Estimating Idaho county level health indicators using small area estimation and spatial microsimulation

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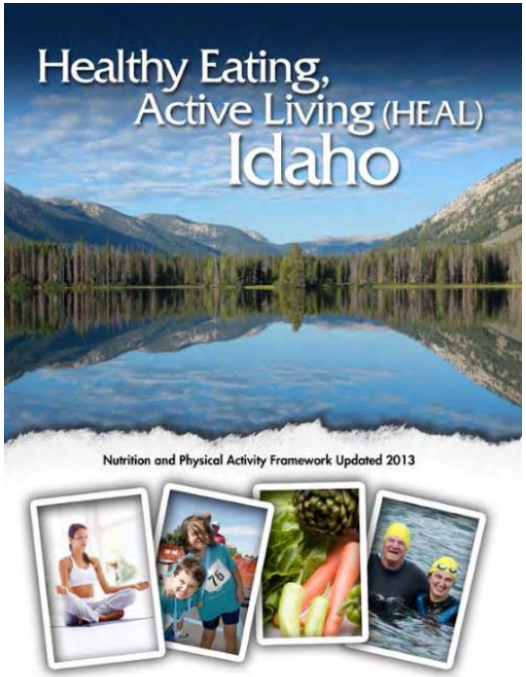
Project Overview- Impetus



GOAL 3

Establish a statewide system to report, monitor and evaluate healthy eating and active living programs and initiatives.

- **Identify and reduce gaps** in healthy eating and active living
- **Increase capacity** of agencies to collect and analyze health data
- **Increase understanding** of the burden of inactivity and poor nutrition
- **Disseminate** findings
- **Provide support** to orgs to assess barriers
- **Use data** in program planning/advocacy/media

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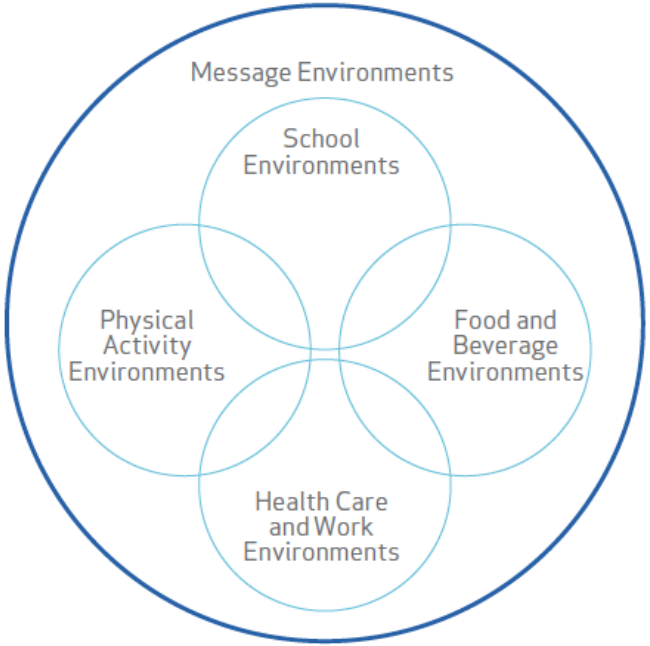
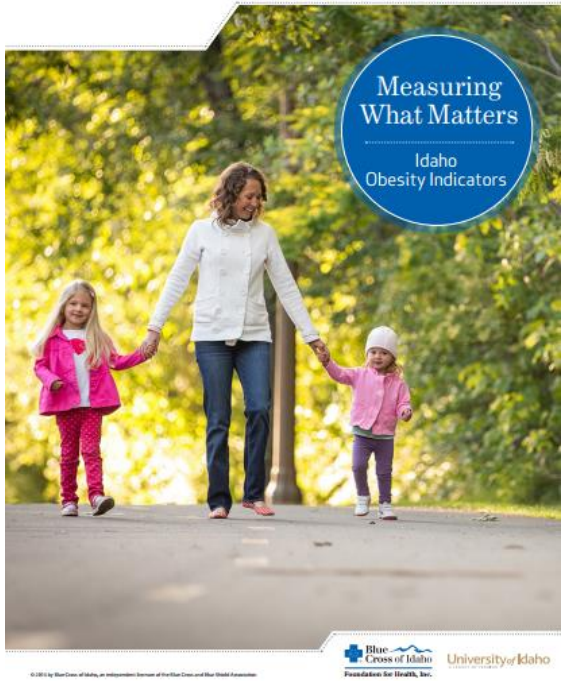
Project Overview - Brief history

