

2019 Women in Statistics & Data Science Conference

# Sexual Violence and Mental Health Across the Lifespan

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# PRESENTATION OVERVIEW

- ❖ Background
  - Sexual violence toward women
  - Sexual violence & mental health in women
- ❖ Study Objectives
- ❖ Methods/Results: Teen Girls
- ❖ Methods/Results: New Moms
- ❖ Limitations & Future Directions



# Background

Sexual violence = “Sexual activity when consent is not obtained or not freely given”

<https://www.cdc.gov/violenceprevention/sexualviolence/fastfact.html>

# 44% of women

experience sexual violence involving  
physical contact during their lifetimes

<https://www.cdc.gov/violenceprevention/pdf/2015data-brief508.pdf>

# 1 in 3

# women

experience intimate partner violence  
(IPV) involving contact sexual violence,  
physical violence, and/or stalking

<https://www.cdc.gov/violenceprevention/pdf/2015data-brief508.pdf>

25.5 million  
women

in the U.S. have been victims of rape or  
attempted rape during their lifetimes

<https://www.cdc.gov/violenceprevention/pdf/2015data-brief508.pdf>

# 11 million women

in the U.S. first experienced rape or  
attempted rape before the age of 18

<https://www.cdc.gov/violenceprevention/pdf/2015data-brief508.pdf>



More than 20%  
of teen girls  
experience physical dating violence

Silverman et al. (2001), Wincentak et al. (2017)





About 14%  
of teen girls  
experience sexual dating violence

Silverman et al. (2001), Wincentak et al. (2017)



# Between 3% and 9% of women

## experience IPV during pregnancy

Alhusen et al. (2013); Bailey (2010); Bailey & Daughterty (2007); Martin et al. (2001); Saltzman et al. (2003); Sharps et al. (2007)

## Based on previous research:

- ❖ Women who have been sexually assaulted have the highest burden of PTSD
- ❖ Women who have experienced IPV have increased incidence & severity of depression, anxiety, PTSD, suicidal ideation

Bonomi et al. (2007), Pico-Alfonso et al. (2006), Romito et al. (2005)

## Based on previous research:

- ❖ Teen girls who have experienced dating violence have increased risk of attempted suicide, substance use, bulimia, & sexual risk behaviors
- ❖ Teen girls who have been sexually assaulted had higher prevalences of attempted suicide

## Based on previous research:

- ❖ Women who experienced IPV during pregnancy had significantly higher odds of PTSD, anxiety, and depressive symptoms
- ❖ IPV during pregnancy was significantly associated with obstetric complications and postpartum depression symptoms

Bacchus et al. (2004), Mahenge et al. (2013), Mezey et al. (2005)

# Objectives

Using data from the 2013-2017 Youth Risk Behavior Survey:

- ❖ Estimate state-level prevalences of rape (ever), sexual violence (past 12 months), IPV (past 12 months), depression symptoms (past 12 months), and suicidal ideation (past 12 months) among teen girls
- ❖ Logistic Regression Model (A), outcome = depression symptoms in past 12 months (y/n)
- ❖ Logistic Regression Model (B), outcome = suicidal ideation in past 12 months (y/n)

# Objectives

Using data from the 2012-2015 Pregnancy Risk Assessment Monitoring System:

- ❖ Estimate state-level prevalence of IPV (before and/or during pregnancy) and postpartum depression symptoms among new moms
- ❖ Logistic Regression Model (C), outcome = postpartum depression symptoms (y/n)

# Methods/Results: Teen Girls





# Data Source #1: YRBS

## YRBS = Youth Risk Behavior Survey

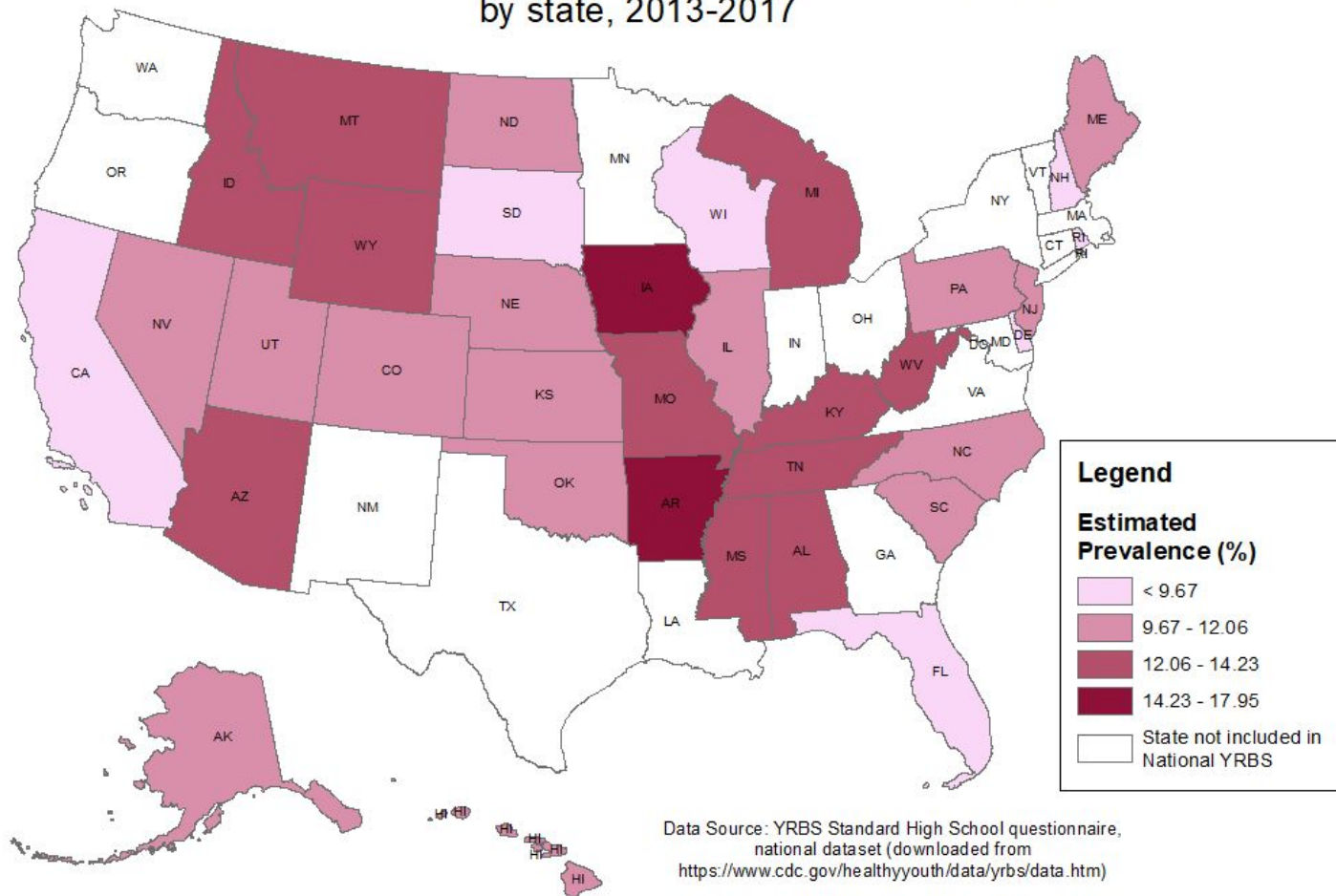
- What is YRBS?
  - National YRBS includes data for 35 states
- Eligibility for YRBS
- YRBS surveys: in-person during school
- YRBS response rates



