

Roadway Departure Safety Workshop

Central San Joaquin Counties

Sponsored by FHWA California Division
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Hanford, California

David Ragland, PhD, MPH, Co-Director, U.C. Berkeley, Safe Transportation
Research and Education Center (SafeTREC)

Topics

- A. Introduction
- B. Road Departure Injuries
- C. Comparison among Counties
- D. Kings County (Example)
- E. Potential Countermeasures
- F. Summary and Questions
- G. Appendix (Maps for Individual Counties)

Central San Joaquin Counties





Central San Joaquin Counties (Statistics)

County	Population	Road Miles (Thousand)	VMT (100 Million)	Caltrans District	CHP Division
Kings	149,785	1,545	14.1	6	4
Tulare	460,437	4,893	36.7	6	4
Fresno	979,915	6,955	82.4	6	4
Total	1,590,137	13,393	133.2		
California	38,993,940	174,803	3,398.4		

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Road Way Departure FHWA Definition

Movement Preceding Crash

- Leave roadway left or right
- Cross over the center line

****and / or****

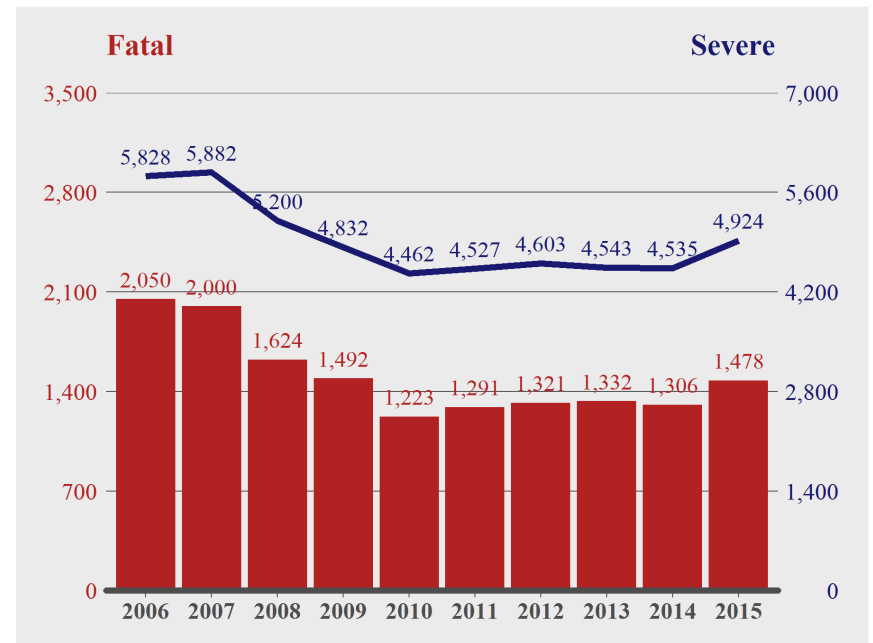
Outcome (If any of these happen its assumed vehicle left roadway)

- Hit object
- Roll over
- Head on

Fatal & Severe Injuries Trends (Lane Departures)



