MADA Final Project

Trends in New HIV Diagnoses in the US, 2008-2022

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2023-02-24

Note: There seem to be lot of issues getting tables to render well in Word doc format, need to come back to this. I tried 5 or so different methods and they all look terrible when in a doc vs html. Also having issues with resolving crossrefs.

Warning: package 'ggplot2' was built under R version 4.2.2

Warning: package 'skimr' was built under R version 4.2.2

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Warning: package 'gt' was built under R version 4.2.2

# 1. Summary/Abstract

The purpose of this analysis is to analyze US trends in new HIV diagnoses over the past 10 years. Previous research by [Chapin-Bardales et al. (2017)](https://doi.org/10.1016/j.annepidem.2017.04.002) evaluated trends in AIDS diagnosis rates by race/ethnicity between 1984-2013. This analysis will focus on new HIV diagnosesbetween 2008-2022; subgroups will include region, age group, gender, and race/ethnicity. (Chapin-Bardales, Rosenberg, & Sullivan, 2017)

# 2. Introduction

## 2.1 General Background Information

*Provide enough background on your topic that others can understand the why and how of your analysis*

## 2.2 Description of data and data source

**Data Source**:

*Note: New diagnoses data are currently available through 2020. If 2021-2022 data are not available by the time the analysis needs to be completed, the analysis will be temporarily restricted to 2012-2020.*

* HIV New Diagnoses: [AIDSVu](https://aidsvu.org/) (Sullivan et al., 2020)

**Analysis**:

* Rate (per 100,000) of new HIV diagnoses by age, gender, and race/ethnicity (national, regional)
* Rate ratios for new HIV diagnoses by age, gender, and race/ethnicity (national, regional)
* Estimated annual percent change (EAPC) for incidence
  + Calculated using [Joinpoint Regression Software (R-Callable Command-Line Version 4.9.0.0)](https://surveillance.cancer.gov/help/joinpoint/tech-help/citation)
* Other modeling TBD based on course modules

## 2.3 Questions/Hypotheses to be addressed

*State the research questions you plan to answer with this analysis.*

# 3. Methods

*Describe your methods. That should describe the data, the cleaning processes, and the analysis approaches. You might want to provide a shorter description here and all the details in the supplement.*

## 3.1 Data aquisition

Data files were downloaded from [AIDSVu](https://aidsvu.org/) and placed in the data/raw\_data/AIDSVu subfolder. The new diagnosis files consist of one xlsx file per year for each level (national, regional, etc.).

## 3.2 Data import and cleaning

The processingcode.R file includes the following steps: + Read in xlsx data files and combine all years for each level + Subset variables of interest and rename variables so all levels are consistent + View/explore data + Calculate new rate ratio variables for subgroups + Prepare combined national and regional file with all variables

