Time for State Bicycle Helmet Legislation?

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Fact or Fiction?

Minneapolis is the most bike-friendly city in the U.S. in Y2010.
Minneapolis is #1 Bike City

Bicycling.com list of the most bike-friendly cities in the U.S:

• Cities with 100,000 citizens or more
• Number of segregated bike lanes
• Municipal bike racks
• Bike boulevards
• Availability of "smart, savvy bike shops"
There’s always a price tag!

More bikes on the road mean more potential for accidents!!!
‘Bike-related injuries increase in Twin Cities’

By TIM HARLOW, Star Tribune
October 3, 2008
Fact or Fiction?

- Bicycle helmets reduce head injuries and deaths by up to 85%*
- If each rider wore a helmet one death per day and one injury every four minutes will be prevented‡

* A case-control study of the effectiveness of bicycle safety helmets
‡ Bicycle Associated Head Injuries and Deaths in the United States From 1984 Through 1988: How Many Are Preventable?
Jeffrey J. Sacks, MD, MPH; Patricia Holmgreen, MS; Suzanne M. Smith, MD; Daniel M Sosin, MD. JAMA, 1991;266:3016-3018
Fact or Fiction?

- Despite the fact that nearly 70% of all fatal bicycle crashes involve head injuries, only about 20-25% of all bicyclists wear bicycle helmets.

NHTSA
Minnesota Bicycle Laws

Minnesota Statutes, Sections 169

• Riding
• Turning
• Sidewalks
• Parking
• Affirmative defense

…Nothing on helmet use
FACT:

• Minnesota has no bicycle helmet use law

• 21 states (including the District of Columbia) have enacted some form of bicycle helmet usage laws, mostly for riders younger than 16.

QUESTION:
Can Minnesotan bicyclists afford to do without state bicycle helmet legislation?
No State or local helmet laws

- Arkansas
- Colorado
- Idaho
- Indiana
- Iowa
- **Minnesota**
- Mississippi
- North Dakota
- South Dakota
- South Carolina
- Utah
- Vermont
- Wyoming
- Nebraska
Is it Time for Minnesota bicycle helmet use law?

What data suggest
Fact or Fiction?

- Bicycles are subject to the same traffic laws as motor vehicles, but bicycle crashes are reported to the Minnesota Department of Public Safety only if they involve collision with a motor vehicle.

FACT
DATA SPEAKS…
HOSPITAL-TREATED BICYCLE INJURY
MIDAS 2001-2010; (ED & Inpatient, n=61,231)

TRAUMA REGISTRY

BICYCLE-RELATED FATALITY
MCHS, 2001-2010; All Deaths (n=106)
HOSPITAL-TREATED BICYCLE INJURY

MIDAS 2001-2010; (ED & Inpatient, n=61,231)
Hospital-treated bicycle injury, MN 2001-2010 (N=61,231)

- Male: 71.5%
- Female: 28.5%
Count of hospital-treated bicycle injury

Hospital (ED & In-patient) treated bicycle injury

\[ y = 49.933x \]
Age-adj rate/100,000

Hospital (ED & in-patient) treated bicycle injury

y = 0.6439x
Nonfatal Motor Vehicle Traffic Pedal Cyclist
MN 2001-2010, Level of Care

Rates per 100,000 population are age-adjusted to the US 2000 Standard Population

Estimated 2020 rate: 12.6
Estimated 2020 rate: 0.8
Non-Traffic Pedal Cyclist
MN 2001-2010, Level of Care

Estimated 2020 rate:
ER/ED: 81.5
Hospitalization: 3.8

Rates per 100,000 population are age-adjusted to the US 2000 Standard Population
Nonfatal Motor Vehicle Traffic Pedal Cyclist
MN 2001-2010, Gender

Rates per 100,000 population are age-adjusted to the US 2000 Standard Population
Non-Traffic Pedal Cyclist
MN 2001-2010, Gender

Rates per 100,000 population are age-adjusted to the US 2000 Standard Population

TRAUMA REGISTRY
Hospitalized bicycle injury rate, MN 2001 - 2010

The graph shows the age-adjusted rates and counts of hospitalized bicycle injuries from 2001 to 2010. The rates increase steadily over the years, with a sharp rise in the later years. The counts also show a similar trend, with a significant increase towards the end of the period.
Rate among cyclists, MN
2001-2010

[Graph showing rates by age group for males and females.]

