This directory contains data and code that replicates tables and figures for the following paper:

**Title:** Teenage Driving, Mortality, and Risky Behaviors

**Authors:** Jason Huh and Julian Reif

One master script runs all of the code. The analysis requires minimal memory and processing resources. It was last run on a Windows 10 Desktop with 32 gigabytes of RAM and an i7-8700 CPU 3.20 GHz processor. The runtime was less than five minutes.

# Data availability statement

We certify that the authors of the manuscript have legitimate access and permission to use the data employed in this manuscript. Some of the original data are confidential and cannot be made publicly available. However, aggregated versions of these datasets are included to allow the replicator to reproduce nearly all the tables and figures from the manuscript.

# License

The data are licensed under a Creative Commons Attribution 4.0 International Public License. The code is licensed under a Modified BSD License. See **LICENSE.txt** for details.

# Software requirements

Stata version 16 or higher

* Add-on packages are included in **scripts/libraries/stata** and do not need to be installed by user. The names, installation sources, and installation dates of these packages are available in **scripts/libraries/stata/stata.trk**.

# Instructions

Executing the master script **run.do** will run the analysis and generate all tables and figures. Before running this script, you must make one edit:

1. Line 18: Define a global macro, **Driving**, that points to the directory containing this README file

For example, that line should look something like the following:

global Driving "C:/Users/jdoe/thisfolder"

# Directory structure

driving # Project folder

├── data # Read-only (input) data

├── processed # Processed data

├── results # Output files

| ├── figures # Figures (PDF)

| ├── intermediate # Intermediate results

| └── tables # Tables (LaTeX)

├── scripts # Code

| ├── libraries/stata # Add-on Stata packages

| ├── programs # Auxiliary code called by scripts

| ├── 1\_import\_data.do

| ├── 2\_clean\_data.do

| ├── 3\_combine\_data.do

| ├── 4\_analysis.do

| ├── 5\_supporting\_analysis.do

| └── 6\_tables.do

└── run.do # Master script

# Datasets

**Add Health**

The driving behavior, working, and school leaving outcomes are constructed from a confidential version of the 1995-1996 Add Health surveys (Add Health, 1995-1996). Replicating the original analysis requires access to the full core sample with pseudo-state identifiers. To gain access to these data, follow the directions provided by the Carolina Population Center (CPC) Data Portal at the University of North Carolina at Chapel Hill:

<https://data.cpc.unc.edu/projects/2/view>

This replication package includes an aggregated version of the Add Health data that are used by the replication code. Those files are located in:

/data/add\_health/derived

**Fatality Analysis Reporting System**

The Fatality Analysis Reporting System (FARS) data are publicly available online (NHTSA, 1983-2014):

<https://www.nhtsa.gov/research-data/fatality-analysis-reporting-system-fars>

Due to large file size, the FARS data are not included in this replication package. Interested researchers can obtain these data files from the openICPSR repository associated with this study.

**Federal Highway Administration**

Data on the number of licensed drivers for ages 16-19 during the 1983-2014 time period are publicly available from the Federal Highway Administration (FHWA, 1983-2014). We use page 1 of “Table DL-220 Licensed Drivers, By Sex and Age Group, 1964-2014.pdf” (original file name: “dl220.pdf”) downloaded from:

<https://www.fhwa.dot.gov/policyinformation/quickfinddata/qfdrivers.cfm>

We fixed obvious errors in the reported total counts for age 18 in 2001 and 2007, by comparing these values against the numbers provided separately by sex. Specifically, we changed the total number of licensed drivers aged 18 in 2001 from 2854 to 2754, and the total number of licensed drivers aged 18 in 2007 from 1873 to 2873.

The downloaded file is available as part of this replication package in:

/data/fhwa

**FIPS codes**

State Federal Information Processing Standard (FIPS) codes are publicly available from the United States Census Bureau (Census, n.d.):

<https://www.census.gov/library/reference/code-lists/ansi/ansi-codes-for-states.html>

The state FIPS codes are available in a Stata file in:

/data/fips

**ICD codes**

Complete lists of ICD-9 and ICD-10 codes used to classify the cause of death in the National Vital Statistics data are publicly available online (ICD9Data.com, n.d.; WHO, n.d.).

