



MOTOR VEHICLE CRASHES IN TEXAS INVOLVING PEDAL CYCLISTS, 2012-2013

Injury Epidemiology & Surveillance Branch

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TABLE OF CONTENTS

Introduction	1
Who is injured?	3
How badly are cyclists injured?	5
Who uses helmets?	6
Safety strategies	8
Summary.....	10
Technical notes	11
References.....	12

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INTRODUCTION

Bicycling's popularity is growing in the United States. Commuting by bicycle increased 60% between 2000 and 2012, and the percentage of individuals living in large cities that bicycled as a mode of transportation nearly doubled [1]. In Texas, bicycle sharing programs have been launched in seven of the state's largest cities.

Bicycling for transportation or leisure has the health benefits associated with physical activity, and adults who bicycle for transportation purposes are more likely to meet CDC-recommended weekly activity levels than those who commute by car [2, 3]. Bicycling may be accompanied by unintended adverse health outcomes, however, as bicyclists are at risk of

crashes leading to injury or death. On a per trip basis, bicyclists are twice as likely as motorists to die on US roads [4]. Helmet use may reduce the risk of severe head injuries among cyclists if a crash does occur [1], particularly in places with mandatory helmet laws [5]. Texas currently has no law requiring cyclists of any age to wear helmets.

In this study, we sought to examine the demographic characteristics and intermediate health outcomes of bicyclists involved in motor vehicle crashes on Texas roads and compare demographic characteristics between cyclists who used a helmet and those who did not. To accomplish this, the Texas Department of State Health Services EMS & Trauma Registries (ETR) surveillance system data on EMS provider runs were linked with traffic collision data from the Texas Department of Transportation

(TxDOT). Cyclists with crashes in 2012-2013 were included in our analyses. More information about our data linkage procedures and linked data set can be found in Technical Notes at the end of this document. Our data linkage procedure resulted in 625 records that were reported to both TxDOT and ETR for 2012-2013.

LINKED DATA PROVIDE A MORE COMPLETE PICTURE OF INJURIES IN TEXAS



CITIES WITH BIKE SHARE PROGRAMS

Data linkage is the process by which information from different sources relating to the same person or event is brought together.

Historically, data linkage has been done with medical and health-related data, as a single source rarely has all the information on an event.

SAFETY TIPS FOR CYCLISTS & DRIVERS

WEAR A HELMET

Always wear a helmet when cycling

BE SEEN

Wear bright clothing and use active lighting at night

3 FEET, PLEASE

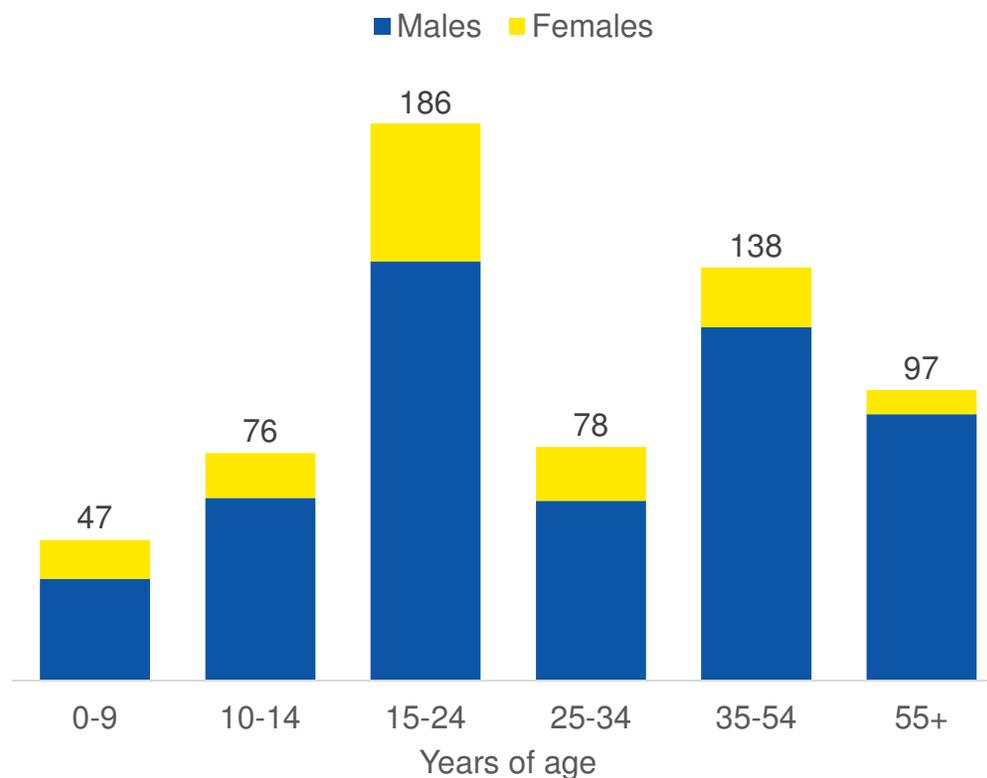
When passing cyclists, give them three feet of room



