

Effect of State-Level Health Insurance Nondiscrimination Policies on Gender Minority Mental Health

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Acknowledgments

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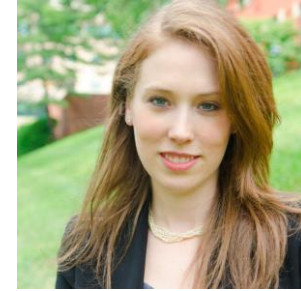
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Overview

Research Question

Were state-level nondiscrimination policies associated with changes in suicidality among gender minority individuals?

Methods

Difference-in-differences design using commercial health insurance claims

Preview of Findings

Nondiscrimination policies were associated with a decrease or no change in suicidality in all years following the policy

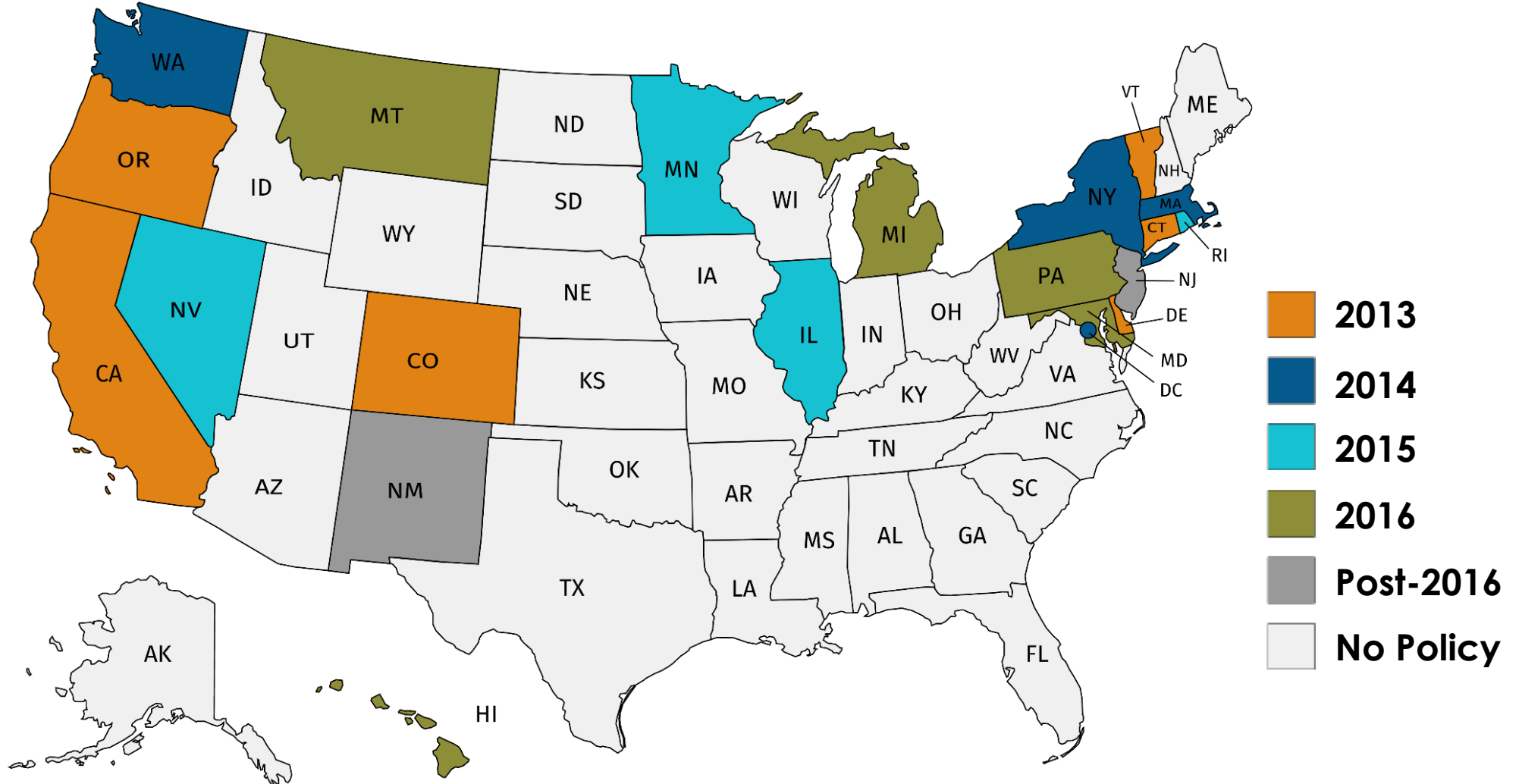
Motivation for Research Question

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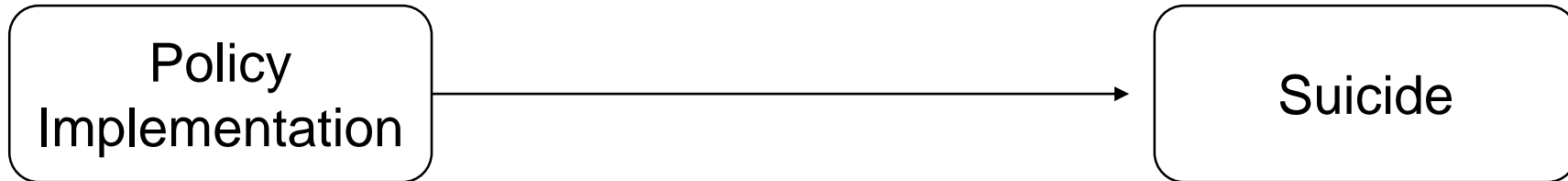
- **40 percent** of gender minority individuals report a **lifetime suicide attempt**, compared to less than 5 percent in the general population.¹
- **Reduced access to gender affirming services** and **discrimination** have been linked to **worse mental health outcomes**.²⁻⁴
- Historically, **private insurers** in the U.S. have **explicitly restricted coverage** of health care services **for gender minority populations**.⁵

Motivation for Research Question

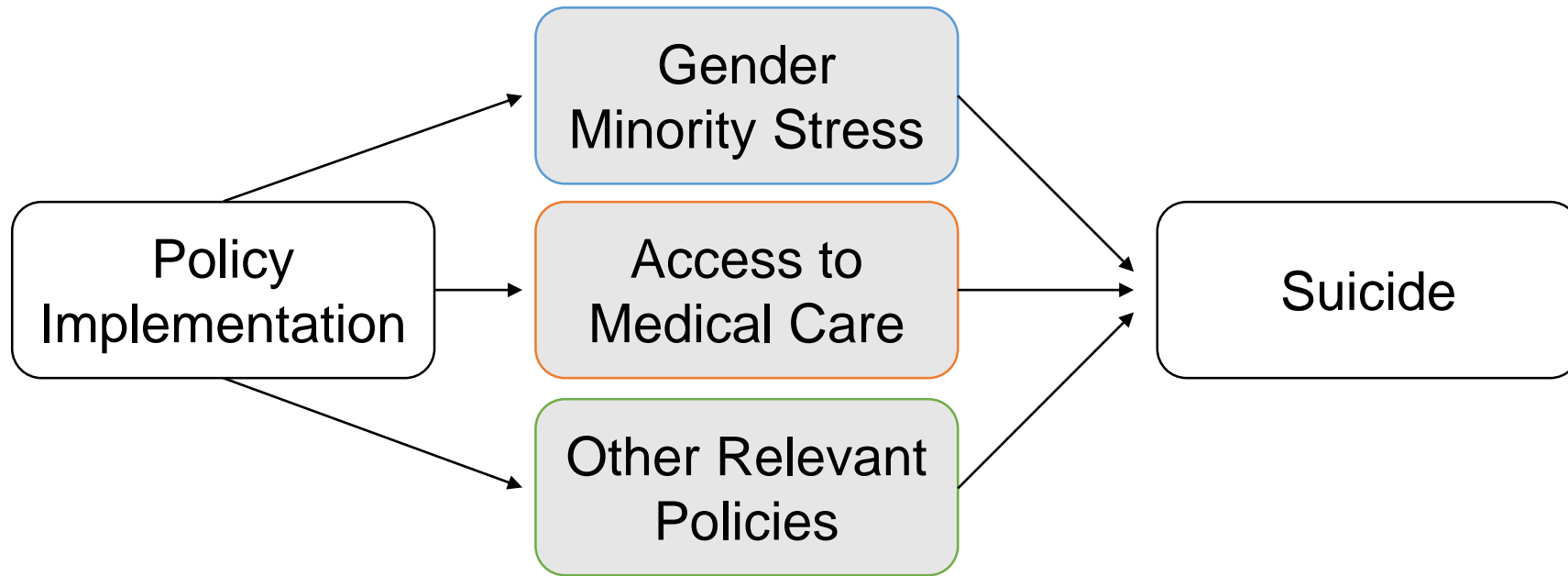
Since 2012, 21 states have implemented policies prohibiting insurer discrimination based on gender identity



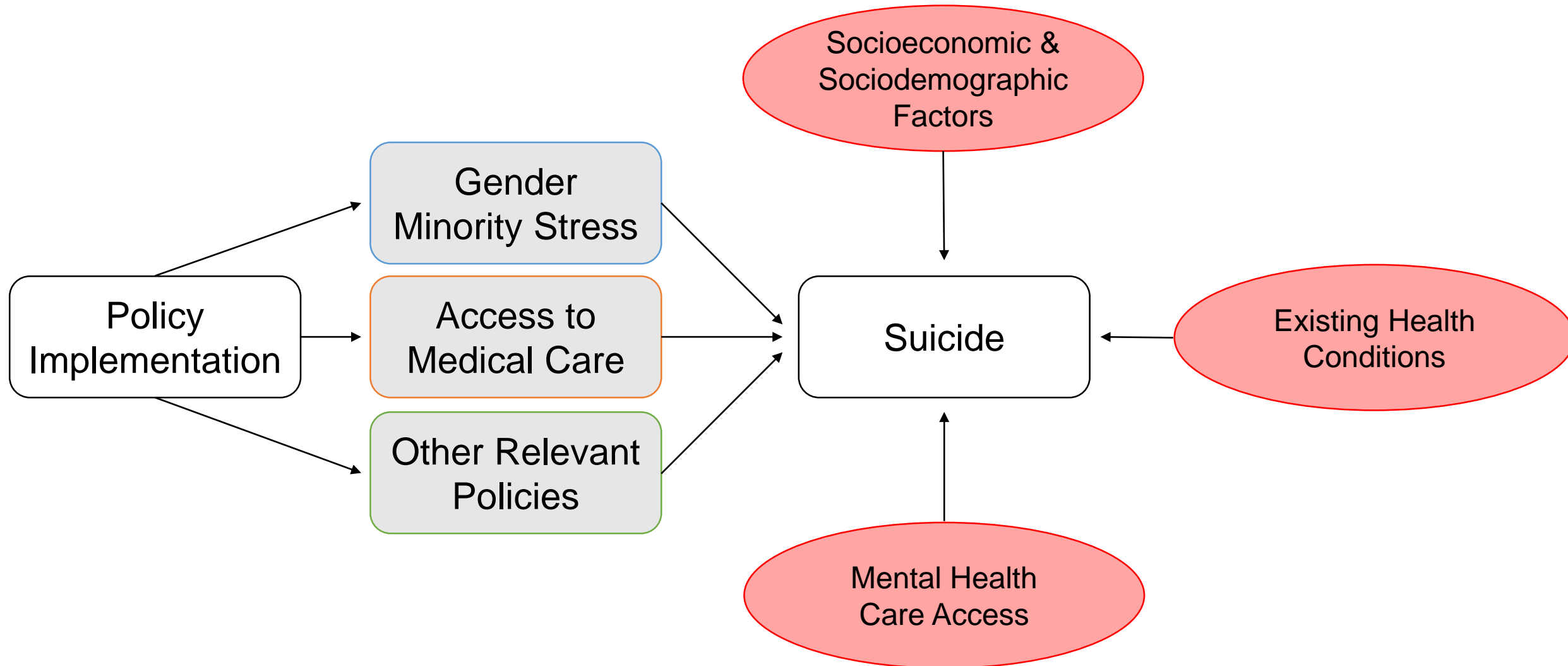
Methods - Causal Model



Methods - Causal Model



Methods - Causal Model



Methods - Data

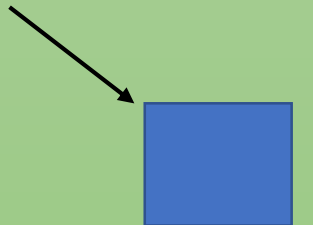
IBM® MarketScan® Commercial Claims Database (MarketScan)