ICD-9 codes are available from: <http://www.icd9data.com/2015/Volume1/default.htm>

ICD-10 codes are available from: <https://icd.who.int/browse10/2019/en>

The codes used in the analysis are listed in a LaTeX table in:

/data/icd\_codes

**Minimum legal driving age laws**

Data on minimum legal driving age (MDA) laws for 1995-2014 are obtained from "gdl\_effective\_dates.pdf" downloaded from the Insurance Institute for Highway Safety (IIHS, 1995-2014):

<http://www.iihs.org/iihs/topics/laws/graduatedlicenseintro?topicName=teenagers>

Data on MDA laws for 1983-1994 are hand-collected from databases of state session laws from HeinOnline (HeinOnline, 1983-1994):

<https://home.heinonline.org/content/session-laws-library>

Anyone with a subscription to HeinOnline can obtain access to these state session laws. The downloaded file from the IIHS, along with the hand-collected data, are available in:

/data/mda

**Mortality**

The mortality outcomes are constructed from a confidential version of the 1983-2014 National Vital Statistics (NCHS, 1983-2014). To gain access to these data, follow the directions provided by the National Center for Health Statistics:

<https://www.cdc.gov/nchs/nvss/nvss-restricted-data.htm>

Replicating the original analysis requires access to two restricted-use variables: (1) state of residence; and (2) month of birth. This replication package includes an aggregated version of the mortality data that are used by the replication code. Those files are located in:

/data/mortality/derived

**National Household Travel Survey**

Data on the average annual vehicle miles traveled by licensed drivers for ages 16-19 for 1983, 1990, 1995, 2001, 2009, and 2017 are publicly available from the National Household Travel Survey (NHTS, 1983-2017). The analysis employs data from Table 23 of “2017\_nhts\_summary\_travel\_trends.pdf” downloaded from:

<https://nhts.ornl.gov/publications>

The downloaded file is available as part of this replication package in:

/data/nhts

**Minimum legal school leaving age laws**

Data on the age range for compulsory school attendance for 1994, 1996, 1997, 2000, 2002, 2004, 2006-2010, 2013, and 2014 are constructed using publicly available information from the National Center for Education Statistics (NCES, 1994-2014):

<https://nces.ed.gov/programs/digest>

The data are available as part of this replication package in:

/data/schoolage

**Surveillance, Epidemiology, and End Results population data**

The Surveillance, Epidemiology, and End Results (SEER) Program’s population data are publicly available online (NCI, 1983-2014):

<https://seer.cancer.gov/popdata>

Interested researchers can also obtain these data files from the openICPSR repository associated with this study. This replication package includes an aggregated version of the SEER data that are used by the replication code.  
Those files are located in:

/data/seer/derived

# Descriptions of scripts

**run.do** is a master script that sets up the environment, creates output folders, and then calls other scripts.

**1\_import\_data.do**

This script imports raw datasets and saves them in Stata format. The mortality portion of this script is disabled because the confidential version of the mortality data is not included in this replication package. The FARS portion is also disabled because the FARS data are not included in this replication package.

**2\_clean\_data.do**

This script processes and cleans datasets. The mortality portion of this script is disabled because the confidential version of the mortality data is not included in this replication package.

**3\_combine\_data.do**

This script combines datasets together to create the files used in the main analysis. The mortality portion of this script is disabled because the confidential version of the mortality data is not included in this replication package. The FARS portion is also disabled because the FARS data are not included in this replication package.

**4\_analysis.do**

This script estimates the regression discontinuity (RD) model and creates RD plots.

**5\_supporting\_analysis.do**

This script provides supporting analysis and creates supplemental tables and figures. The FARS portion of this script is disabled because the FARS data are not included in this replication package.

**6\_tables.do**

This script uses the results saved by *4\_analysis.do* to create tables.

# References

Add Health (1995-1996). National Longitudinal Study of Adolescent to Adult Health [restricted-use version]. <https://data.cpc.unc.edu/projects/2/view>.