WHO IS INJURED?

AGE AND SEX: Over 80% of cyclists in the linked data set were male. The age group 15-24 years had the highest proportion of cyclists who were female. The median age of cyclists was 25, but bicyclists of all ages were involved in crashes with motor vehicles where EMS transport was requested. Children under 15 years comprised 20% of the linked records. Nearly 40% of cyclists in the linked data set were 35 years and older.

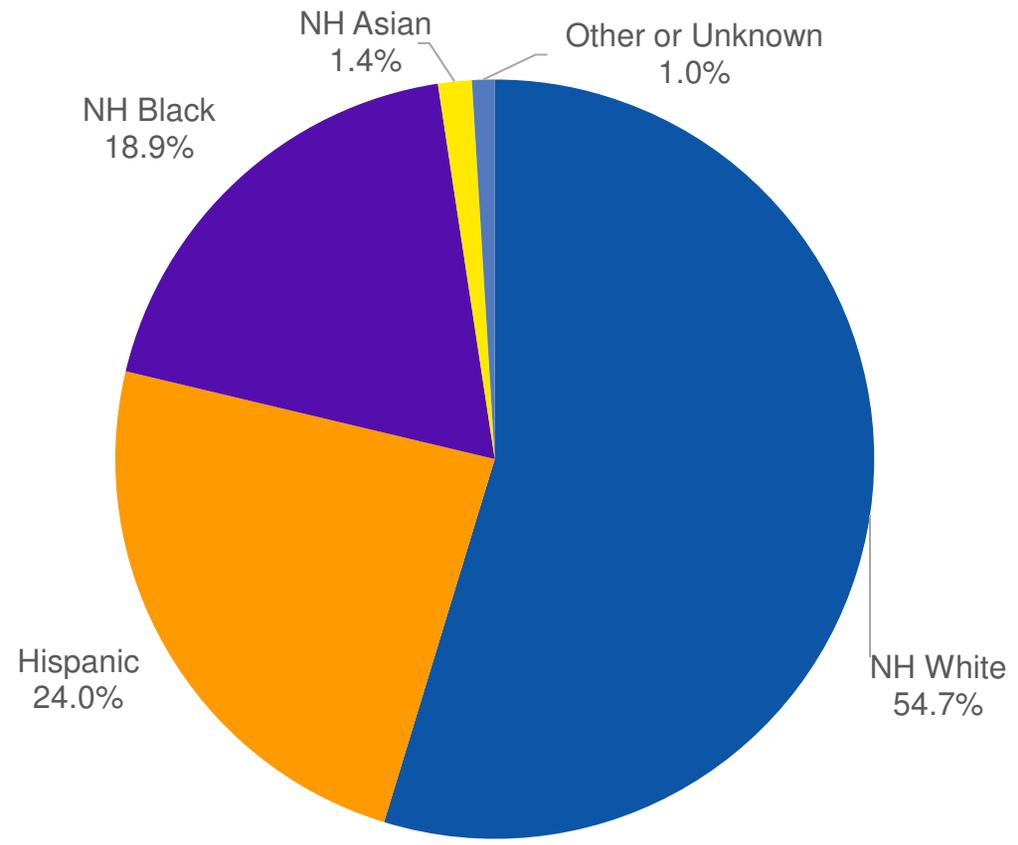
Most cyclists involved in motor vehicle crashes in Texas are male and half are under 25 years of age, 2012-2013[†]