## 3.3 Statistical analysis

*Explain anything related to your statistical analyses.*

# 4. Results

## 4.1 Exploratory/Descriptive analysis

**?@tbl-natsummarytable** shows a full summary of the National data.

Table 1: National Data

| Year | Geo | Overall\_Rate | Male\_Rate | Female\_Rate | Black\_Rate | White\_Rate | Hispanic\_Rate | Asian\_Rate | AIAN\_Rate | MultRace\_Rate | NHPI\_Rate | Age13t24\_Rate | Age25t34\_Rate | Age35t44\_Rate | Age45t54\_Rate | Age55p\_Rate | black\_white\_rateratio | hispanic\_white\_rateratio | asian\_white\_rateratio | aian\_white\_rateratio | multrace\_white\_rateratio | nhpi\_white\_rateratio | female\_male\_rateratio | age13t24\_age35t44\_rateratio | age25t34\_age35t44\_rateratio | age45t54\_age35t44\_rateratio | age45t54\_age55p\_rateratio |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **2008** | United States | 18.9 | 29.3 | 8.9 | 71.0 | 7.3 | 31.3 | 5.8 | 7.6 | 90.9 | 13.1 | 16.7 | 30.6 | 29.9 | 21.3 | 5.8 | 9.7 | 4.3 | 0.8 | 1.0 | 12.5 | 1.8 | 0.3 | 0.6 | 1.0 | 0.7 | 0.2 |
| **2009** | United States | 17.7 | 27.9 | 7.9 | 66.0 | 6.8 | 29.3 | 5.7 | 7.2 | 83.5 | 12.3 | 17.1 | 28.9 | 27.5 | 19.5 | 5.3 | 9.7 | 4.3 | 0.8 | 1.1 | 12.3 | 1.8 | 0.3 | 0.6 | 1.1 | 0.7 | 0.2 |
| **2010** | United States | 16.8 | 26.9 | 7.2 | 61.9 | 6.6 | 26.8 | 5.2 | 8.2 | 66.1 | 11.5 | 17.6 | 28.4 | 24.8 | 18.3 | 5.1 | 9.4 | 4.1 | 0.8 | 1.2 | 10.0 | 1.7 | 0.3 | 0.7 | 1.1 | 0.7 | 0.2 |
| **2011** | United States | 16.0 | 25.8 | 6.6 | 58.4 | 6.3 | 25.4 | 5.4 | 7.1 | 58.1 | 11.7 | 17.4 | 27.5 | 22.5 | 17.5 | 4.8 | 9.3 | 4.0 | 0.9 | 1.1 | 9.2 | 1.9 | 0.3 | 0.8 | 1.2 | 0.8 | 0.2 |
| **2012** | United States | 15.6 | 25.5 | 6.1 | 55.1 | 6.3 | 25.1 | 5.6 | 8.6 | 55.6 | 9.5 | 17.4 | 27.9 | 21.0 | 16.8 | 4.6 | 8.7 | 4.0 | 0.9 | 1.4 | 8.8 | 1.5 | 0.2 | 0.8 | 1.3 | 0.8 | 0.2 |
| **2013** | United States | 14.9 | 24.6 | 5.7 | 52.2 | 6.0 | 24.0 | 5.5 | 7.5 | 51.9 | 10.0 | 16.7 | 27.6 | 19.5 | 15.8 | 4.7 | 8.7 | 4.0 | 0.9 | 1.2 | 8.7 | 1.7 | 0.2 | 0.9 | 1.4 | 0.8 | 0.2 |
| **2014** | United States | 15.1 | 25.0 | 5.6 | 52.4 | 6.0 | 24.7 | 6.2 | 9.0 | 45.7 | 8.9 | 17.5 | 29.0 | 19.8 | 15.0 | 4.4 | 8.7 | 4.1 | 1.0 | 1.5 | 7.6 | 1.5 | 0.2 | 0.9 | 1.5 | 0.8 | 0.2 |
| **2015** | United States | 14.9 | 24.8 | 5.4 | 51.7 | 5.9 | 24.3 | 6.2 | 8.5 | 40.4 | 14.0 | 17.4 | 29.6 | 18.9 | 14.7 | 4.2 | 8.8 | 4.1 | 1.1 | 1.4 | 6.8 | 2.4 | 0.2 | 0.9 | 1.6 | 0.8 | 0.2 |
| **2016** | United States | 14.6 | 24.3 | 5.4 | 50.6 | 5.8 | 24.2 | 6.1 | 11.1 | 35.8 | 8.2 | 16.7 | 30.4 | 18.5 | 13.9 | 4.3 | 8.7 | 4.2 | 1.1 | 1.9 | 6.2 | 1.4 | 0.2 | 0.9 | 1.6 | 0.8 | 0.2 |
| **2017** | United States | 14.1 | 23.3 | 5.2 | 48.6 | 5.6 | 23.1 | 5.9 | 10.2 | 30.0 | 10.6 | 16.1 | 29.6 | 17.8 | 13.3 | 4.2 | 8.7 | 4.1 | 1.1 | 1.8 | 5.4 | 1.9 | 0.2 | 0.9 | 1.7 | 0.7 | 0.2 |
| **2018** | United States | 13.7 | 22.7 | 5.1 | 46.7 | 5.5 | 22.6 | 5.4 | 8.7 | 25.7 | 12.7 | 15.3 | 29.3 | 17.4 | 12.7 | 4.0 | 8.5 | 4.1 | 1.0 | 1.6 | 4.7 | 2.3 | 0.2 | 0.9 | 1.7 | 0.7 | 0.2 |
| **2019** | United States | 13.2 | 21.9 | 4.9 | 45.5 | 5.3 | 21.9 | 4.5 | 10.2 | 22.7 | 13.4 | 14.9 | 28.4 | 17.1 | 12.0 | 4.0 | 8.6 | 4.1 | 0.8 | 1.9 | 4.3 | 2.5 | 0.2 | 0.9 | 1.7 | 0.7 | 0.2 |
| **2020** | United States | 10.9 | 18.3 | 3.8 | 37.4 | 4.6 | 17.3 | 3.8 | 9.9 | 15.8 | 13.0 | 11.9 | 24.4 | 14.1 | 9.8 | 3.2 | 8.1 | 3.8 | 0.8 | 2.2 | 3.4 | 2.8 | 0.2 | 0.8 | 1.7 | 0.7 | 0.2 |