# Federal Highway Administration (1983-2014). Highway Statistics Series. <https://www.fhwa.dot.gov/policyinformation/quickfinddata/qfdrivers.cfm> (accessed April 11, 2019).

HeinOnline (1983-1994). Session Laws Library. <https://home.heinonline.org/content/session-laws-library> (accessed July 30, 2020).

ICD9Data.com (n.d.). 2015 ICD-9-CM Diagnosis Codes. <http://www.icd9data.com/2015/Volume1/default.htm> (accessed July 10, 2019).

Insurance Institute for Highway Safety (1995-2014). Effective Dates of Graduated Licensing Laws. <http://www.iihs.org/iihs/topics/laws/graduatedlicenseintro?topicName=teenagers> (accessed October 8, 2015).

National Cancer Institute (1983-2014). Surveillance, Epidemiology, and End Results (SEER) Program Populations, DCCPS, Surveillance Research Program. <https://seer.cancer.gov/popdata> (accessed June 28, 2018).

National Center for Education Statistics (1994-2014). Digest of Education Statistics. <https://nces.ed.gov/programs/digest> (accessed January 13, 2021).

National Center for Health Statistics (1983-2014). National Vital Statistics System, Mortality Data [restricted-use version]. <https://www.cdc.gov/nchs/nvss/nvss-restricted-data.htm>.

National Highway Traffic Safety Administration (1983-2014). Fatality Analysis Reporting System (FARS). <https://www.nhtsa.gov/research-data/fatality-analysis-reporting-system-fars> (accessed June 1, 2017).

National Household Travel Survey (1983-2017). Summary of Travel Trends. <https://nhts.ornl.gov/publications> (accessed December 9, 2020).

United States Census Bureau (n.d.). American National Standards Institute. <https://www.census.gov/library/reference/code-lists/ansi/ansi-codes-for-states.html> (accessed November 13, 2015).

World Health Organization (n.d.). ICD-10 Version: 2019. <https://icd.who.int/browse10/2019/en> (accessed July 10, 2019).

