater limited English-speaking households. These data will also assist grant development, help shape public health and health system program planning and implementation and could provide needed trend data for program monitoring and evaluation if the modeling efforts are sustained.

In terms of future efforts, other important medical conditions and behaviors to include in subsequent severe COVID-19 disease risk modeling efforts include cancer, chronic liver disease, disabilities, immunocompetence, HIV (Human immunodeficiency virus), neurologic conditions, physical inactivity, and other emerging related risk conditions. A clearer understanding of the relationship between severe COVID-19 disease and level of severity or level of control of the underlying health condition (e.g., diabetes) is needed.

A second Bureau of Equity & Strategic Partnerships award, which began in 2023, is focused on extending our COVID-19 modeling efforts to construct secondary predictive models which associate BRFSS variables with direct COVID-19 outcomes (hospitalizations, deaths, etc.). These future modeling efforts will allow us to not only parse out the impacts of existing health conditions and their effects on COVID-19 outcomes, but to also assess the effects of COVID-19

on possible increases in the health parameters themselves (e.g., do higher COVID-19 cases or hospitalizations in a county result in increased levels of obesity or hypertension?).
In addition, the 2022 BRFSS data set (projected release of the data is mid-year, 2023) contains critical COVID-19 related data and data on the social determinants of health. This data set will allow for robust analysis of reported medical conditions, COVID-19 disease outcomes, long COVID-19, and the social determinants of health. The 2022 BRFSS data would allow us to map county level estimates of vaccine uptake and vaccine refusal and analyze the impact of vaccination status on reported medical conditions and COVID-19 outcomes. With ongoing support, these modeling efforts could be sustained over time allowing for needed county- level trend data. From a modeling methodology perspective, additional approaches other than iterative proportional fitting can be a useful way to assess validity. Techniques such as combinatorial optimization, simulated annealing, or spatially weighted regression, are methods which may allow us to evaluate error, and to improve aspects of accuracy over space and time.

There are limitations to the findings in this report and most have to do with accepted limitations of the BRFSS data set. The Idaho BRFSS randomized sample is generated by PHD, not by county, potentially resulting in less representation of smaller counties in the sample frame. Oversampling among smaller counties has helped correct lack of sampling representation. The BRFSS data set contains possible biases including nonresponse, social desirability, recall, and lack of knowledge of medical conditions. Idaho BRFSS respondents skew older, female, and possess higher education and report higher income and lower poverty than Idahoans overall. Comparing BRFSS respondent demographics to the census data, it is apparent that individuals who identify as LBGTQ, and belonging to racial and ethnic minority groups are not evenly represented in the BRFSS sample. BRFSS does not collect survey responses from individuals who are incarcerated or live in long-term care facilities, two populations highly vulnerable to COVID-19 disease exposure. Finally, as noted by Razzaghi, (2020), BRFSS asks respondents about a limited number of conditions, and it does not assess disease severity nor specify variations of conditions that increase risk. Increasing BRFSS sampling among rural counties and among minoritized populations would increase the validity of these findings.

Conclusion

Modeling Idaho COVID-19 Health Disparities provided the first opportunity to explore county level estimates for underlying health conditions that increase COVID-19 disease severity. The interactive website Modeling Idaho Health provides helpful spatial representation of medical conditions, county-level disease rankings, and key social and economic challenges impacting Idaho counties. This data will provide an opportunity to identify, prioritize, and guide strategic actions to improve health outcomes. Sustained modeling efforts will provide trend data needed to evaluate public health programmatic and policy efforts over time.

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Appendices

1. *Modeling COVID-19 Health Disparities* Summary- English

2. *Modeling COVID-19 Health Disparities* Summary- Spanish

3. *Modeling COVID-19 Health Disparities* Supplemental Materials (additional maps and graphs) can be found at: https://modelingidahohealth.org/background

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Modeling COVID-19 Health Disparities

Project Purpose

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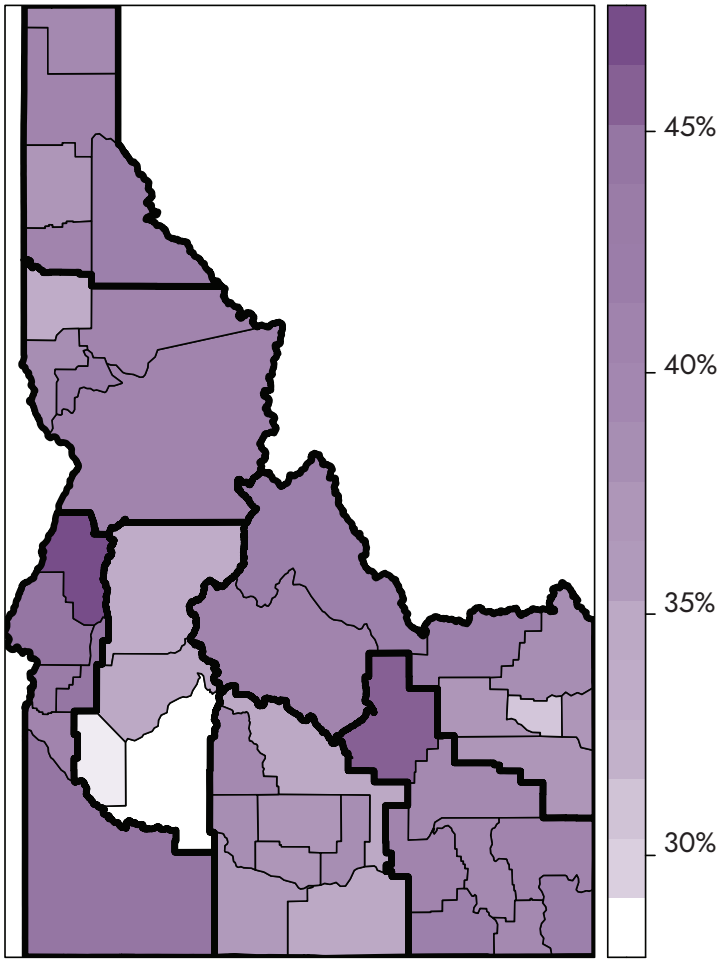
Several factors increase the risk for severe COVID-19 disease. Obesity, diabetes mellitus (type 1 and type 2), respiratory disease (chronic obstructive pulmonary disease and asthma), heart disease (angina and heart attack), and chronic kidney disease (CKD), are well known to increase severe COVID-19 disease risk. Age further increases the risk of severe COVID-19 disease and death. Smoking, heavy drinking, and lack of physical activity can also contribute to poorer health and increased risk within populations.