**?@fig-natplots** shows exploratory plots for the national rates by subgroup.

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| Figure 1: National rates by subgroup |

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| Figure 2: National rates by subgroup |

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| Figure 3: National rates by subgroup |

**?@tbl-natratios** shows a summary of selected rate ratios for race/ethnicity and sex.

Table 1: Rate Ratios

| Year | Black\_Rate | White\_Rate | Hispanic\_Rate | black\_white\_rateratio | hispanic\_white\_rateratio | Male\_Rate | Female\_Rate | female\_male\_rateratio |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **2008** | 71.0 | 7.3 | 31.3 | **9.7** | **4.3** | 29.3 | 8.9 | **0.3** |
| **2009** | 66.0 | 6.8 | 29.3 | **9.7** | **4.3** | 27.9 | 7.9 | **0.3** |
| **2010** | 61.9 | 6.6 | 26.8 | **9.4** | **4.1** | 26.9 | 7.2 | **0.3** |
| **2011** | 58.4 | 6.3 | 25.4 | **9.3** | **4.0** | 25.8 | 6.6 | **0.3** |
| **2012** | 55.1 | 6.3 | 25.1 | **8.7** | **4.0** | 25.5 | 6.1 | **0.2** |
| **2013** | 52.2 | 6.0 | 24.0 | **8.7** | **4.0** | 24.6 | 5.7 | **0.2** |
| **2014** | 52.4 | 6.0 | 24.7 | **8.7** | **4.1** | 25.0 | 5.6 | **0.2** |
| **2015** | 51.7 | 5.9 | 24.3 | **8.8** | **4.1** | 24.8 | 5.4 | **0.2** |
| **2016** | 50.6 | 5.8 | 24.2 | **8.7** | **4.2** | 24.3 | 5.4 | **0.2** |
| **2017** | 48.6 | 5.6 | 23.1 | **8.7** | **4.1** | 23.3 | 5.2 | **0.2** |
| **2018** | 46.7 | 5.5 | 22.6 | **8.5** | **4.1** | 22.7 | 5.1 | **0.2** |
| **2019** | 45.5 | 5.3 | 21.9 | **8.6** | **4.1** | 21.9 | 4.9 | **0.2** |
| **2020** | 37.4 | 4.6 | 17.3 | **8.1** | **3.8** | 18.3 | 3.8 | **0.2** |