- Convenience sample of private health insurance claims contributed by large employers and health plans from across the country
- Includes 26-53 million enrollees per year from 2009-2017

Methods - Data

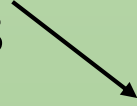
All MarketScan enrollees

MarketScan enrollees
who identify as
gender minority



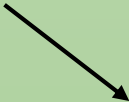
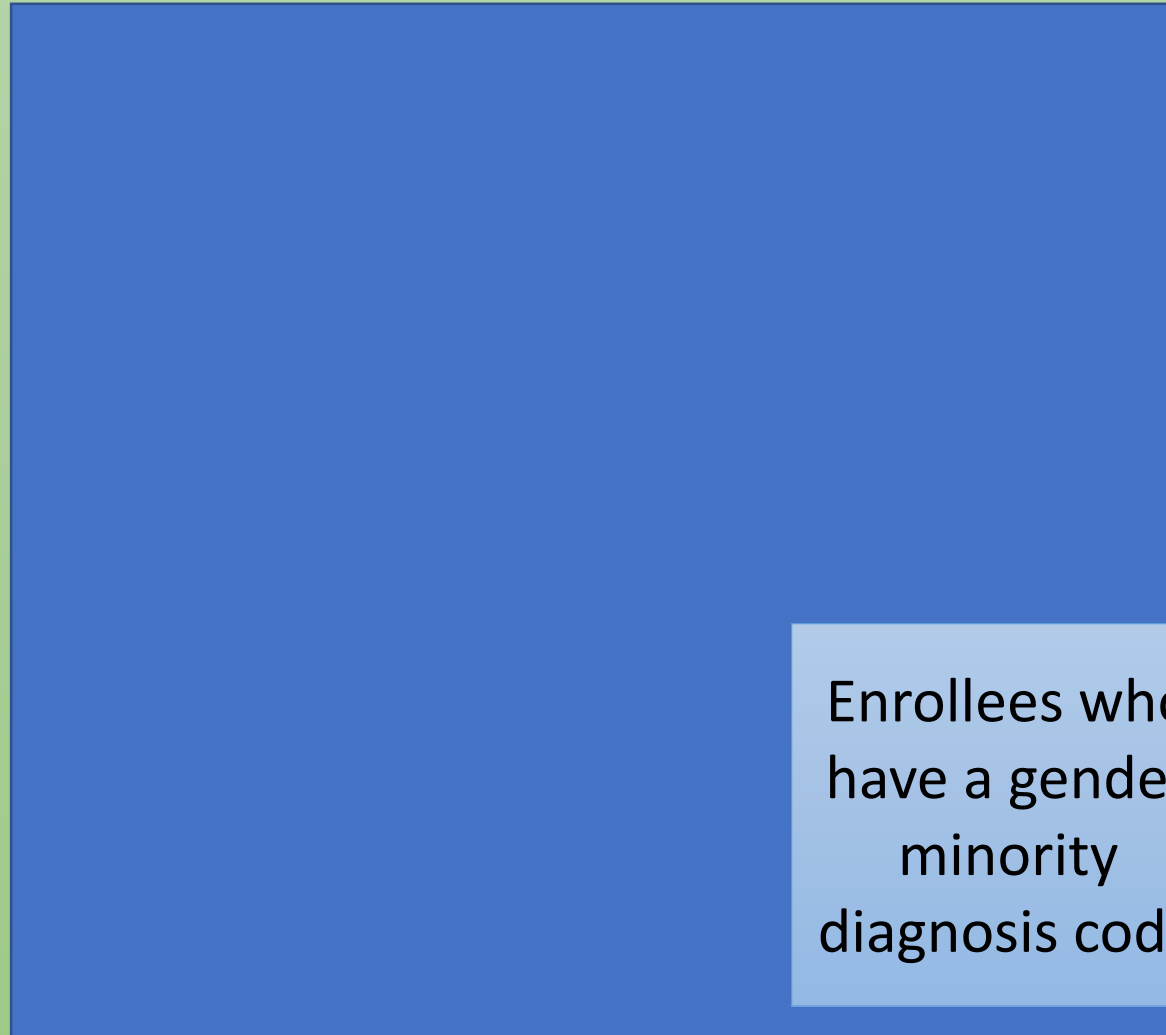
Methods - Data

MarketScan enrollees
who identify as
gender minority



Methods - Data

MarketScan enrollees
who identify as
gender minority

A black arrow points from the text 'MarketScan enrollees who identify as gender minority' to a large blue rectangle.

Enrollees who
have a gender
minority
diagnosis code

Methods - Data

How do enrollees end up in our sample?

Enrollees who
have a gender
minority
diagnosis code

Methods - Data

How do enrollees end up in our sample?

Technically

- Gender identity disorder (302.85, F64.1, etc)
- Transsexualism (302.5, F64.0, etc.)
- Personal history of sex reassignment (Z87.890)

Enrollees who
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Methods - Data

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- Gender identity disorder (302.85, F64.1, etc)
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Conceptually

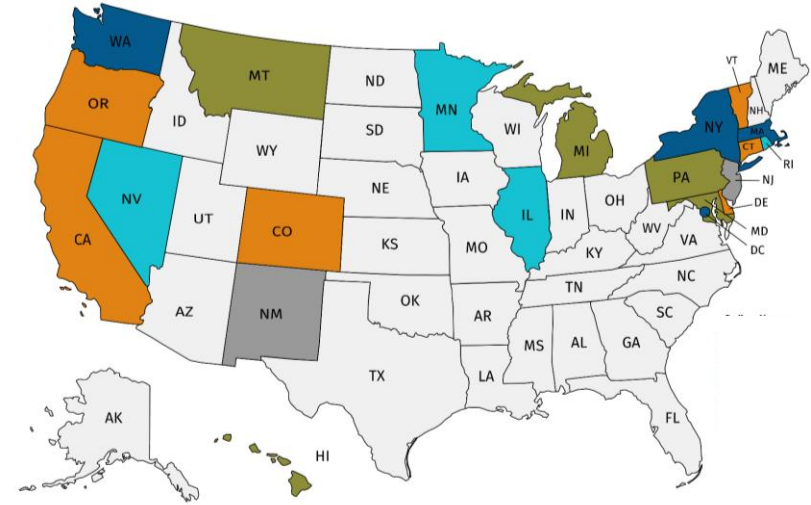
- Gender affirming hormones or surgery
- Gender dysphoria
- Gender minority identity disclosure

Enrollees who
have a gender
minority
diagnosis code

Methods – Study Design

Differences-in-Differences Design

- 4 treatment cohorts: Based on implementation year
- 1 comparison group: All states with no policy as of December 31, 2016 (n=30)
- Exposure: Implementation of nondiscrimination policy for private health insurers
- Outcome: Suicidality (diagnosis codes for suicide attempt, potential suicide attempt, and suicidal ideation)
- Pre-implementation period: 2009 – year before policy implementation
- Post-implementation period: Implementation year – 2017



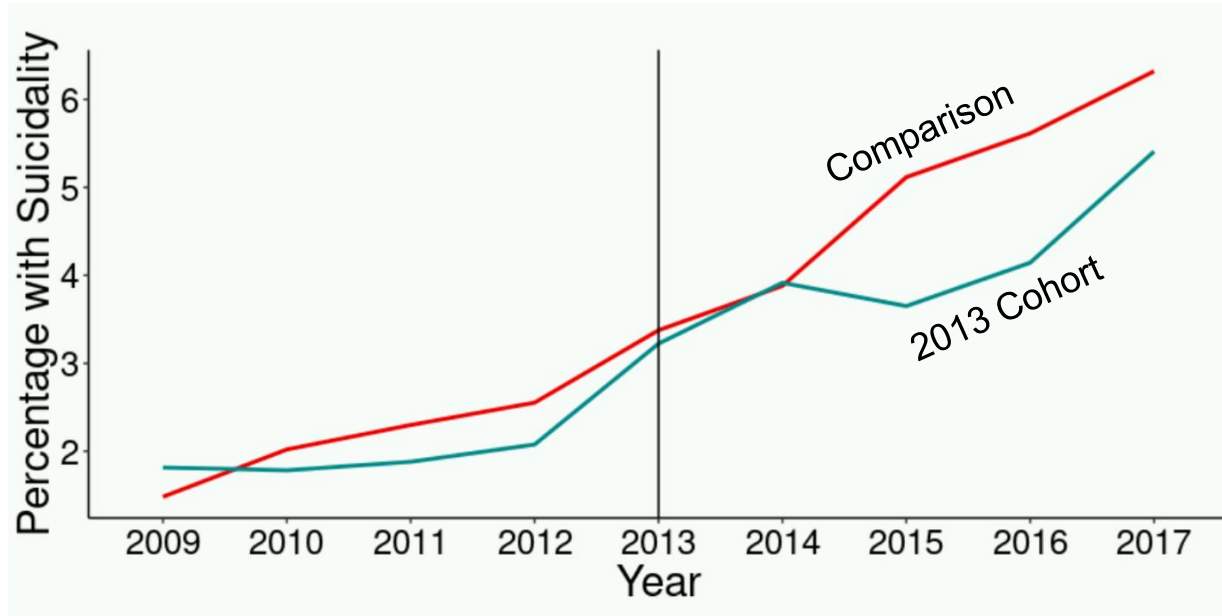
Methods – Statistical Analysis

- Separate models for each of the 4 policy cohorts versus comparison group
- Estimated effects for each post-implementation year
- Main models included enrollee level covariates and year-fixed effects
- Standard errors clustered at the state level