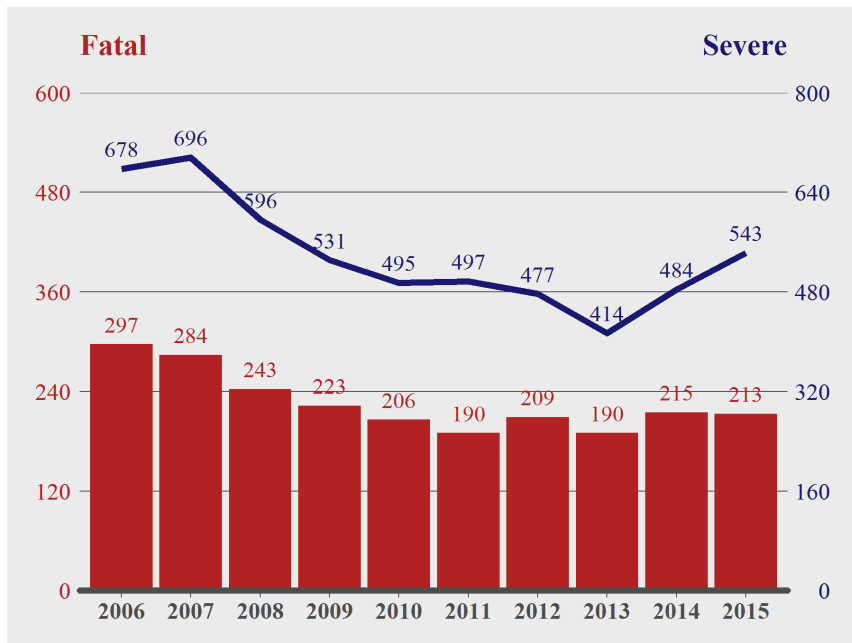
(a) Central San Joaquin Counties



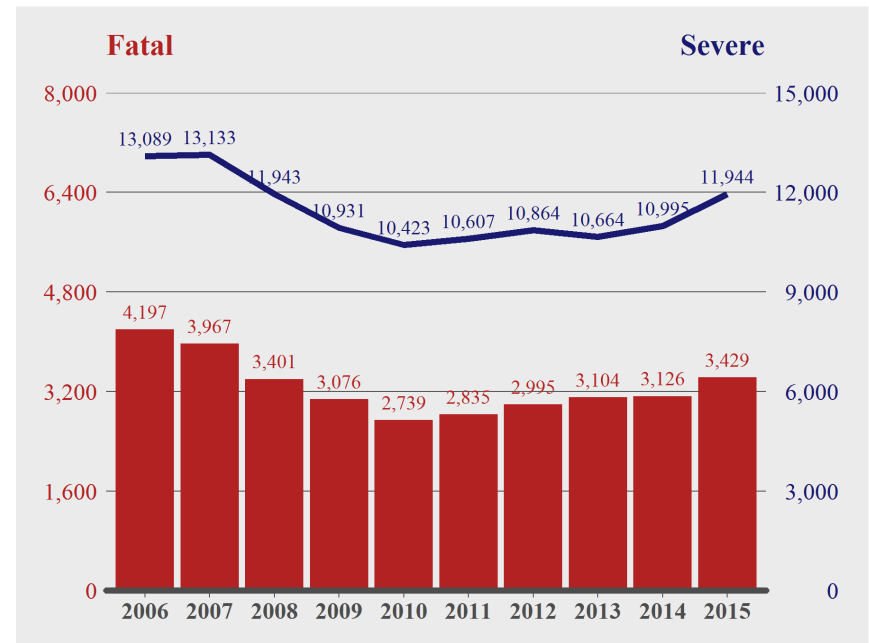
(b) Rest of the State

Source: SWITRS 2006 – 2015

All Fatal & Severe Injuries Trends (Central San Joaquin Counties vs. California)



