# EXECUTIVE SUMMARY

## (I) OVERVIEW

**Case**- This case study examines the relationship between teenage driving and mortality, with a focus on how motor vehicle accidents (MVAs) and other causes of death are influenced by reaching the minimum legal driving age (MLDA). Teenage drivers are at a higher risk of fatal accidents due to their inexperience, making the understanding of the impact of driving eligibility crucial for developing effective safety policies. Using data from 1983 to 2014, the study explores variations in MLDA across states, ranging from 14 to 18 years of age, to estimate the causal effect of becoming eligible to drive on mortality rates. The regression discontinuity (RD) design applied in this study helps to isolate the effect of driving eligibility by comparing individuals close to the MLDA cutoff, minimizing confounding factors.

**Objective**- The primary objective of this case study is to assess whether reaching the MLDA has a direct causal impact on mortality rates, specifically due to motor vehicle accidents (MVAs). It aims to provide insights into how driving eligibility influences teenage mortality and to evaluate the effectiveness of regulations surrounding the MLDA. By applying a regression discontinuity design, the study seeks to mitigate selection bias that could otherwise skew comparisons between licensed and non-licensed individuals. Ultimately, the study aims to offer evidence that can inform policymakers on the risks associated with teenage driving and guide the formulation of regulations aimed at reducing these risks.

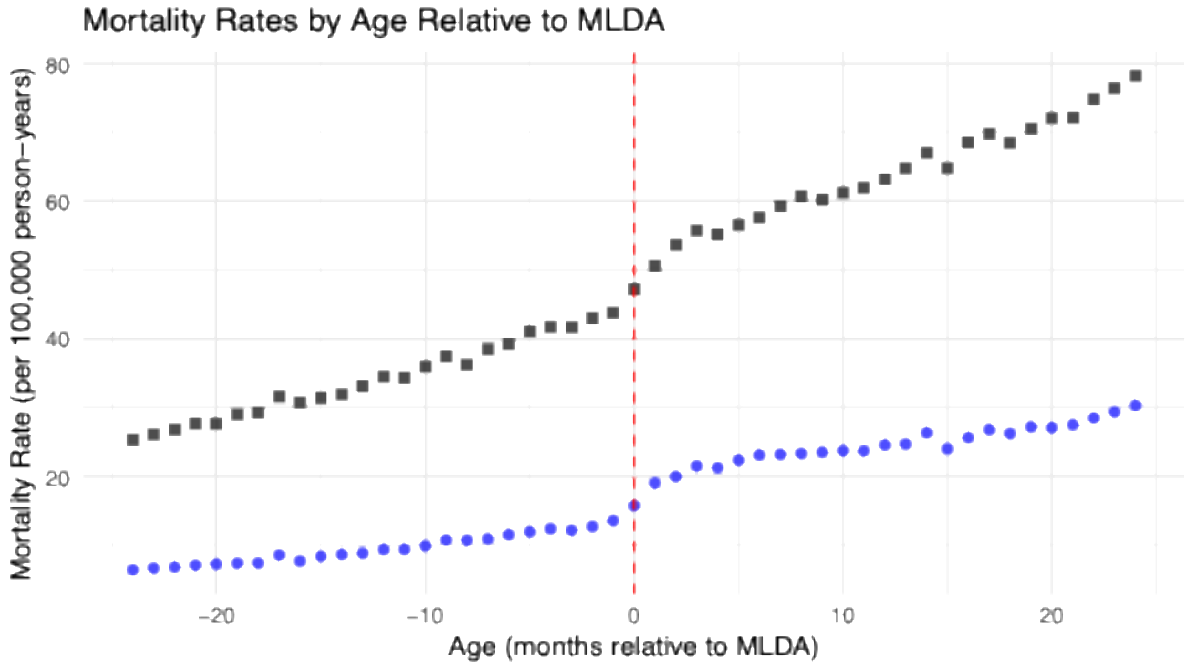
## (II) FINDINGS-

### 1. Mortality Rates above and below the MLDA

- **Mortality Rate (1–24 months above MLDA):** 64.37031 per 100,000 person-years
- **Mortality Rate (1–24 months below MLDA):** 34.08069 per 100,000 person-years

The observed difference in mortality rates between individuals above and below the MLDA suggests an increase in mortality rates after reaching the legal drinking age. This difference might indicate a potential causal effect of the MLDA on mortality, though it should be noted that this does not account for confounding factors such as other behaviours associated with age or legal access to alcohol.

**2. Scatter plot showing mortality rates due to (a) any cause and (b) motor vehicle accidents with black squares as markers for any cause of death and blue circles as markers for mortality due to motor vehicle accidents.**




**3. Non-parametric RD Estimation (Donut RD)**

Non-parametric RD estimates were calculated using four different bandwidths: 48, 24, 12, and 6 months. The results are as follows:

| | Bandwidth | RD_Estimate_AllCause | RD_Estimate_MVA |
|---|---|---|---|
| 1 | 48 | 12.107313 | 9.588254 |
| 2 | 24 | 6.877585 | 6.551764 |
| 3 | 12 | 6.611472 | 5.968510 |
| 4 | 6 | 6.012612 | 4.867183 |

As the bandwidth decreases, the estimates for both all-cause and motor vehicle accident mortality become more precise, but they also tend to be smaller. This suggests that using a smaller bandwidth helps focus on individuals who are closer to the MLDA, which might reduce bias from individuals who are farther from the cutoff. However, smaller bandwidths also result in less data, which can reduce the precision of the estimates.

**4. Parametric RD Estimation**

A parametric RD model, which allows for linear trends on either side of the cutoff, was also used to estimate the causal effect of the MLDA on mortality. The results were:

| | Bandwidth | RD_Estimate_AllCause | RD_Estimate_MVA |
|---|---|---|---|
| 1 | 48 | 11.891433 | 9.534183 |
| 2 | 24 | 6.877585 | 6.551764 |
| 3 | 12 | 6.611472 | 5.968510 |
| 4 | 6 | 6.012612 | 4.867183 |

These estimates are similar to the non-parametric RD estimates, indicating a consistent finding regardless of the model used. The parametric model smooths over the local trends, potentially providing a better fit but also introducing assumptions about the linear relationship on either side of the cutoff.

**(III) Conclusion**

The analysis of mortality rates reveals a significant increase in mortality for individuals just above the MLDA compared to those just below, especially with regard to motor vehicle accident mortality. This suggests that the MLDA could be influencing behavior in a way that contributes to higher mortality rates. The RD estimations, both non-parametric and parametric, show consistent results, with smaller bandwidths yielding more precise estimates of the causal effect of reaching the MLDA on mortality.

**Lessons for Policymakers and Stakeholders:**

1. **Reevaluation of Legal Drinking Age Policies:** The observed increase in mortality following the MLDA suggests that policymakers should consider further research into the impact of alcohol access on public health, particularly in terms of motor vehicle accidents.
2. **Focus on Targeted Interventions:** Given the precision of RD estimates with smaller bandwidths, interventions aimed at individuals close to the legal drinking age may be more effective in preventing alcohol-related accidents.
3. **Consideration of Alternative Factors:** While the MLDA shows a potential causal effect on mortality, it is essential for policymakers to control for other factors, such as socioeconomic status and prior risky behaviors, that could confound the relationship.
4. **Further Research:** Additional studies should explore the mechanisms behind the observed increase in mortality, including alcohol consumption patterns, risk behaviors, and enforcement of MLDA laws.