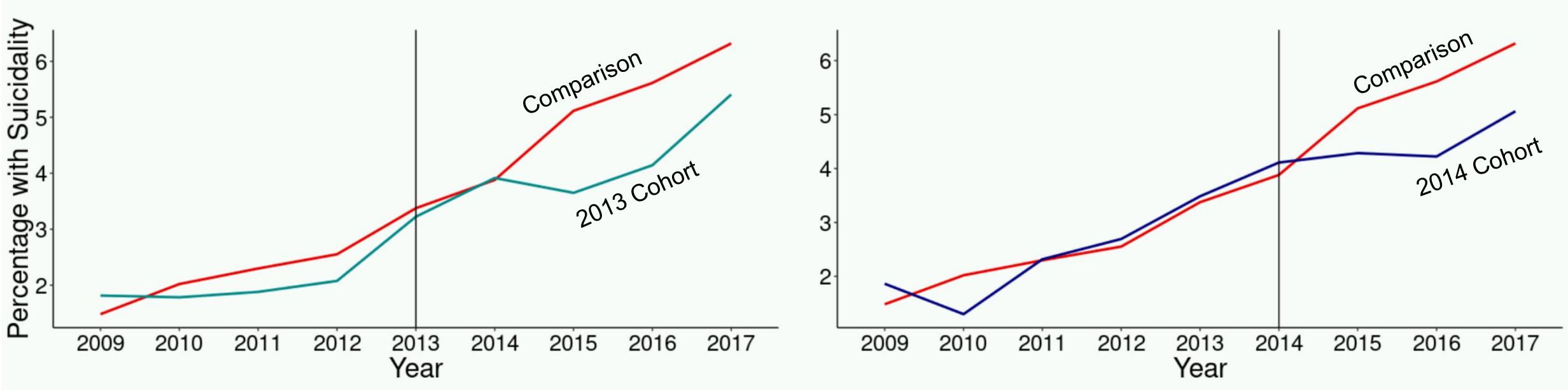
Characteristics of Gender Minority Individuals in State Policy Cohorts and Comparison Groups

	2013 Cohort	2014 Cohort	2015 Cohort	2016 Cohort	Comparison Group
States (n)	6	4	4	5	30
Enrollees (n)	2257	1694	657	1129	5674
Age in years (mean)	27	26	26	25	26
HMO (%)	30	12	5	21	13
Living in rural area (%)	4	4	6	7	10
Psychiatrists per person	0.0002	0.0002	0.0001	0.0002	0.0001
Policy Tally (mean)	1.14	1.15	1.11	1.01	0.97

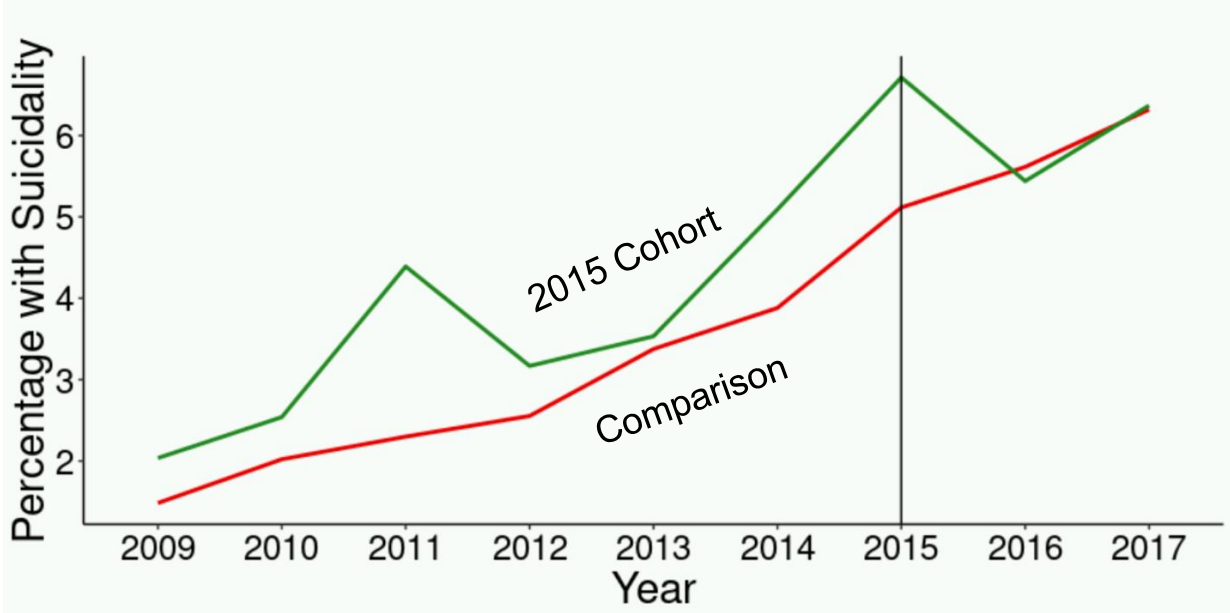
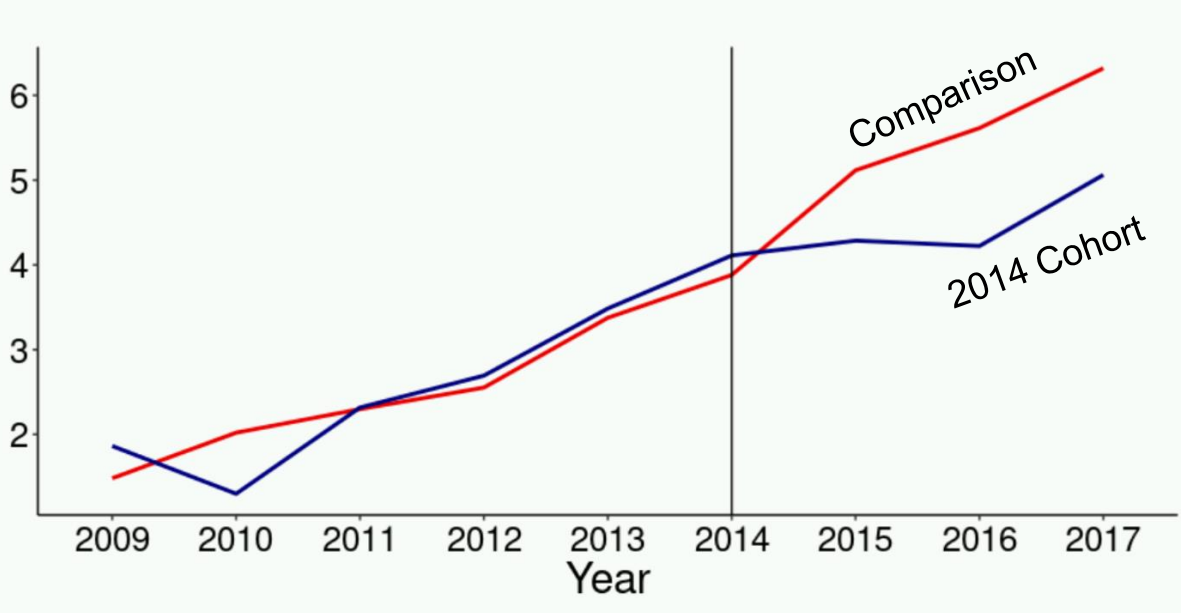
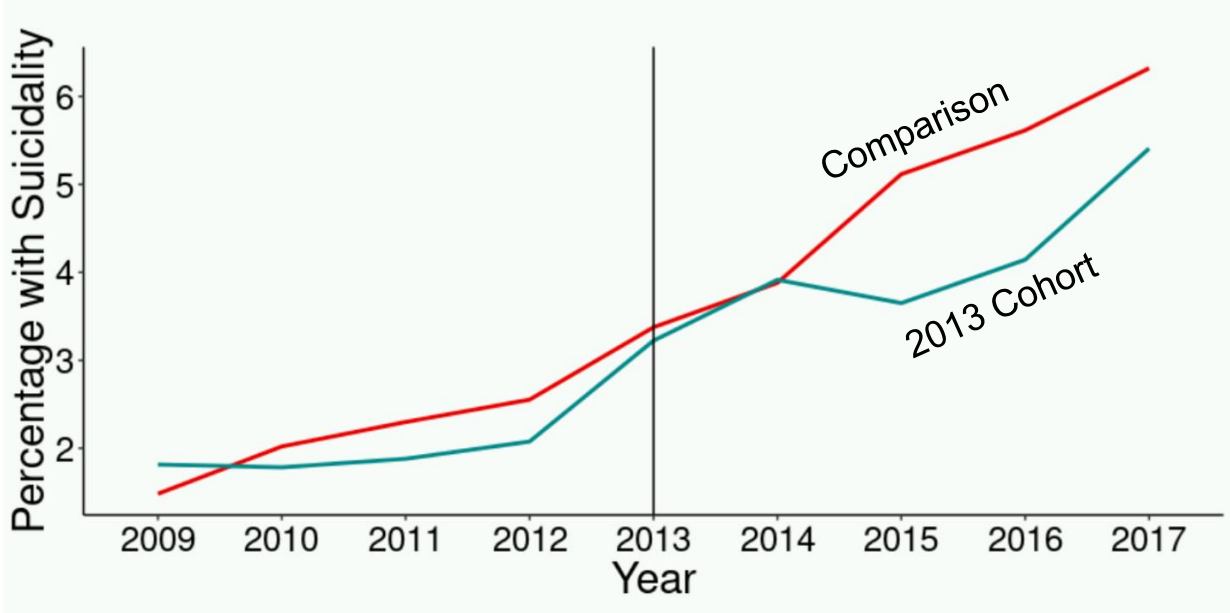
Unadjusted Trends in Suicidality for Each Policy Cohort versus the Comparison Group



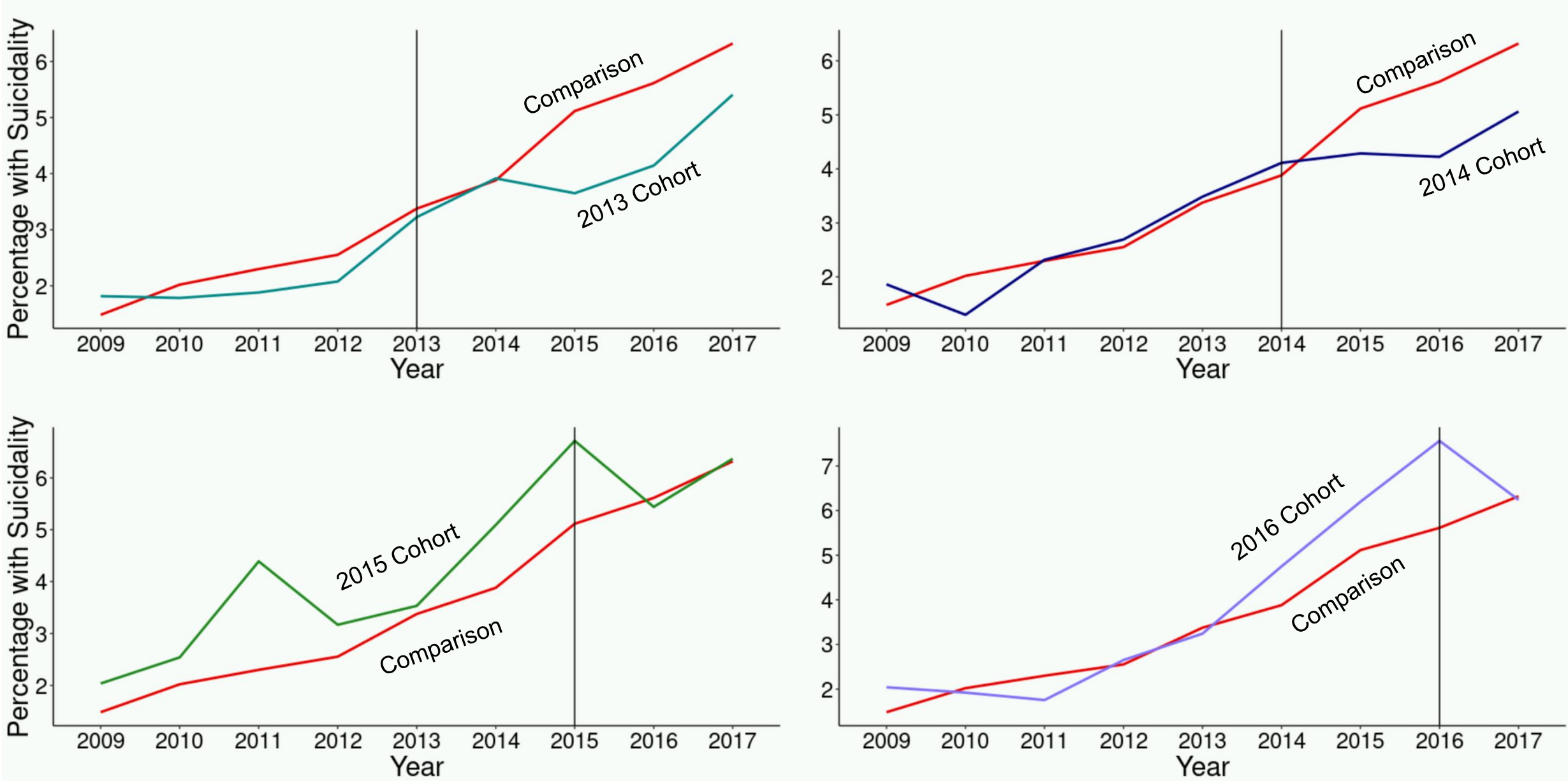
Unadjusted Trends in Suicidality for Each Policy Cohort versus the Comparison Group