[†]EMS and TxDOT crash linked dataset, Injury Epidemiology & Surveillance Branch, Texas Department of State Health Services

RACE AND ETHNICITY: Over half of the bicyclists in the linked dataset were non-Hispanic white. Hispanics accounted for 24% of the cyclists, while 19% were non-Hispanic black. Less than 2% were identified as non-Hispanic Asian. Relative to their population in the state, non-Hispanic whites and non-Hispanic blacks were overrepresented among cyclists involved in motor vehicle crashes, while Hispanics were underrepresented.

Over half of cyclists involved in motor vehicle crashes in Texas were non-Hispanic white, 2012-2013[†]

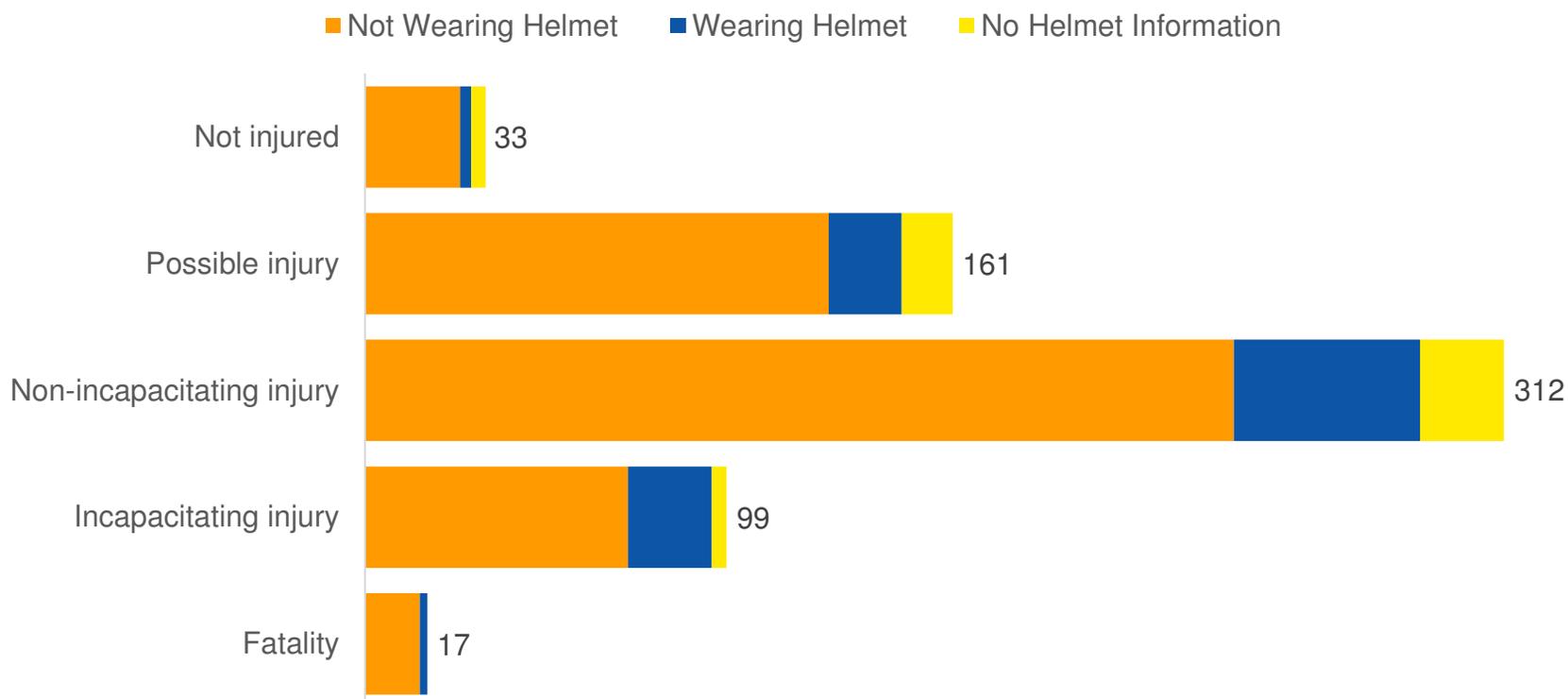