Assessment of data availability and data gaps in five critical environments to better define and target obesity in Idaho.





Accelerating Progress in Obesity Prevention (2012)

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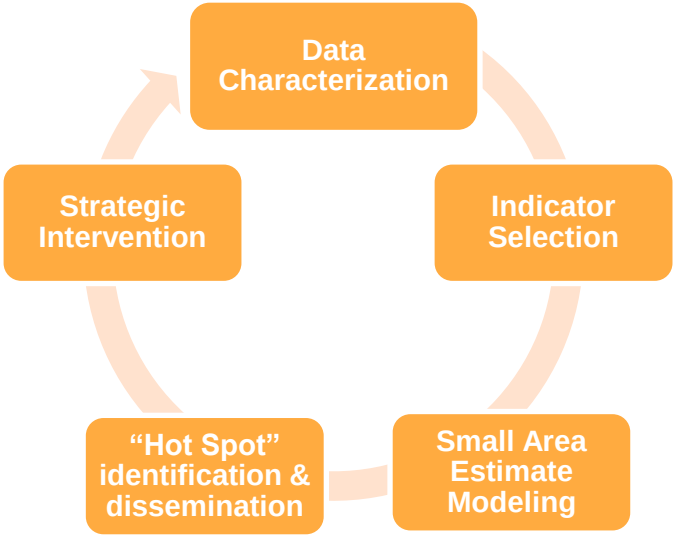
Surveillance → Small Area Estimates → Strategic Intervention

BRFSS data by Age, gender, sex, geography, income

BMI I, II, III
Fruit & Veg
Physical Activity
Food Insecurity

Proof of Concept
American Community Survey



Brown, H, Mesa Frias, M, & Wiest, M. Bridging the Obesity Data Gap: A Microsimulation Model, University of Idaho-2016

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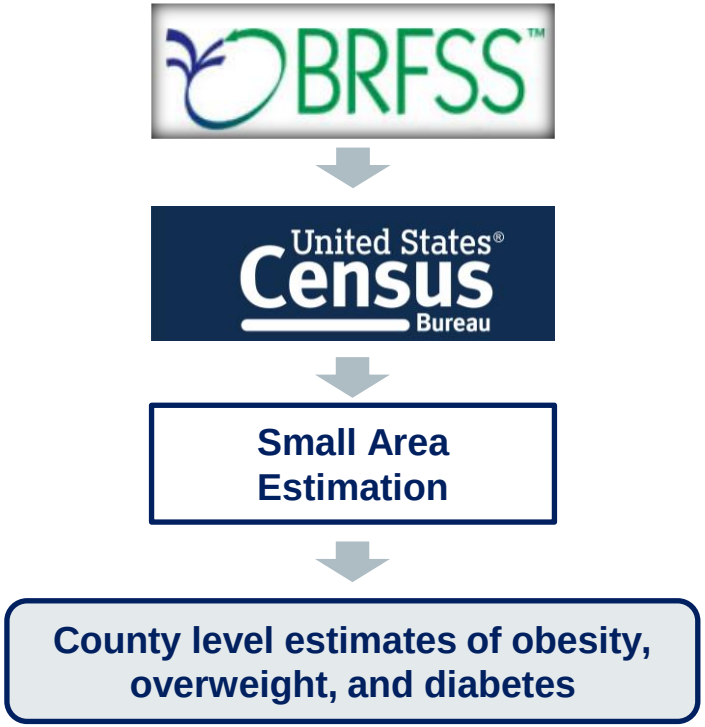
2020 Project Overview