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Unadjusted Trends in Suicidality for Each Policy Cohort versus the Comparison Group




Estimated Changes in Suicidality Associated with State-Level Non-Discrimination Policies

	2013 Cohort	2014 Cohort	2015 Cohort	2016 Cohort
2013	↑			
2014	↑			
2015	↓			
2016	↓			
2017	↑			

 Indicates p-value < 0.05

Estimated Changes in Suicidality Associated with State-Level Non-Discrimination Policies

	2013 Cohort	2014 Cohort	2015 Cohort	2016 Cohort
2013	↑			
2014	↑	↓		
2015	↓	↓		
2016	↓	↓		
2017	↑	↓		

 Indicates p-value < 0.05

Estimated Changes in Suicidality Associated with State-Level Non-Discrimination Policies

	2013 Cohort	2014 Cohort	2015 Cohort	2016 Cohort
2013	↑			
2014	↑	↓		
2015	↓	↓ OR=0.73 CI: (0.58, 0.90)		
2016	↓	↓ OR = 0.49 CI: (0.41, 0.58)		
2017	↑	↓		

↓ Indicates p-value < 0.05

Estimated Changes in Suicidality Associated with State-Level Non-Discrimination Policies

	2013 Cohort	2014 Cohort	2015 Cohort	2016 Cohort
2013	↑			
2014	↑	↓		
2015	↓	↓ OR=0.73 CI: (0.58, 0.90)	↑	
2016	↓	↓ OR = 0.49 CI: (0.41, 0.58)	↓ OR = 0.50 CI: (0.39, 0.64)	
2017	↑	↓	↓	

↓ Indicates p-value < 0.05

Estimated Changes in Suicidality Associated with State-Level Non-Discrimination Policies

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2013	↑			
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2016	↓	↓ OR = 0.49 CI: (0.41, 0.58)	↓ OR = 0.50 CI: (0.39, 0.64)	↓
2017	↑	↓	↓	↓ OR = 0.61 CI: (0.44, 0.85)

↓ Indicates p-value < 0.05

Limitations

- Heterogeneity in policy language and policy timing
- Selection via the diagnosis-based identification algorithm
- Other concerns related to difference-in-differences design (e.g., exogenous shocks, parallel trends)
- Diagnosis codes and changes in diagnosis codes used to define suicidality outcome

Takeaways

- Nondiscrimination policies were associated with a decrease in suicidality in the first post-implementation year among states that implemented policies in 2014 to 2016. Among states that implemented policies in 2013, there was no effect on suicidality.
- Results suggest that health insurance nondiscrimination policies have, at worst, no effect on gender minority mental health and, at best, a notable impact on gender minority suicidality.
- Barriers to implementation of health insurance nondiscrimination policies may be lower than expected.

Thank you!

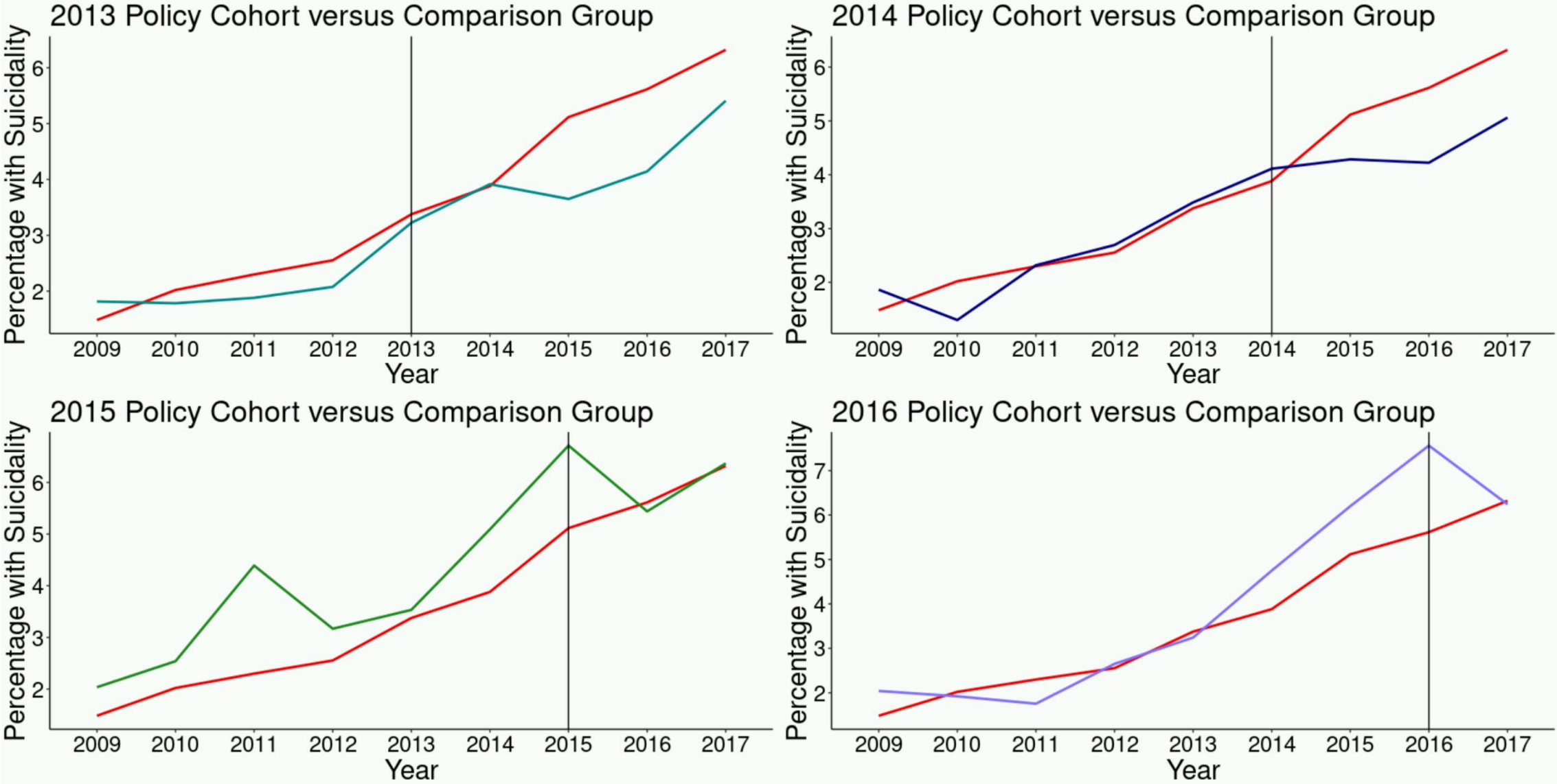
References

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4. Chodzen G, Hidalgo MA, Chen D, Garofalo R. Minority Stress Factors Associated With Depression and Anxiety Among Transgender and Gender-Nonconforming Youth. *J Adolesc Health*. 2019;64(4):467-471. doi:10.1016/j.jadohealth.2018.07.006
5. Baker KE. The Future of Transgender Coverage. *N Engl J Med*. 2017;376(19):1801-1804. doi:10.1056/NEJMp1702427

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Additional Slides

Unadjusted Trends in Inpatient Mental Health Hospitalizations for Each Policy Cohort versus the Comparison Group, 2009-2017



— Comparison — 2013 — 2014 — 2015 — 2016

Estimated Changes in Inpatient Mental Health Hospitalization Associated with State-Level Non-Discrimination Policies^a

	2013 Cohort		2014 Cohort		2015 Cohort		2016 Cohort	
	Odds Ratio (95% CI)	<i>P</i> value	Odds Ratio (95% CI)	<i>P</i> value	Odds Ratio (95% CI)	<i>P</i> value	Odds Ratio (95% CI)	<i>P</i> value
MHHosp.								
2013	0.82 (0.69, 0.98)	.03						
2014	1.12 (0.92, 1.35)	.27	1.29 (1.04, 1.60)	.02				
2015	0.70 (0.54, 0.90)	.01	1.03 (0.78, 1.35)	.85	0.74 (0.58, 0.94)	.02		
2016	0.77 (0.60, 0.97)	.03	0.86 (0.71, 1.03)	.11	0.61 (0.52, 0.72)	<.001	0.90 (0.71, 1.15)	.41
2017	0.86 (0.61, 1.20)	.36	0.87 (0.64, 1.16)	.35	0.79 (0.63, 0.99)	.04	0.81 (0.57, 1.16)	.26

Abbreviations: MH Hosp., Mental Health Hospitalizations

^aAll models use data from 2009 to 2017 and cluster standard errors at the state level.

eTable 5. Pre-policy Yearly Trend Differences Between each Policy Cohort and Comparison Group 1

	2013 Cohort	2014 Cohort	2015 Cohort	2016 Cohort
	Odds Ratio (standard error)	Odds Ratio (standard error)	Odds Ratio (standard error)	Odds Ratio (standard error)
Suicidality	0.93 (1.11)	0.93 (1.08)	0.97 (1.05)	0.99 (1.03)
MH Hosp.	0.88* (1.06)	1.04 (1.10)	0.98 (1.04)	1.02 (1.04)

Abbreviations: MH Hosp., Mental Health Hospitalizations

*p<0.05 **p<0.01 ***p<0.001

eTable 6. Pre-policy Yearly Trend Differences Between each Policy Cohort and Comparison Group 2

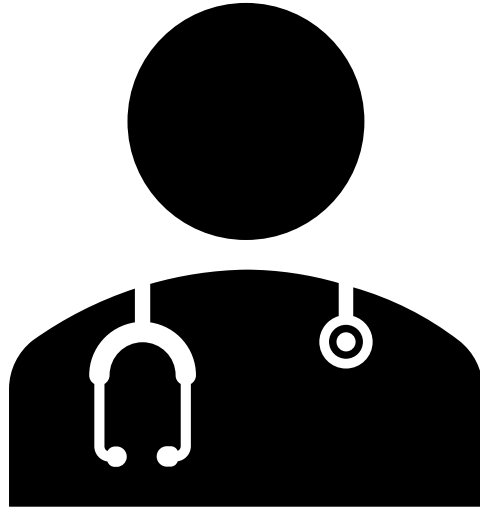
	2013 Cohort	2014 Cohort	2015 Cohort	2016 Cohort
	Odds Ratio (standard error)	Odds Ratio (standard error)	Odds Ratio (standard error)	Odds Ratio (standard error)
Suicidality	0.93 (1.11)	0.91 (1.08)	0.95 (1.05)	0.98 (1.03)
MH Hosp.	0.88* (1.06)	1.03 (1.10)	0.98 (1.04)	1.02 (1.04)