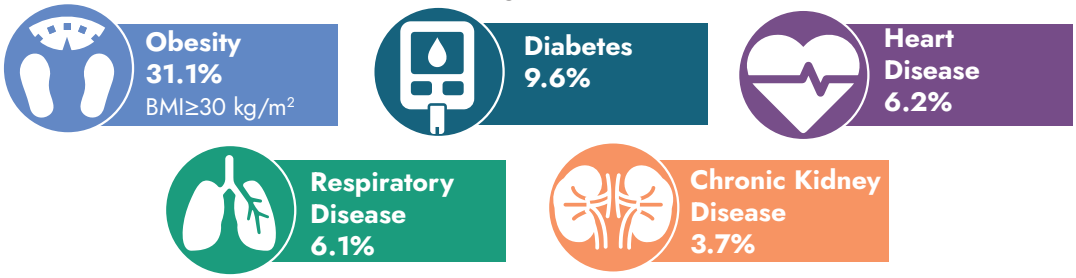
Prevalence of at least one health condition associated with severe COVID-19 disease



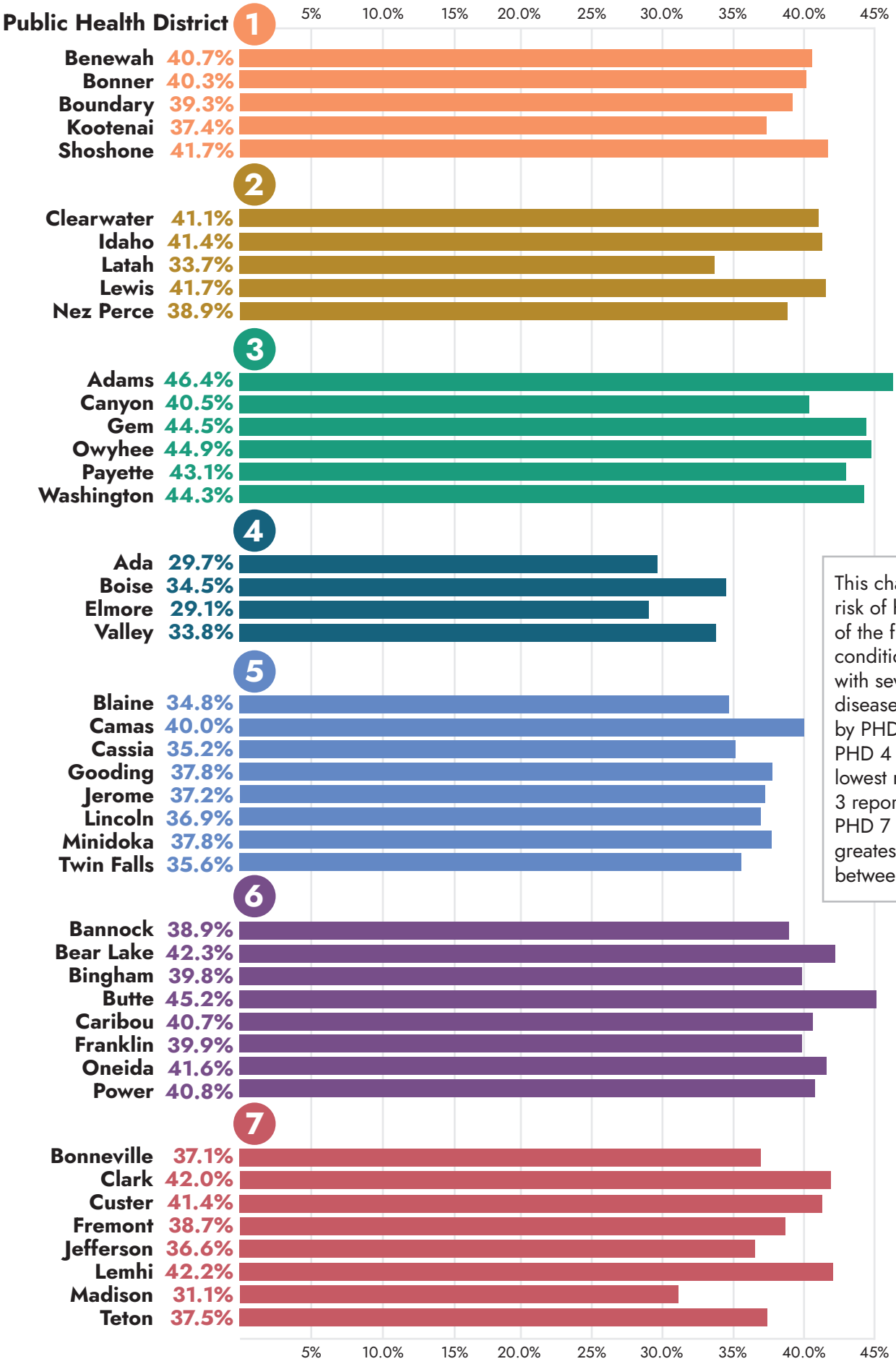
This map shows the percentage of adults in Idaho counties who report having at least one of the five health conditions that increase risk for severe COVID-19 disease. COVID-19 disease risk conditions vary within Public Health Districts and between counties. Rural counties tend to have a higher percentage of risk conditions than urban counties. In Idaho, 40% of adults 18 or older have a least one health condition putting them at risk for severe COVID-19 disease.