# Methods: Descriptive Stats (YRBS)

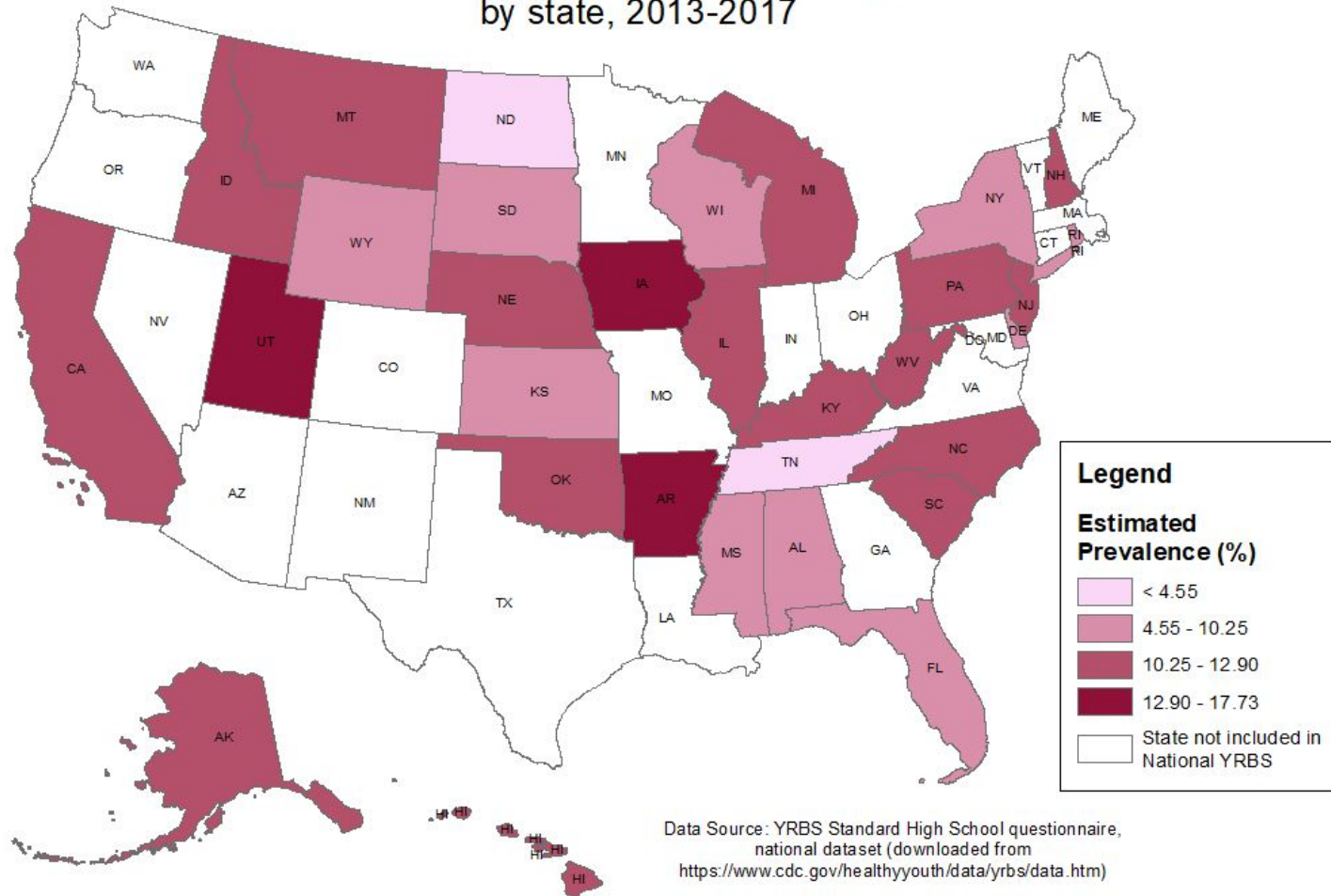
- ❖ YRBS Standard High School questionnaire
- ❖ National dataset (publically available thru CDC) for data years 2013, 2015, 2017 - includes data from 38 states
  - Jenks optimization method used to categorize data for maps
- ❖ 162,715 total girls in sample
- ❖ Half of girls were 15-16 years old
- ❖ 9th, 10th, 11th, 12th grades about equally represented
- ❖ 54% of girls were non-Hispanic White, 20% of girls were Hispanic

## Estimated Prevalence of Teen Girls experiencing Rape, by state, 2013-2017



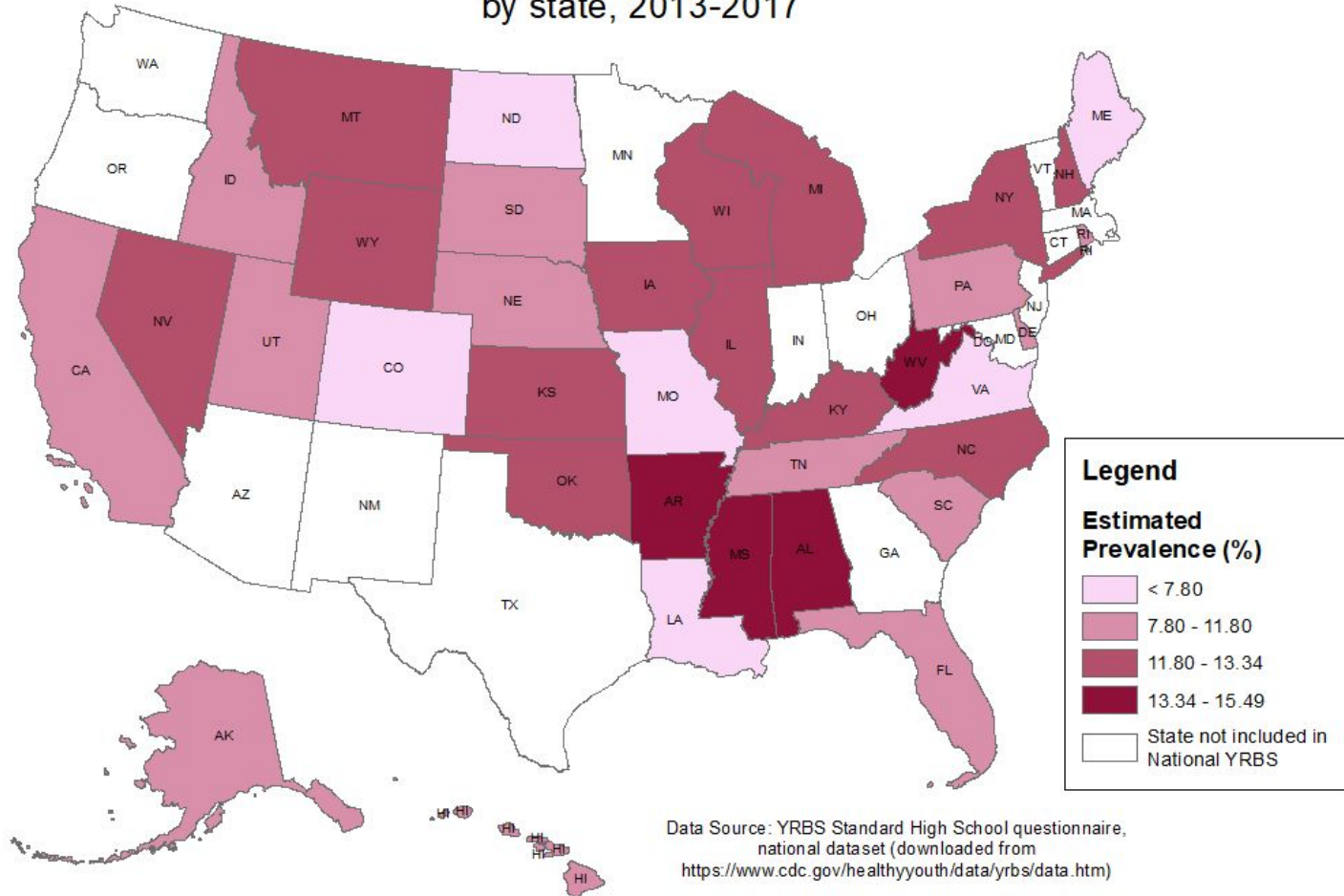
Data Source: YRBS Standard High School questionnaire,  
national dataset (downloaded from  
<https://www.cdc.gov/healthyyouth/data/yrbs/data.htm>)

