

Regional Reweighting of Michigan PRAMS Data: Method and Applications

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Outline 1

- **Goals and Objectives**
 - Reweighting Method
 - Outcomes
 - Lessons Learned
- MI PRAMS has been a useful state-level tool for many years
 - Michigan has a geographically diverse population, with unequal distribution of pregnancy risks
 - Can a state-level tool be repurposed for local-level analyses?



How many pieces of mail did Michigan PRAMS send to obtain the data used in this presentation?

15,000
35,000
55,000
85,000

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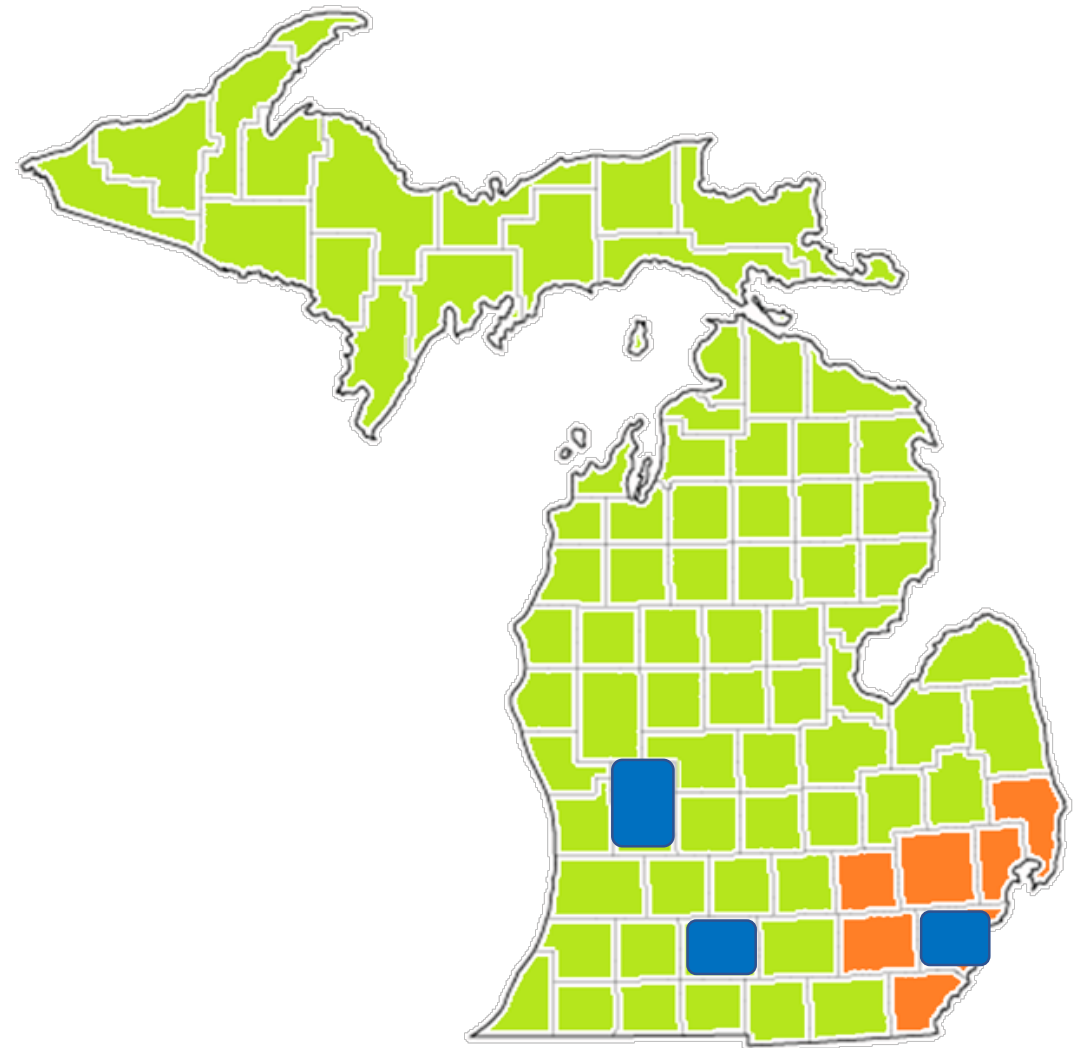
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Outline 2

- Goals and Objectives
- **Reweighting Method**
 - **I. Harmonize Strata**
 - **II. County Level Reweighting**
 - **III. Multi-County Regions**
 - **IV. Multi-Year Data Set**
- Outcomes
- Lessons Learned

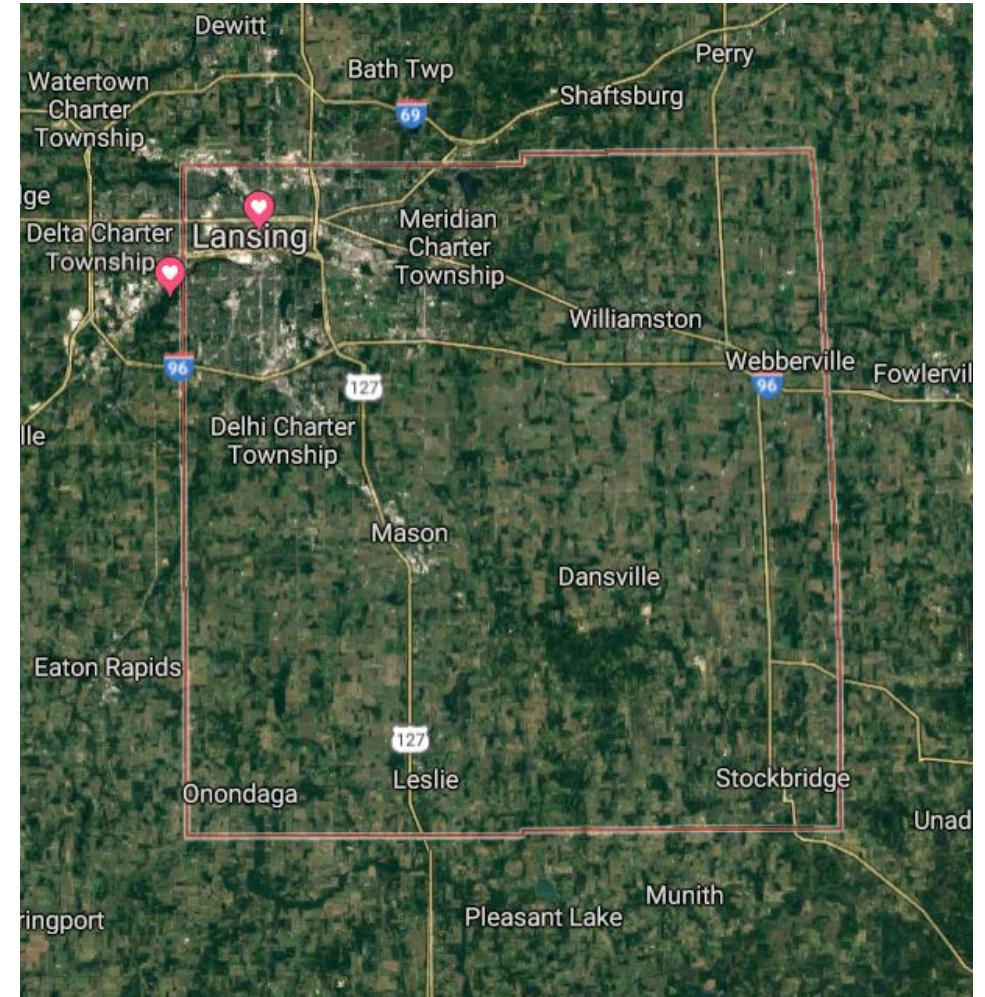
I. Harmonize Strata

- 3,233 - 3,964 mothers per year sampled
 - 2012-2014 = 11,009
- 50-60% mothers complete
 - 2012-2014 = 5,664
- Many strata across 2012-2014
 - 1: Low Birth Weight
 - 2: NBW Black, SE Michigan [**ORANGE**]
 - 3: NBW Black, Rest of Michigan
 - 4: NBW Non-Black, SE Michigan [**ORANGE**]
 - 5: NBW Non-Black, Rest of Michigan
 - 6-9: Kellogg Counties [**BLUE**]
- Most Parsimonious Strata:
 - Black + low birth weight
 - Black + normal birth weight
 - Non-black + low birth weight
 - Non-black + normal birth weight