Utilizing the CDC's **Behavioral Risk Factor Surveillance Survey** (BRFSS), in combination with US Census data, to generate Idaho county-based prevalence estimates for:

- **obesity**,
- **overweight**, and
- **diabetes**



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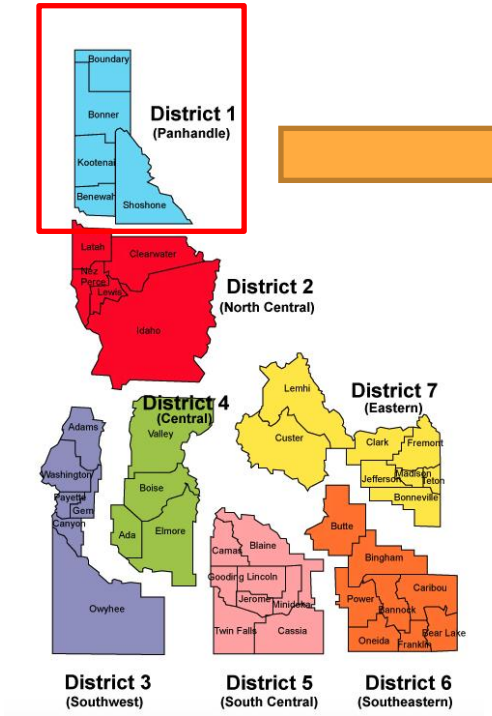
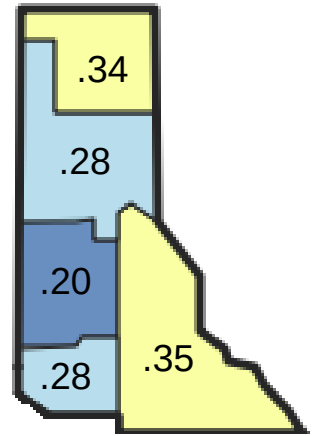
2020 Project Overview

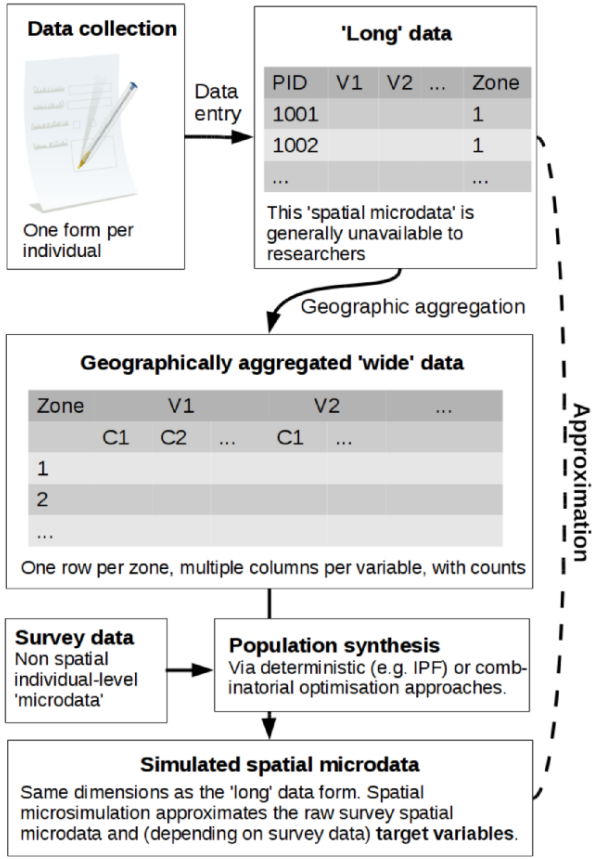


Small Area Estimation Techniques

ACS Population Data
Age
Sex
Race
Education

BRFSS Survey Data
Obesity
Overweight
Diabetes





Modeling Approach

- Small area estimation (SAE)
- Spatial microsimulation
  - Iterative Proportional Fitting