Abbreviations: MH Hosp., Mental Health Hospitalizations

*p<0.05 **p<0.01 ***p<0.001

Sensitivity Analyses

Mental Health Access



Other Relevant Policies



eTable 7. Alternative Model Specifications and Comparison Groups for 2013 Policy Cohort

	Base Model Comparison Group 1	MH Access Comparison Group 1	Other Policies Comparison Group 1	Base Model Comparison Group 2	MH Access Comparison Group 2	Other Policies Comparison Group 2
	Odds Ratio (95% CI)	Odds Ratio (95% CI)	Odds Ratio (95% CI)	Odds Ratio (95% CI)	Odds Ratio (95% CI)	Odds Ratio (95% CI)
Suicidality						
2013	1.16 (0.77, 1.75)	1.19 (0.79, 1.79)	1.17 (0.78, 1.75)	1.12 (0.75, 1.67)	1.14 (0.76, 1.70)	1.20 (0.81, 1.77)
2014	1.16 (0.83, 1.63)	1.19 (0.81, 1.77)	1.24 (0.84, 1.84)	1.11 (0.79, 1.57)	1.13 (0.76, 1.68)	1.19 (0.73, 1.95)
2015	0.94 (0.73, 1.20)	0.97 (0.69, 1.36)	0.84 (0.58, 1.20)	0.91 (0.70, 1.17)	0.93 (0.66, 1.31)	0.76 (0.45, 1.27)
2016	0.82 (0.65, 1.03)	0.84 (0.66, 1.08)	0.68 (0.52, 0.90)	0.80 (0.63, 1.02)	0.82 (0.64, 1.06)	0.64 (0.42, 0.95)
2017	1.29 (0.9, 1.88)			1.23 (0.84, 1.80)		
MH Hosp.						
2013	0.82 (0.69, 0.98)	0.84 (0.72, 0.98)	0.82 (0.55, 1.22)	0.81 (0.68, 0.97)	0.83 (0.70, 0.97)	0.87 (0.61, 1.25)
2014	1.12 (0.92, 1.35)	1.14 (0.92, 1.42)	1.00 (0.76, 1.32)	1.12 (0.93, 1.36)	1.16 (0.93, 1.43)	1.13 (0.80, 1.6)
2015	0.70 (0.54, 0.90)	0.71 (0.53, 0.95)	0.79 (0.63, 0.99)	0.69 (0.53, 0.90)	0.71 (0.53, 0.94)	0.83 (0.67, 1.02)
2016	0.77 (0.60, 0.97)	0.78 (0.63, 0.97)	0.85 (0.59, 1.22)	0.76 (0.60, 0.96)	0.77 (0.62, 0.97)	0.89 (0.62, 1.27)
2017	0.86 (0.61, 1.20)			0.84 (0.60, 1.19)		

Abbreviations: MH Hosp., Mental Health Hospitalizations

eTable 8. Alternative Model Specifications and Comparison Groups for 2014 Policy Cohort

	Base Model Comparison Group 1	MH Access Comparison Group 1	Other Policies Comparison Group 1	Base Model Comparison Group 2	MH Access Comparison Group 2	Other Policies Comparison Group 2
	Odds Ratio (95% CI)	Odds Ratio (95% CI)	Odds Ratio (95% CI)	Odds Ratio (95% CI)	Odds Ratio (95% CI)	Odds Ratio (95% CI)
Suicidality						
2014	0.87 (0.69, 1.08)	0.85 (0.68, 1.07)	0.88 (0.65, 1.20)	0.85 (0.68, 1.06)	0.85 (0.67, 1.07)	0.86 (0.63, 1.17)
2015	0.73 (0.58, 0.90)	0.73 (0.59, 0.90)	0.62 (0.34, 1.13)	0.72 (0.57, 0.90)	0.72 (0.59, 0.88)	0.63 (0.37, 1.08)
2016	0.49 (0.41, 0.58)	0.49 (0.41, 0.58)	0.41 (0.26, 0.64)	0.49 (0.41, 0.58)	0.49 (0.41, 0.59)	0.40 (0.28, 0.59)
2017	0.77 (0.58, 1.03)			0.74 (0.55, 1.00)		
MH Hosp.						
2014	1.29 (1.04, 1.60)	1.40 (1.17, 1.68)	1.33 (1.01, 1.75)	1.31 (1.06, 1.62)	1.47 (1.23, 1.73)	1.34 (1.02, 1.75)
2015	1.03 (0.78, 1.35)	1.07 (0.78, 1.48)	1.95 (1.28, 2.94)	1.03 (0.79, 1.35)	1.08 (0.79, 1.49)	1.86 (1.23, 2.80)
2016	0.86 (0.71, 1.03)	0.89 (0.73, 1.08)	1.71 (1.27, 2.29)	0.86 (0.71, 1.03)	0.89 (0.73, 1.09)	1.46 (1.09, 1.93)
2017	0.87 (0.64, 1.16)			0.86 (0.64, 1.16)		

Abbreviations: MH Hosp., Mental Health Hospitalizations

eTable 9. Alternative Model Specifications and Comparison Groups for 2015 Policy Cohort

	Base Model Comparison Group	MH Access Comparison Group	Other Policies Comparison Group	Base Model Comparison Group	MH Access Comparison Group	Other Policies Comparison Group
	1	1	1	2	2	2
	Odds Ratio (95% CI)	Odds Ratio (95% CI)	Odds Ratio (95% CI)	Odds Ratio (95% CI)	Odds Ratio (95% CI)	Odds Ratio (95% CI)
Suicidality						
2015	1.10 (0.79, 1.52)	1.05 (0.73, 1.54)	1.21 (0.73, 1.97)	1.09 (0.78, 1.52)	1.05 (0.71, 1.54)	1.20 (0.69, 2.10)
2016	0.50 (0.39, 0.64)	0.49 (0.37, 0.65)	0.66 (0.44, 0.98)	0.50 (0.39, 0.66)	0.49 (0.36, 0.66)	0.67 (0.44, 1.01)
2017	0.81 (0.47, 1.38)			0.78 (0.45, 1.34)		
MH Hosp.						
2015	0.74 (0.58, 0.94)	0.75 (0.58, 0.96)	0.71 (0.49, 1.03)	0.74 (0.58, 0.94)	0.74 (0.58, 0.96)	0.64 (0.40, 1.03)
2016	0.61 (0.52, 0.72)	0.62 (0.54, 0.72)	0.68 (0.50, 0.91)	0.61 (0.52, 0.71)	0.61 (0.53, 0.71)	0.60 (0.46, 0.79)
2017	0.79 (0.63, 0.99)			0.77 (0.61, 0.98)		

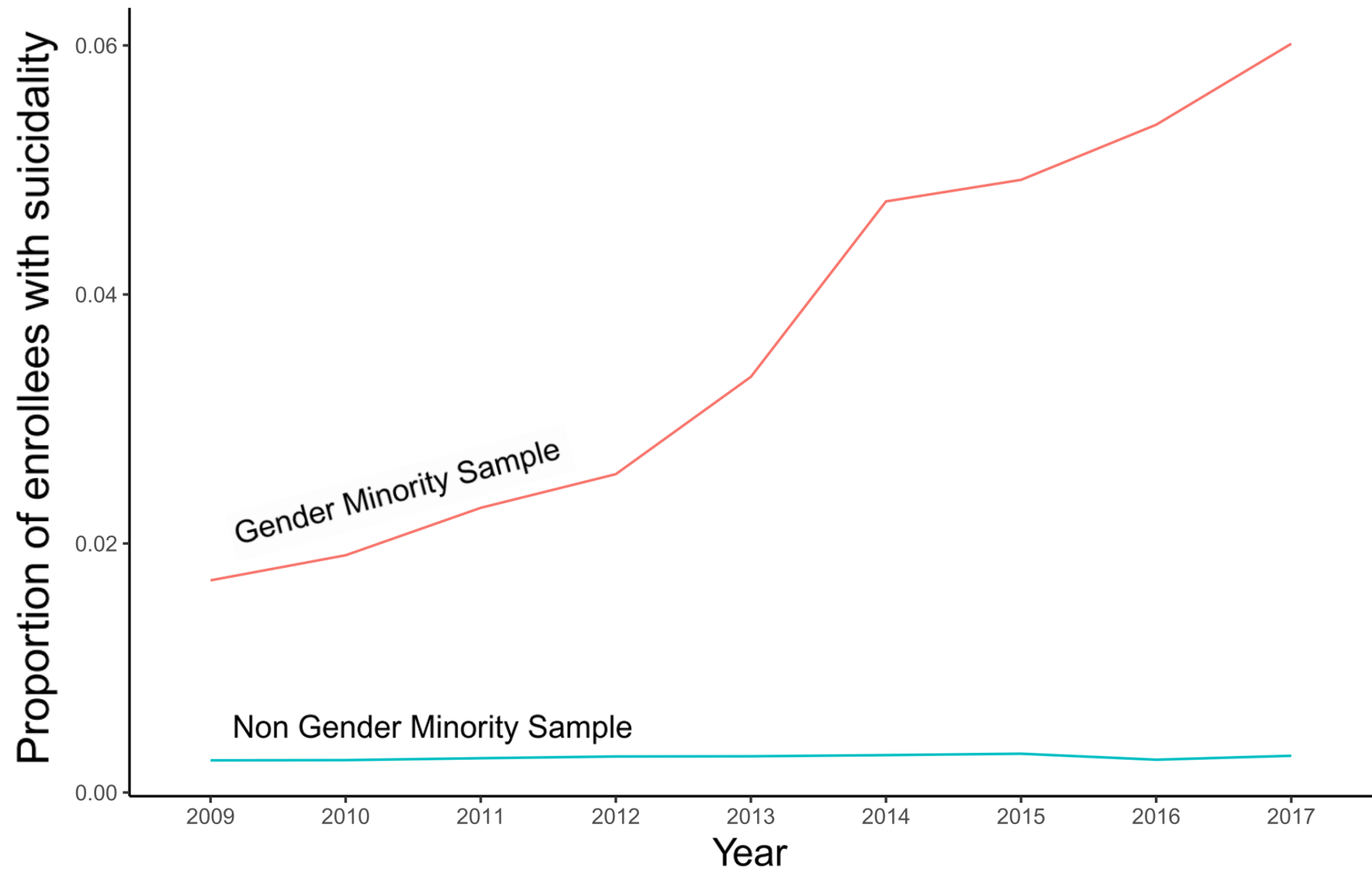
Abbreviations: MH Hosp., Mental Health Hospitalizations

eTable 10. Alternative Model Specifications and Comparison Groups for 2016 Policy Cohort

	Base Model Comparison Group 1	MH Access Comparison Group 1	Other Policies Comparison Group 1	Base Model Comparison Group 2	MH Access Comparison Group 2	Other Policies Comparison Group 2
	Odds Ratio (95% CI)	Odds Ratio (95% CI)	Odds Ratio (95% CI)	Odds Ratio (95% CI)	Odds Ratio (95% CI)	Odds Ratio (95% CI)
Suicidality						
2016	0.93 (0.81, 1.07)	0.95 (0.80, 1.13)	0.90 (0.69, 1.16)	0.95 (0.83, 1.08)	0.96 (0.82, 1.14)	0.88 (0.68, 1.15)
2017	0.61 (0.44, 0.85)			0.62 (0.44, 0.87)		
MH Hosp.						
2016	0.90 (0.71, 1.15)	0.91 (0.70, 1.17)	0.91 (0.68, 1.22)	0.89 (0.70, 1.14)	0.90 (0.70, 1.17)	0.89 (0.66, 1.2)
2017	0.81 (0.57, 1.16)			0.80 (0.56, 1.15)		