II. County Level Reweighting

- Begin with one county, one stratum, one birth year
 - Ingham County
 - Low birth weight infants to African American mothers
 - 2012
- Vital Records count: 71
- PRAMS weighted count: 33
- $NEWwt = WTANAL * [71/33]$
- $NEWwt = WTANAL * 2.15$
- Survey weight for Ingham County LBW-AA responders now match the Vital Records count





II. County Level Reweighting

- PRAMS plurality adjusted weighted counts:
 - WTANAL
 - LBW-AA: 33
 - NBW-AA: 418
 - LBW-NAA: 105
 - NBW-NAA: 3,059
 - TOTAL: 3,615
- Vital Records plurality adjusted counts:
 - LBW-AA: 71
 - NBW-AA: 452.8
 - LBW-NAA: 198.2
 - NBW-NAA: 2,508
 - TOTAL: 3,230
- County level adjustment factor (X)
 - (WTANAL*X = NEWwt):
 - LBW-AA: 2.15
 - NBW-AA: 1.08
 - LBW-NAA: 1.89
 - NBW-NAA: 0.82
 - TOTAL: 3,230

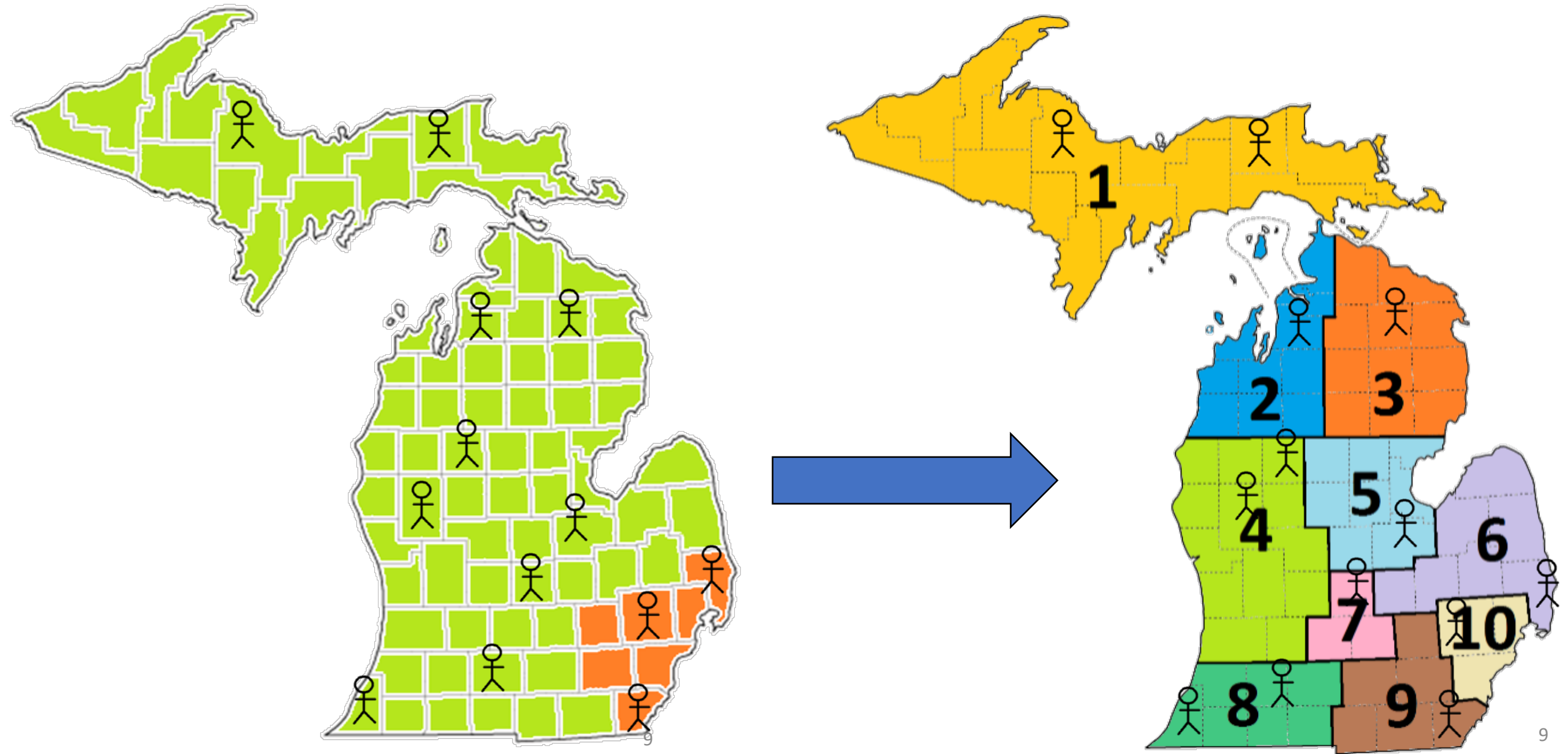
Ingham County responders who used to "speak" for mothers at the state level now represent other mothers at the county level



III. Multi-County Region Reweighting

- Problem - what to do with empty strata?
 - Some counties have no PRAMS responders to represent mothers
- Prosperity Region 7
 - Ingham, Clinton, and Eaton Counties
- Clinton and Eaton Counties have some low birth weight babies born to African American mothers
 - However, no mothers were selected for PRAMS
- "Borrow" responders from nearby counties within the region of interest

III. Multi-County Region Reweighting





III. Multi-County Region Reweighting

- | | | |
|--|--|---|
| <ul style="list-style-type: none"> • Region 7 PRAMS plurality adjusted weighted counts: <ul style="list-style-type: none"> • <u>NEWWT</u> • LBW-AA: 71 • NBW-AA: 547 • LBW-NAA: 309 • NBW-NAA: 4,226 • TOTAL: 5,153 | <ul style="list-style-type: none"> • Region 7 Vital Records plurality adjusted counts: <ul style="list-style-type: none"> • LBW-AA: 84 • NBW-AA: 547.8 • LBW-NAA: 308.2 • NBW-NAA: 4,225 • TOTAL: 5,165 | <ul style="list-style-type: none"> • Region 7 level adjustment factor (Q) <ul style="list-style-type: none"> • (NEWWT*Q = <u>PRWT</u>): • LBW-AA: 1.18 • NBW-AA: 1.002 • LBW-NAA: 0.997 • NBW-NAA: 0.9998 • TOTAL: 5,166 |
|--|--|---|

Some Region 7 responders who used to "speak" for mothers within their own county now represent mothers at the regional level



IV. Multi-Year Data Set - Region 7

- Accurately reweighted data set \neq Useful data set
- Adequate number of responders needed for precise estimates