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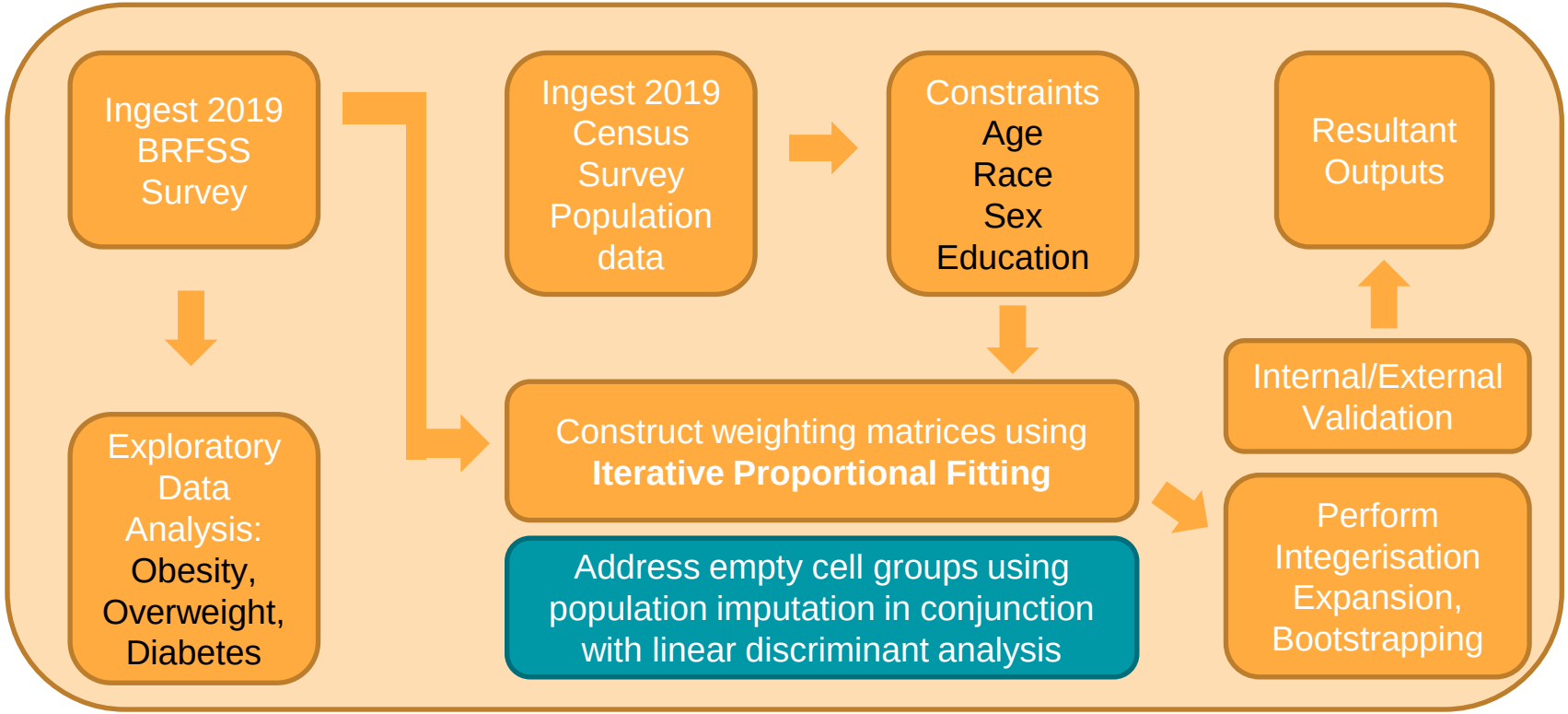
Methods