[†]EMS and TxDOT crash linked dataset, Injury Epidemiology & Surveillance Branch, Texas Department of State Health Services

HOW BADLY ARE CYCLISTS INJURED?

Among the 622 linked records where injury status was assessed by EMS, only 5% were assessed as not injured. There were 17 fatalities among all age groups. Nearly 70% of cyclists in the linked dataset experienced an injury or death, while 26% were considered to have a possible injury.

Most cyclists involved in motor vehicle crashes in Texas were injured, 2012-2013[†]



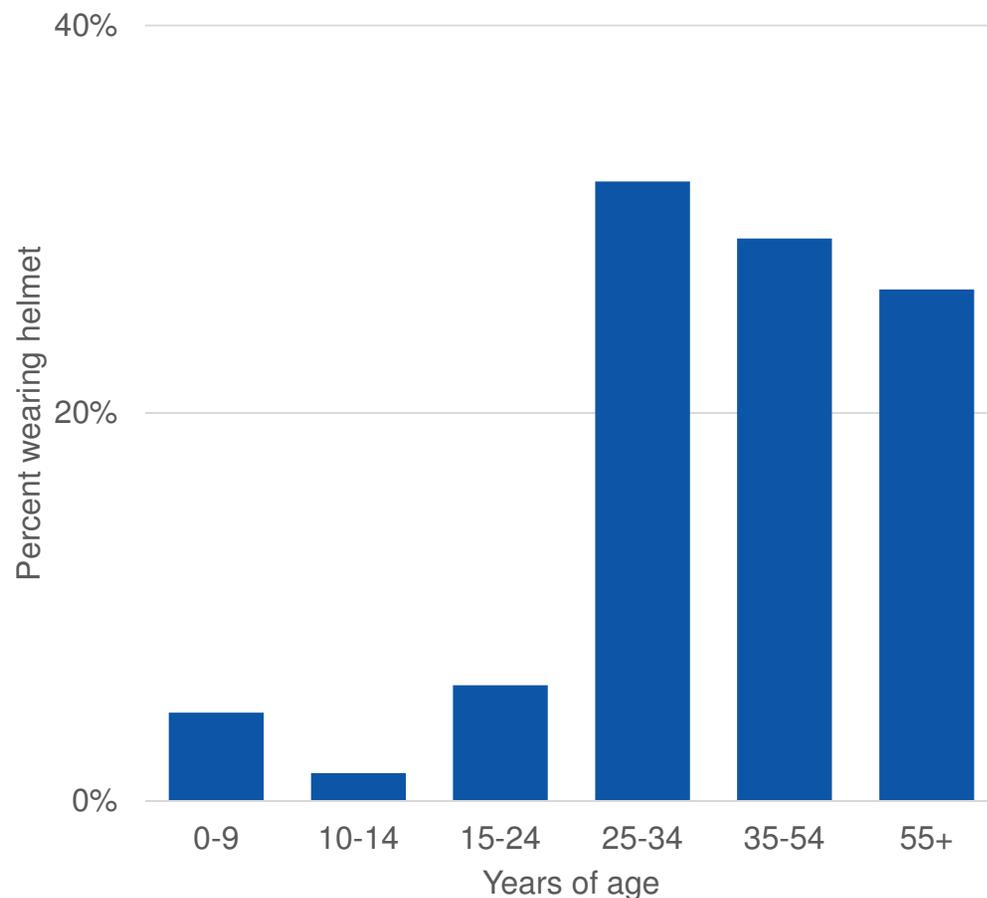
[†]EMS and TxDOT crash linked dataset, Injury Epidemiology & Surveillance Branch, Texas Department of State Health Services

WHO USES HELMETS?