- 2012

- LBW-AA: 1
- NBW-AA: 34
- LBW-NAA: 13
- NBW-NAA: 33

- 2013

- LBW-AA: 1
- NBW-AA: 37
- LBW-NAA: 15
- NBW-NAA: 28

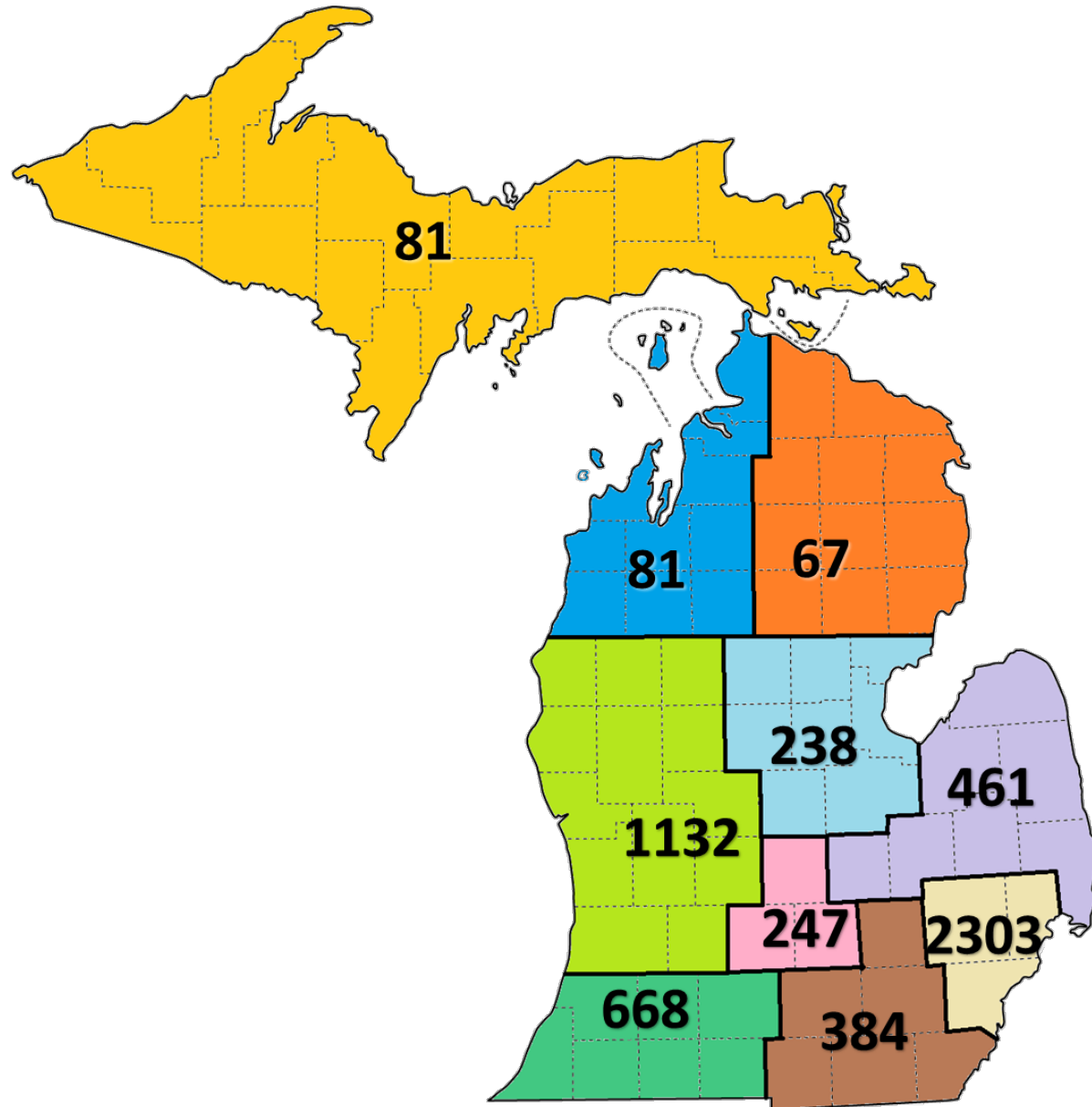
- 2014

- LBW-AA: 1
- NBW-AA: 31
- LBW-NAA: 10
- NBW-NAA: 43

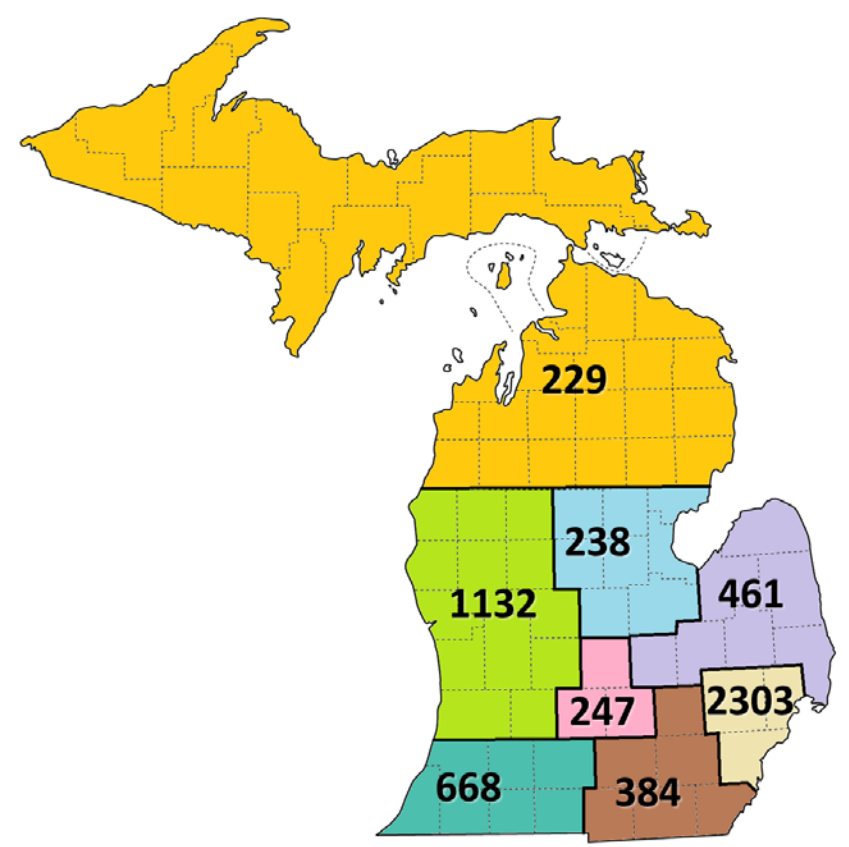
- 2012-2014 (Weighted)

- LBW-AA: 3 (220)
- NBW-AA: 102 (1,776)
- LBW-NAA: 38 (832)
- NBW-NAA: 104 (12,691)
- TOTAL: 247 (15,509)

