

A BIG PROBLEM, A SMALL DEVICE

A LOOK INTO ADOLESCENT E-CIG USAGE

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WHAT IS AN E-CIGARETTE?





01

Battery
Operated
Devices

02

Nicotine
Based

03

Introduced
in 2007





HOW DID THEY BECOME SO
POPULAR?

THE VAPING COMMUNITY

- Strong Subculture
- Social Media Presence

MARKETING

- Directed Advertising
- Big Tobacco Methods



WHY A VAPING CRISIS?

CONCERNS

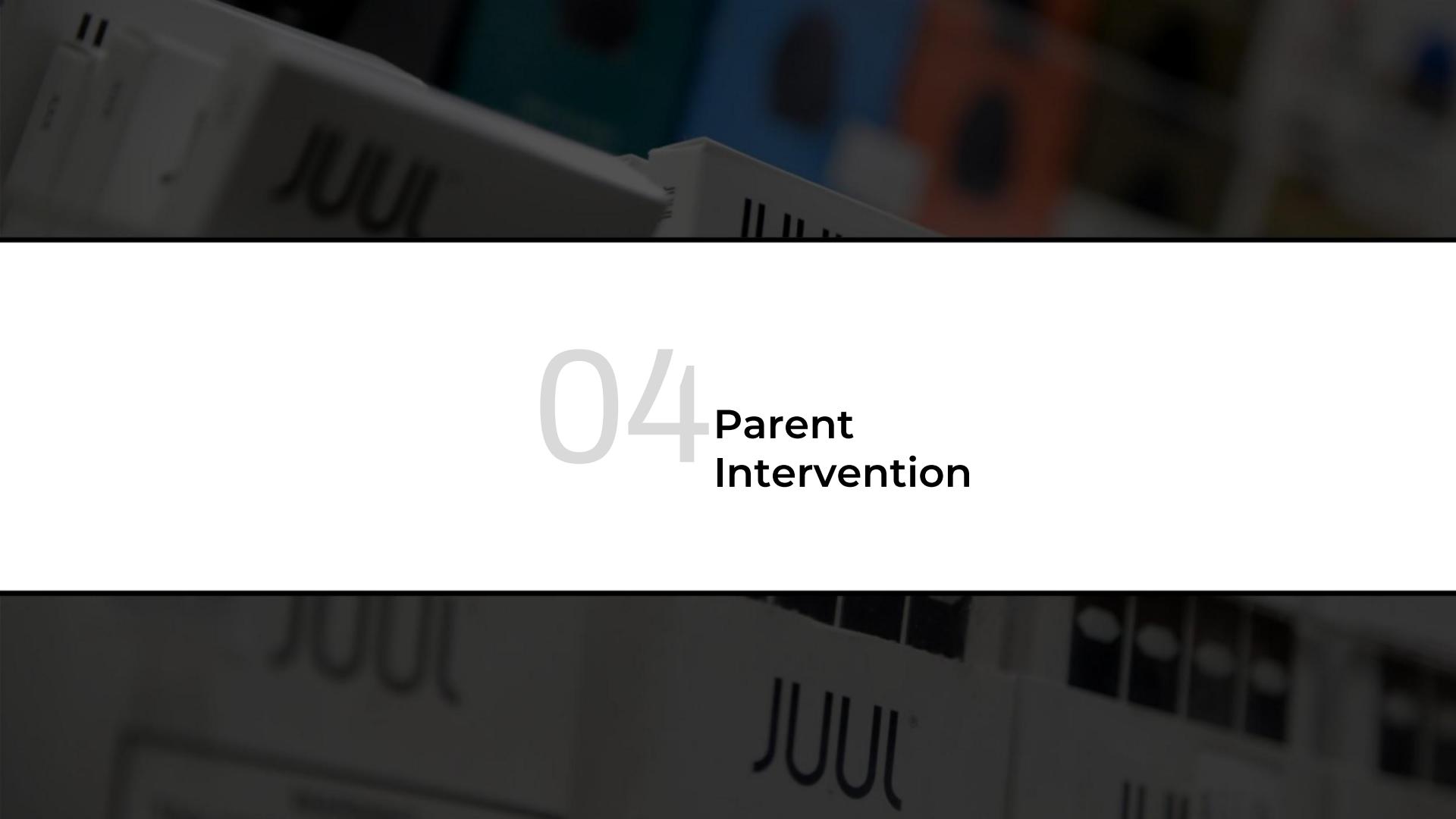
- Lack of high quality information
- Unknown long-term effects
- Spike in hospitalizations