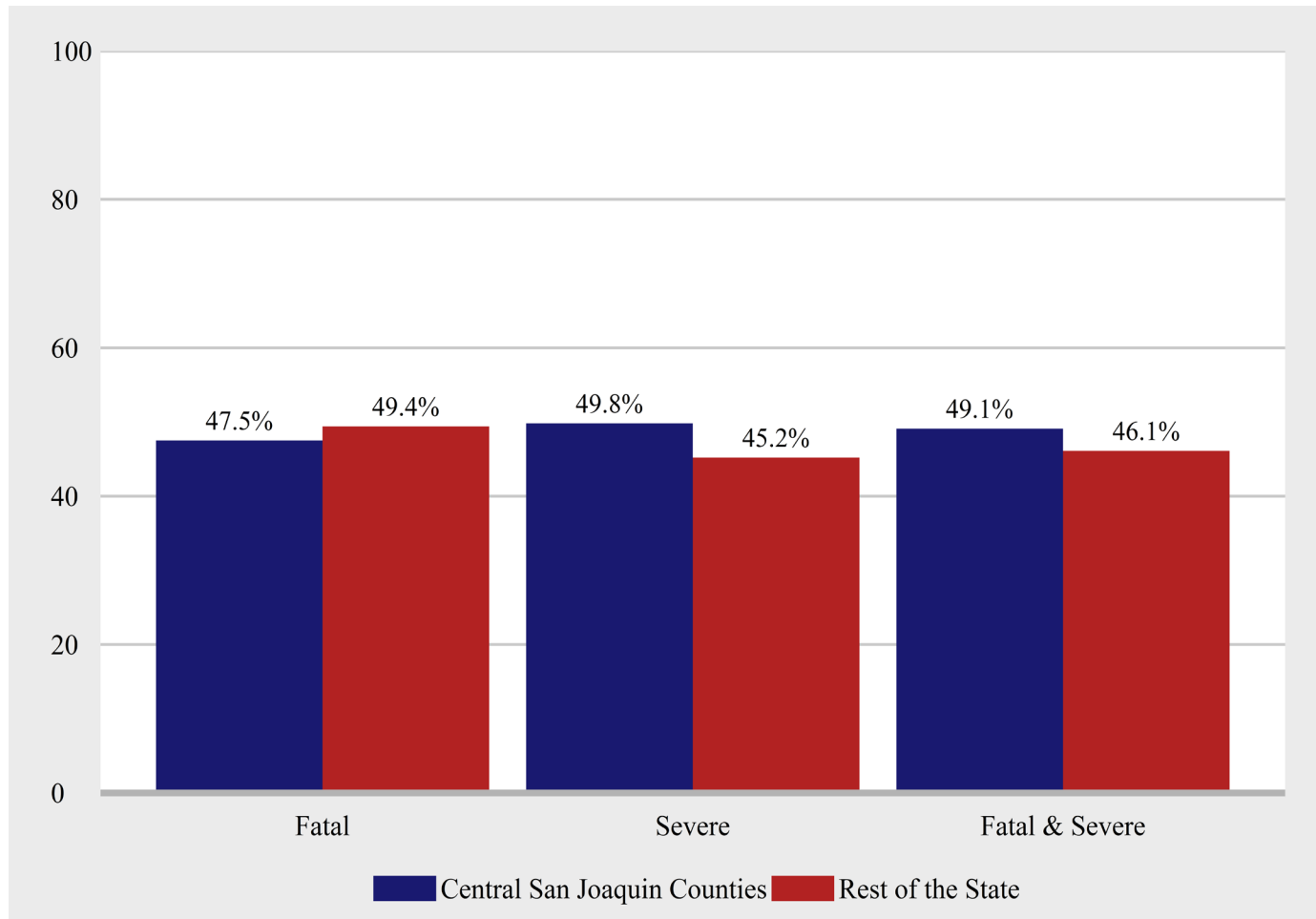
(a) Central San Joaquin Counties



(b) California

Source: SWITRS 2006 – 2015

% Fatal and Severe Injuries (Lane Departures)