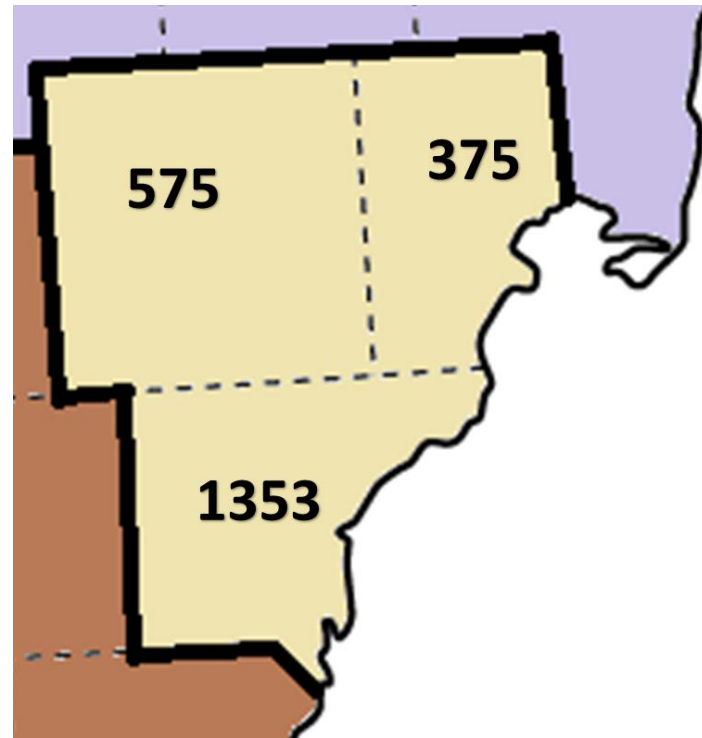
IV. Multi-Year Data Set - Ten Regions



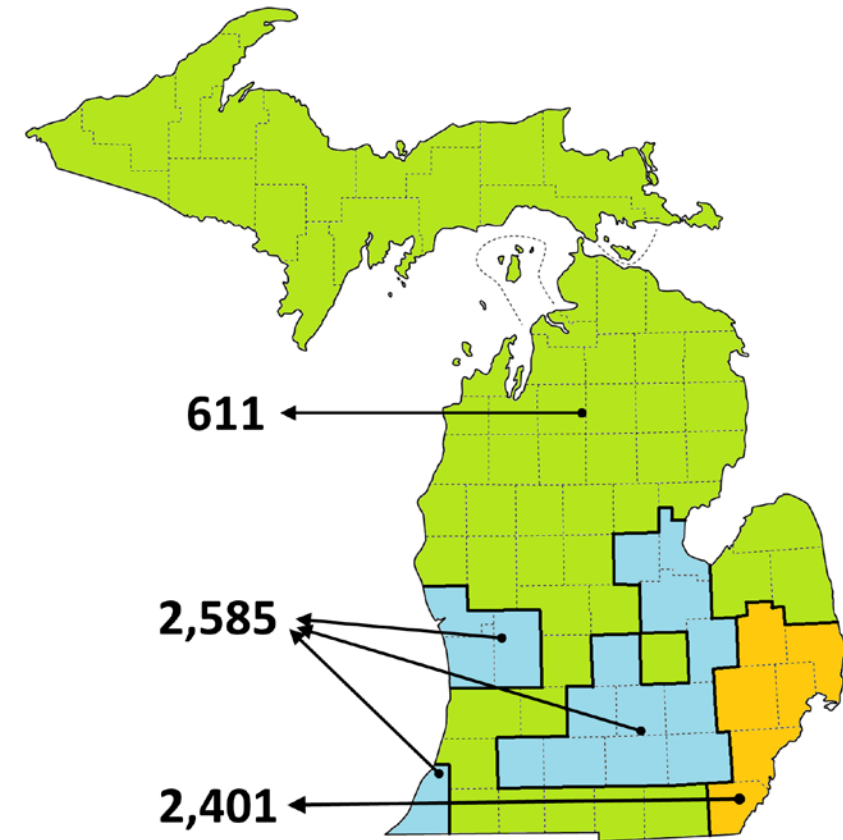
IV. Multi-Year Data Set - Alternate Configurations



Combine Northern Michigan Regions



Divide 3 Most Populous Counties



Rural - Urban SE - Urban Non-SE

Outline 3

- Goals and Objectives
- Reweighting Method
- **Outcomes**
 - **Data Set Accuracy**
 - **Regional Results**
- Lessons Learned



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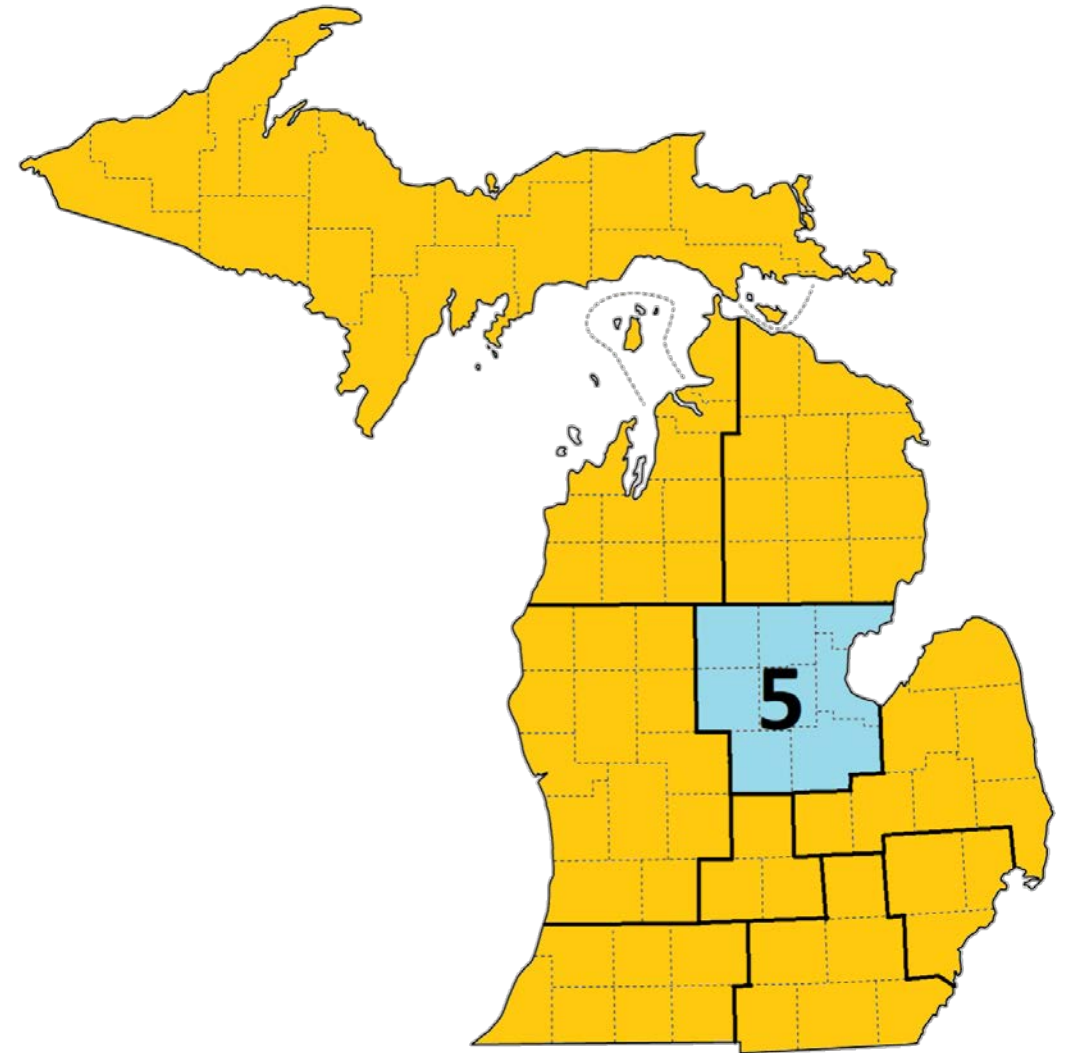
Outcome 1: Data Set Accuracy

- 2012-2014 Combined Data Set
- New weighted counts by region match Vital Records and MI PRAMS counts