- Male
- Female
## Hospitalized cyclists: Helmet use, MN 2001 -2010

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
<th>Rate/100,000</th>
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</thead>
<tbody>
<tr>
<td>All hospitalized cyclists (n=4,227)</td>
<td>743</td>
<td>17.6%</td>
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</tr>
<tr>
<td>Those with TBI (n=2,043)</td>
<td>335</td>
<td>16.4%</td>
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</tr>
<tr>
<td>Those with other Severe Injury (n=640)</td>
<td>126</td>
<td>19.7%</td>
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</tbody>
</table>
Injured Cyclists in Trauma: % Helmet Use

MN 2001 -2010

Male & Female Age-specific Proportion wearing helmets
MCHS, 2001-2010; (n=106)

BICYCLE-RELATED FATALITY
Numbers are used because rates are unstable when the numbers are so low.
Motor Vehicle Traffic - related
Pedal Cyclist Deaths
by Gender & Age Group
MN, 2001 - 2010
Non-Traffic - related Pedal Cyclist Death
MN, 2001-2010

Numbers are used because rates are unstable when the numbers are so low
Number of **Non-Traffic** Pedal Cyclist Deaths by Gender & Age Group, MN 2001 - 2010
OTHER CONSIDERATIONS
Helmet law counterfactual

Bicycle helmets are effective, but could a mandate use of helmet backfire?

- Example*:
  - helmet laws reduce use of bicycles
  - risk of dying from head injury per hour is similar for unhelmeted cyclists & motor vehicle occupants

*Head injuries and bicycle helmet laws.
D.L. Robinson
Accident Analysis & Prevention Volume 28, Issue 4, July 1996, Pages 463–475
Fact or Fiction?

• Are helmeted cyclists "car magnets"… does wearing a helmet increases the risk of being hit by a passing car?

  – Drivers pass closer when overtaking cyclists wearing helmets
  – Compared to overtaking bare-headed cyclists, increasing the risk of a collision

Bath, UK.
Accident Analysis & Prevention Journal.
2006.
Health impact of mandatory bicycle helmet laws – Australian Study

• Where cycling is safe…
a helmet law is likely to have a large unintended negative health impact.

• Where cycling is relatively unsafe…
helmets will do little to make it safer;

• A helmet law, under relatively extreme assumptions:
may make a small positive contribution to net societal health.

Fact or Fiction?

• The benefits of cycling, even without a helmet, have been estimated to outweigh the hazards by a factor of 20 to 1

Hillman 1993; Cycle helmets—the case for and against. Policy Studies Institute, London
Fact or Fiction?

• Nationally, the estimated annual cost of bicycle related injuries and deaths (for all ages) is $8 billion.
• Every dollar spent on bicycle helmets saves society $30 in indirect medical costs and other costs.

Is it Time for Minnesota bicycle helmet use law?

Jon Roesler, MS
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Ghost bikes are painted white and left near the scene of an accident to commemorate a cyclist who lost his or her life in a traffic accident.
Definition

- A Pedal Cycle is any road transport vehicle operated solely by pedals.
- Includes: bicycle, pedal cycle, tricycle
- Excludes: motorized bicycle
- ICD-9-CM, 1999 U.S. DHHS
- (ICD-10 as well)
Methods

• Hospital discharge records; Y 2001-2010
• Minnesota residents
• Diagnostic & E-codes
• Injury: TBI / Other severe injury

• Data sources:
  1. MIDAS (ED & inpatient)
  2. Trauma Registry (mostly Severe inpatient hospitalizations)
  3. Death certificates

• Gender
• Age groupings
• Injury
  – Incidence
  – Outcome: nonfatal / fatal
  – Severity
• Hospital charges
Hospitalization rate among cyclists, MN 2001-2010
Hospitalized cyclists: Helmet use, MN 2001-2010

Male & Female Age-specific Rates / 100,000

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Rate</th>
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<td>&lt;1</td>
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<td>1-4</td>
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<td>70-74</td>
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<tr>
<td>75-79</td>
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• Consider calculating R correlation coefficient:
  – helmet use vs. Hospitalization rate
  – helmet use vs. TBI rate
  – Helmet use vs. Other severe injury rate
Fact or Fiction?

• Bicycle crashes were most prevalent in the three-hour time period of 3:00-6:00 p.m.
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<tr>
<th>Rank</th>
<th>City</th>
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<td>10</td>
<td>Minneapolis</td>
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