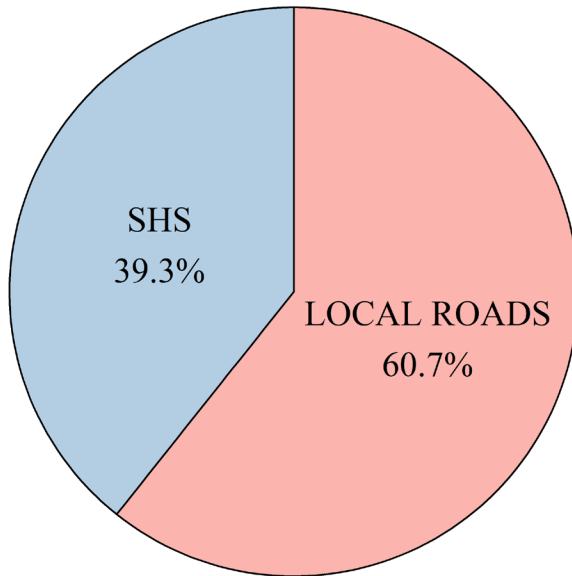
Source: SWITRS 2006 – 2015

9/27/2017

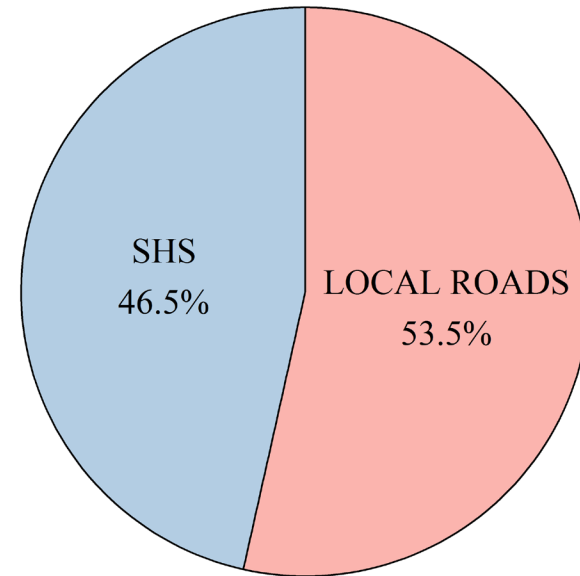
Note: Group injury percentage is defined as group injuries (lane departure) relative to group total injuries.

% Fatal & Severe Injuries (Lane Departures) on State Highway System (SHS) vs. Local Roads