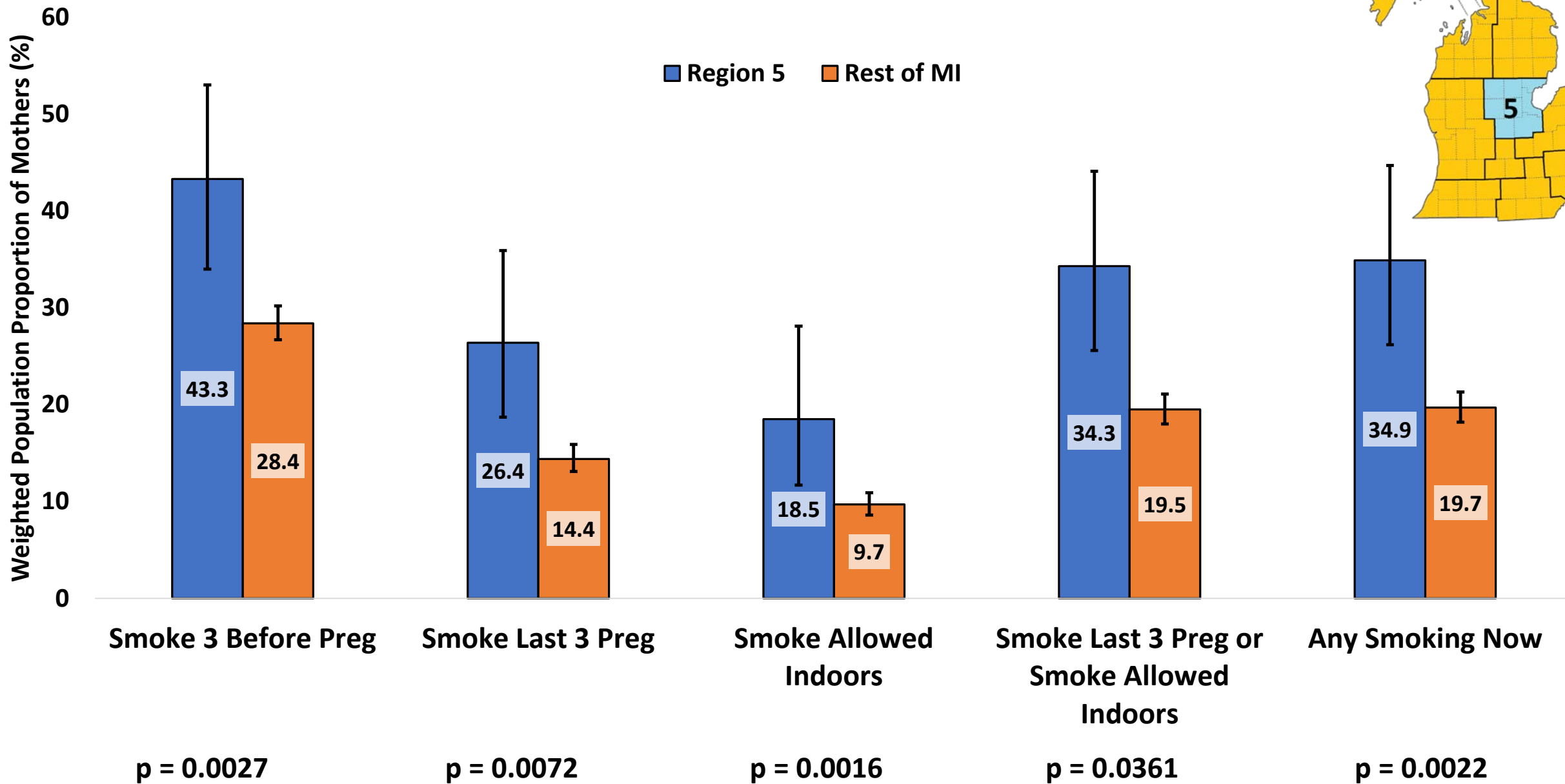
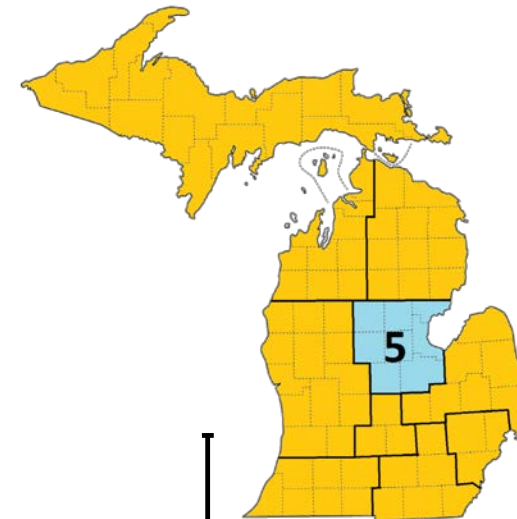
Stratum	Regional Weight	Vital Records	PRAMS Weight
LBW-AA	7,875	7,890	7,426
NBW-AA	17,018	17,019	17,188
LBW-NAA	54,068	53,992	53,508
NBW-NAA	255,504	255,504	252,951
TOTAL	334,465	334,405	331,073

Outcome 2: Regional Results

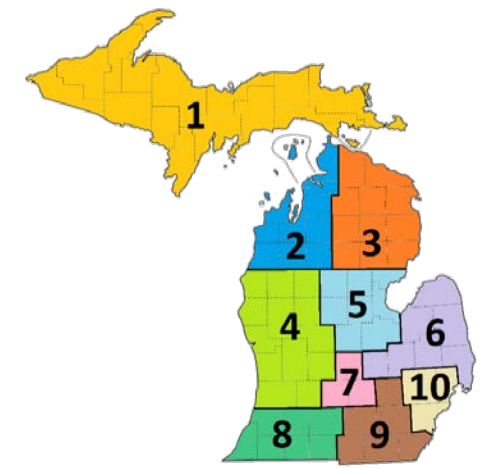
- Statistical tests:
 - One region versus all other regions combined
 - i.e. Region 5 vs Regions (1-4, 6-10)
- Smoking
- Home visiting participation
- Life stressors
- Teeth cleaned during pregnancy
- Safe sleep



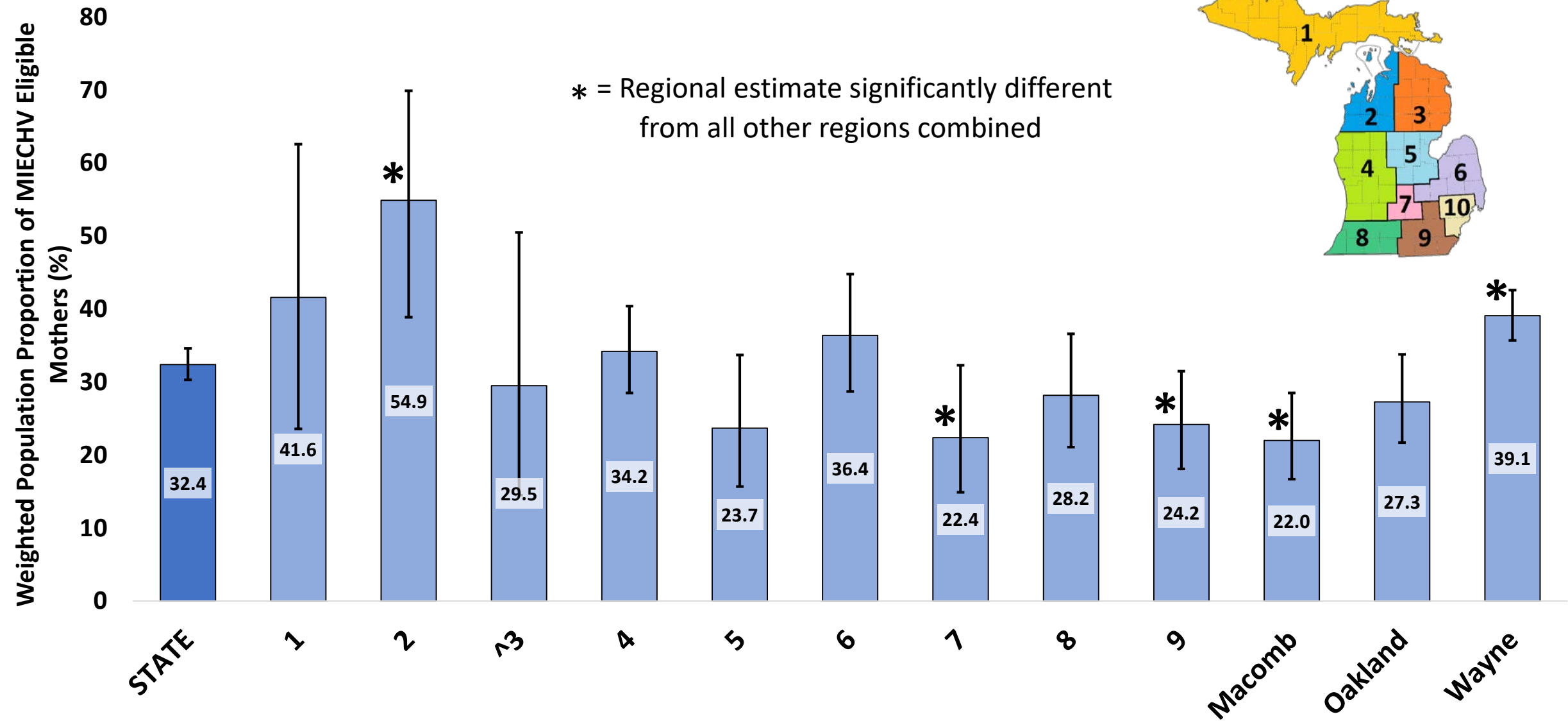
Smoke Exposure Before, During, and After Pregnancy Prosperity Region 5 | MI PRAMS 2012-2014



Any Home Visiting Participation - MIECHV Eligible Mothers by Prosperity Region | MI PRAMS 2012-2014