Lowest Risk Elmore County 29.1 %
Highest Risk Adams County 46.4%

Health Factors Contributing to Severe COVID-19 Disease in Idaho

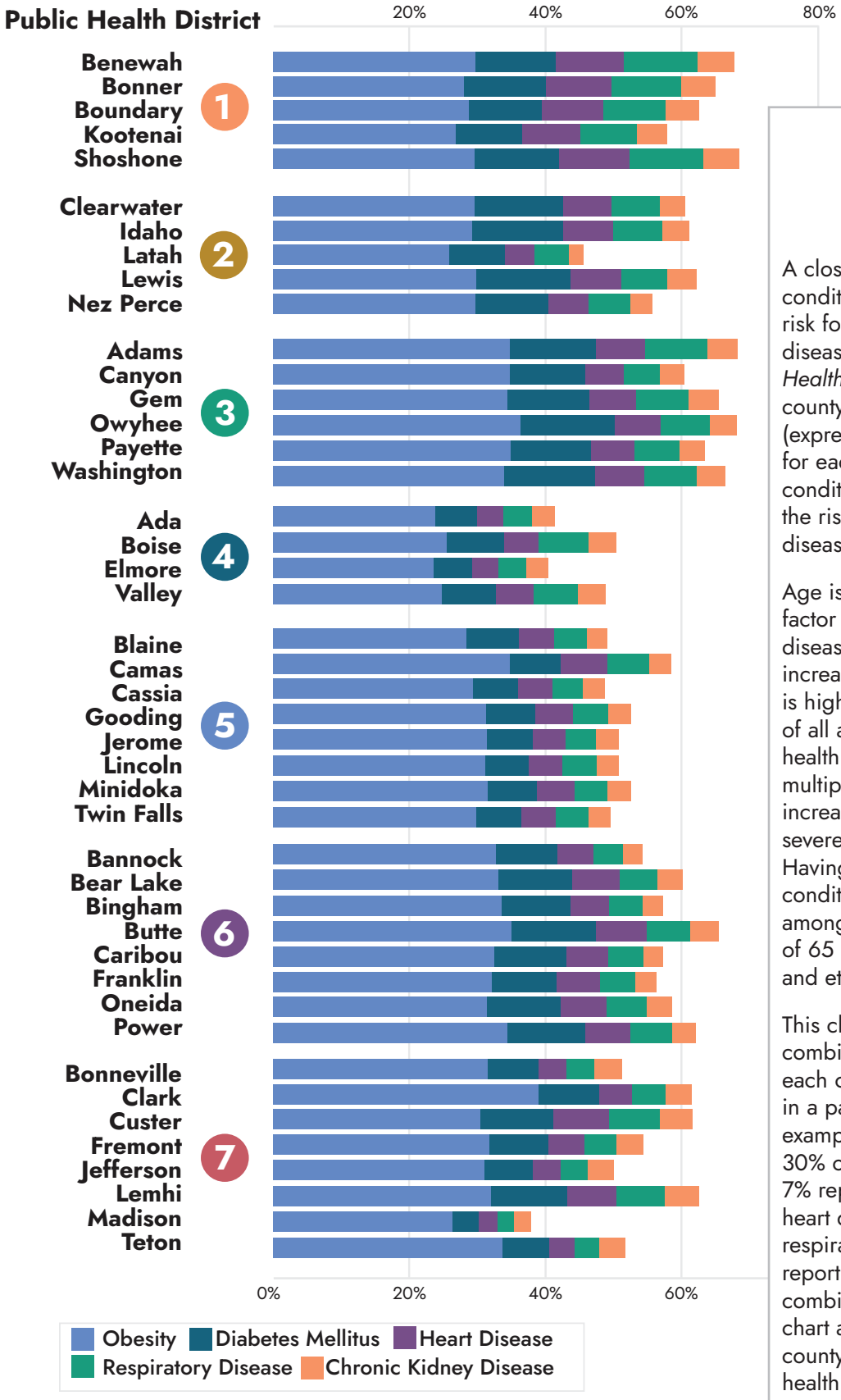


Comparison of the prevalence of at least one health condition associated with severe COVID-19 disease by Public Health District (PHD) and Idaho county



This chart shows the risk of having one of the five health conditions associated with severe COVID-19 disease, which varies by PHD and by county. PHD 4 reports the lowest risk, while PHD 3 reports the highest. PHD 7 reports the greatest risk variation between counties.