Of 579 records in the linked dataset with helmet use information, only 17% were wearing a helmet at the time of their crash with a motor vehicle. The median age of helmet-wearing cyclists was 39 compared to non-helmet-wearing cyclists, who had a median age of 21. Among children under 15 years, less than 3% were wearing a helmet at the time of the incident.

Helmet use among males and females was similar. In contrast, non-Hispanic white bicyclists in the linked dataset were more likely to be wearing a helmet than those of other races or ethnicities. Of cyclists wearing a helmet, 81% were non-Hispanic white.

Older cyclists involved in motor vehicle crashes in Texas were more likely to be wearing a helmet, 2012-2013[†]



[†]EMS and TxDOT crash linked dataset, Injury Epidemiology & Surveillance Branch, Texas Department of State Health Services

30%

Percentage of children under 15 involved in motor vehicle crashes while bicycling who were wearing a helmet[†]



[†]EMS and TxDOT crash linked dataset, Injury Epidemiology & Surveillance Branch, Texas Department of State Health Services

SAFETY STRATEGIES

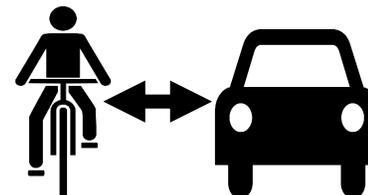
Helmets

Bicycle helmet laws for children are effective for increasing helmet use and reducing crash-related injuries and deaths among children [6], and are enhanced when combined with supportive publicity and education campaigns. Texas has no state-wide law requiring cyclists of any age to wear a helmet. However, nine cities in Texas have helmet laws for children.



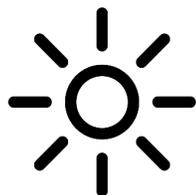
Safe passage laws

Nearly thirty states have laws requiring a minimum clearance distance when passing cyclists. Statewide legislation for Texas requiring 3 ft (6 ft for commercial vehicles) has been proposed during a previous legislative session. Twenty-three Texas cities have safe passage distance ordinances.



Active lighting and rider visibility

Fluorescent clothing can enhance rider visibility in the daytime [7]. At night, retro-reflective clothing and active lighting may improve the visibility of cyclists [7]. Texas requires cyclists riding at night to have an active front white light, active rear red light, and a rear reflector. The lights must be visible from a distance of 500 feet.



Roadway engineering measures

Bike-friendly communities make bicycling safe, comfortable, and convenient for people of all ages and abilities. Dedicated bike lanes and other engineering measures may enhance bicyclist safety.





In March 2011, San Antonio became the first city in Texas to launch a bike share program. It remains the largest bike sharing program in the state.

CYCLING PROGRAMS IN TEXAS

AUSTIN

BikeTexas

<http://www.biketexas.org>

Bike Texas College Active Transport Safety (CATS) Program

Ghisallo Cycling Initiative

<http://www.ghisallo.org>

After-school Bike Clubs; Earn-A-Bike program; Bicycle Rodeos

Please BE KIND to Cyclists

<http://www.bekindtocyclists.org>

Cyclists' Tragedy Assistance Program (T.A.P)