**?@tbl-regsummarytable** shows a full summary of the Regional data.

Table 1: Regional Data

| Year | Geo | Overall\_Rate | Male\_Rate | Female\_Rate | Black\_Rate | White\_Rate | Hispanic\_Rate | Asian\_Rate | AIAN\_Rate | MultRace\_Rate | NHPI\_Rate | Age13t24\_Rate | Age25t34\_Rate | Age35t44\_Rate | Age45t54\_Rate | Age55p\_Rate | black\_white\_rateratio | hispanic\_white\_rateratio | asian\_white\_rateratio | aian\_white\_rateratio | multrace\_white\_rateratio | nhpi\_white\_rateratio | female\_male\_rateratio | age13t24\_age35t44\_rateratio | age25t34\_age35t44\_rateratio | age45t54\_age35t44\_rateratio | age45t54\_age55p\_rateratio |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **2008** | Midwest | 10 | 16 | 4 | 48 | 4 | 22 | 5 | 6 | 64 | 10 | 11 | 18 | 16 | 10 | 2 | 12.0 | 5.5 | 1.2 | 1.5 | 16.0 | 2.5 | 0.2 | 0.7 | 1.1 | 0.6 | 0.1 |
| **2008** | Northeast | 19 | 29 | 10 | 76 | 6 | 51 | 6 | 2 | 164 | 0 | 17 | 32 | 31 | 23 | 7 | 12.7 | 8.5 | 1.0 | 0.3 | 27.3 | 0.0 | 0.3 | 0.5 | 1.0 | 0.7 | 0.2 |
| **2008** | South | 26 | 39 | 14 | 80 | 9 | 30 | 6 | 5 | 145 | 23 | 24 | 40 | 40 | 31 | 8 | 8.9 | 3.3 | 0.7 | 0.6 | 16.1 | 2.6 | 0.4 | 0.6 | 1.0 | 0.8 | 0.2 |
| **2008** | West | 15 | 26 | 4 | 54 | 10 | 21 | 6 | 11 | 34 | 13 | 11 | 25 | 25 | 16 | 4 | 5.4 | 2.1 | 0.6 | 1.1 | 3.4 | 1.3 | 0.2 | 0.4 | 1.0 | 0.6 | 0.2 |
| **2009** | Midwest | 10 | 16 | 4 | 48 | 4 | 21 | 5 | 4 | 69 | 10 | 12 | 18 | 15 | 9 | 2 | 12.0 | 5.2 | 1.2 | 1.0 | 17.2 | 2.5 | 0.2 | 0.8 | 1.2 | 0.6 | 0.1 |
| **2009** | Northeast | 18 | 28 | 9 | 67 | 5 | 49 | 6 | 4 | 151 | 17 | 17 | 30 | 29 | 21 | 6 | 13.4 | 9.8 | 1.2 | 0.8 | 30.2 | 3.4 | 0.3 | 0.6 | 1.0 | 0.7 | 0.2 |
| **2009** | South | 24 | 37 | 12 | 74 | 8 | 28 | 5 | 5 | 126 | 12 | 25 | 38 | 36 | 27 | 7 | 9.2 | 3.5 | 0.6 | 0.6 | 15.8 | 1.5 | 0.3 | 0.7 | 1.1 | 0.8 | 0.2 |
| **2009** | West | 14 | 24 | 4 | 49 | 9 | 19 | 6 | 10 | 32 | 12 | 10 | 24 | 22 | 15 | 4 | 5.4 | 2.1 | 0.7 | 1.1 | 3.6 | 1.3 | 0.2 | 0.5 | 1.1 | 0.7 | 0.2 |
| **2010** | Midwest | 10 | 16 | 4 | 46 | 4 | 19 | 4 | 6 | 51 | 5 | 12 | 18 | 14 | 9 | 2 | 11.5 | 4.8 | 1.0 | 1.5 | 12.8 | 1.2 | 0.2 | 0.9 | 1.3 | 0.6 | 0.1 |
| **2010** | Northeast | 17 | 27 | 8 | 63 | 6 | 42 | 4 | 4 | 101 | 39 | 16 | 29 | 27 | 20 | 6 | 10.5 | 7.0 | 0.7 | 0.7 | 16.8 | 6.5 | 0.3 | 0.6 | 1.1 | 0.7 | 0.2 |