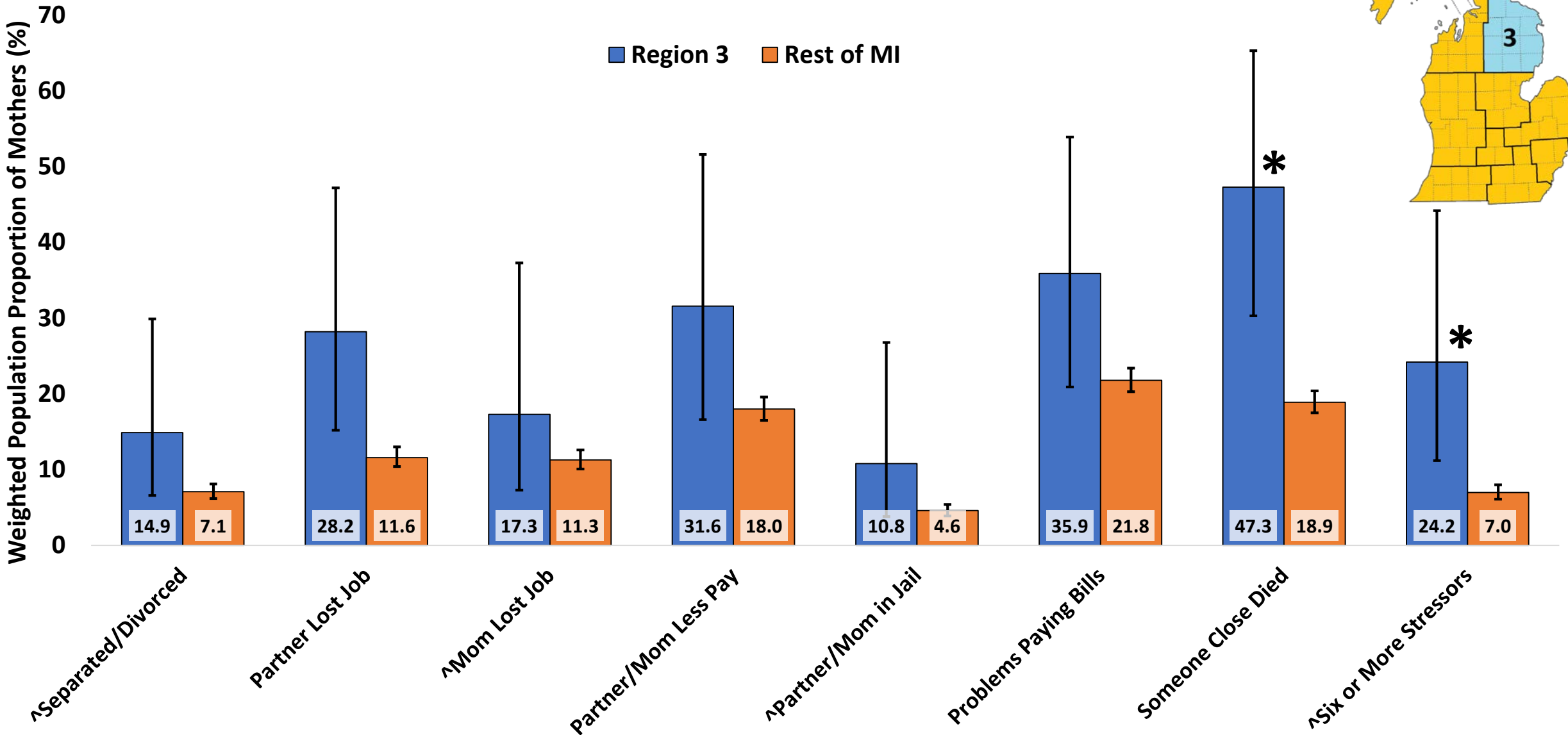
* = Regional estimate significantly different from all other regions combined



^ Relative standard error between 30% and 50% - interpret with caution

Life Stressors in 12 Months Before Delivery

Prosperity Region 3 | MI PRAMS 2012-2014



^ Relative standard error between 30% and 50% - interpret with caution

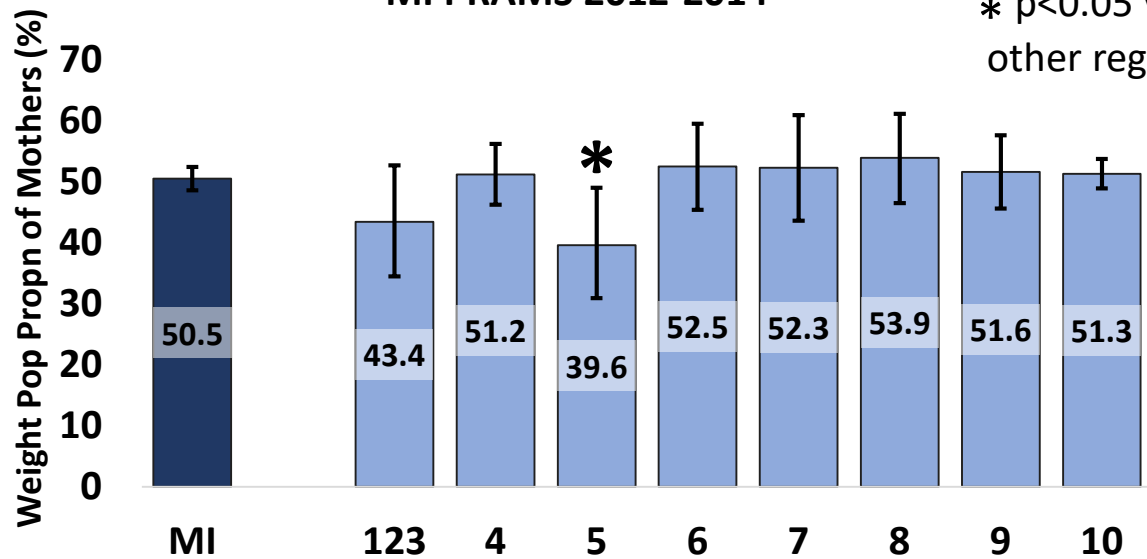
* Regional estimate differs significantly from remainder of the state (p < 0.05)