3 Million

Children Past 30 Days



WHAT ARE THE RISK FACTORS?



04 Parent Intervention



DO ADOLESCENTS IN MINNESOTA WHO HAVE
NEGATIVE PARENTAL AT-HOME ENVIRONMENTS
HAVE A HIGHER RISK OF ENGAGING WITH E-
CIGARETTES AND OTHER VAPING PRODUCTS?

DATA

- Minnesota Student Survey (MSS)
- Administered Every 3 Years
- Asks students about their activities, opinions, and experiences
- Voluntary Participation

Age	perceived_risk	parent_perceived_risk	caring_attributes
13	Risk.Low	Parent.Risk.High	Parent.High
14	Risk.High	Parent.Risk.High	Parent.High
17	Risk.High	Parent.Risk.High	Parent.High
13	Risk.High	Parent.Risk.High	Parent.High
14	Risk.Low	Parent.Risk.High	Parent.High
13	Risk.Low	Parent.Risk.High	Parent.High
13	Risk.High	Parent.Risk.High	Parent.Low
16	Risk.Low	Parent.Risk.Low	Parent.High
15	Risk.High	Parent.Risk.High	Parent.High
14	Risk.Low	Parent.Risk.High	Parent.High
14	Risk.High	Parent.Risk.High	Parent.High
17	Risk.High	Parent.Risk.High	Parent.High
14	Risk.High	Parent.Risk.High	Parent.High
15	Risk.High	Parent.Risk.High	Parent.High
12	Risk.High	Parent.Risk.High	Parent.High
13	Risk.Low	Parent.Risk.High	Parent.High
14	Risk.Low	Parent.Risk.Low	Parent.High
14	Risk.Low	Parent.Risk.Low	Parent.High
14	Risk.Low	Parent.Risk.High	Parent.High
13	Risk.High	Parent.Risk.High	Parent.High

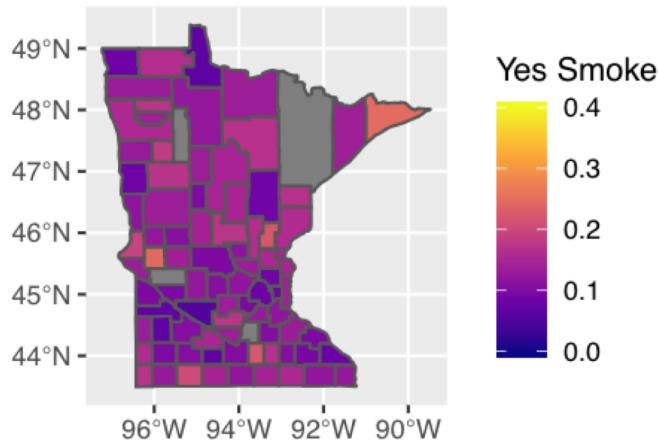
VARIABLES

- Age
- Biological Sex
- Household Alcohol
- Parent Care
- Parent Risk
- Perceived Self-Risk
- Smoking Status