DALLAS

Elbowz Racing

<http://www.elbowzracing.com>

Elbowz Racing Bicycle Safety Program

HOUSTON

BikeHouston

<https://www.bikehouston.org>

SAN ANTONIO

Alamo Area Metropolitan Planning Organization, San Antonio

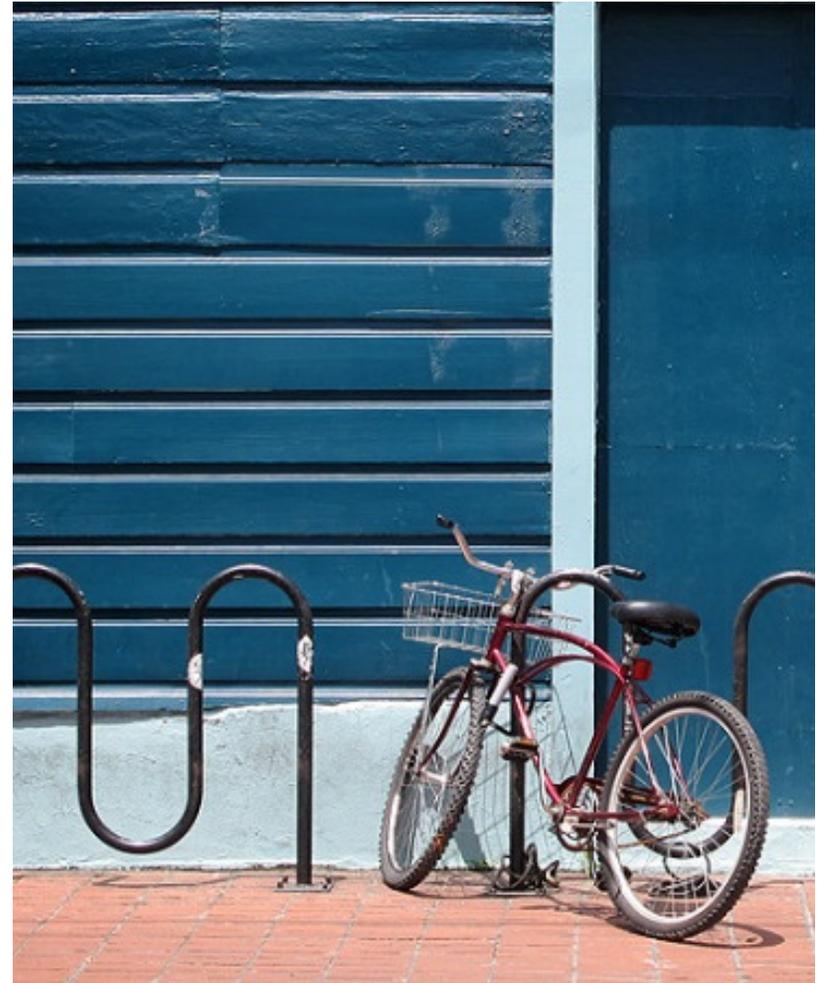
<http://www.alamoareampo.org/Bike-Ped>

Bike Walk Safe Alamo Area

SUMMARY

Cyclists of all ages, races, ethnicities, and sexes were involved in motor vehicle crashes in Texas. Most bicyclists in Texas involved in motor vehicle crashes during 2012-2013 were non-Hispanic white and male. There were racial and age disparities in helmet use among bicyclists in the dataset. Non-Hispanic whites were more likely to have been wearing a helmet than non-whites, as were older cyclists. Troublingly, helmet use among children under 15 years was almost non-existent. Because of the overall small number of individuals wearing helmets, we were unable to make inferences about whether helmet use was associated with less debilitating injuries.

There are limitations to our analysis. Only individuals identified in the linked dataset were included, and not all groups may be equally likely to have records linked because of factors such as missing names or social security numbers. Additionally, there may be demographic or helmet use differences with regard to notification of TxDOT and requests for EMS transport, which could bias our comparisons of helmet use between groups. Lastly, it is important to note that motor vehicle crashes account for a minority of all bicycle crashes resulting in injuries [8].



TECHNICAL NOTES

Defining Racial/Ethnic Groups:

Race was defined by combining race and ethnic group in the databases. An individual was defined as Hispanic if they chose Hispanic for their ethnicity, regardless of race. American Indian/Alaska Native, Native Hawaiian/Pacific Islander, multiracial and individuals with missing race or ethnicity data were classified as Other or Unknown.