| **2010** | South | 23 | 35 | 11 | 69 | 8 | 26 | 5 | 6 | 101 | 12 | 26 | 37 | 32 | 25 | 7 | 8.6 | 3.2 | 0.6 | 0.8 | 12.6 | 1.5 | 0.3 | 0.8 | 1.2 | 0.8 | 0.2 |
| **2010** | West | 13 | 24 | 3 | 48 | 9 | 18 | 6 | 11 | 31 | 10 | 11 | 23 | 20 | 15 | 4 | 5.3 | 2.0 | 0.7 | 1.2 | 3.4 | 1.1 | 0.1 | 0.6 | 1.1 | 0.8 | 0.2 |
| **2011** | Midwest | 10 | 16 | 4 | 44 | 4 | 19 | 5 | 4 | 47 | 0 | 12 | 17 | 13 | 9 | 2 | 11.0 | 4.8 | 1.2 | 1.0 | 11.8 | 0.0 | 0.2 | 0.9 | 1.3 | 0.7 | 0.2 |
| **2011** | Northeast | 16 | 25 | 8 | 59 | 5 | 38 | 5 | 0 | 92 | 6 | 16 | 28 | 24 | 18 | 5 | 11.8 | 7.6 | 1.0 | 0.0 | 18.4 | 1.2 | 0.3 | 0.7 | 1.2 | 0.8 | 0.2 |
| **2011** | South | 22 | 34 | 10 | 65 | 8 | 26 | 6 | 6 | 89 | 14 | 25 | 36 | 29 | 24 | 7 | 8.1 | 3.2 | 0.8 | 0.8 | 11.1 | 1.8 | 0.3 | 0.9 | 1.2 | 0.8 | 0.2 |
| **2011** | West | 12 | 22 | 3 | 45 | 8 | 18 | 6 | 10 | 25 | 12 | 10 | 22 | 19 | 14 | 4 | 5.6 | 2.2 | 0.8 | 1.2 | 3.1 | 1.5 | 0.1 | 0.5 | 1.2 | 0.7 | 0.2 |
| **2012** | Midwest | 10 | 16 | 3 | 44 | 4 | 19 | 3 | 7 | 47 | 9 | 13 | 18 | 12 | 9 | 2 | 11.0 | 4.8 | 0.8 | 1.8 | 11.8 | 2.2 | 0.2 | 1.1 | 1.5 | 0.8 | 0.2 |
| **2012** | Northeast | 16 | 25 | 7 | 57 | 5 | 37 | 5 | 7 | 89 | 12 | 16 | 29 | 22 | 18 | 5 | 11.4 | 7.4 | 1.0 | 1.4 | 17.8 | 2.4 | 0.3 | 0.7 | 1.3 | 0.8 | 0.2 |
| **2012** | South | 21 | 33 | 9 | 60 | 8 | 25 | 6 | 6 | 82 | 12 | 25 | 36 | 27 | 22 | 6 | 7.5 | 3.1 | 0.8 | 0.8 | 10.2 | 1.5 | 0.3 | 0.9 | 1.3 | 0.8 | 0.2 |
| **2012** | West | 12 | 22 | 3 | 42 | 8 | 18 | 6 | 11 | 24 | 9 | 11 | 23 | 18 | 14 | 3 | 5.2 | 2.2 | 0.8 | 1.4 | 3.0 | 1.1 | 0.1 | 0.6 | 1.3 | 0.8 | 0.2 |
| **2013** | Midwest | 9 | 16 | 3 | 44 | 4 | 19 | 5 | 6 | 39 | 0 | 13 | 17 | 11 | 9 | 3 | 11.0 | 4.8 | 1.2 | 1.5 | 9.8 | 0.0 | 0.2 | 1.2 | 1.5 | 0.8 | 0.3 |
| **2013** | Northeast | 15 | 23 | 6 | 50 | 5 | 35 | 4 | 3 | 91 | 12 | 15 | 27 | 20 | 16 | 5 | 10.0 | 7.0 | 0.8 | 0.6 | 18.2 | 2.4 | 0.3 | 0.8 | 1.4 | 0.8 | 0.2 |
| **2013** | South | 20 | 32 | 9 | 57 | 7 | 24 | 6 | 5 | 75 | 10 | 24 | 37 | 25 | 21 | 6 | 8.1 | 3.4 | 0.9 | 0.7 | 10.7 | 1.4 | 0.3 | 1.0 | 1.5 | 0.8 | 0.2 |
| **2013** | West | 12 | 21 | 3 | 40 | 7 | 17 | 6 | 11 | 23 | 11 | 11 | 22 | 17 | 13 | 3 | 5.7 | 2.4 | 0.9 | 1.6 | 3.3 | 1.6 | 0.1 | 0.6 | 1.3 | 0.8 | 0.2 |