The combined percentage of each of the five reported health conditions by Public Health District (PHD) and Idaho county



A CLOSER LOOK

A closer look at health conditions that increase the risk for severe COVID-19 disease. *Modeling COVID-19 Health Disparities* produced county-level prevalence data (expressed as a percentage) for each of the five health conditions known to increase the risk for severe COVID-19 disease.

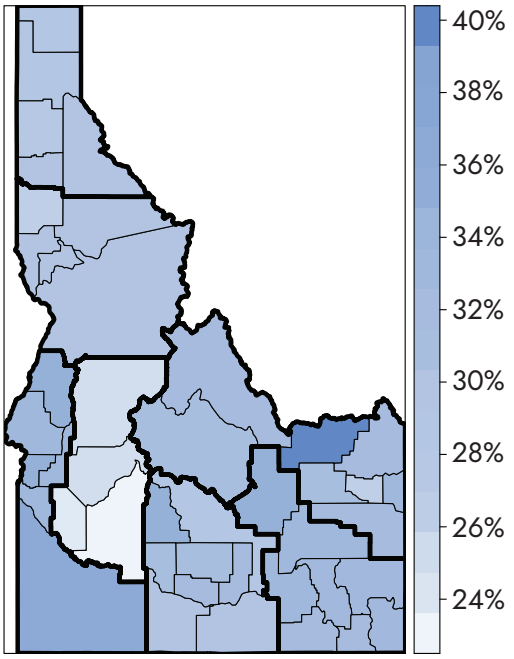
Age is the strongest risk factor for severe COVID-19 disease, and the risk greatly increases with age. The risk is higher among people of all ages with specific health conditions. Having multiple health conditions increases the overall risk for severe COVID-19 disease. Having more than one health condition is more common among people over the age of 65 and among some racial and ethnic minority groups.

This chart shows the combined percentage of each of the five conditions in a particular county. For example, in Twin Falls county, 30% of people report obesity, 7% report diabetes, 5% report heart disease, 5% report respiratory disease and 3% report kidney disease, for a combined total of 50%. This chart allows for the individual county comparison of specific health conditions.

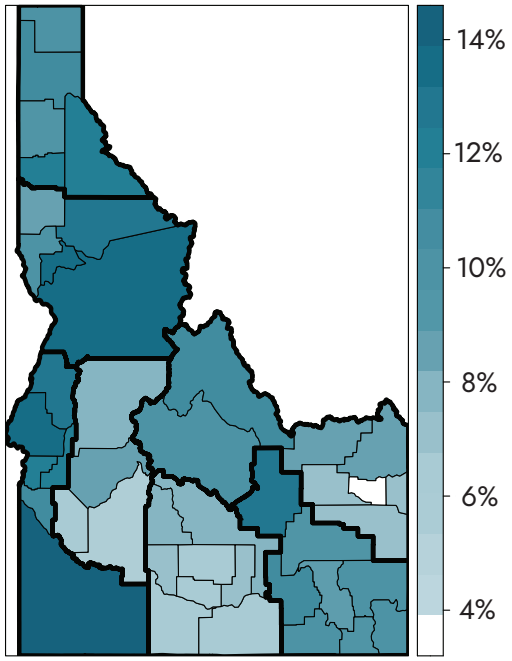
Social Determinants of Health

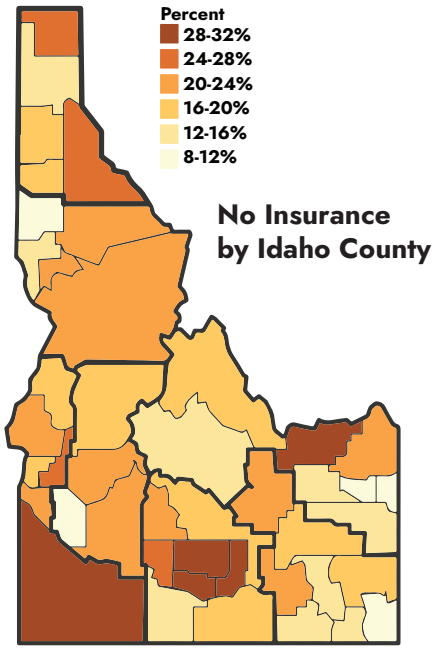
Socio-economic factors can place some individuals at higher risk for severe COVID-19 disease and make it difficult to seek, access, and receive medical care that is understandable and suitable. *Modeling COVID-19 Health Disparities* used the American Community Survey (ACS) data (poverty, no insurance, less than 12th grade education and limited English speaking household) to describe conditions that create barriers for people to maintain good health, obtain medical care, and reduce the risk of severe COVID-19 disease.

Obesity by Idaho County

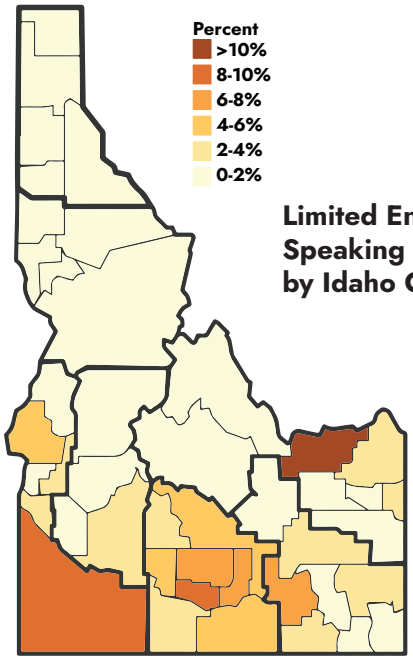


Diabetes by Idaho County





No Insurance by Idaho County



Limited English Speaking Household by Idaho County

Modeling COVID-19 Health Disparities created county-level estimates for over 10 health conditions and health behaviors known to increase the risk for severe COVID-19 disease and death. Follow the QR code for the *Modeling Idaho Health.org* interactive website for more county-level data, state comparisons, and contact information.