# Lists of exhibits

| Figure | Source script | Line number | Output file | Notes |
| --- | --- | --- | --- | --- |
| Figure 1a | 4\_analysis.do | 164 | rd\_license\_male\_female.pdf |  |
| Figure 1b | 4\_analysis.do | 171 | rd\_vmd150\_male\_female.pdf |  |
| Figure 1c | 4\_analysis.do | 274 | rd\_any\_male\_female.pdf |  |
| Figure 1d | 4\_analysis.do | 280 | rd\_mva\_male\_female.pdf |  |
| Figure 2a | 4\_analysis.do | 258 | rd\_sa\_poisoning\_female.pdf |  |
| Figure 2b | 4\_analysis.do | 258 | rd\_sa\_poisoning\_subst\_female.pdf |  |
| Figure 2c | 4\_analysis.do | 258 | rd\_sa\_poisoning\_gas\_female.pdf |  |
| Figure 3a | 4\_analysis.do | 258 | rd\_sa\_poisoning\_male.pdf |  |
| Figure 3b | 4\_analysis.do | 258 | rd\_sa\_poisoning\_subst\_male.pdf |  |
| Figure 3c | 4\_analysis.do | 258 | rd\_sa\_poisoning\_gas\_male.pdf |  |
| Figure 4a | 4\_analysis.do | 351 | yearbins\_cod\_mva\_male.pdf |  |
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| Figure 4c | 4\_analysis.do | 351 | yearbins\_cod\_mva\_female.pdf |  |
| Figure 4d | 4\_analysis.do | 351 | yearbins\_cod\_sa\_poisoning\_female.pdf |  |
| Figure A.1a | 4\_analysis.do | 149 | rd\_vehiclemiles\_150.pdf |  |
| Figure A.1b | 4\_analysis.do | 149 | rd\_vehiclemiles\_265.pdf |  |
| Figure A.2a | 4\_analysis.do | 245 | rd\_any\_ext\_int\_male.pdf |  |
| Figure A.2b | 4\_analysis.do | 245 | rd\_any\_ext\_int\_female.pdf |  |
| Figure A.3a | 4\_analysis.do | 258 | rd\_sa\_drowning\_male.pdf |  |
| Figure A.3b | 4\_analysis.do | 258 | rd\_sa\_drowning\_female.pdf |  |
| Figure A.4a | 4\_analysis.do | 258 | rd\_extother\_male.pdf |  |
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| Figure A.5a | 4\_analysis.do | 149 | rd\_work4weeks.pdf |  |
| Figure A.5b | 4\_analysis.do | 149 | rd\_notenrolled.pdf |  |
| Figure A.6a | - | - | subgroup\_birmonth\_mva.pdf | Not available |
| Figure A.6b | - | - | subgroup\_birmonth\_rel\_mva.pdf | Not available |
| Figure A.7a | - | - | subgroup\_birmonth\_sa\_poisoning\_female.pdf | Not available |
| Figure A.7b | - | - | subgroup\_birmonth\_rel\_sa\_poisoning\_female.pdf | Not available |
| Figure A.8a | 5\_supporting\_analysis.do | 242 | placebo\_cod\_mva\_none.pdf |  |
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| Figure A.8c | 5\_supporting\_analysis.do | 242 | placebo\_cod\_mva\_male.pdf |  |
| Figure A.8d | 5\_supporting\_analysis.do | 242 | placebo\_cod\_mva\_female.pdf |  |
| Figure A.8e | 5\_supporting\_analysis.do | 248 | placebo\_cod\_sa\_poisoning\_male.pdf |  |
| Figure A.8f | 5\_supporting\_analysis.do | 248 | placebo\_cod\_sa\_poisoning\_female.pdf |  |
| Figure B.1 | 5\_supporting\_analysis.do | 166 | appendix\_license\_trends\_ages1619.pdf |  |
| Figure B.2 | 5\_supporting\_analysis.do | 299 | appendix\_vmt\_trends\_ages1619.pdf |  |
| Figure B.3a | 5\_supporting\_analysis.do | 129 | appendix\_mort\_trends\_male.pdf |  |
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| Figure B.4a | 5\_supporting\_analysis.do | 143 | appendix\_mort\_trends\_poisoning.pdf |  |
| Figure B.4b | 5\_supporting\_analysis.do | 143 | appendix\_mort\_trends\_firearm.pdf |  |
| Figure B.4c | 5\_supporting\_analysis.do | 143 | appendix\_mort\_trends\_drowning.pdf |  |
| Figure B.4d | 5\_supporting\_analysis.do | 143 | appendix\_mort\_trends\_other.pdf |  |

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| --- | --- | --- | --- | --- |
| Table | Source script | Line number | Output file | Notes |
| Table 1 | 6\_tables.do | 356 | rd\_mortality.tex |  |
| Table A.1 | 6\_tables.do | 455 | rd\_mortality\_sa\_female.tex |  |
| Table A.2 | 6\_tables.do | 579 | rd\_subgroup\_mda\_mva.tex |  |
| Table A.3 | 6\_tables.do | 579 | rd\_subgroup\_mda\_sa\_poisoning.tex |  |
| Table A.4 | - | - | rd\_subgroup\_license.tex | Not available |
| Table A.5 | - | - | rd\_subgroup\_vmd.tex | Not available |
| Table A.6 | - | - | rd\_subgroup\_mva.tex | Not available |
| Table A.7 | - | - | rd\_subgroup\_sa\_poisoning.tex | Not available |
| Table A.8 | - | - | rd\_subgroup\_birmonth\_mva.tex | Not available |
| Table A.9 | - | - | rd\_subgroup\_birmonth\_sa\_poisoning\_female.tex | Not available |
| Table A.10 | 6\_tables.do | 706 | rd\_mortality\_altbws.tex |  |
| Table A.11 | 6\_tables.do | 808 | rd\_mortality\_polys.tex |  |
| Table A.12 | 6\_tables.do | 927 | rd\_mortality\_ols.tex |  |
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