Central San Joaquin Counties



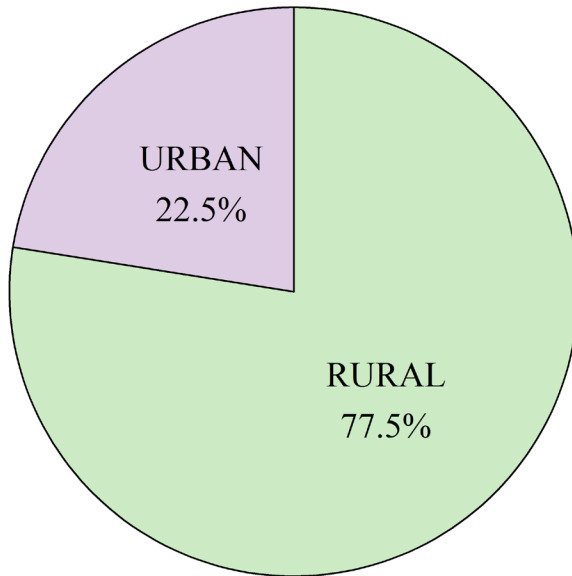
Rest of the State



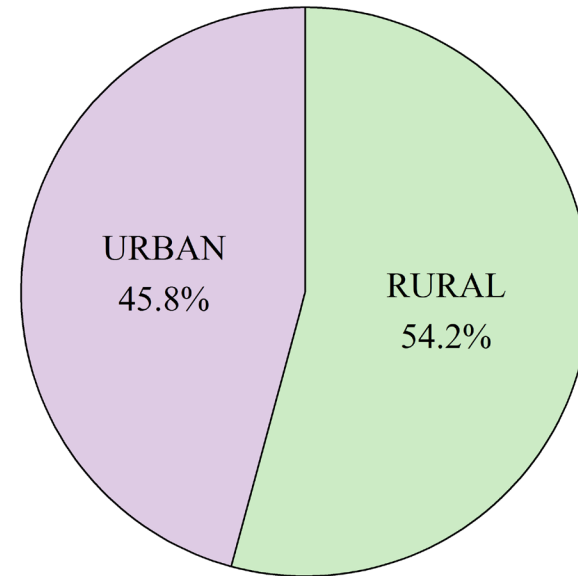
Source: SWITRS 2006 – 2015

% Fatal & Severe Injuries (Lane Departures) on Urbanicity

Central San Joaquin Counties

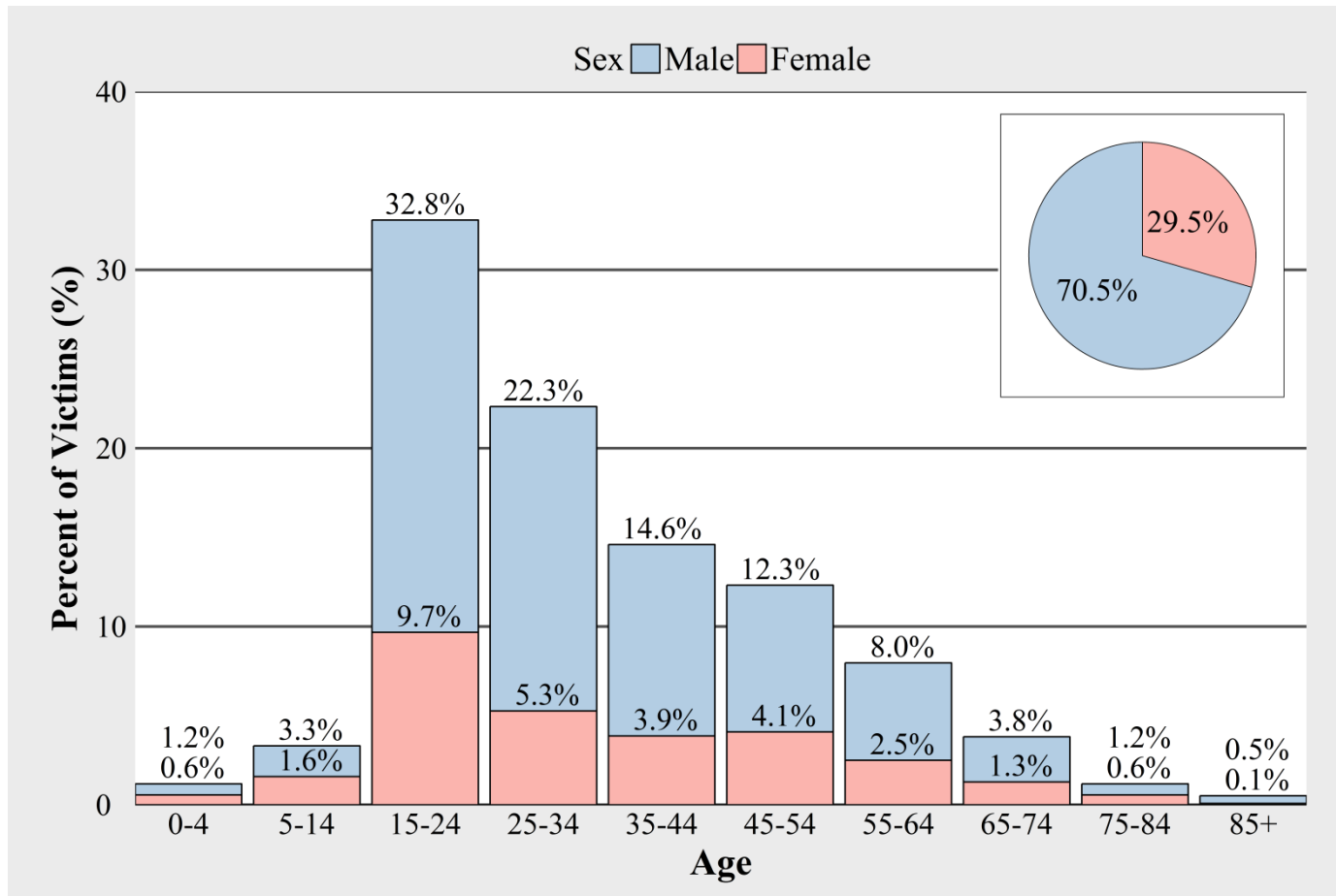


Rest of the State



Source: SWITRS 2006 – 2015

Fatal & Severe Injuries (Lane Departures) by Sex and Age (Central San Joaquin Counties)