Teeth Cleaned During Pregnancy by Region

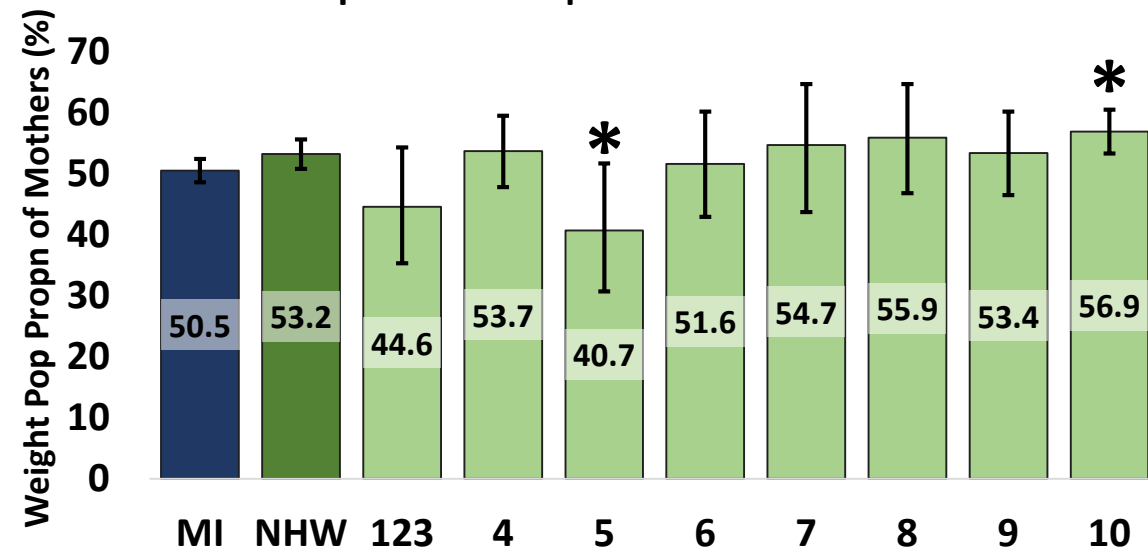
MI PRAMS 2012-2014

* p<0.05 vs all other regions



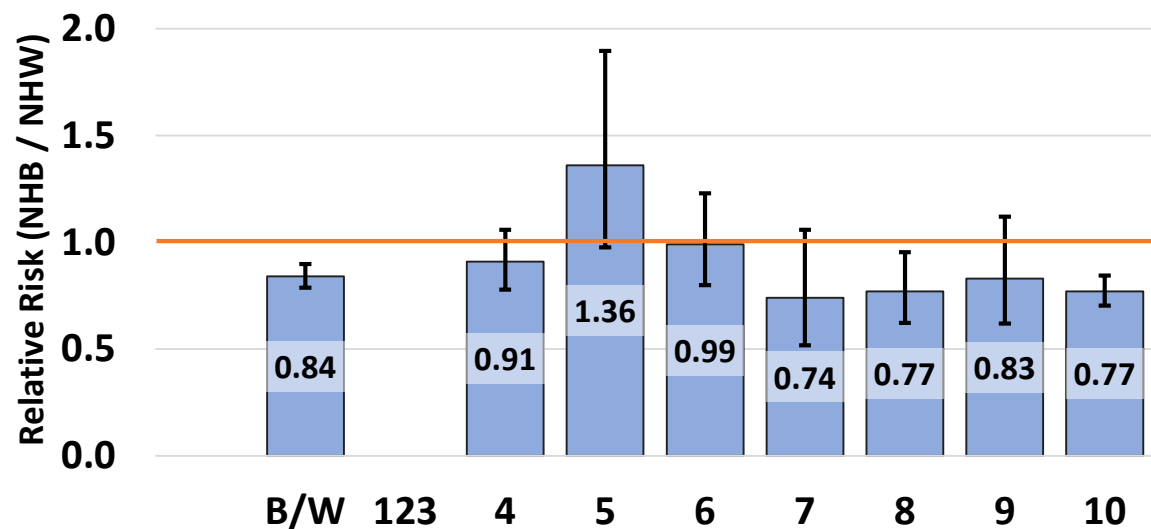
Teeth Cleaned During Pregnancy by Region

Non-Hispanic White | MI PRAMS 2012-2014



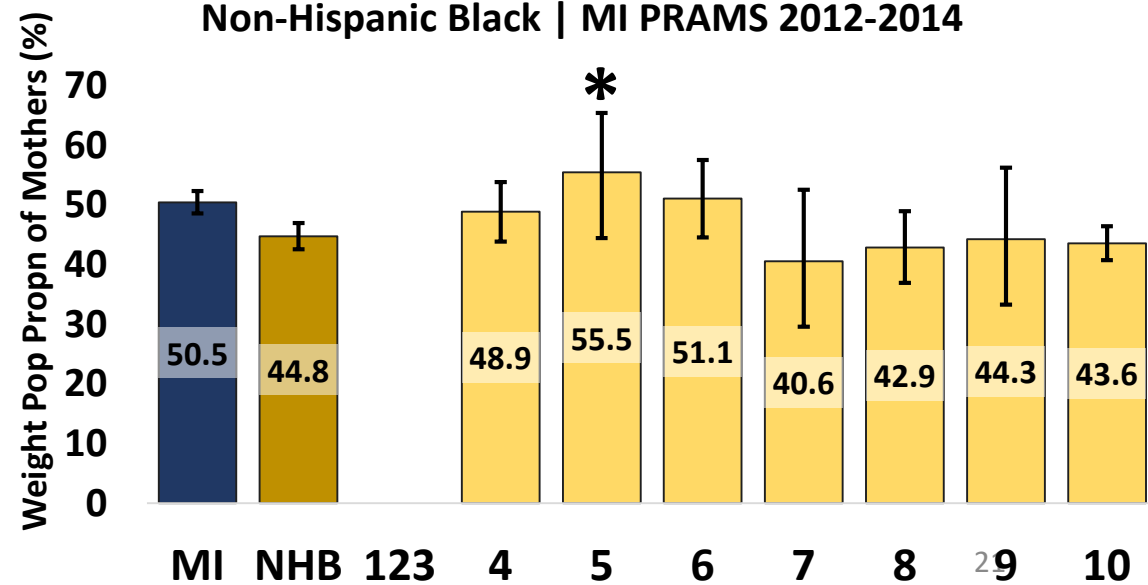
Teeth Cleaned During Pregnancy by Region

NHB/NHW | MI PRAMS 2012-2014



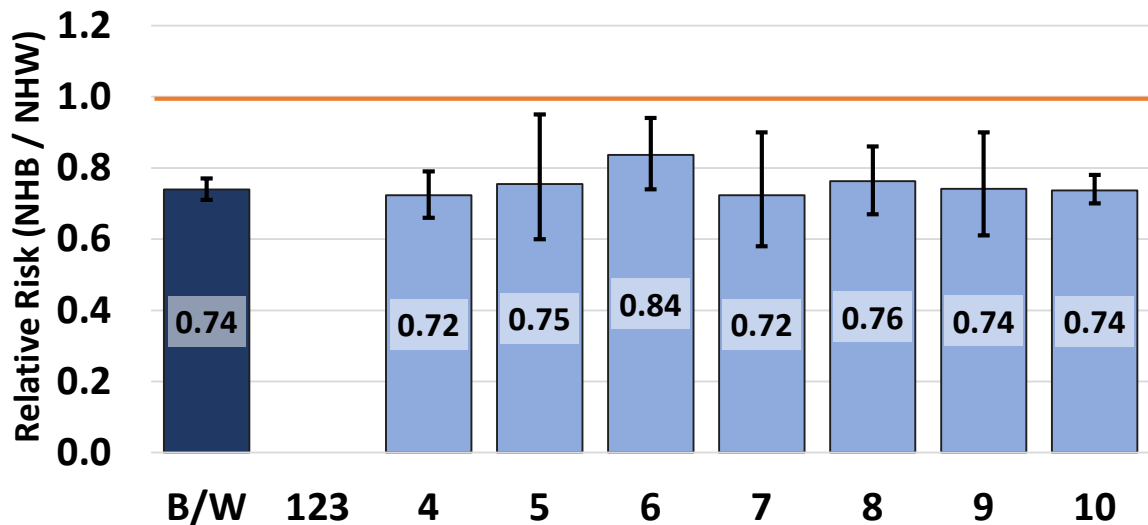
Teeth Cleaned During Pregnancy by Region