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This project was made possible by National Initiative to Address COVID-19 Health Disparities through Centers for Disease Control and Prevention (CDC), #OT21-2103. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the Idaho Dept of Health and Welfare, or CDC.

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MODELANDO LA SALUD DE IDAHO

https://modelingidahohealth.org

Modelando las disparidades de salud de COVID-19

Objetivo del proyecto

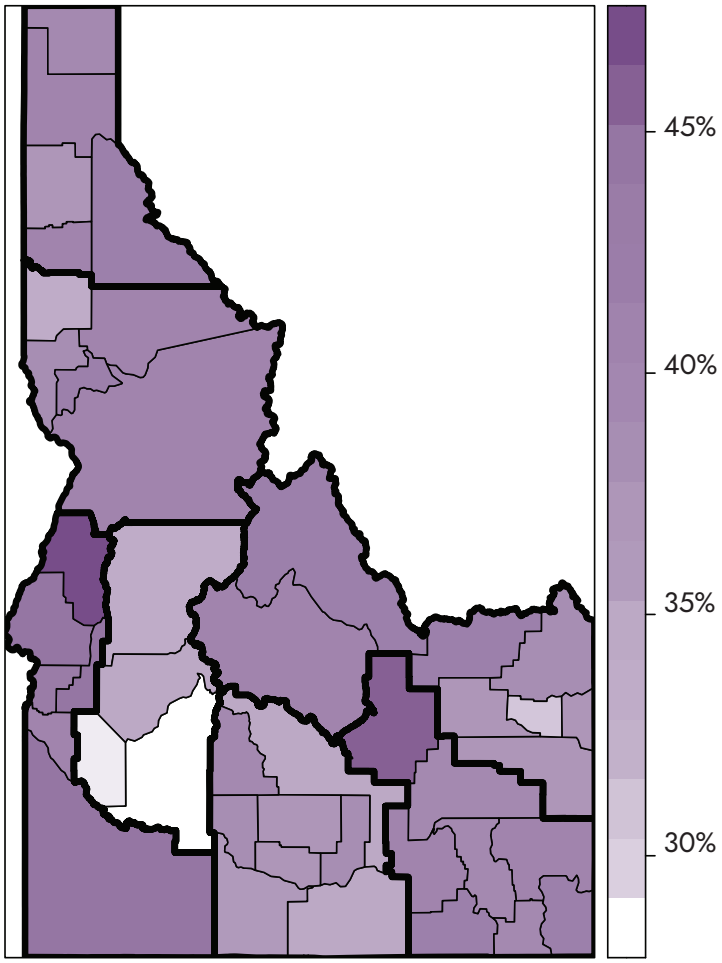
Existe evidencia fuerte que las personas con algunas afecciones de salud tienen un mayor riesgo de enfermedad grave por COVID-19, incluida la hospitalización, el ingreso en cuidados intensivos, la ventilación mecánica y la muerte. El proyecto *Modelando las disparidades de salud de COVID-19* desarrolló una técnica de modelado para identificar poblaciones en riesgo de enfermedad grave por COVID-19 y muerte a nivel de región. Antes de este trabajo, estos datos estaban disponibles por los Idaho Public Health Districts (PHD).

La información de salud para adultos de Idaho se recopila utilizando el Behavioral Risk Factor Surveillance System (BRFSS). Cada año, aproximadamente 5,000 residentes de Idaho (mayores de 18 años) responden a la encuesta telefónica de BRFSS. Los resultados de la encuesta se encuentran en el sitio web de Idaho BRFSS.[ENLACE].

Las disparidades de salud por COVID-19 utilizó técnicas de modelado de estimación de áreas pequeñas que combinan datos de BRFSS con datos de la American Community Survey (ACS) para crear medidas de condición de salud a nivel de región asociadas con la enfermedad COVID-19 grave. Modelar y mapear las condiciones de salud y la información social y económica a nivel de región (por ejemplo, pobreza, falta de seguro, educación más baja, hogar de habla inglesa limitado) permite a los funcionarios de salud estatales y locales, organizaciones sin fines de lucro y formuladores de políticas identificar y tomar medidas para prevenir enfermedades y mejorar la salud.

Varios factores aumentan el riesgo de enfermedad grave por COVID-19. La obesidad, la diabetes mellitus (tipo 1 y tipo 2), la enfermedad respiratoria (enfermedad pulmonar obstructiva crónica y asma), la enfermedad cardíaca (angina y ataque cardíaco) y la enfermedad renal crónica (ERC) son buenas conocidas para aumentar el riesgo grave de enfermedad COVID-19. La edad aumenta aún más el riesgo de enfermedad grave por COVID-19 y muerte. También, el tabaquismo, el consumo excesivo de alcohol y la falta de actividad física pueden contribuir a una peor salud y un mayor riesgo dentro de las poblaciones.