Source: SWITRS 2006 – 2015

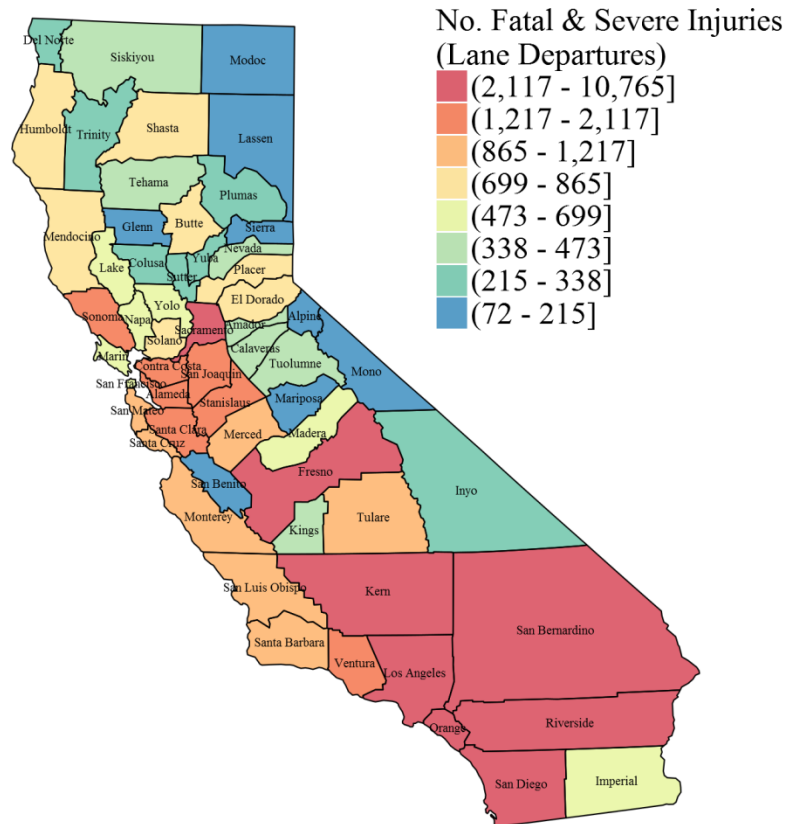
Central San Joaquin Counties and Rest of State (Summary)

- From 2006-2015 trends downward to about 2010 and then shift upward, for both total and roadway departure injuries (for central San Joaquin counties and for the rest of the state)
- Percent of roadway departure injuries is similar in the central San Joaquin counties and the rest of the state.
- Local road and rural involvement for roadway departure injuries is higher in central San Joaquin counties compared to rest of the state.