# Estimated Prevalence of Teen Girls experiencing Sexual Violence, by state, 2013-2017



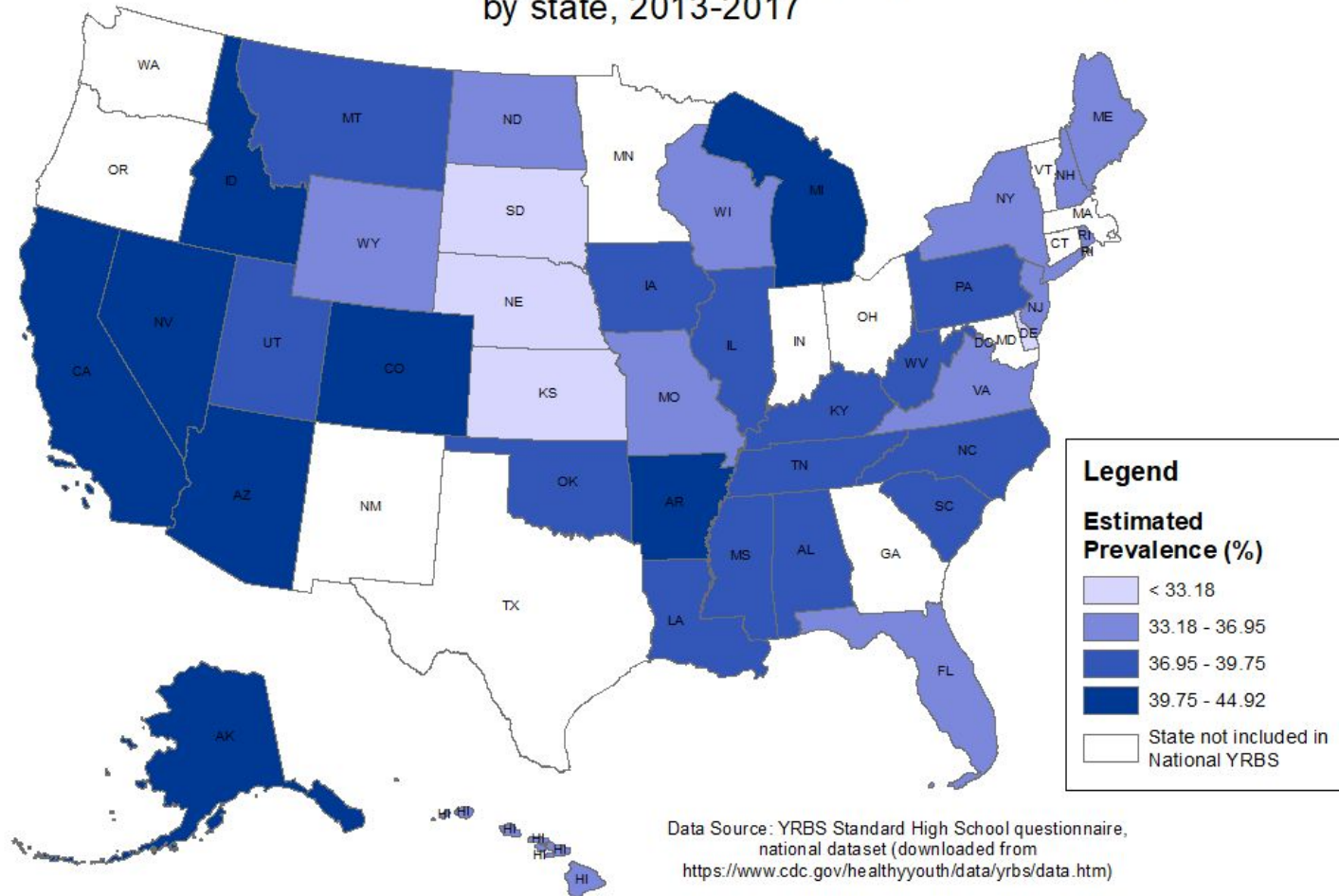
Data Source: YRBS Standard High School questionnaire, national dataset (downloaded from <https://www.cdc.gov/healthyouth/data/yrebs/data.htm>)

# Estimated Prevalence of Teen Girls experiencing IPV, by state, 2013-2017



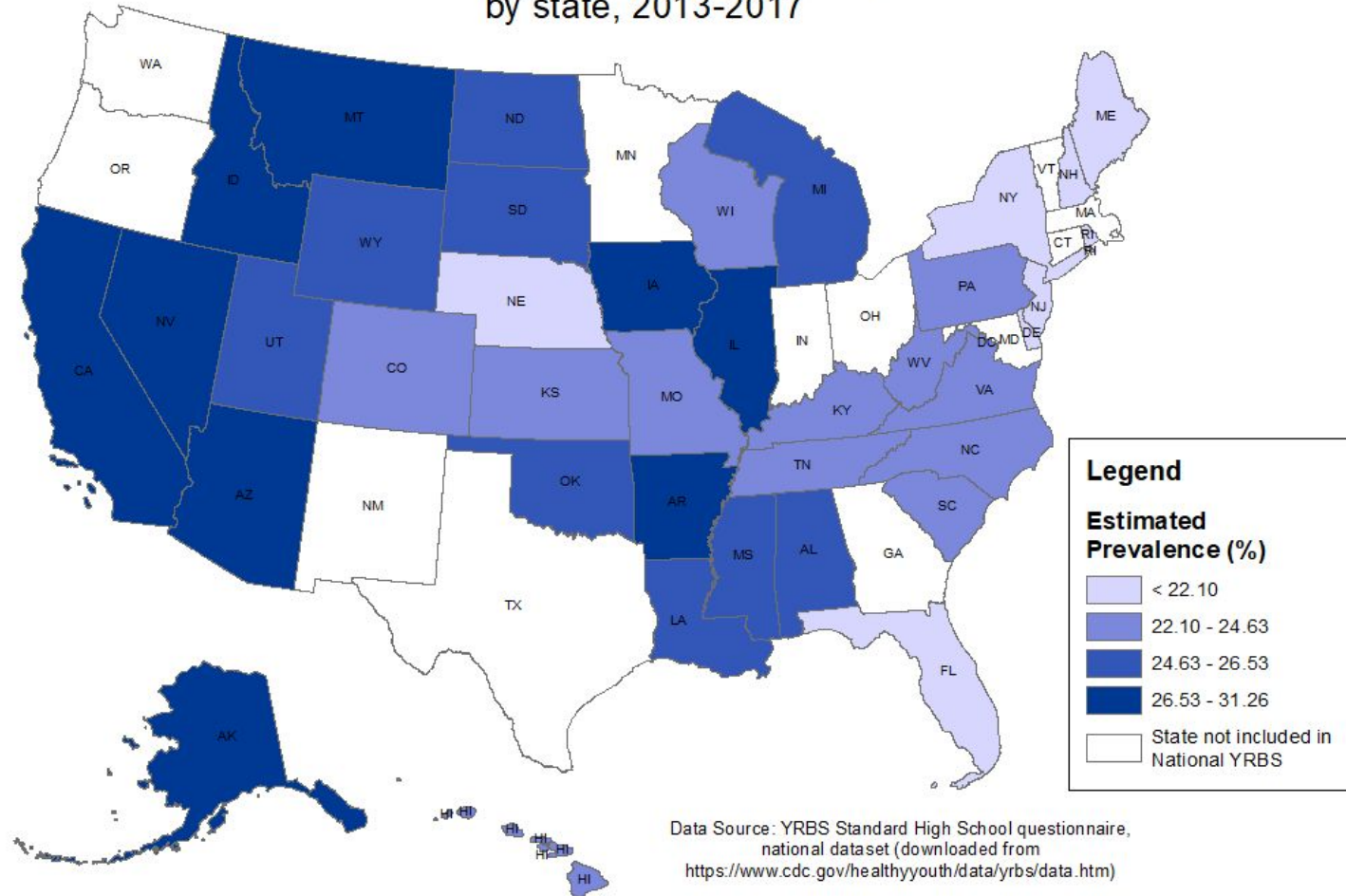
Data Source: YRBS Standard High School questionnaire,  
national dataset (downloaded from  
<https://www.cdc.gov/healthyouth/data/yrbs/data.htm>)