| **2014** | Midwest | 9 | 15 | 3 | 42 | 4 | 19 | 5 | 6 | 32 | 4 | 12 | 18 | 11 | 8 | 2 | 10.5 | 4.8 | 1.2 | 1.5 | 8.0 | 1.0 | 0.2 | 1.1 | 1.6 | 0.7 | 0.2 |
| **2014** | Northeast | 14 | 23 | 6 | 52 | 5 | 34 | 5 | 7 | 71 | 18 | 15 | 27 | 21 | 16 | 5 | 10.4 | 6.8 | 1.0 | 1.4 | 14.2 | 3.6 | 0.3 | 0.7 | 1.3 | 0.8 | 0.2 |
| **2014** | South | 20 | 33 | 8 | 57 | 7 | 25 | 6 | 6 | 70 | 9 | 25 | 38 | 25 | 20 | 6 | 8.1 | 3.6 | 0.9 | 0.9 | 10.0 | 1.3 | 0.2 | 1.0 | 1.5 | 0.8 | 0.2 |
| **2014** | West | 13 | 22 | 3 | 43 | 8 | 18 | 7 | 13 | 21 | 9 | 12 | 24 | 17 | 13 | 3 | 5.4 | 2.2 | 0.9 | 1.6 | 2.6 | 1.1 | 0.1 | 0.7 | 1.4 | 0.8 | 0.2 |
| **2015** | Midwest | 9 | 15 | 3 | 42 | 4 | 17 | 6 | 5 | 29 | 12 | 13 | 19 | 12 | 8 | 2 | 10.5 | 4.2 | 1.5 | 1.2 | 7.2 | 3.0 | 0.2 | 1.1 | 1.6 | 0.7 | 0.2 |
| **2015** | Northeast | 14 | 22 | 6 | 48 | 4 | 32 | 5 | 6 | 63 | 6 | 14 | 27 | 18 | 14 | 5 | 12.0 | 8.0 | 1.2 | 1.5 | 15.8 | 1.5 | 0.3 | 0.8 | 1.5 | 0.8 | 0.3 |
| **2015** | South | 20 | 33 | 8 | 57 | 7 | 26 | 7 | 8 | 59 | 24 | 25 | 40 | 25 | 19 | 6 | 8.1 | 3.7 | 1.0 | 1.1 | 8.4 | 3.4 | 0.2 | 1.0 | 1.6 | 0.8 | 0.2 |
| **2015** | West | 12 | 22 | 3 | 44 | 7 | 18 | 7 | 11 | 21 | 13 | 12 | 24 | 16 | 13 | 3 | 6.3 | 2.6 | 1.0 | 1.6 | 3.0 | 1.9 | 0.1 | 0.8 | 1.5 | 0.8 | 0.2 |
| **2016** | Midwest | 9 | 15 | 3 | 43 | 4 | 17 | 5 | 5 | 29 | 8 | 12 | 19 | 11 | 8 | 2 | 10.8 | 4.2 | 1.2 | 1.2 | 7.2 | 2.0 | 0.2 | 1.1 | 1.7 | 0.7 | 0.2 |
| **2016** | Northeast | 13 | 21 | 6 | 45 | 4 | 31 | 6 | 8 | 52 | 17 | 13 | 28 | 18 | 13 | 4 | 11.2 | 7.8 | 1.5 | 2.0 | 13.0 | 4.2 | 0.3 | 0.7 | 1.6 | 0.7 | 0.2 |
| **2016** | South | 20 | 32 | 8 | 55 | 7 | 26 | 6 | 8 | 52 | 7 | 24 | 41 | 24 | 18 | 6 | 7.9 | 3.7 | 0.9 | 1.1 | 7.4 | 1.0 | 0.2 | 1.0 | 1.7 | 0.8 | 0.2 |
| **2016** | West | 12 | 22 | 3 | 46 | 7 | 19 | 6 | 16 | 18 | 8 | 13 | 25 | 16 | 12 | 3 | 6.6 | 2.7 | 0.9 | 2.3 | 2.6 | 1.1 | 0.1 | 0.8 | 1.6 | 0.8 | 0.2 |
| **2017** | Midwest | 9 | 15 | 3 | 42 | 4 | 17 | 5 | 6 | 26 | 8 | 12 | 20 | 11 | 8 | 2 | 10.5 | 4.2 | 1.2 | 1.5 | 6.5 | 2.0 | 0.2 | 1.1 | 1.8 | 0.7 | 0.2 |
| **2017** | Northeast | 13 | 20 | 5 | 45 | 4 | 30 | 5 | 4 | 43 | 28 | 13 | 26 | 17 | 12 | 4 | 11.2 | 7.5 | 1.2 | 1.0 | 10.8 | 7.0 | 0.2 | 0.8 | 1.5 | 0.7 | 0.2 |