Non-Hispanic Black | MI PRAMS 2012-2014

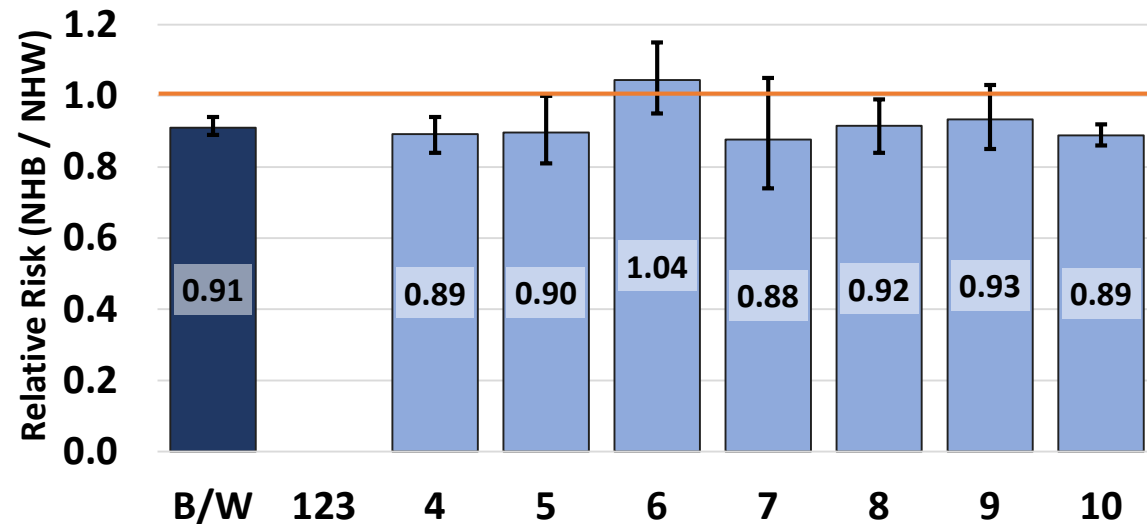




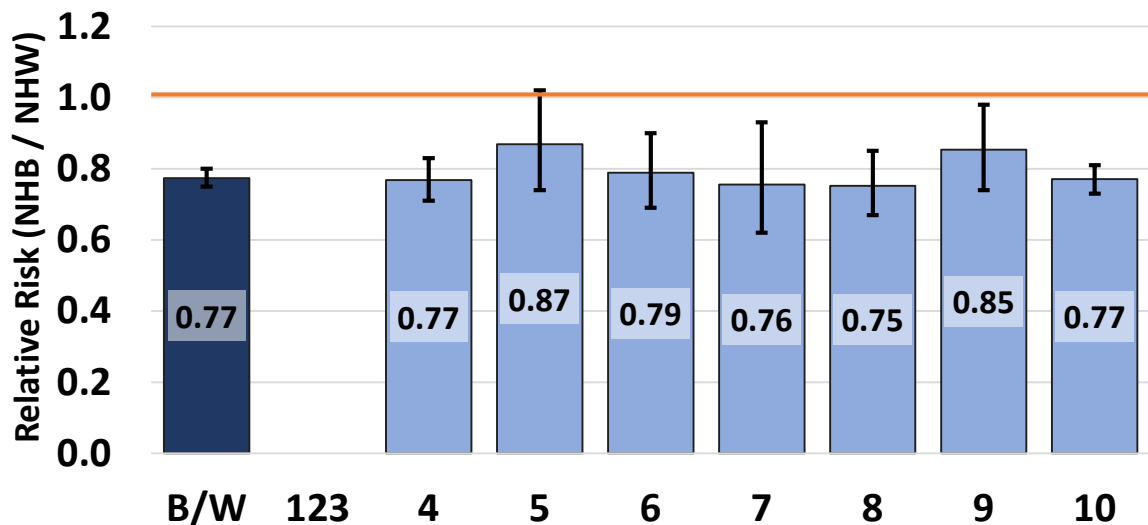
Infant Sleeps on Back by Region
 NHB/NHW | MI PRAMS 2012-2014



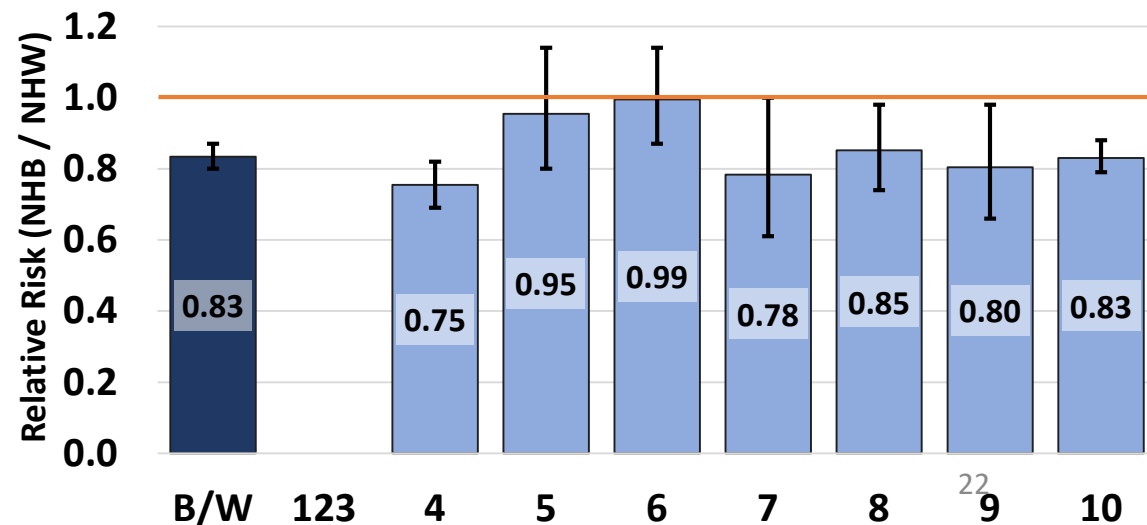
Infant Sleeps in Crib by Region
 NHB/NHW | MI PRAMS 2012-2014



Infant Sleeps on Firm Mattress by Region
 NHB/NHW | MI PRAMS 2012-2014



Infant Sleeps Alone by Region
 NHB/NHW | MI PRAMS 2012-2014

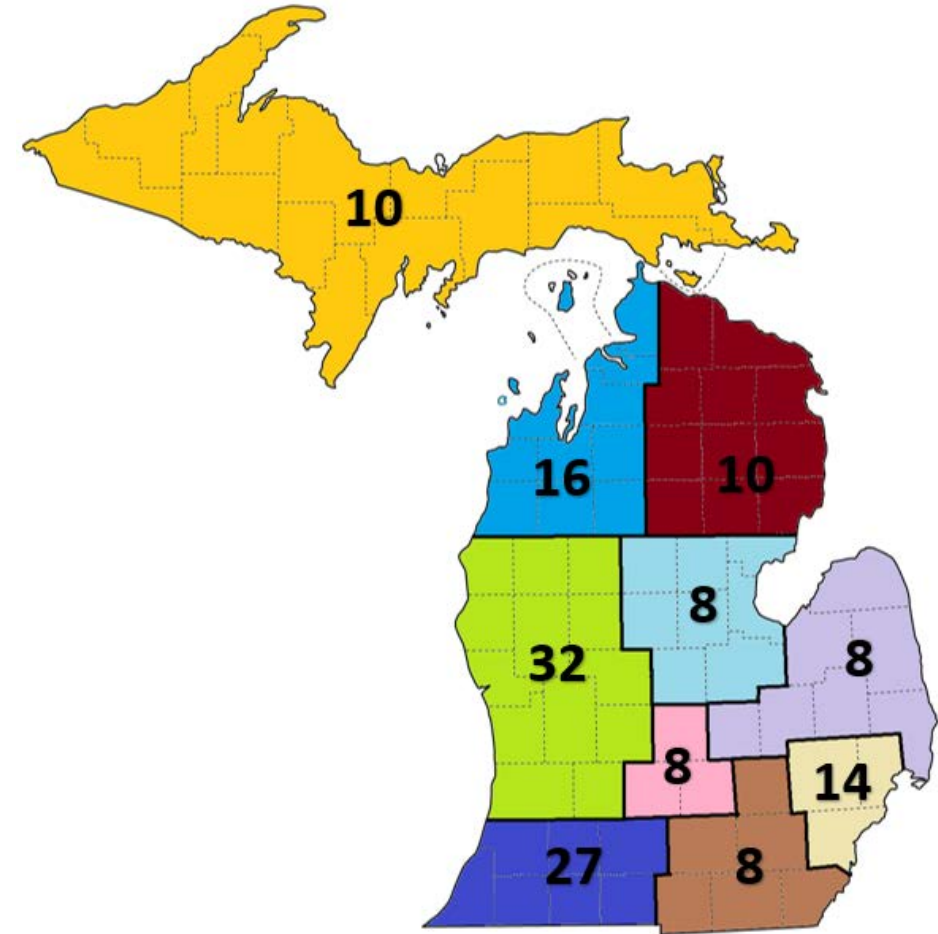


Outline 4

- Goals and Objectives
- Reweighting Method
- Outcomes
- **Lessons Learned**

Lessons Learned: Local Partner Engagement

- Polled local public health partners to determine topics of interests for regional reports
- 141 people responded
- Topics of greatest interest:
 - Mental health
 - Substance use
 - Service utilization
 - Breastfeeding
- Two regional reports released
- 20 data presentation requests involving regional data





Limitations and Strengths

Strengths

- Includes CDC non-responder adjustments
- Easy to implement
 - Flexible multi-county regions
 - Accurately weighted
- Empty strata filled by geographically, demographically similar responders

Limitations

- Lose the ability to examine time trends
- Subgroup analysis limited
- Still some areas with low numbers of responders after re-weighting
- Assumes that women randomly selected to represent the state still accurately represent their region

MI PRAMS People

- **MDHHS**

- Patricia McKane, DVM MPH
- Chris Fussman, MS
- Jill Hardy
 - Hannah Sauter
 - Anna Raykov
 - Madeline Booth
 - Jacob Paciorek
- Mei You, MS
- Carol Davis
- Virginia Ganzevoort
- Karen Andruszewski

- **Larry Hembroff Survey Consulting**

- CDC

- Tanya Williams MPH
- Nan Ruffo MPA

- Rutgers Bloustein Center for Survey Research (2016 -->)

- Nancy Wolff
- Griselda Villanueva | Vanessa Loyola
- Many interviewers!

- Michigan State University Office for Survey Research

- (1987 - 2015)