# Estimated Prevalence of Teen Girls experiencing Depression Symptoms, by state, 2013-2017



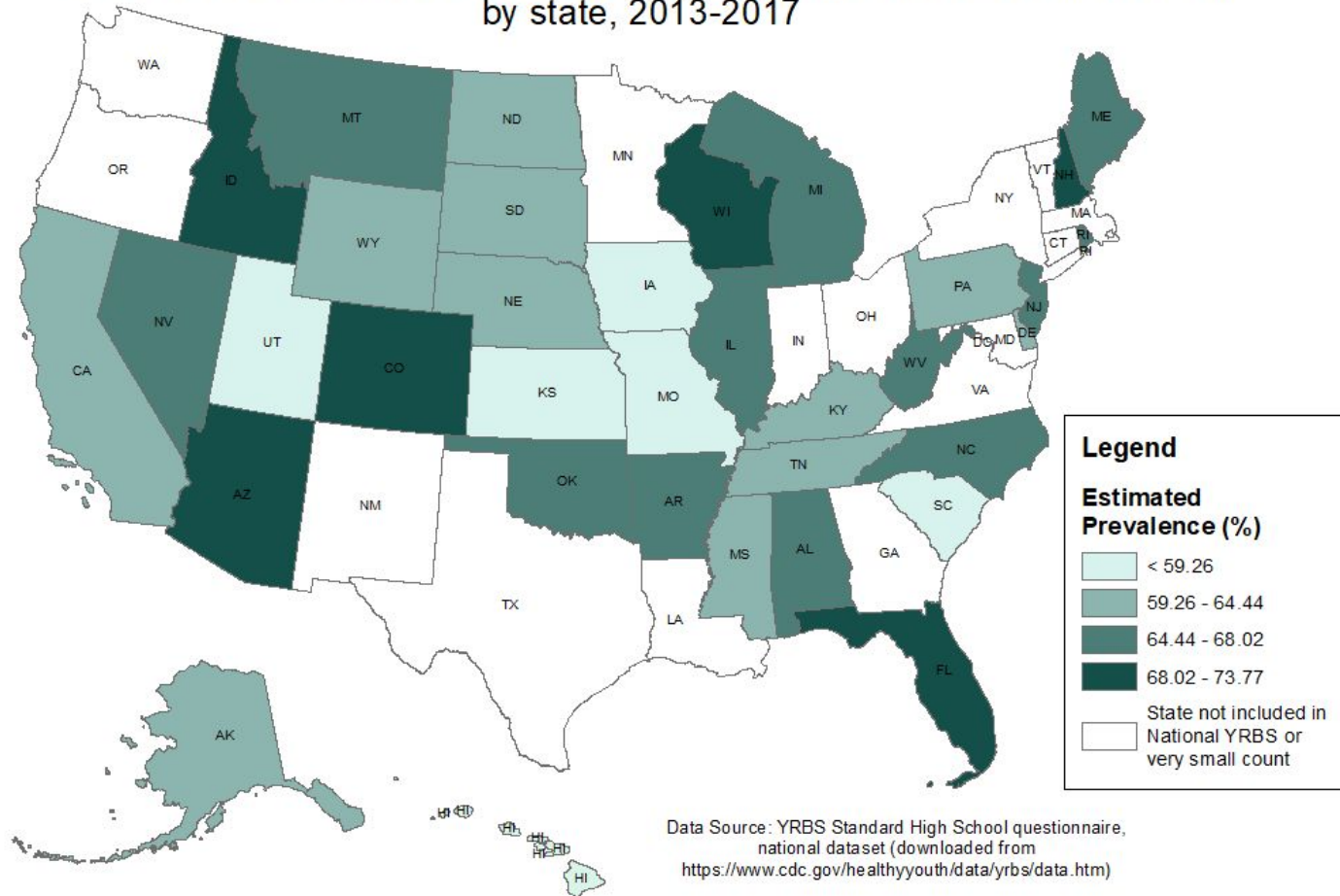
Data Source: YRBS Standard High School questionnaire, national dataset (downloaded from <https://www.cdc.gov/healthyyouth/data/yrbs/data.htm>)

# Estimated Prevalence of Teen Girls experiencing Suicidal Ideation, by state, 2013-2017



Data Source: YRBS Standard High School questionnaire, national dataset (downloaded from <https://www.cdc.gov/healthyyouth/data/yrebs/data.htm>)

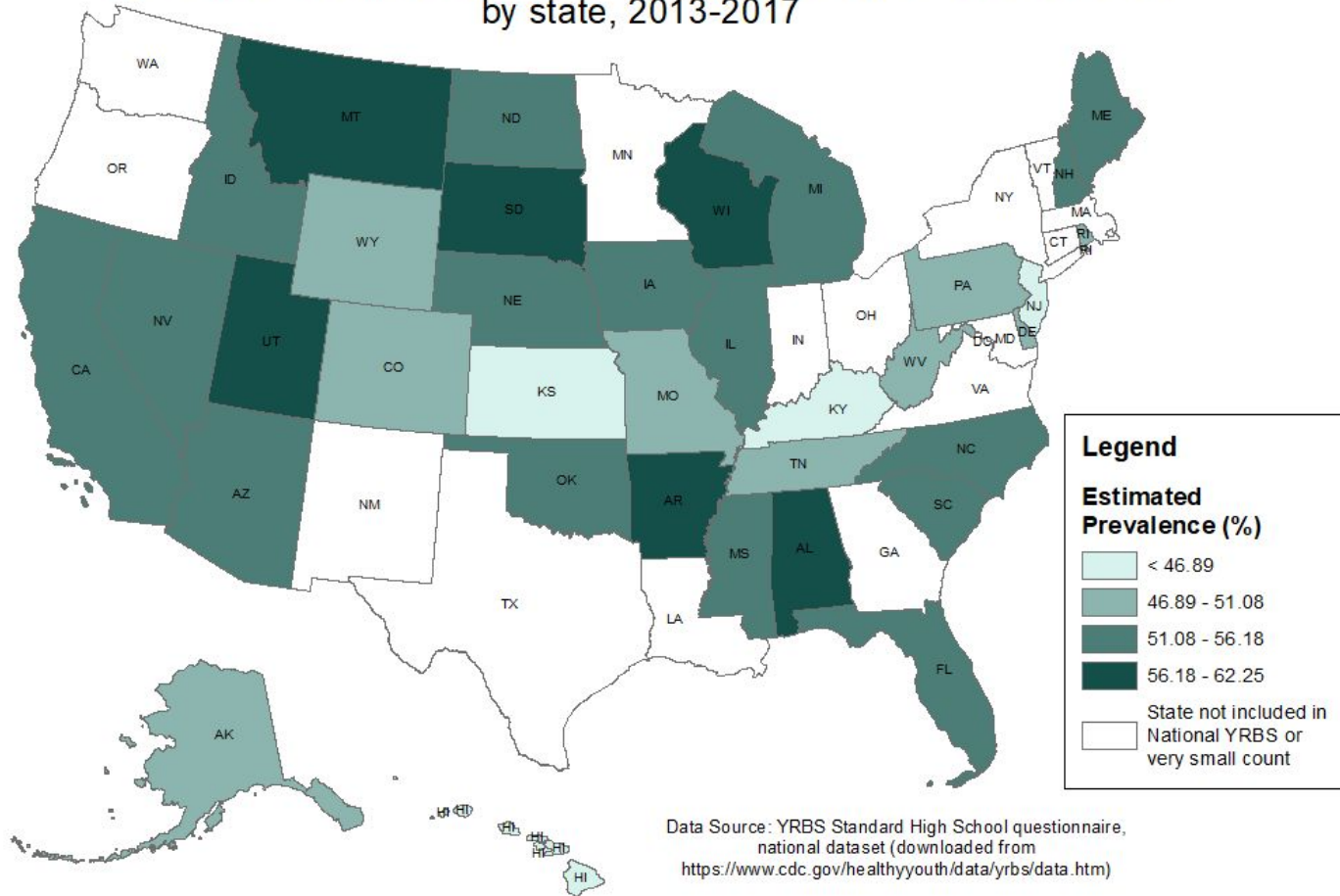
Of those teen girls who reported ever being raped:  
Estimated Prevalence of Teen Girls experiencing Depression Symptoms,  
by state, 2013-2017



Data Source: YRBS Standard High School questionnaire,  
national dataset (downloaded from  
<https://www.cdc.gov/healthyouth/data/yrebs/data.htm>)