Prevalencia de al menos una condición de salud asociada con la enfermedad grave de COVID-19



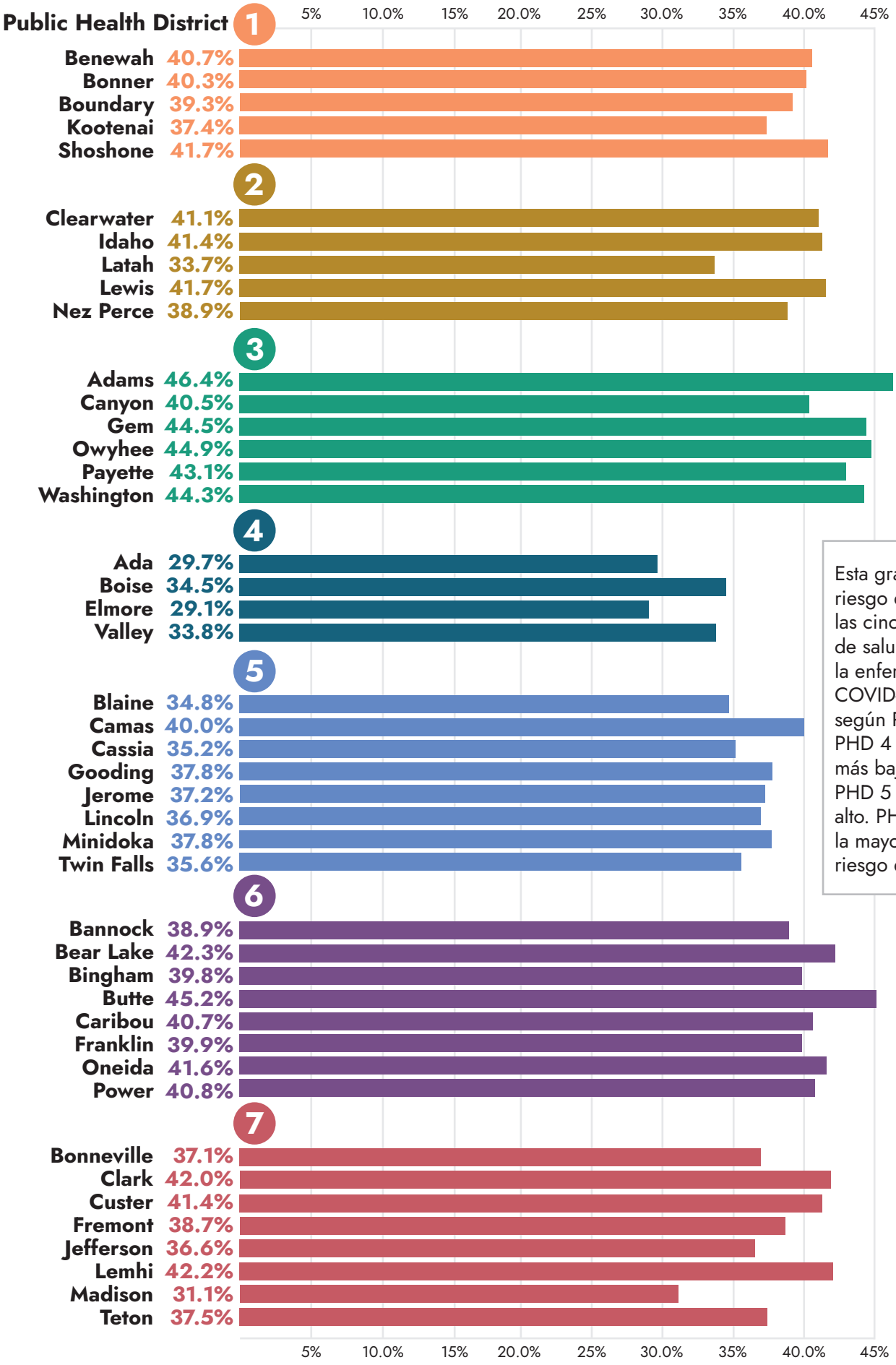
Este mapa muestra el porcentaje de adultos en las regiones de Idaho que informan tener al menos una de las cinco afecciones de salud que aumentan el riesgo de enfermedad grave por COVID-19. Las condiciones de riesgo de enfermedad varían dentro de los distritos de salud pública y entre regiones. Las regiones rurales tienden a tener un mayor porcentaje de condiciones de riesgo que las regiones urbanas. En Idaho, el 40% de los adultos mayores de 18 años tienen al menos una afección de salud que los pone en riesgo de contraer una enfermedad grave por COVID-19.

Riesgo más baja región de Elmore County 29.1 %
Mayor riesgo región de Adams County 46.4%