Abbreviations: MH Hosp., Mental Health Hospitalizations

Proportion of Enrollees with Suicidality in the Gender Minority Versus Non Gender Minority Sample in 2009-2017



Methods – Statistical Analysis

$$Y_{ist} = \beta_0 + \beta_1 Exposure_s + \beta_2 Exposure_s 2013_t + \beta_3 Exposure_s 2014_t + \beta_4 Exposure_s 2015_t + \beta_5 Exposure_s 2016_t + \beta_6 Exposure_s 2017_t + \beta_7 Year_t + \beta_8 X_{ist} + e_{ist}$$

- Y_{it} is suicidality for individual i in state s in year t
- $Exposure_s$ is an indicator for policy exposure in state s
- β_2 through β_6 are the effects of interest in each of the post policy years
- $Year_t$ are year fixed effects
- X_{it} is a vector of enrollee-level covariates

Methods – Statistical Analysis

$$Y_{ist} = \beta_0 + \beta_1 Exposure_s + \beta_2 Exposure_s 2013_t + \beta_3 Exposure_s 2014_t + \beta_4 Exposure_s 2015_t + \beta_5 Exposure_s 2016_t + \beta_6 Exposure_s 2017_t + \beta_7 Year_t + \beta_8 X_{ist} + e_{ist}$$

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Methods – Statistical Analysis

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Methods – Statistical Analysis

$$Y_{ist} = \beta_0 + \beta_1 Exposure_s + \beta_2 Exposure_s 2013_t + \beta_3 Exposure_s 2014_t + \beta_4 Exposure_s 2015_t + \beta_5 Exposure_s 2016_t + \beta_6 Exposure_s 2017_t + \beta_7 Year_t + \beta_8 X_{ist} + e_{ist}$$

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- $Exposure_s$ is an indicator for policy exposure in state s
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- $Year_t$ are year fixed effects
- X_{it} is a vector of enrollee-level covariates

Methods – Statistical Analysis

$$Y_{ist} = \beta_0 + \beta_1 Exposure_s + \beta_2 Exposure_s 2013_t + \beta_3 Exposure_s 2014_t + \beta_4 Exposure_s 2015_t + \beta_5 Exposure_s 2016_t + \beta_6 Exposure_s 2017_t + \beta_7 Year_t + \beta_8 X_{ist} + e_{ist}$$

- Y_{it} is suicidality for individual i in state s in year t
- $Exposure_s$ is an indicator for policy exposure in state s
- β_2 through β_6 are the effects of interest in each of the post policy years
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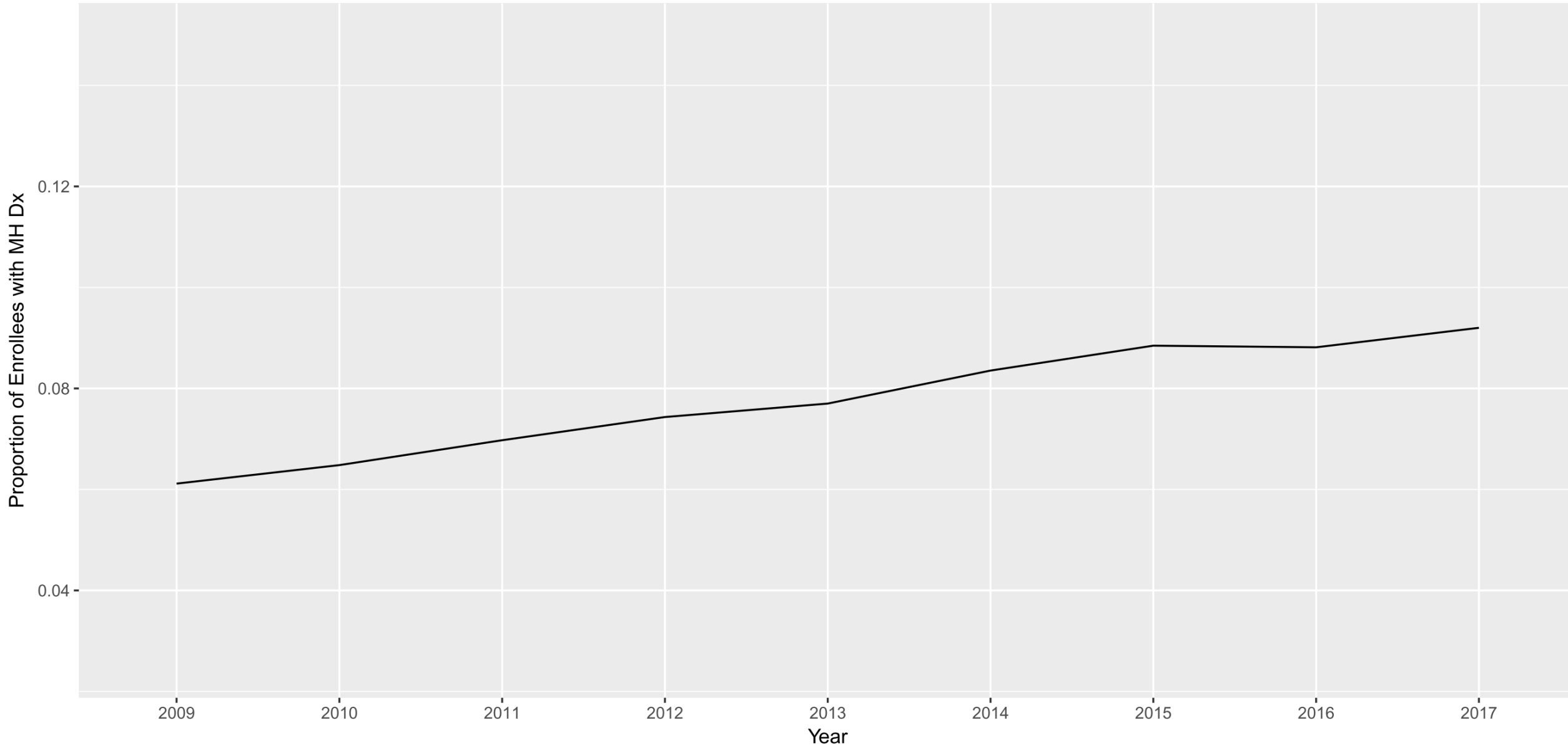
Methods – Statistical Analysis

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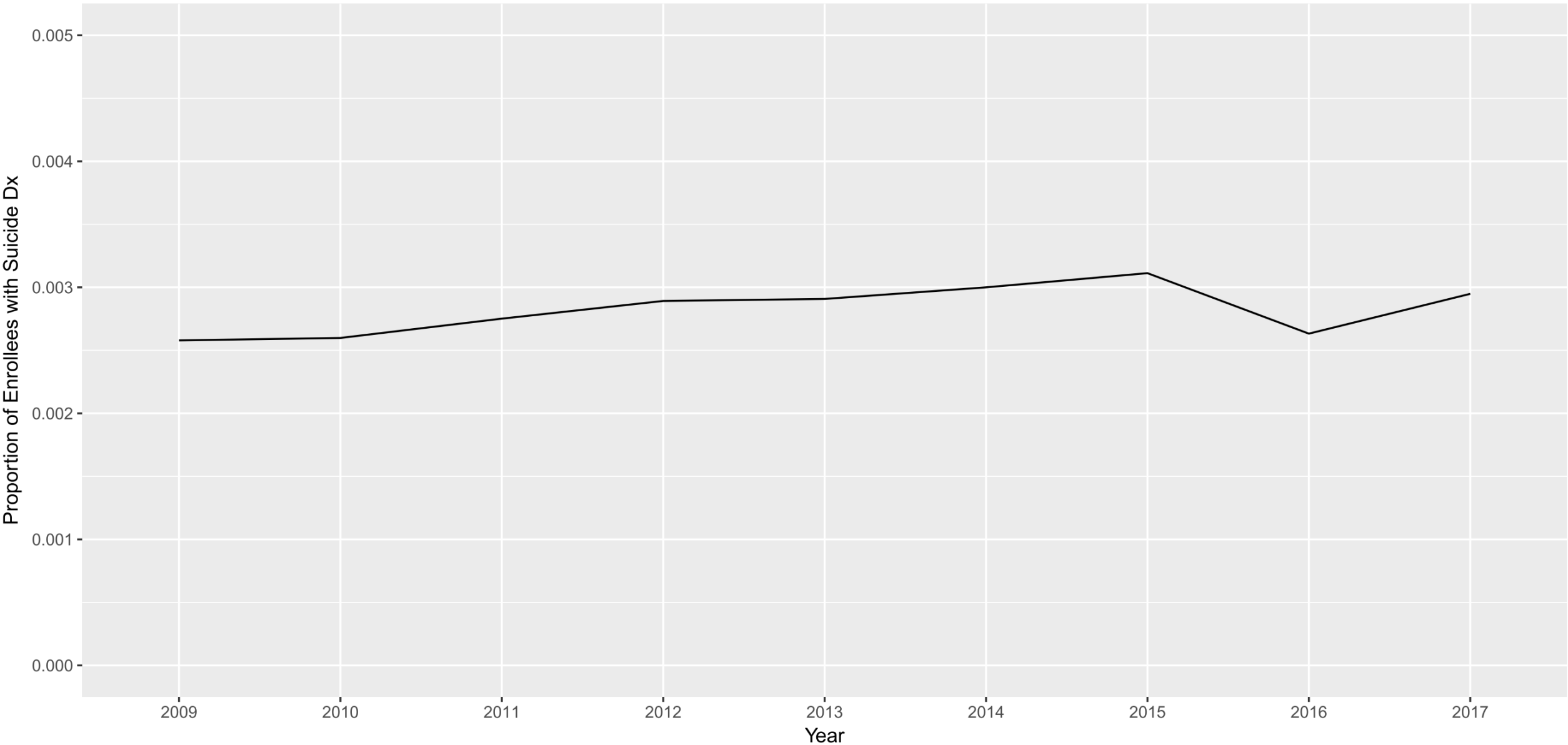
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Standard errors are clustered at the state level.