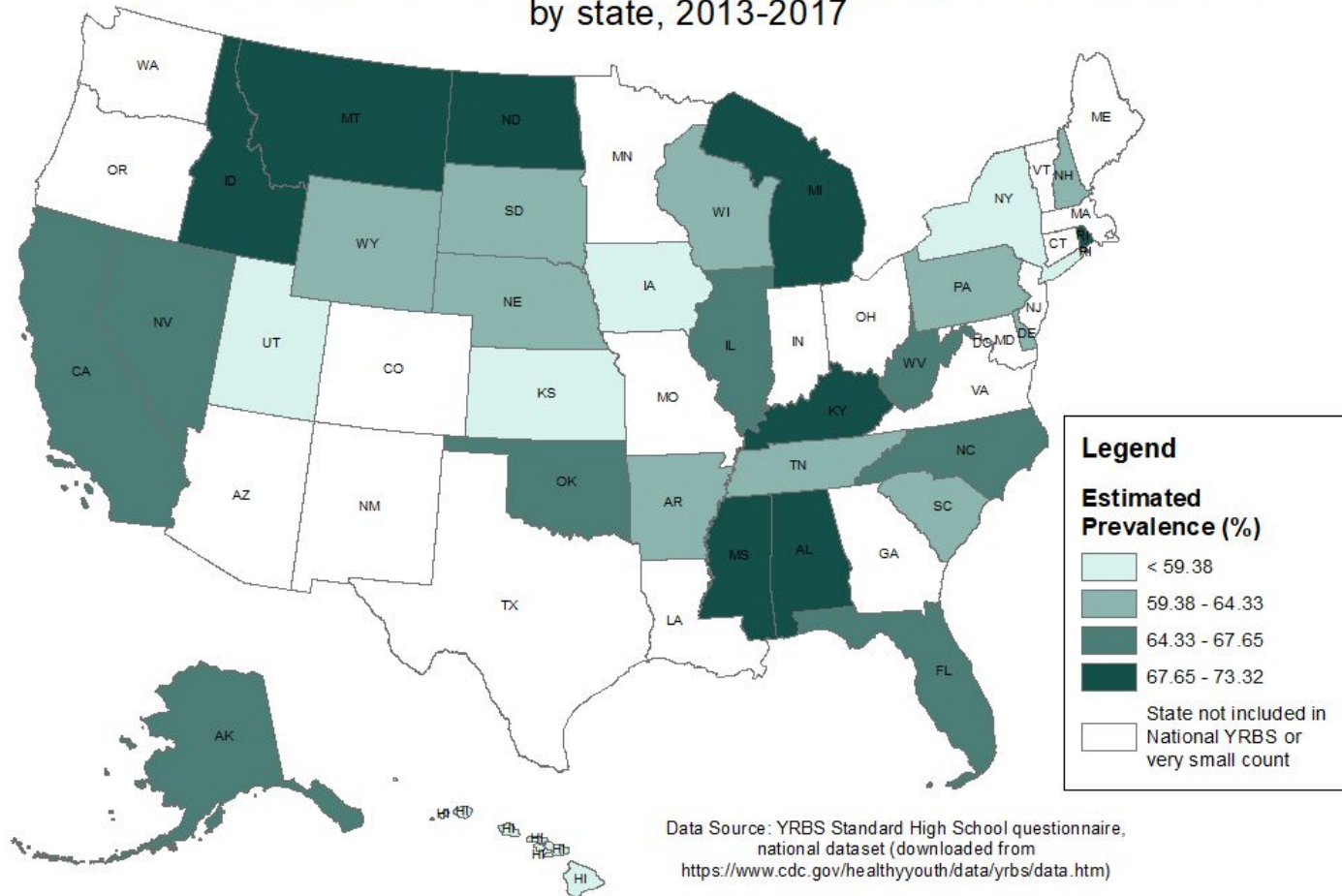


Of those teen girls who reported ever being raped:  
Estimated Prevalence of Teen Girls experiencing Suicidal Ideation,  
by state, 2013-2017



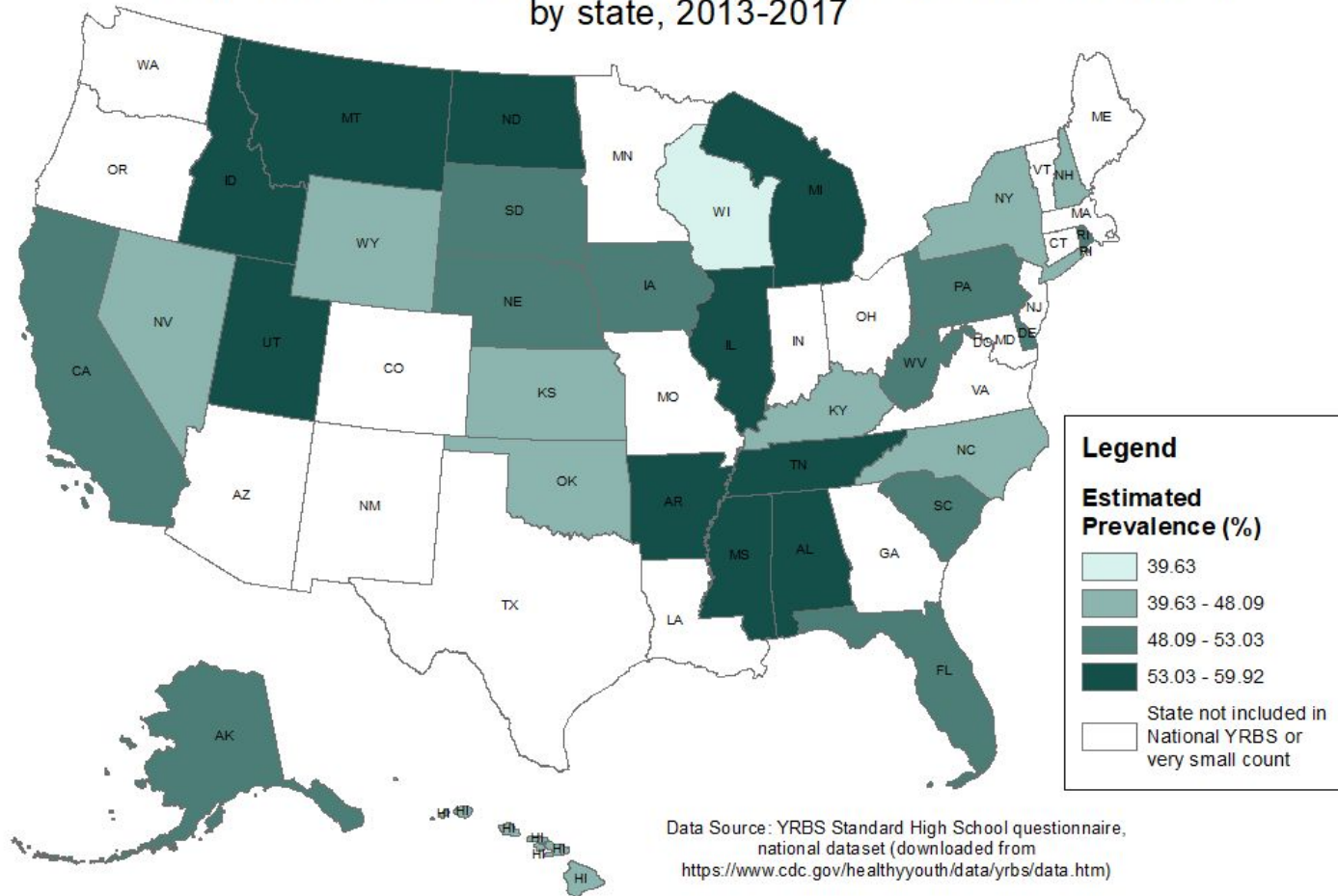
Data Source: YRBS Standard High School questionnaire,  
national dataset (downloaded from  
<https://www.cdc.gov/healthyyouth/data/yrbs/data.htm>)

Of those teen girls who reported experiencing sexual violence in the past 12 months:  
Estimated Prevalence of Teen Girls experiencing Depression Symptoms,  
by state, 2013-2017