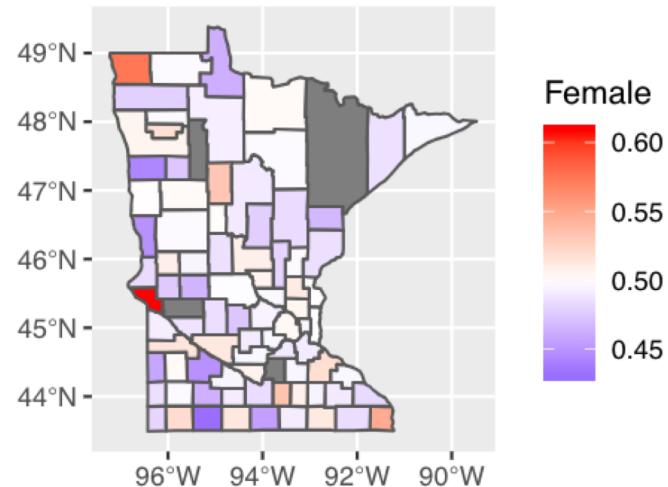
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14	Risk.Low	Parent.Risk.High	Parent.H
14	Risk.High	Parent.Risk.High	Parent.H
17	Risk.High	Parent.Risk.High	Parent.H
14	Risk.High	Parent.Risk.High	Parent.H
15	Risk.High	Parent.Risk.High	Parent.H
12	Risk.High	Parent.Risk.High	Parent.H
13	Risk.Low	Parent.Risk.High	Parent.H
14	Risk.Low	Parent.Risk.Low	Parent.H
14	Risk.Low	Parent.Risk.Low	Parent.H
14	Risk.Low	Parent.Risk.High	Parent.H
13	Risk.High	Parent.Risk.High	Parent.H