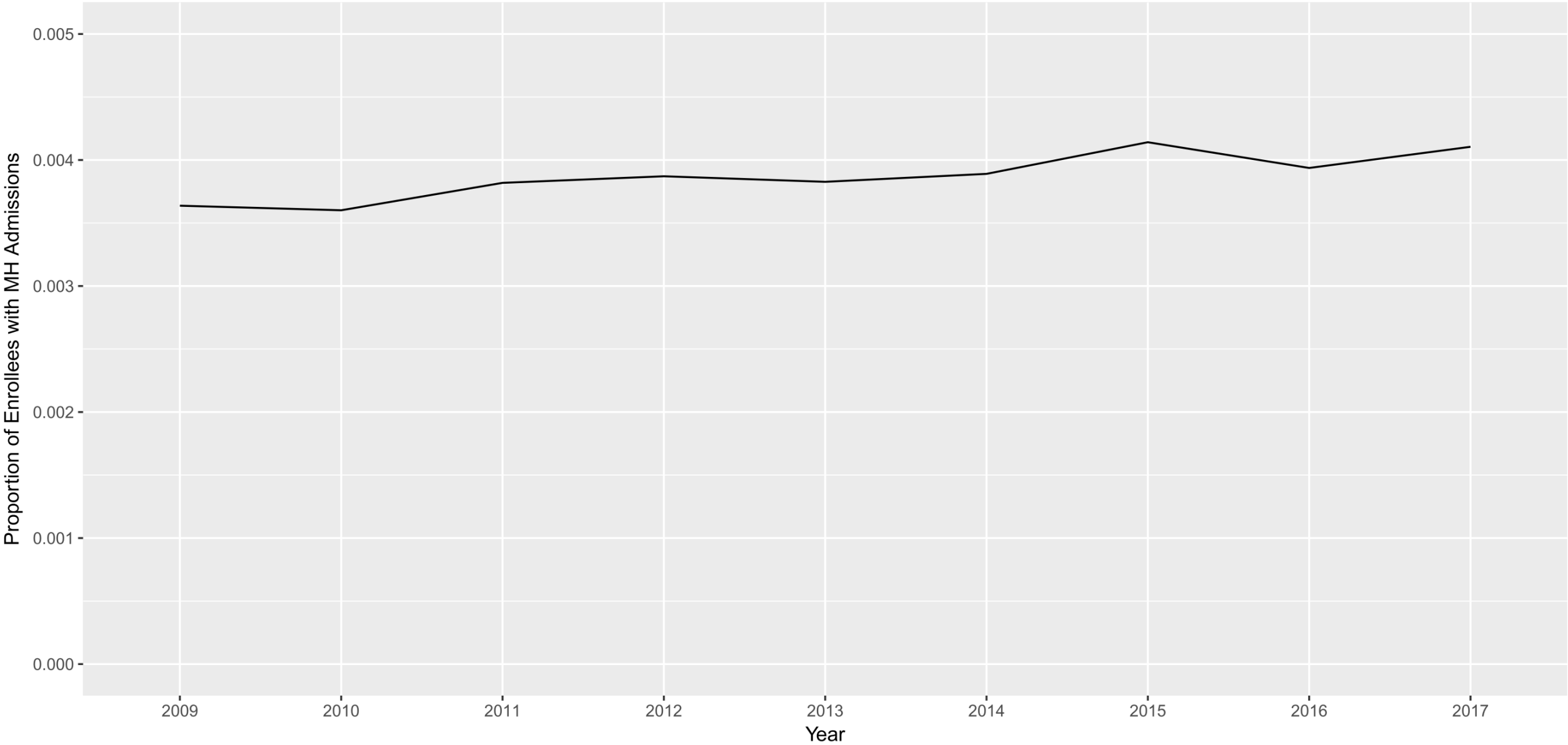
Proportion of non-gender minority enrollees with mental health diagnoses



Proportion of non-gender minority enrollees with suicidal behavior



Proportion of non-gender minority enrollees with mental health hospitalizations



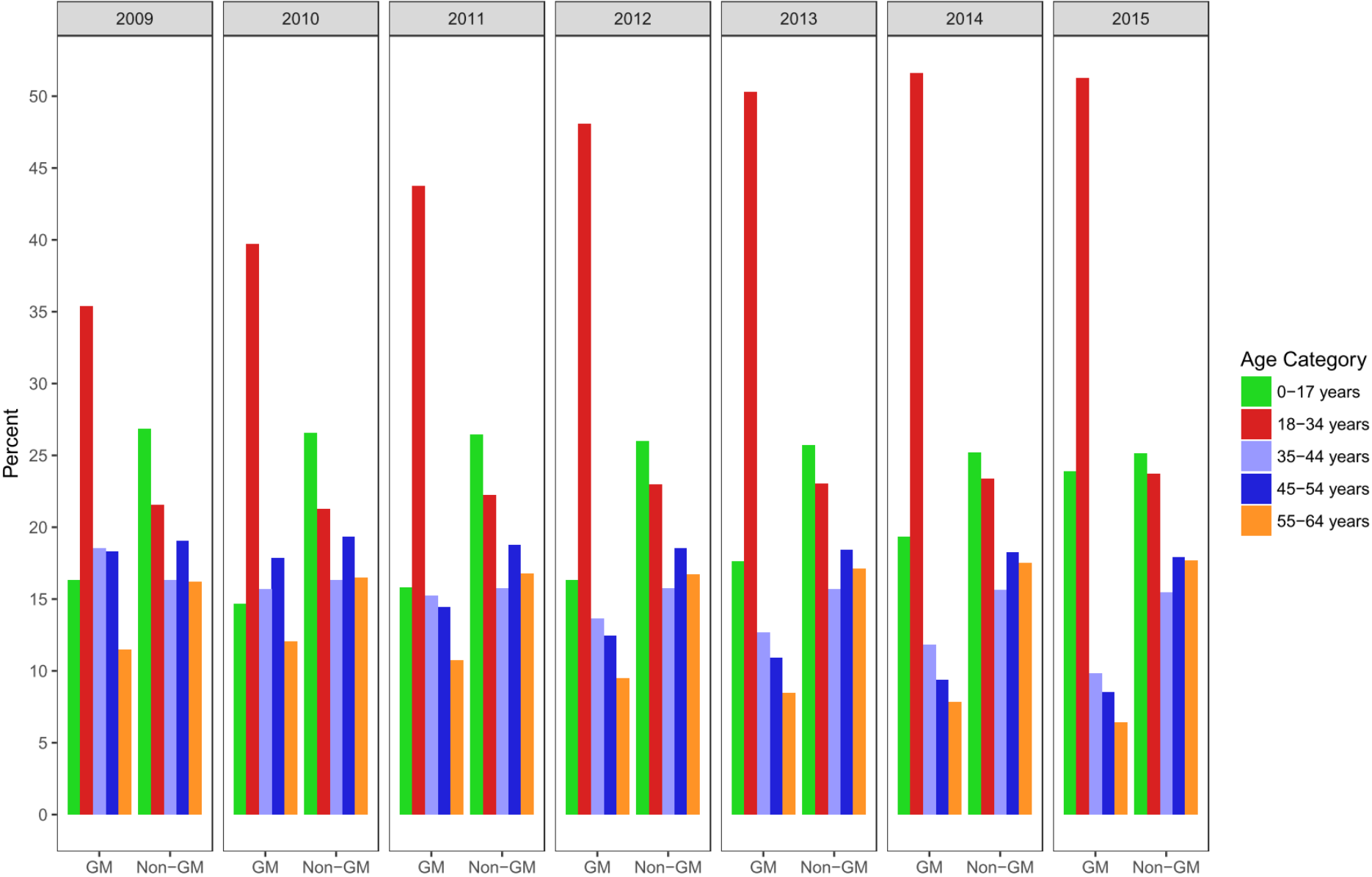
Sexual and Gender Minority State Law Database

- Same-sex marriage licensed/recognized
- Private employment discrimination (SO/GI)
- Housing discrimination (SO/GI)
- Public accommodation discrimination (SO/GI)
- Education discrimination (SO/GI)
- Credit discrimination (SO)
- Healthcare discrimination (SO/GI)
- Restroom access
- Medicaid exclusion
- Anti-bullying laws (SO/GI)
- Laws prohibiting favorable or neutral discussion of homosexuality in schools (aka “No promo homo laws”)
- State ID amendment
- Hate crime data collection
- Hate crime minimum sentence SO/GI
- Sodomy prohibition
- Unequal age of consent
- Adoption
- Second parent adoption
- Foster care adoption
- HIV criminalization
- Informed consent law
- Religious freedom law

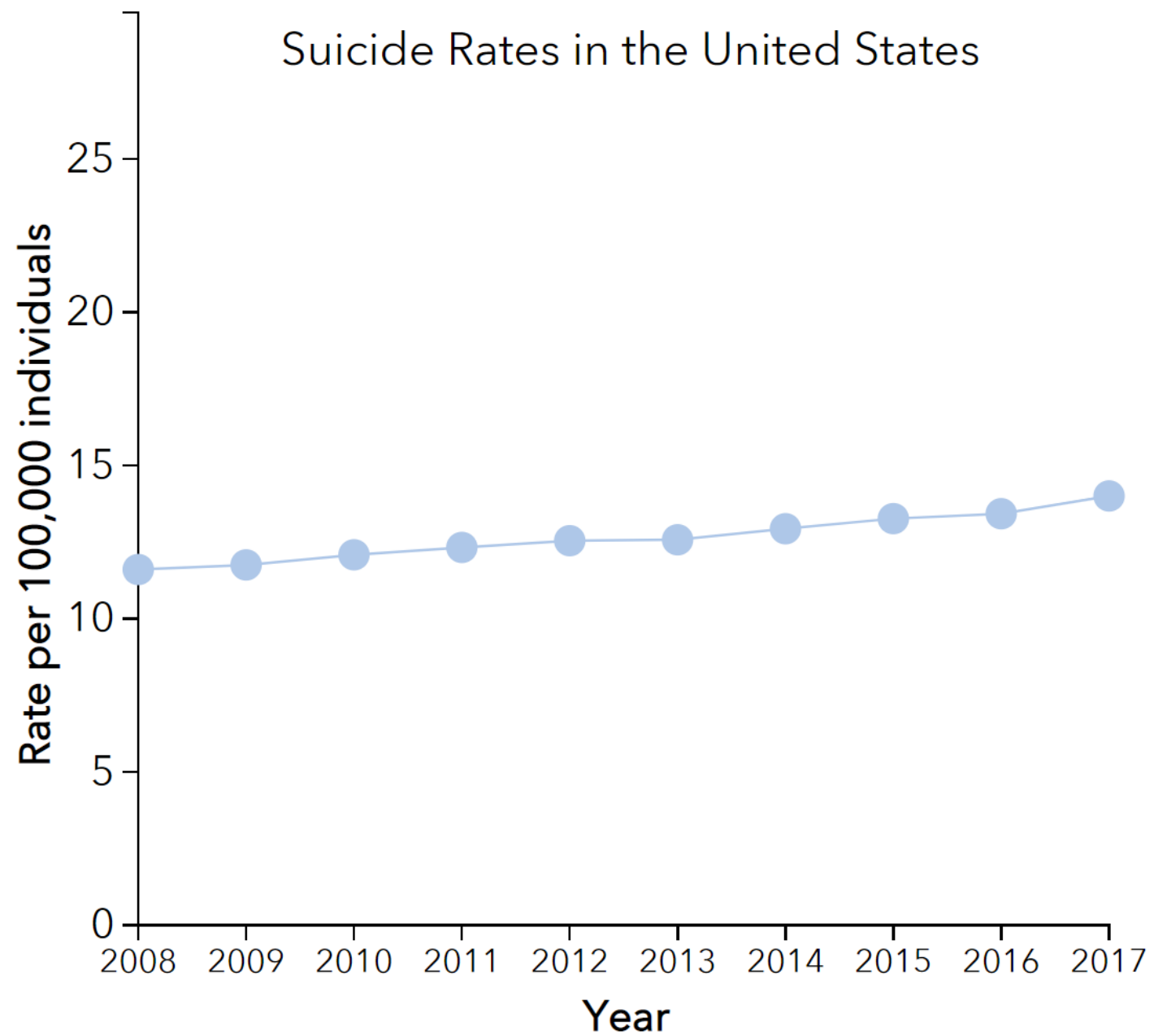
Number of Gender Minority Enrollees in Overall Sample By Year