Factores de salud que contribuyen a la enfermedad grave de COVID-19 en Idaho

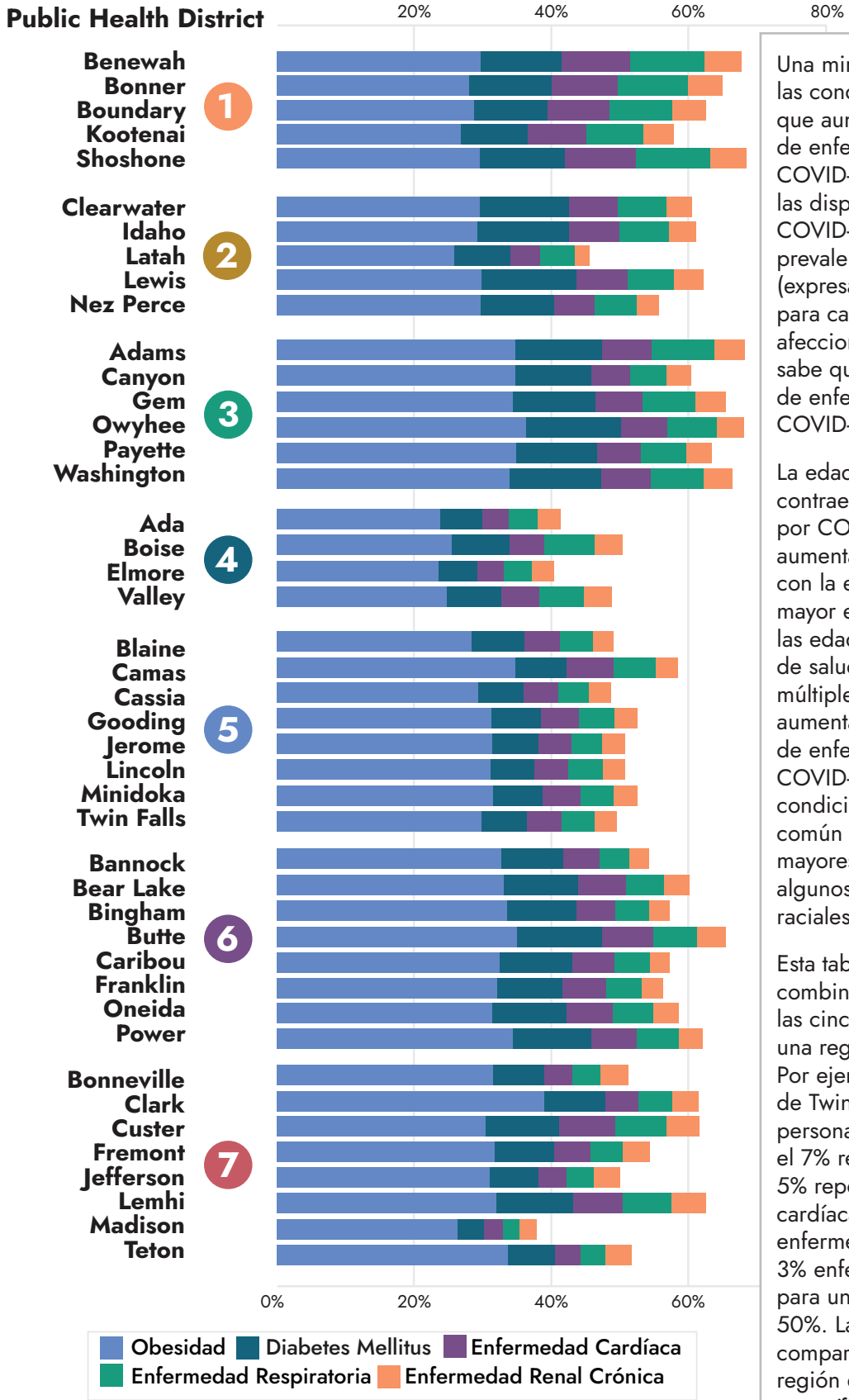
- **Diabetes Mellitus 9.6%**
- **Enfermedad Cardíaca 6.2%**
- **Obesidad 31.1%** BMI≥30 kg/m²
- **Enfermedad Respiratoria 6.1%**
- **Enfermedad Renal Crónica 3.7%**

Comparación de la prevalencia de al menos una afección de salud asociada con la enfermedad grave de COVID-19 por Public Health District (PHD) y la región de Idaho



Esta gráfica muestra el riesgo de tener una de las cinco afecciones de salud asociadas con la enfermedad grave COVID-19 que varía según PHD y la región. PHD 4 reporta el riesgo más bajo, mientras que PHD 5 reporta el más alto. PHD 7 reporta la mayor variación de riesgo entre regiones.

El porcentaje combinado de cada una de las cinco condiciones de salud reportadas por Public Health District (PHD) y la región de Idaho



UNA MIRADA

Una mirada más cercana a las condiciones de salud que aumentan el riesgo de enfermedad grave por COVID-19. El modelado de las disparidades de salud de COVID-19 produjo datos de prevalencia a nivel de región (expresados como porcentaje) para cada una de las cinco afecciones de salud que se sabe que aumentan el riesgo de enfermedad grave por COVID-19.

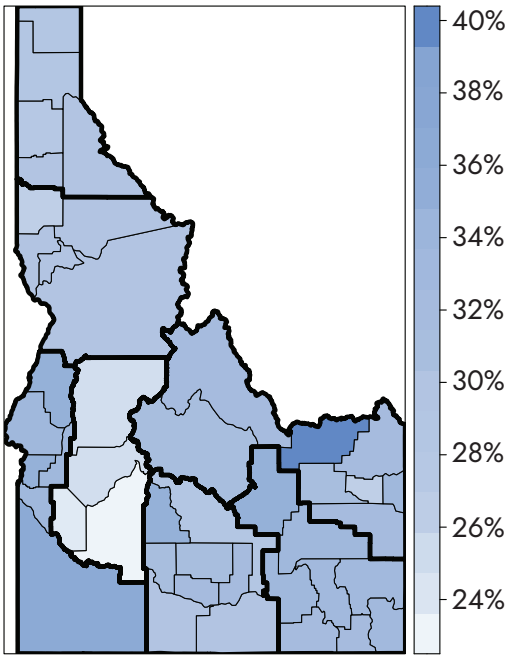
La edad es el mayor riesgo de contraer la enfermedad grave por COVID-19, y el riesgo aumenta considerablemente con la edad. El riesgo es mayor entre personas de todas las edades con condiciones de salud específicas. Tener múltiples afecciones de salud aumenta el riesgo general de enfermedad grave por COVID-19. Tener más de una condición de salud es más común entre las personas mayores de 65 años y entre algunos grupos minoritarios raciales y étnicos.