| **2017** | South | 19 | 31 | 8 | 53 | 7 | 25 | 6 | 7 | 44 | 14 | 23 | 40 | 23 | 17 | 6 | 7.6 | 3.6 | 0.9 | 1.0 | 6.3 | 2.0 | 0.3 | 1.0 | 1.7 | 0.7 | 0.3 |
| **2017** | West | 12 | 21 | 3 | 42 | 7 | 18 | 7 | 15 | 15 | 9 | 12 | 24 | 15 | 12 | 3 | 6.0 | 2.6 | 1.0 | 2.1 | 2.1 | 1.3 | 0.1 | 0.8 | 1.6 | 0.8 | 0.2 |
| **2018** | Midwest | 9 | 14 | 3 | 40 | 4 | 16 | 4 | 7 | 21 | 7 | 11 | 20 | 11 | 8 | 2 | 10.0 | 4.0 | 1.0 | 1.8 | 5.2 | 1.8 | 0.2 | 1.0 | 1.8 | 0.7 | 0.2 |
| **2018** | Northeast | 12 | 19 | 5 | 41 | 4 | 27 | 6 | 6 | 35 | 17 | 12 | 24 | 16 | 12 | 4 | 10.2 | 6.8 | 1.5 | 1.5 | 8.8 | 4.2 | 0.3 | 0.8 | 1.5 | 0.8 | 0.2 |
| **2018** | South | 19 | 30 | 7 | 51 | 7 | 25 | 6 | 6 | 38 | 13 | 22 | 40 | 23 | 17 | 5 | 7.3 | 3.6 | 0.9 | 0.9 | 5.4 | 1.9 | 0.2 | 1.0 | 1.7 | 0.7 | 0.2 |
| **2018** | West | 12 | 20 | 3 | 44 | 7 | 18 | 5 | 12 | 14 | 13 | 12 | 24 | 15 | 11 | 3 | 6.3 | 2.6 | 0.7 | 1.7 | 2.0 | 1.9 | 0.1 | 0.8 | 1.6 | 0.7 | 0.2 |
| **2019** | Midwest | 8 | 13 | 3 | 39 | 4 | 16 | 4 | 9 | 17 | 34 | 10 | 19 | 11 | 7 | 2 | 9.8 | 4.0 | 1.0 | 2.2 | 4.2 | 8.5 | 0.2 | 0.9 | 1.7 | 0.6 | 0.2 |
| **2019** | Northeast | 11 | 18 | 5 | 40 | 3 | 26 | 4 | 4 | 35 | 11 | 12 | 25 | 15 | 10 | 4 | 13.3 | 8.7 | 1.3 | 1.3 | 11.7 | 3.7 | 0.3 | 0.8 | 1.7 | 0.7 | 0.3 |
| **2019** | South | 18 | 30 | 7 | 50 | 7 | 24 | 5 | 9 | 34 | 18 | 22 | 38 | 23 | 16 | 6 | 7.1 | 3.4 | 0.7 | 1.3 | 4.9 | 2.6 | 0.2 | 1.0 | 1.7 | 0.7 | 0.3 |
| **2019** | West | 11 | 20 | 3 | 42 | 6 | 18 | 5 | 12 | 10 | 11 | 11 | 23 | 15 | 11 | 3 | 7.0 | 3.0 | 0.8 | 2.0 | 1.7 | 1.8 | 0.1 | 0.7 | 1.5 | 0.7 | 0.2 |
| **2020** | Midwest | 7 | 12 | 3 | 34 | 3 | 12 | 4 | 10 | 13 | 16 | 8 | 17 | 9 | 6 | 2 | 11.3 | 4.0 | 1.3 | 3.3 | 4.3 | 5.3 | 0.2 | 0.9 | 1.9 | 0.7 | 0.2 |
| **2020** | Northeast | 9 | 15 | 4 | 32 | 3 | 20 | 3 | 6 | 20 | 22 | 9 | 20 | 12 | 9 | 3 | 10.7 | 6.7 | 1.0 | 2.0 | 6.7 | 7.3 | 0.3 | 0.8 | 1.7 | 0.8 | 0.2 |
| **2020** | South | 15 | 24 | 6 | 40 | 6 | 19 | 4 | 7 | 24 | 16 | 17 | 32 | 19 | 13 | 4 | 6.7 | 3.2 | 0.7 | 1.2 | 4.0 | 2.7 | 0.2 | 0.9 | 1.7 | 0.7 | 0.2 |
| **2020** | West | 10 | 17 | 2 | 35 | 6 | 15 | 4 | 13 | 8 | 12 | 9 | 21 | 13 | 9 | 3 | 5.8 | 2.5 | 0.7 | 2.2 | 1.3 | 2.0 | 0.1 | 0.7 | 1.6 | 0.7 | 0.2 |