Year	n
2009	6,456
2010	8,345
2011	10,104
2012	11,852
2013	13,300
2014	15,082
2015	13,657
2016	14,786
2017	13,203

GM Health Status Age Figure



Suicide Rates in the United States



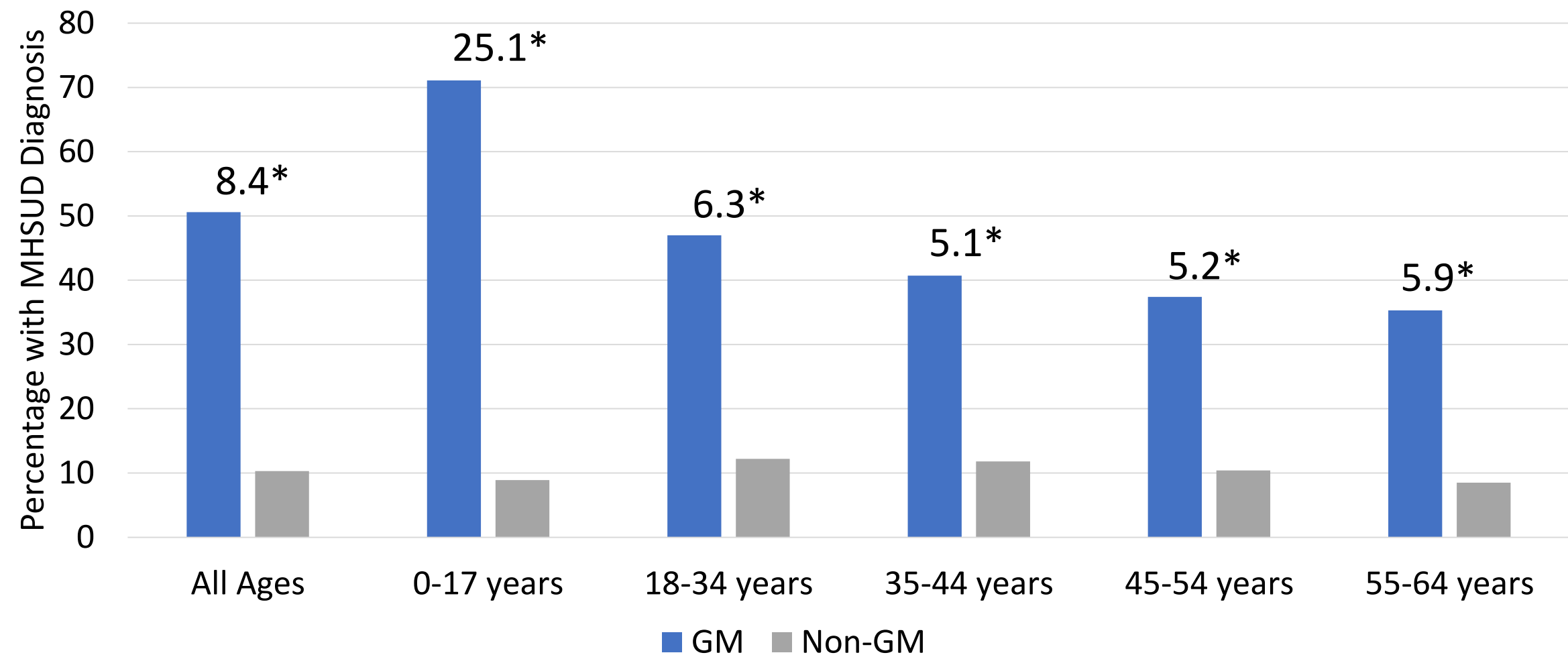
**American
Foundation
for Suicide
Prevention**

GM Health Status - Results

- Six-fold increase in the proportion of enrollees who have a GM diagnosis (from 0.004% in 2009 to 0.026% in 2015)
- Increase in the proportion of GM enrollees who are 18-34 years old
- MHSUD disparities are severe and are most pronounced for 0-17 year-olds

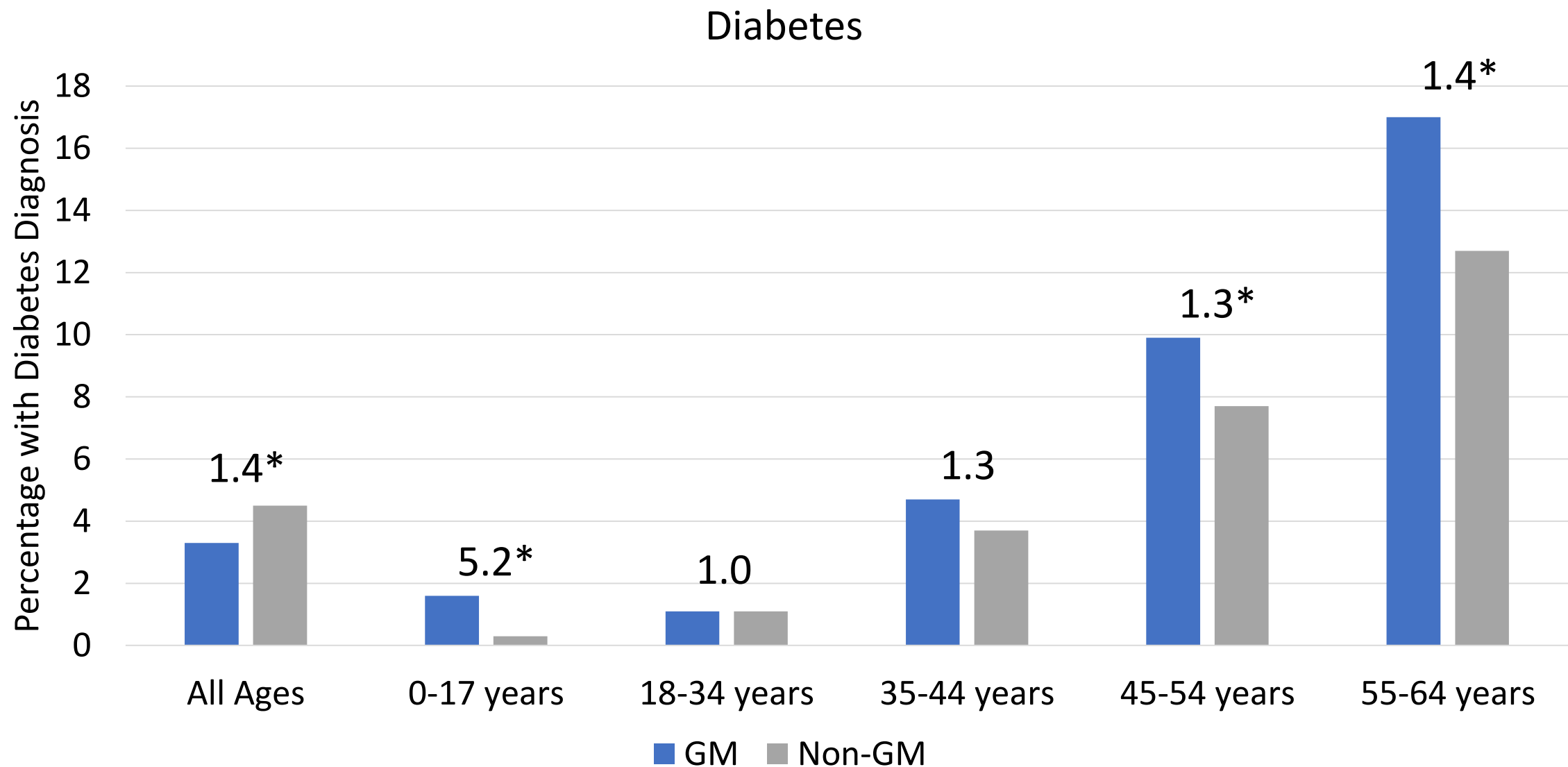
Health Conditions for GM versus non-GM Cohorts in 2015

Mental Health and Substance Use Disorders



* indicates that 95% confidence interval does not include 1

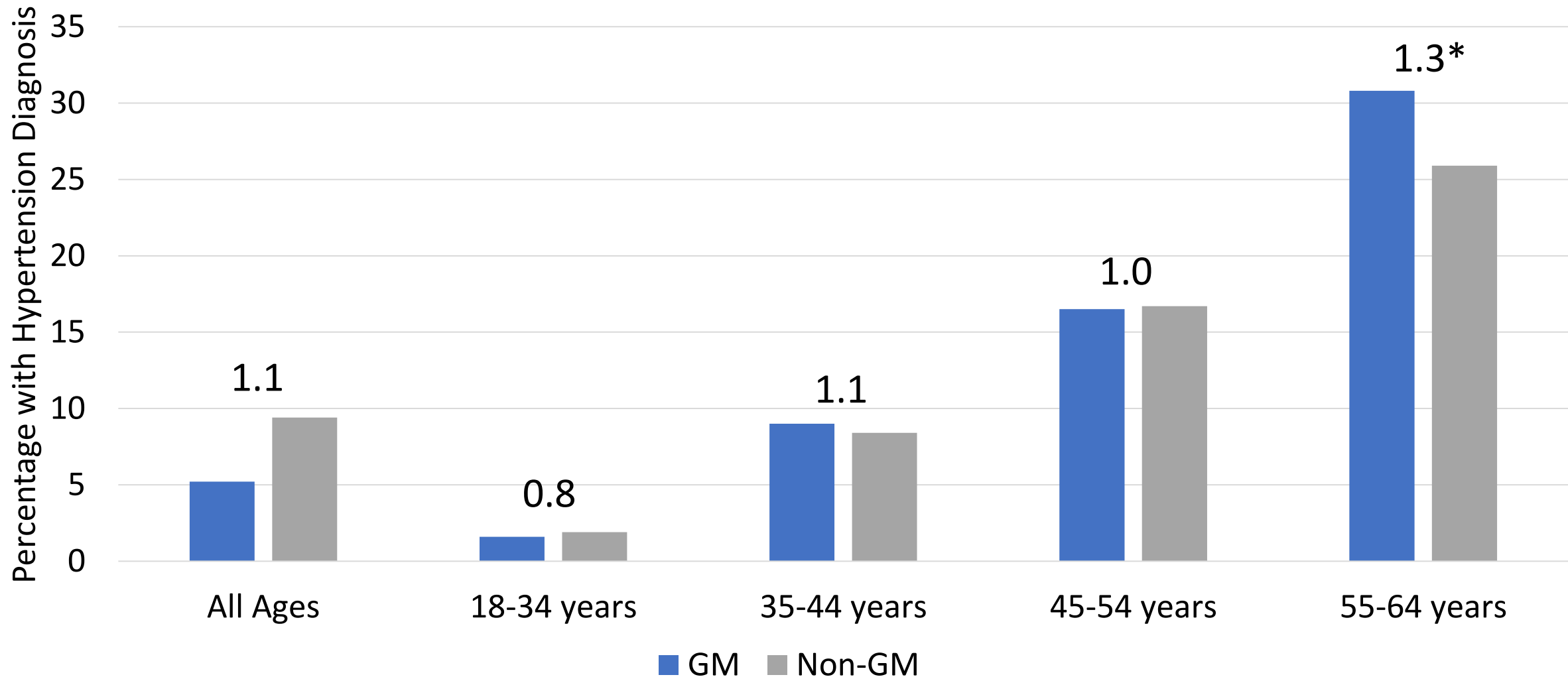
Health Conditions for GM versus non-GM Cohorts in 2015



* indicates that 95% confidence interval does not include 1

Health Conditions for GM versus non-GM Cohorts in 2015

Hypertension



* indicates that 95% confidence interval does not include 1