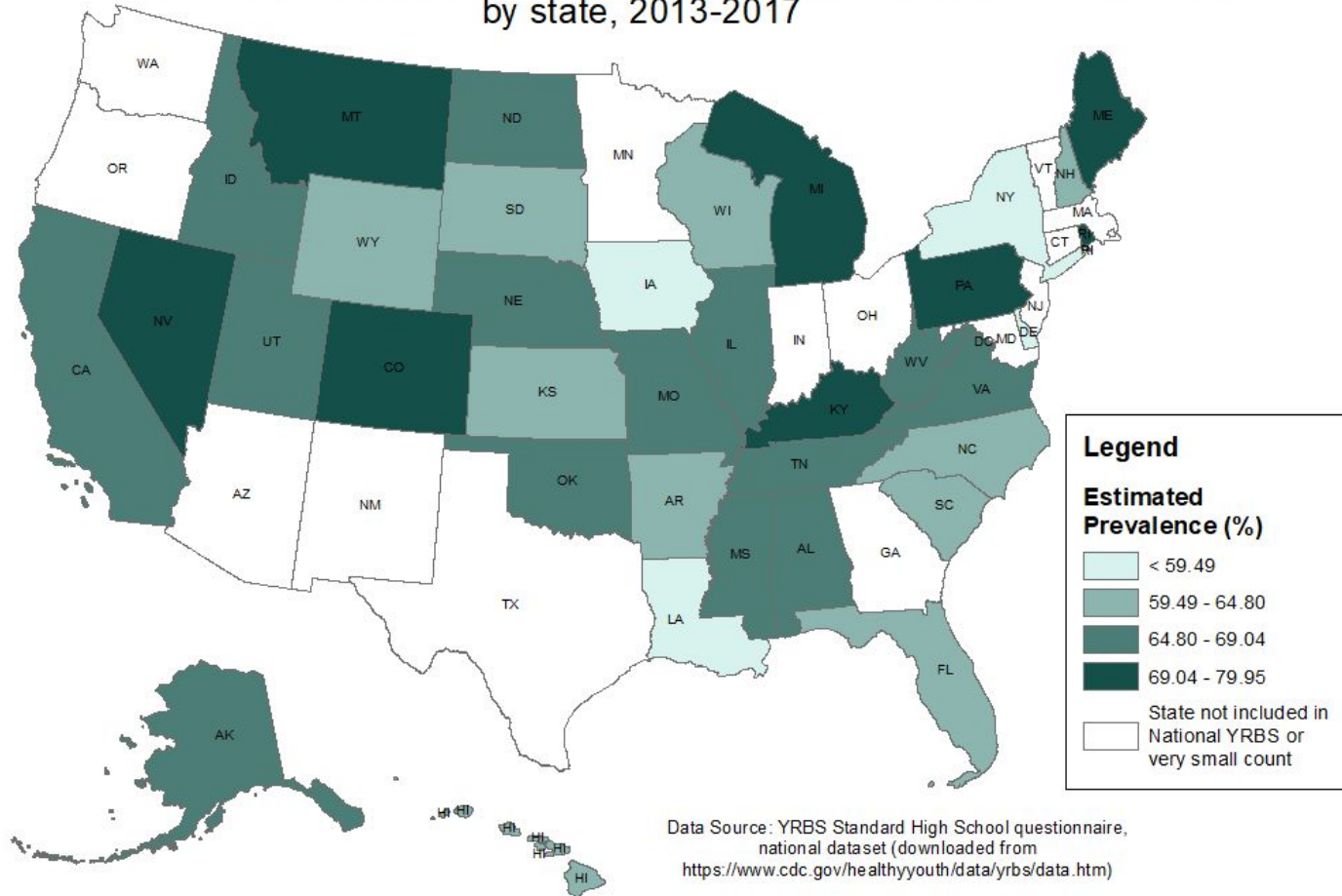


Data Source: YRBS Standard High School questionnaire,  
national dataset (downloaded from  
<https://www.cdc.gov/healthyouth/data/yrbs/data.htm>)

Of those teen girls who reported experiencing sexual violence in the past 12 months:  
Estimated Prevalence of Teen Girls experiencing Suicidal Ideation,  
by state, 2013-2017

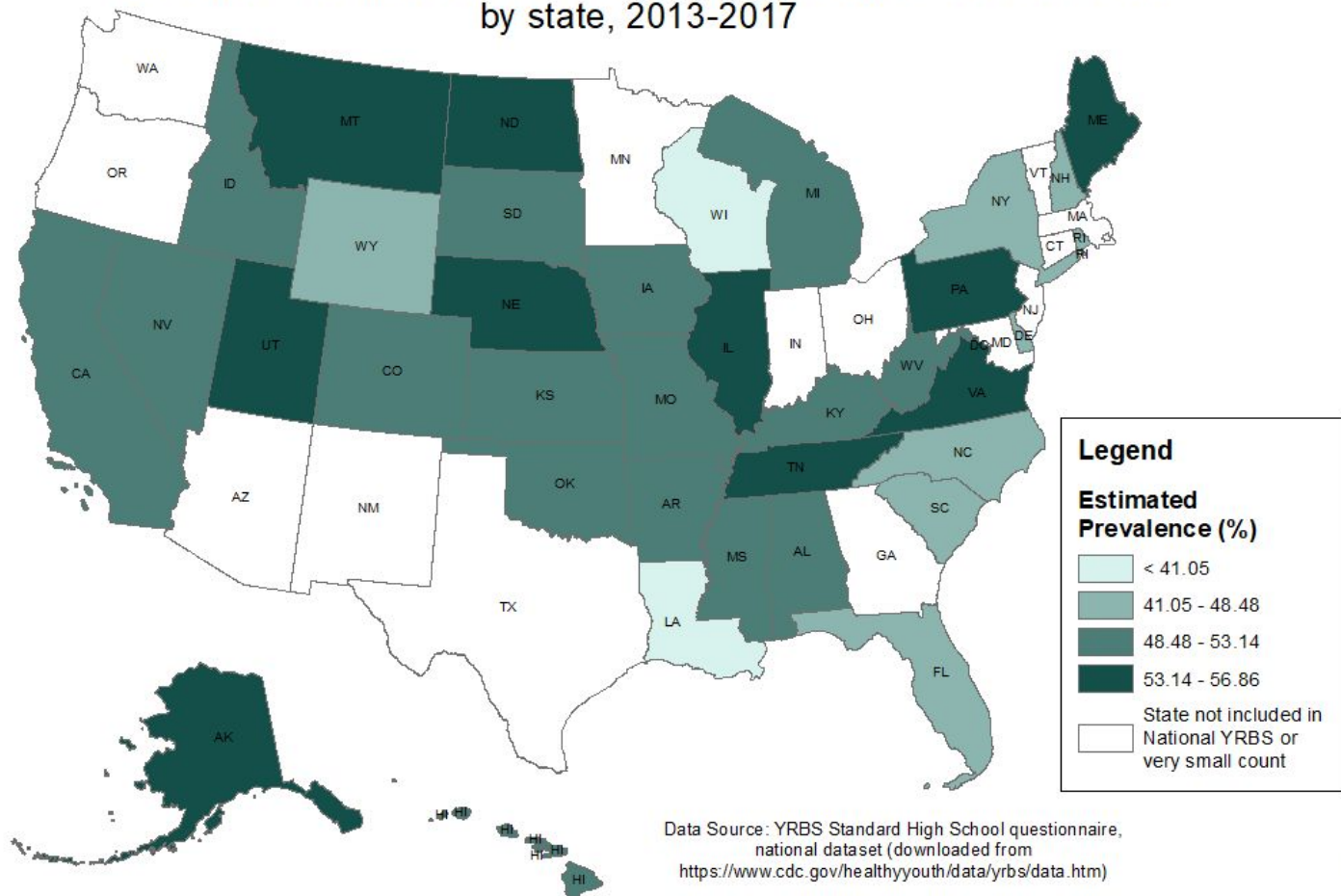


Of those teen girls who reported experiencing IPV in the past 12 months:  
Estimated Prevalence of Teen Girls experiencing Depression Symptoms,  
by state, 2013-2017



Data Source: YRBS Standard High School questionnaire,  
national dataset (downloaded from  
<https://www.cdc.gov/healthyyouth/data/yrbs/data.htm>)