[Figure 4](#fig-regplots) shows an exploratory plot for regional overall new diagnosis rates with female-male rate ratios.

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| Figure 4: **?(caption)** |

## 4.2 Basic statistical analysis

*To get some further insight into your data, if reasonable you could compute simple statistics (e.g. simple models with 1 predictor) to look for associations between your outcome(s) and each individual predictor variable. Though note that unless you pre-specified the outcome and main exposure, any “p<0.05 means statistical significance” interpretation is not valid.*

**?@fig-result** shows a scatterplot figure produced by one of the R scripts.

## 4.3 Full analysis

*Use one or several suitable statistical/machine learning methods to analyze your data and to produce meaningful figures, tables, etc. This might again be code that is best placed in one or several separate R scripts that need to be well documented. You want the code to produce figures and data ready for display as tables, and save those. Then you load them here.*

Example **?@tbl-resulttable2** shows a summary of a linear model fit.

**?(caption)**

# 5. Discussion

## 5.1 Summary and Interpretation

*Summarize what you did, what you found and what it means.*

## 5.2 Strengths and Limitations

*Discuss what you perceive as strengths and limitations of your analysis.*

## 5.3 Conclusions

*What are the main take-home messages?*

*Include citations in your Rmd file using bibtex, the list of references will automatically be placed at the end*

This paper [] discusses types of analyses.

These papers [] are good examples of papers published using a fully reproducible setup similar to the one shown in this template.

Note that this cited reference will show up at the end of the document, the reference formatting is determined by the CSL file specified in the YAML header. Many more style files for almost any journal [are available](https://www.zotero.org/styles). You also specify the location of your bibtex reference file in the YAML. You can call your reference file anything you like, I just used the generic word references.bib but giving it a more descriptive name is probably better.

# 6. References

Chapin-Bardales, J., Rosenberg, E. S., & Sullivan, P. S. (2017). Trends in racial/ethnic disparities of new AIDS diagnoses in the united states, 1984–2013. *Annals of Epidemiology*, *27*(5), 329–334.e2. https://doi.org/<https://doi.org/10.1016/j.annepidem.2017.04.002>

Sullivan, P. S., Woodyatt, C., Koski, C., Pembleton, E., McGuinness, P., Taussig, J., … Sanchez, T. H. (2020). A data visualization and dissemination resource to support HIV prevention and care at the local level: Analysis and uses of the AIDSVu public data resource. *J Med Internet Res*, *22*(10), e23173. <https://doi.org/10.2196/23173>