Model Variants



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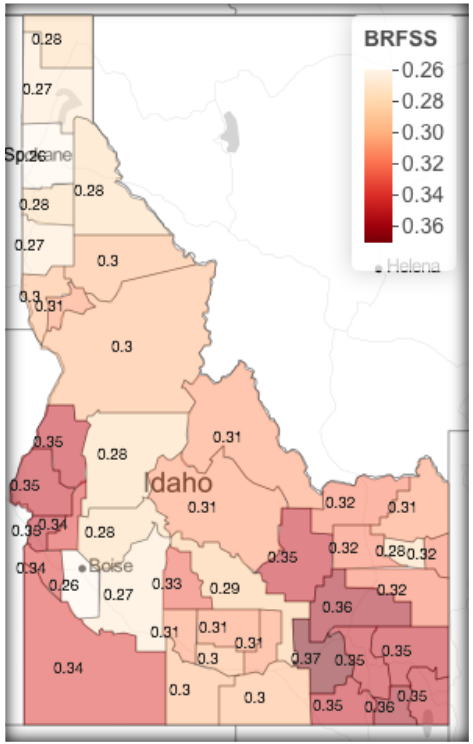
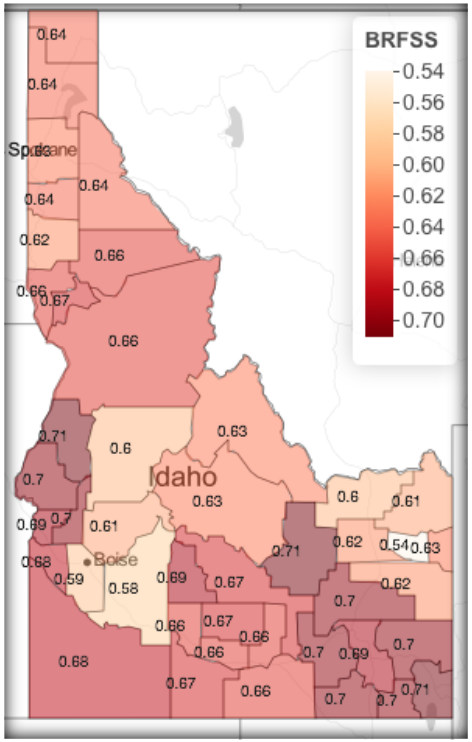
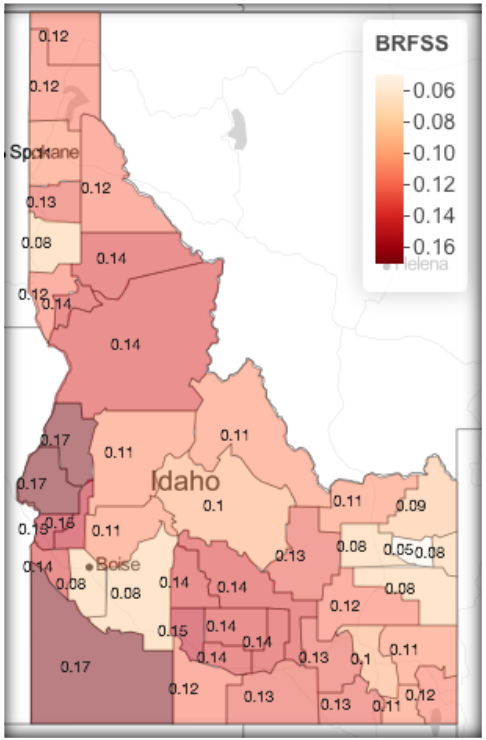
Obesity