Databases:

The databases used for the purposes of this document are the EMS Registry (ETR) and Texas Department of Transportation (TxDOT) motor vehicle crash database. All data were from 2012 and 2013.

Texas Administrative Code §103.1 – §103.8 requires the collection of reportable event data from EMS providers, hospitals, Justices of the Peace, Medical Examiners, and rehabilitation facilities. The EMS & Trauma Registries (ETR) is a statewide passive surveillance system that collects these data. Texas is home to one of the largest EMS registries in the United States with more than 2.6 million EMS runs received annually. EMS providers shall report all runs. A run is a resulting action from a call for assistance where an EMS provider is dispatched to, responds to, provides care to, or transports a person. This includes trauma and medical, emergency and non-emergency, transport and non-transport runs.

Texas Transportation Code §550.062 requires any law enforcement officer who in the regular course of duty investigates a motor vehicle crash that (1) results in injury to or the death of a person or (2) damage to the property of any one person to the apparent extent of \$1,000 or more, to submit a written report of that crash using the Texas Peace Officer's Crash Report (CR-3) to TxDOT not later than the 10th day after the date of the crash. TxDOT collects crash reports from every law enforcement agency in Texas for crashes that occur on any public roadway in Texas, not just crashes occurring on the state highway system. TxDOT also collects Driver's Crash Reports (CR-2) (Blue Form). Texas Transportation Code §550.061 requires the operator of a vehicle involved in a crash to make a written report of the crash if the crash is not investigated by a law enforcement officer and the crash resulted in (1) injury to or the death of a person or (2) damage to the

property of any one person to an apparent extent of \$1,000 or more. The CR-2 must be filed with TxDOT not later than the 10th day after the date of the crash. A person commits an offense if the person does not file the report with TxDOT.

Data Linkage Procedures:

We used Link Plus, which is a free probabilistic record linkage program developed at the Centers for Disease Control and Prevention (CDC), Division of Cancer Prevention and Control. Prior to linkage, the data were cleaned, and duplicates were removed. Link Plus requires users to choose blocking and matching variables. Blocking variables speed up the data analysis process and represent a subset of matching variables. For each matching variable, we used the appropriate matching system (e.g., birth dates, names, Social Security Numbers). If a variable type had no appropriate matching system, we used the generic string setting.

Blocking variables included date of birth, sex, and incident date. Matching variables included all blocking variables, county of injury, last name, first name, middle name, and dispatch-time. We used the direct method and the default cutoff value as recommended by the CDC. After the matching analysis was completed, we manually reviewed the data to determine upper, middle, and lower values. We manually reviewed the potential matches with intermediate values using *a priori* defined standards for a match. A cutoff value was chosen, establishing the minimum score for which matched records would be accepted. Further analyses comparing the original and linked datasets are needed to determine the extent to which the linkage procedure may have been biased.

Limitations:

It is possible that there are demographic differences in regards to notification of TxDOT and requests for EMS transport, which could bias our comparisons of helmet use between groups.

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Table 1. Demographics and helmet use of bicyclists involved in motor vehicle crashes in the linked dataset with subsequent EMS dispatch, Texas, 2012-2013[†]

Demographic category	Total EMS runs	Helmet use	
		Y	N
Sex			
Male	504	76	393
Female	121	23	87
Age Group			
0-9	47	‡	‡
10-14	76	‡	‡
15-24	186	10	158
25-34	78	23	49
35-54	138	38	93
55+	97	24	67
Not reported	3	—	—
Race/Ethnicity			
Hispanic	150	13	129
Non-Hispanic			
White	342	80	239
Black	118	3	102
Asian	9	‡	‡
Other/unknown	6	‡	‡
Total	625	99	480

[†]EMS and TxDOT crash linked dataset, Injury Epidemiology & Surveillance Branch, Texas Department of State Health Services

[‡]Suppressed because of small numbers.