Of those teen girls who reported experiencing IPV in the past 12 months:  
Estimated Prevalence of Teen Girls experiencing Suicidal Ideation,  
by state, 2013-2017



# Methods: Logistic Regression, YRBS Model (A)

Model (A) was built using backwards elimination

Binary outcome = depression symptoms in past 12 months  
(y/n)

Started with 26 covariates

Final model included 18 covariates



# LOGISTIC REGRESSION MODEL (A) RESULTS

*(Outcome = Depression Symptoms)*

<b>Predictor of Interest</b>	<b>Odds Ratio</b>	<b>95% CI</b>
<b>Reported being raped (ever)</b>	<b>1.619*</b>	<b>1.319, 1.986</b>
<b>Reported experiencing sexual violence (past 12 months)</b>	<b>1.279</b>	<b>0.987, 1.659</b>
<b>Reported experiencing IPV (past 12 months)</b>	<b>1.817*</b>	<b>1.376, 2.399</b>

# Methods: Logistic Regression, YRBS Model (B)

Model (B) was built using backwards elimination

Binary outcome = suicidal ideation in past 12 months (y/n)

Started with 26 covariates

Final model included 15 covariates





# LOGISTIC REGRESSION MODEL (B) RESULTS

*(Outcome = Suicidal Ideation)*


<b>Predictor of Interest</b>	<b>Odds Ratio</b>	<b>95% CI</b>
<b>Reported being raped (ever)</b>	<b>1.622*</b>	<b>1.342, 1.959</b>
<b>Reported experiencing sexual violence (past 12 months)</b>	<b>1.605*</b>	<b>1.153, 2.235</b>
<b>Reported experiencing IPV (past 12 months)</b>	<b>1.535*</b>	<b>1.059, 2.224</b>

# Methods/Results: New Moms




# Data Source #2: PRAMS

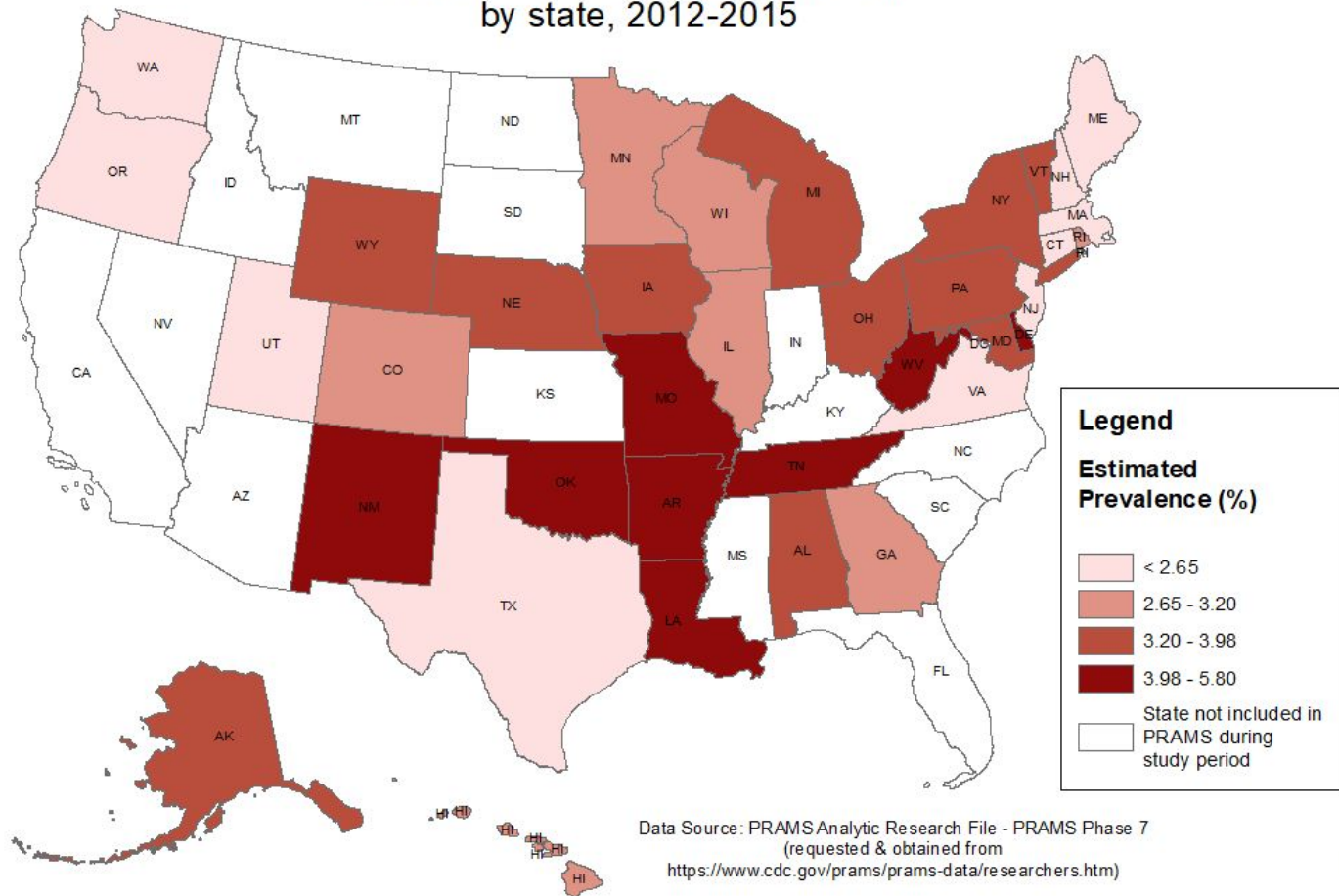
## PRAMS = Pregnancy Risk Assessment Monitoring System

- What is PRAMS?
    - As of 2019: PRAMS includes 47 states + New York City, Puerto Rico, Washington DC, Great Plains Tribal Chairmen's Health Board (approximately 83% of all US live births)
  - Eligibility for PRAMS
  - PRAMS surveys: mail + phone
  - Reward for participation
  - PRAMS response rates
  - Birth certificate data
- 

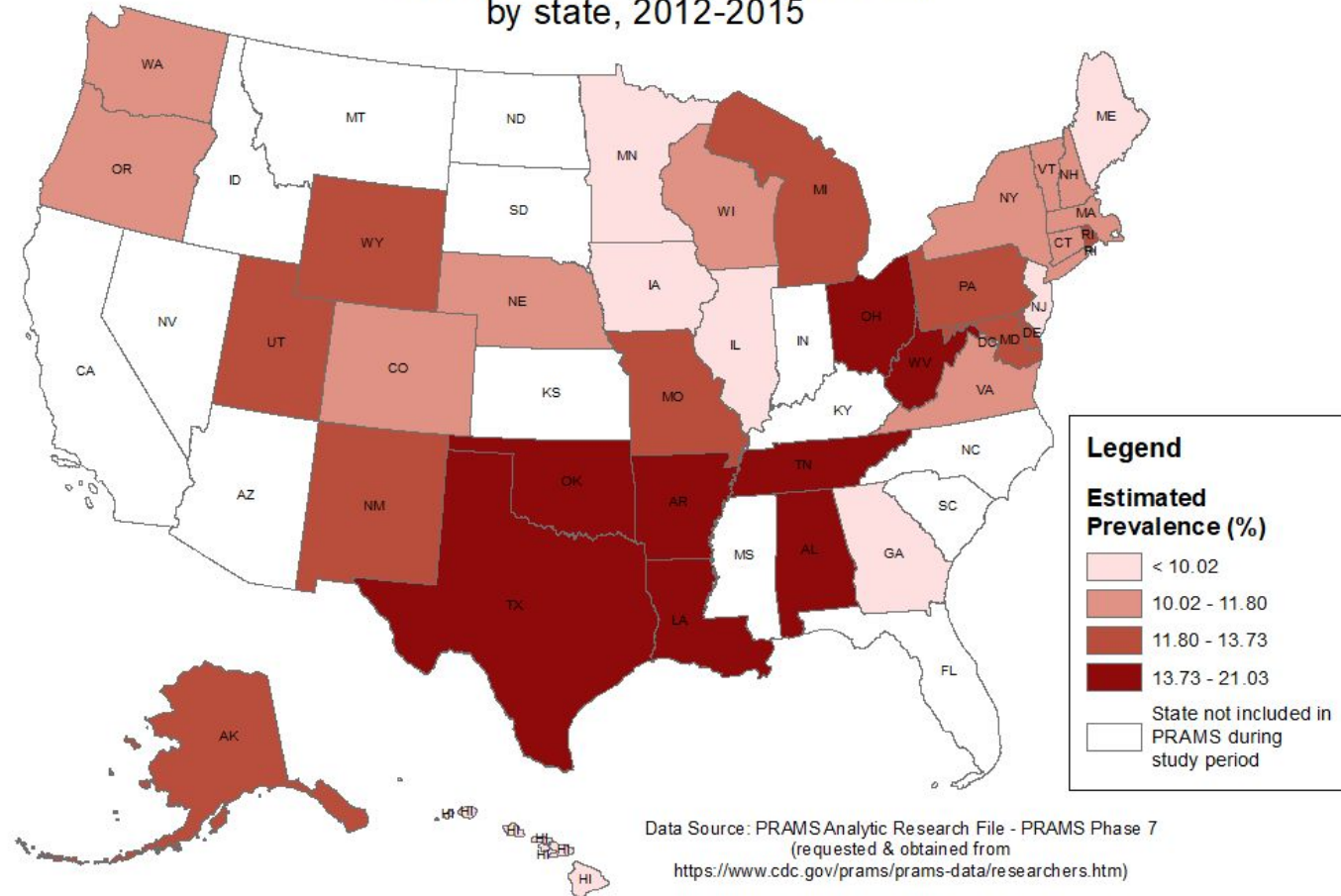
## Methods: Descriptive Stats (PRAMS)