Overweight



Diabetes

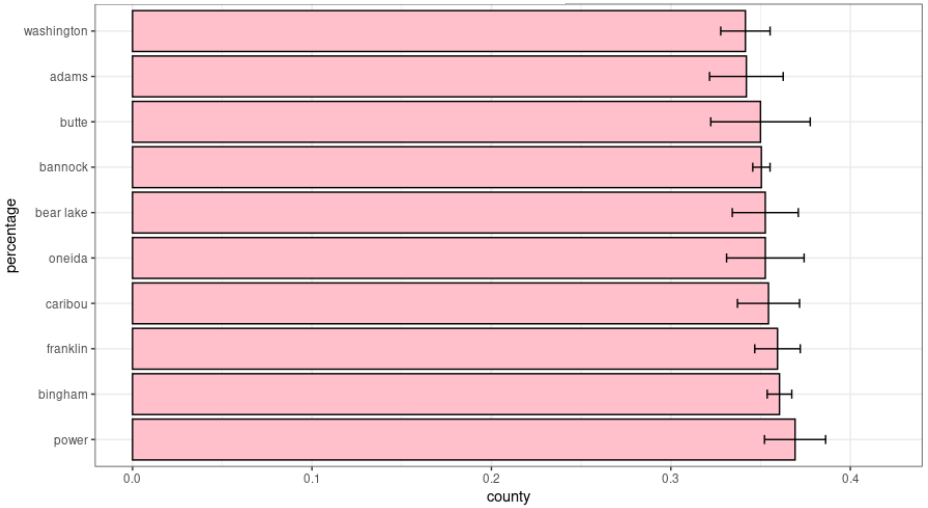


Final Model:

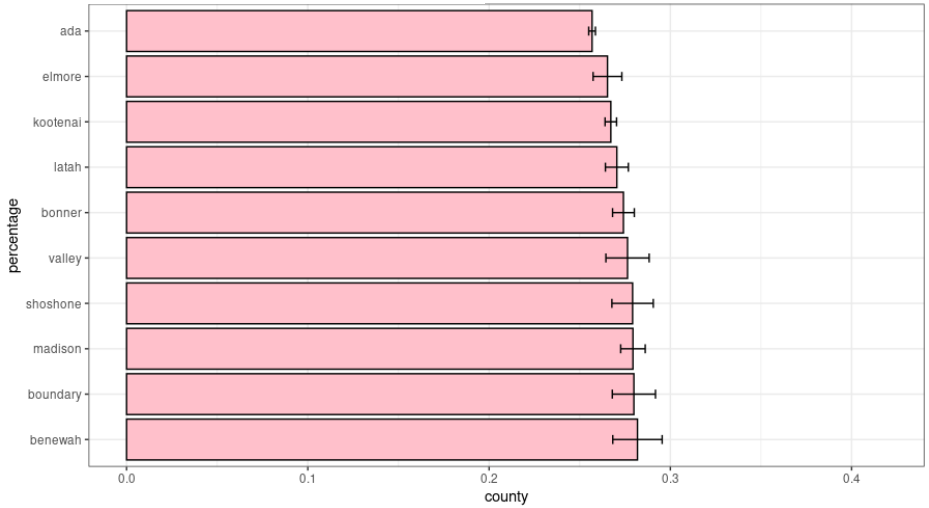
Significant Constraints With No Grouping

