Decreased Millennial Automobility: Are There Public Health Co-Benefits?

Noreen McDonald
University of North Carolina at Chapel Hill
ITS-Leeds, 2015-16

http://media.mnn.com/assets/images/2015/06/gen%20z%20driver.jpg
Overview

• Motivation: Changing Patterns of Auto Demand
• Data & Methods
• Public Health Impacts
  – Auto Travel
  – Physical Activity
  – Traffic Fatalities
• Implications
Motivation:
Changing Patterns of Auto Demand
Changing Patterns of Auto Demand

Annual Vehicle Miles of Travel Per Capita

Source: FHWA, Traffic Volume Trends; US Census Bureau Population Estimates
DfT Table TRA0106; ONS, Population Estimates, MYE4
Changing Patterns of Auto Demand

Change in Annual Vehicle Miles of Travel Per Capita (1995=100)

Source: FHWA, Traffic Volume Trends; US Census Bureau Population Estimates
DfT Table TRA0106; ONS, Population Estimates, MYE4
Decreased Licensure.

Young Adults Holding Driver Licenses: 1990s vs. 2000s

Decreased Auto Use

Young Adult Mode Choice

Motivation

• Strong debate in transport field about
  – Causes
  – Implications for planning practice

• Little consideration of the public health impacts
Potential Impacts of Declining Automobility for Public Health

• Increased physical activity
• Decreased injuries and fatalities
• Reduced noise
• Reduced air pollution

Physical Activity

• Measure changes in time spent in:
  – Utilitarian active travel
  – Leisure activity travel
  – Sports and exercise

• Data: American Time Use Survey, 2003-2014
  – Individual-level
  – 109,352 between 20 and 59
  – Samples of 7,000-15,000 per year
Fatalities

• Changes in:
  – Population-adjusted death rates
  – Exposure-adjusted death rates

• Data: Fatality Analysis Reporting System, 2003-2014
  – 293,292 fatalities involving individuals aged 20 to 59
  – Annual counts of 21,000 to 27,000
Methods

• Absolute Change 2003: 2014

• Linear Trend
  – Physical Activity: Individual level models
    • Unadjusted
    • Adjusted for individual and household factors
  – Fatalities:
    • Population-Adjusted Death Rates: State-level fixed effects with time trend varying by age and sex
Results
Auto Travel

- **Minutes**
  - 2000: 75
  - 2005: 70
  - 2010: 65
  - 2015: 60

- **Year**
  - 2000
  - 2005
  - 2010
  - 2015

Note: Two-year rolling average
Physical Activity

Note: Two-year rolling average
Physical Activity: Utilitarian Active Travel

Note: Two-year rolling average
Physical Activity: Leisure Active Travel

Note: Two-year rolling average
Physical Activity: Sports & Exercise

Minutes

Year


20-29
30-39
40-59

Note: Two-year rolling average
Fatalities Involving MV Occupants
Population-Adjusted Death Rate

Deaths Per 100,000

Year


20-29

30-39

40-59

20 21
Population-Adjusted Death Rate

Males

Deaths Per 100,000

Year


Females

Year


20-29
30-39
40-59
Exposure-Adjusted Death Rate

Males

Deaths Per 1E9 Minutes

Year


20-29
30-39
40-59

Females

Year

Exposure-Adjusted Death Rate

Deaths Per 1E9 Minutes

Males

Females

Year

Year

Deaths

20-29
Summary

• Auto Travel
  – Downward trend in auto use continues through 2014
  – Decreases greatest for young adults (particularly males)

• Physical Activity
  – No shift from automobility to active travel

• Fatalities
  – Sharp decreases in fatalities particularly for young males
  – Decreased exposure explains much of the decline
Implications for public health

• Increasing physical activity from decreasing sedentary auto travel is difficult
  – Context-specific: US=auto-oriented built environment

• Safety impacts are huge
  – 1,400 fewer fatalities among young adults in 2014 due to decreased driving
  – Future: Upward trend in exposure-adjusted death rates and potential increase in exposure
Questions
Contact

Noreen McDonald
noreen@unc.edu
mcdonald.web.unc.edu