- ❖ PRAMS Analytic Research File - national data available by request thru CDC PRAMS - includes data from 36 states
    - Jenks optimization method used to categorize data for maps
  - ❖ PRAMS Phase 7 - data years 2012-2015
  - ❖ 147,747 total moms in sample
  - ❖ 71% of moms were White, 17% of moms were Hispanic
  - ❖ 34% of moms had at least a Bachelor's degree
  - ❖ 57% of moms were 25-34 years old
  - ❖ 61% of moms were married
- 

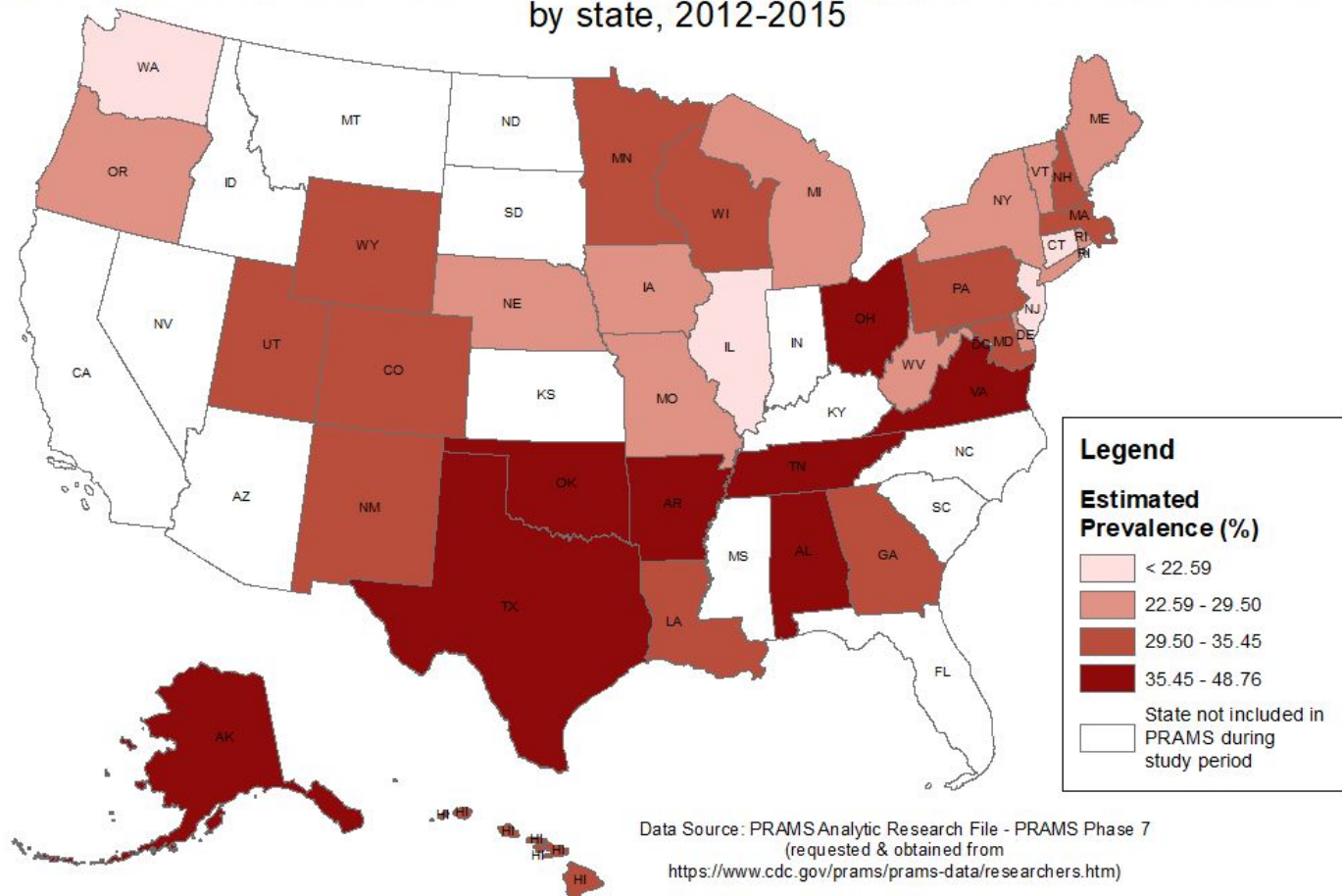
# Estimated Prevalence of New Moms who experienced IPV Before and/or During Pregnancy, by state, 2012-2015



## Estimated Prevalence of New Moms experiencing Postpartum Depression Symptoms, by state, 2012-2015



Of those new moms who reported experiencing IPV before and/or during pregnancy:  
Estimated Prevalence of New Moms experiencing Postpartum Depression Symptoms,  
by state, 2012-2015



Data Source: PRAMS Analytic Research File - PRAMS Phase 7  
(requested & obtained from  
<https://www.cdc.gov/prams/prams-data/researchers.htm>)

# Methods: Logistic Regression, PRAMS Model (C)

Model (C) was built using backwards elimination

Binary outcome = postpartum depression symptoms (y/n)

Started with 56 covariates

Final model included 15 covariates






# LOGISTIC REGRESSION MODEL (C) RESULTS

*(Outcome = Postpartum Depression Symptoms)*


Predictor of Interest	Odds Ratio	95% CI
Reported experiencing IPV (before and/or during pregnancy)	1.447*	1.264, 1.658

# Limitations

- Self-reported data: Possibility of recall bias, social desirability bias, distracted survey-taking...
  - YRBS: Publicly available national dataset, which only includes 35 states
  - PRAMS: Analytic Research File includes only PRAMS states that met response rate threshold
  - Documented under-reporting of IPV and sexual violence  
(<https://www.bjs.gov/index.cfm?ty=dcdetail&iid=245>)
  - Primarily Exploratory/Descriptive: The only inferences are coming from the 3 logistic regression models
  - Data aggregated to the state level: Smooths out any actual variation that occurs at smaller scales
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# Future Directions

## Collection & analysis of primary data:

- Geocoded to as granular a level as possible
  - Including additional age groups to better cover the lifespan (young adult women & adult women - not necessarily new moms; older women)
  - Including additional outcome variables (PTSD symptoms, anxiety symptoms, physical health outcomes)
  - Conducting inferential spatial analysis to look for geographic patterns and implications
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# Acknowledgements


- Many thanks to the PRAMS Working Group ~
- And to all of the interviewers, team members, epidemiologists, & statisticians who make these important surveys happen!



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Thank you!

Questions or  
Suggestions?

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