BIOLOGICAL SEX

Proportion of Students Reporting E-Cigarette Use in Last Month

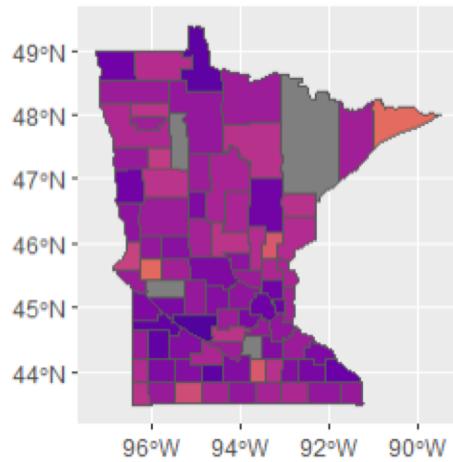


Proportion of Female Students

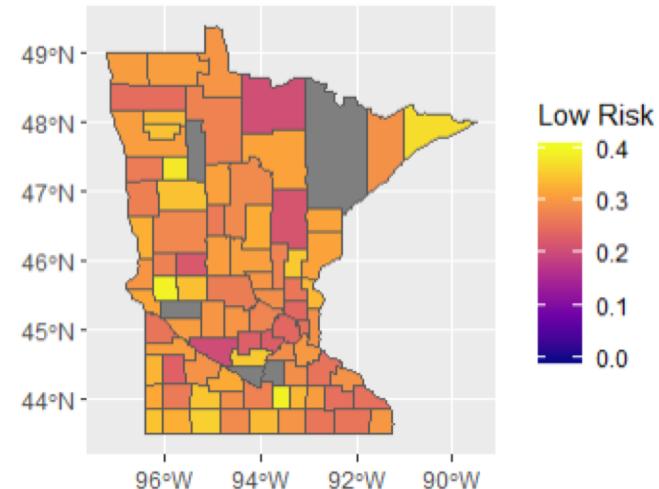


PERCEIVED RISK

Proportion of Students Reporting
E-Cigarette Use in Last Month

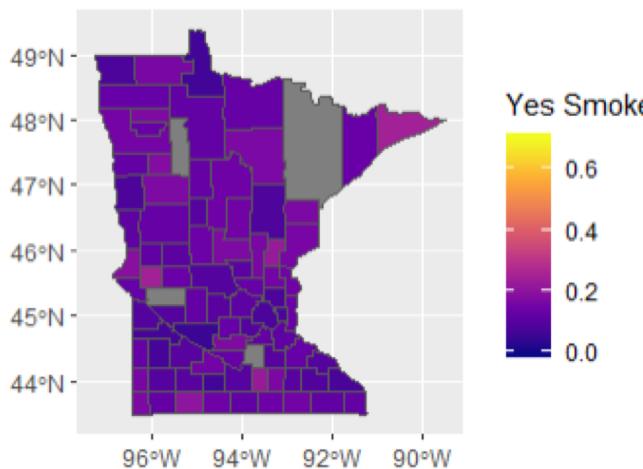


Proportion of Students Reporting
that E-Cigarettes are Low Risk

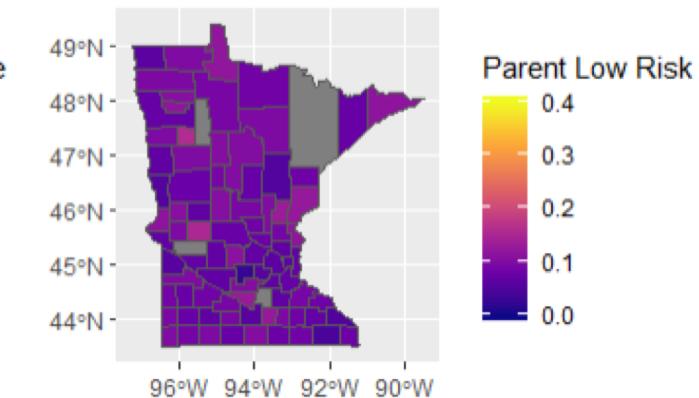


PARENTAL PERCEPTION

Proportion of Students Reporting
E-Cigarette Use in Last Month



Proportion of Students Who Say
Parents Believe E-Cigarettes are Low Risk



CORRELATED DATA

WHAT IT IS....

- Independence Assumption
- Observations Depend on Each Other
- Need to Utilize Different Methods

CORRELATED DATA METHODS

- SPATIAL ANALYSIS
Summaries within a Spatial Boundary
- REPEATED MEASURES METHOD
Repeated Observations
 - GEE LOGISTIC REGRESSION
Marginal Model
 - SENSITIVITY & SPECIFICITY
Metrics for Model Accuracy

GEE Logistic Regression

```
GEEMOD <- GLM(SMOKE ~ AGE + CARE,  
                DATA = SMOKING,  
                FAMILY = BINOMIAL)
```

```
GEEMOD <- GEEM(SMOKE ~ AGE + CARE,  
                DATA = SMOKING,  
                FAMILY = BINOMIAL,  
                CORSTR = 'AR1',  
                ID = COUNTY)
```

FINAL MODEL

LOG ODDS OF E-CIGARETTE USE BY AN INDIVIDUAL =

$$-1.387 + 0.704(\text{RISK.LOW}) + 0.105(\text{PARENT.LOW.CARE}) - 0.186(\text{MALE}) + 0.153(\text{YES.HOUSEHOLD.SUBSTANCE.USE}) + 0.134(\text{AGE} - 10) - 0.124(\text{MALE} * \text{PARENT.LOW.CARE})$$

- SENSITIVITY: 81%
- SPECIFICITY: 31%

SCENARIO A

- Male
- Aged 18
- Low Perceived Risk
- Low Parental Care
- Household Substance Use

60%

SCENARIO B

- Female
- Aged 18
- High Perceived Risk
- High Parental Care
- No Household Substance Use

42%

SCENARIO A

- Male
- Aged 18
- Low Perceived Risk
- Low Parental Care
- Household Substance Use

60%

SCENARIO C

- Male
- Aged 18
- High Perceived Risk
- High Parental Care
- No Household Substance Use

37%

LIMITATIONS

01

NA's limiting data

02

High variability

03

Over/under representation

CONCLUSIONS

01

Risk factors are statistically significant

02

Newly identified relationship

03

More work to do but it is a start!



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QUESTIONS?

**THANK
YOU**