Esta tabla muestra el porcentaje combinado de cada una de las cinco condiciones en una región en particular. Por ejemplo, en la región de Twin Falls, el 30% de las personas reportan obesidad, el 7% reportan diabetes, el 5% reportan enfermedad cardíaca, el 5% informa enfermedad respiratoria y el 3% enfermedad renal informó, para un total combinado del 50%. La gráfica permite la comparación individual de la región de condiciones de salud específicas.

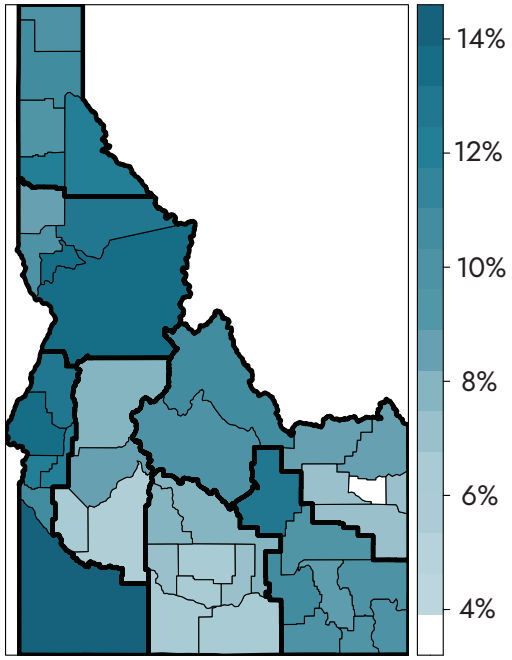
Determinantes sociales de la salud

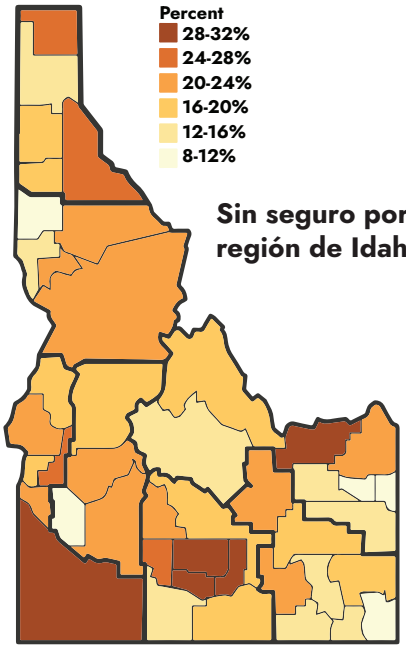
Los factores socioeconómicos pueden poner a algunas personas en mayor riesgo de contraer la enfermedad grave por COVID-19 y dificultar la búsqueda, el acceso y la recepción de atención médica comprensible y adecuada. Modelando las disparidades de salud de COVID-19 utilizó los datos de la American Community Survey (ACS) (pobreza, sin seguro, educación de menos de 12° grado y hogar de habla inglesa limitado) para describir las condiciones que crean barreras para que las personas mantengan una buena salud, obtengan atención médica y reduzcan el riesgo de COVID-19 grave.

Obesidad por región de Idaho

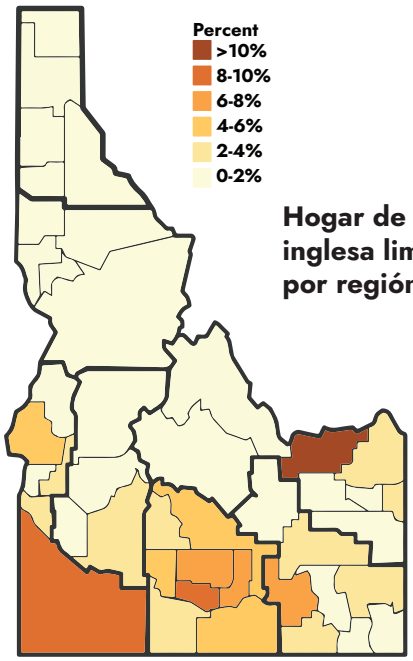


Diabetes mellitus por región de Idaho





Sin seguro por región de Idaho



Hogar de habla inglesa limitado por región de Idaho

Modelando las disparidades de salud de COVID-19 creó estimaciones a nivel de región para más de 10 afecciones de salud y comportamientos de salud que se sabe que aumentan el riesgo de enfermedad grave por COVID-19 y muerte. Siga el código QR del sitio interactivo del Internet de Modeling Idaho Health.org para obtener más datos a nivel de región, comparaciones de estados e información de contacto.

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Este proyecto fue posible gracias a la National Initiative to Address COVID-19 Health Disparities por los Centers for Disease Control and Prevention (CDC), #OT21-2103. Su contenido es responsabilidad exclusiva de los autores y no representa necesariamente las opiniones oficiales del Idaho Dept of Health and Welfare, o CDC.

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