Obesity

Bottom 10 – Obesity 2019

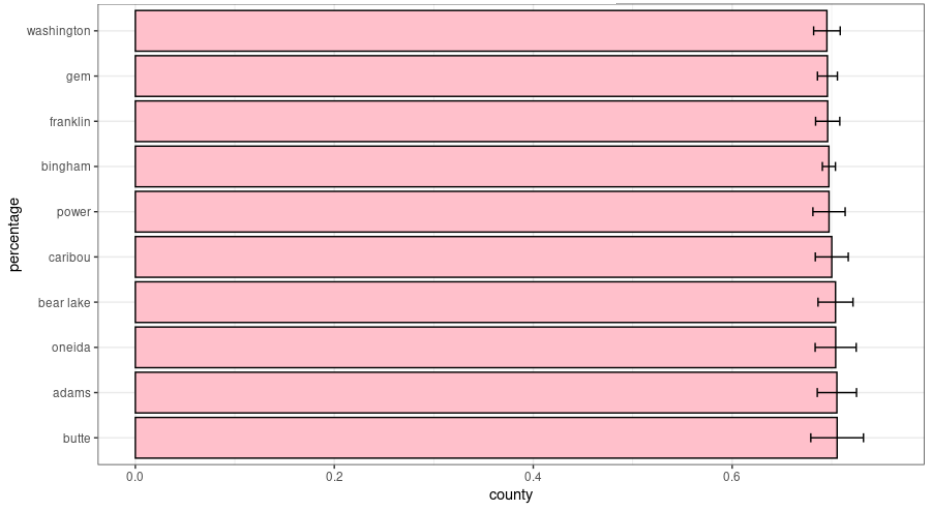


Top 10 – Obesity 2019

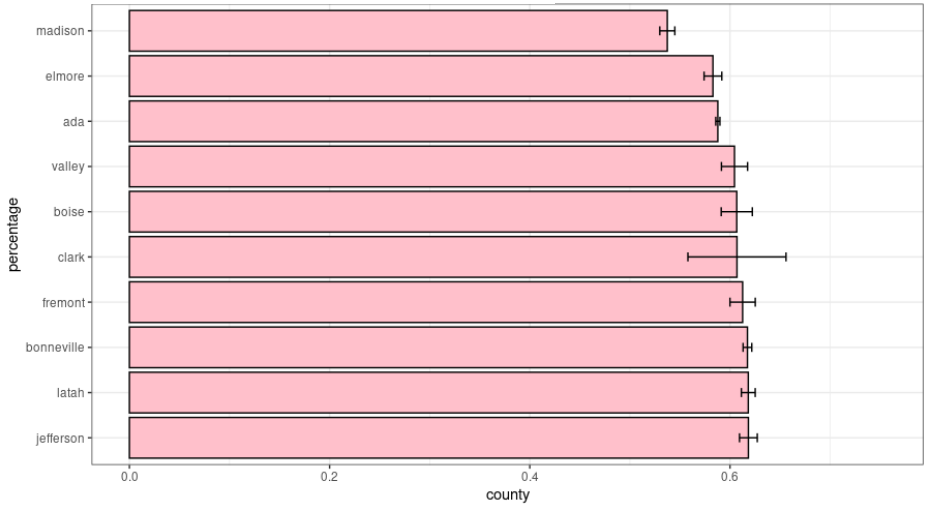


Overweight

Bottom 10 – Overweight 2019

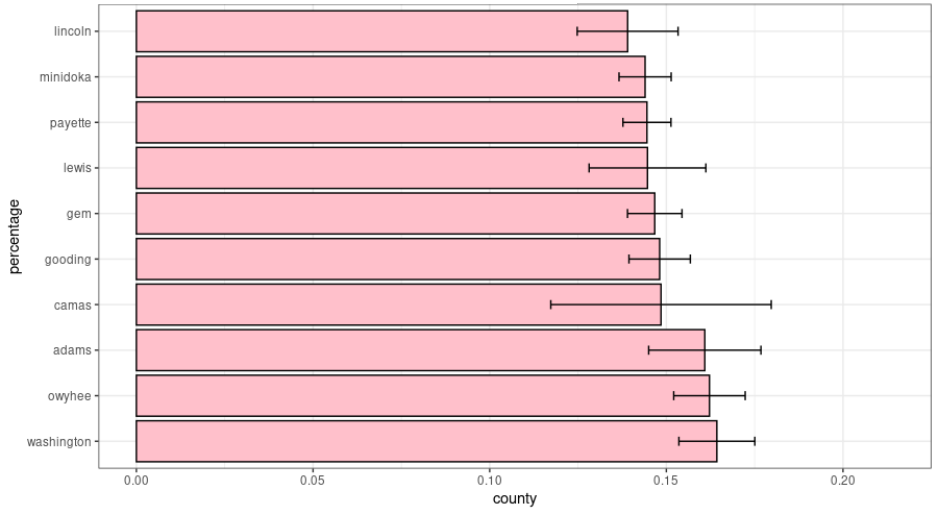


Top 10 – Overweight 2019

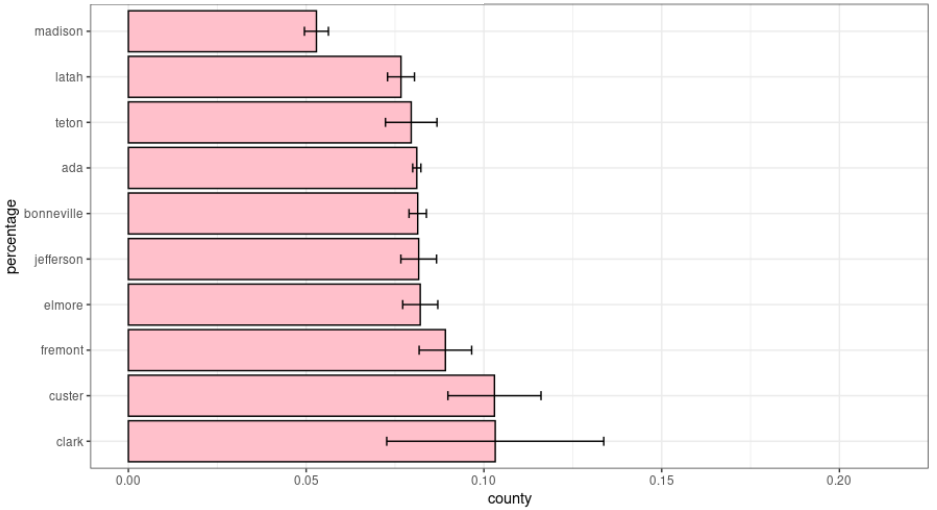


Diabetes

Bottom 10 – Diabetes 2019



Top 10 – Diabetes 2019



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Discussion

- **Iterative Proportional Fitting Model strengths**
  - Allows for internal/external model validation
  - Addresses fractionalization

- **Challenges/Limitations**
  - Dependent on sampling strategy (underrepresentation for some regions)
  - Determining group separations for constraints requires more sophistication
  - Alternative constraint variables may be significant in simulating survey variables (e.g. income)

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Benefits of this work

- Informs community health assessments- public health, hospital systems, community-based organizations & foundations.
- Offers more strategic intervention targets for program implementation and credible evaluation.
- Allows open access to county-level interactive web platform
- Complimentary to increased emphasis on population health approaches

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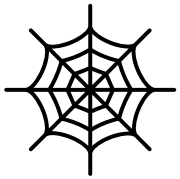
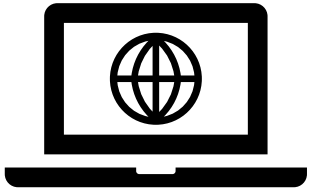
Moving Forward

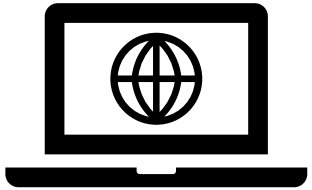
- Expand IPF/SM for other key Idaho health risk indicators
- Explore alterative model techniques (e.g. combinatorial optimization)
- Inform future BRFSS questions, sampling strategies
- Dynamic allocation of constraint groupings based on outcome variable (e.g. tobacco usage)
- Allows for potential prediction models
- Expand approach for multi modeling efforts



API



Output
Dashboards



Dynamic Model
Dashboards

Dashboard Prototypes

Acknowledgements

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