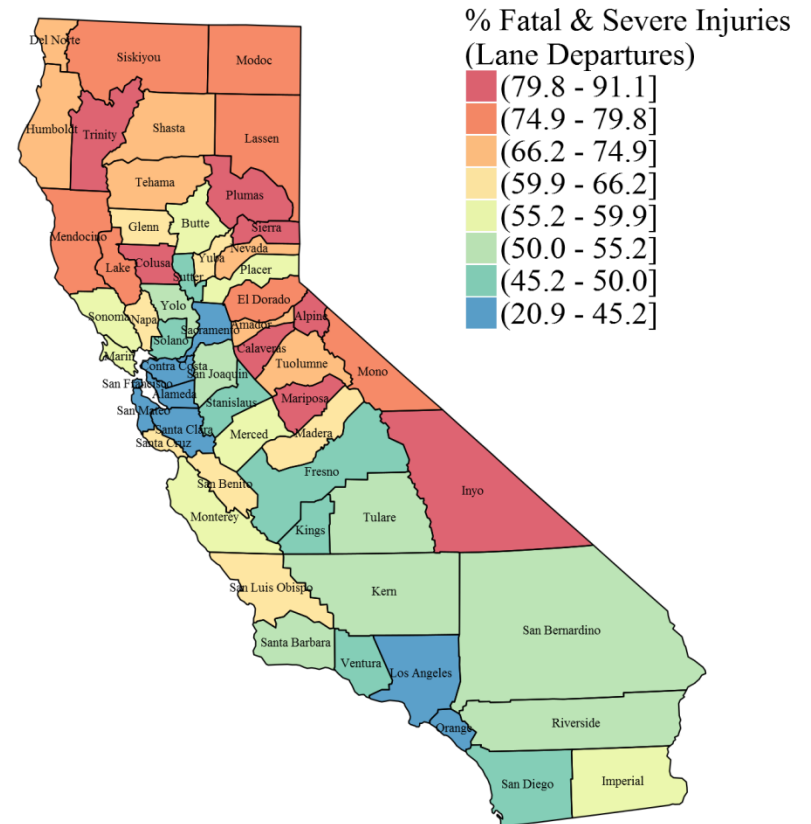
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Fatal and Severe Road Departure Injuries Number (Left) and Percent of Total (Right) by County

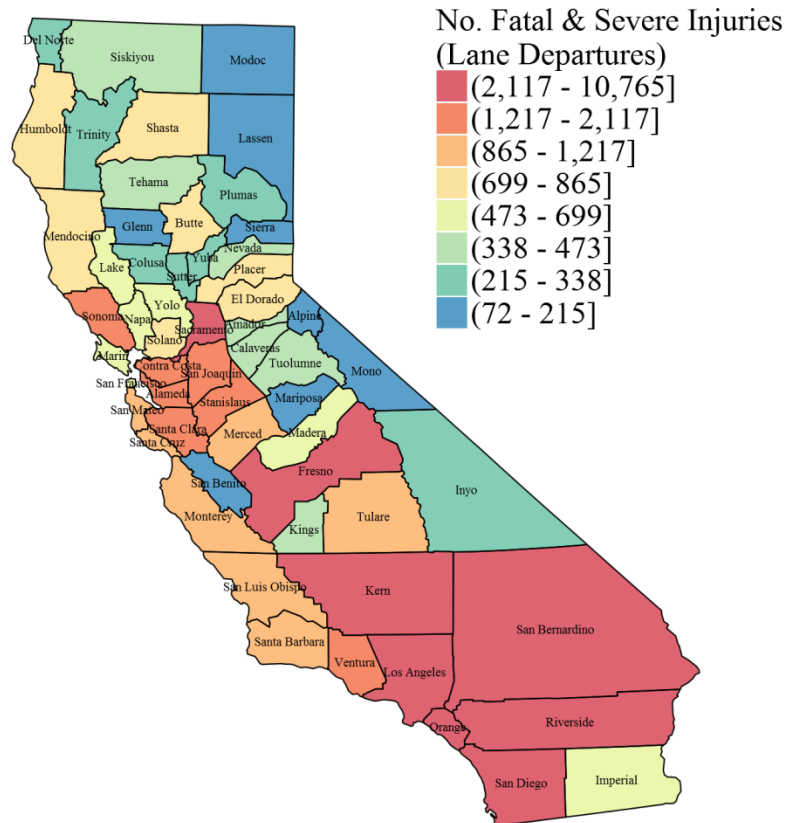


(a) Number of Fatal and Severe Injuries

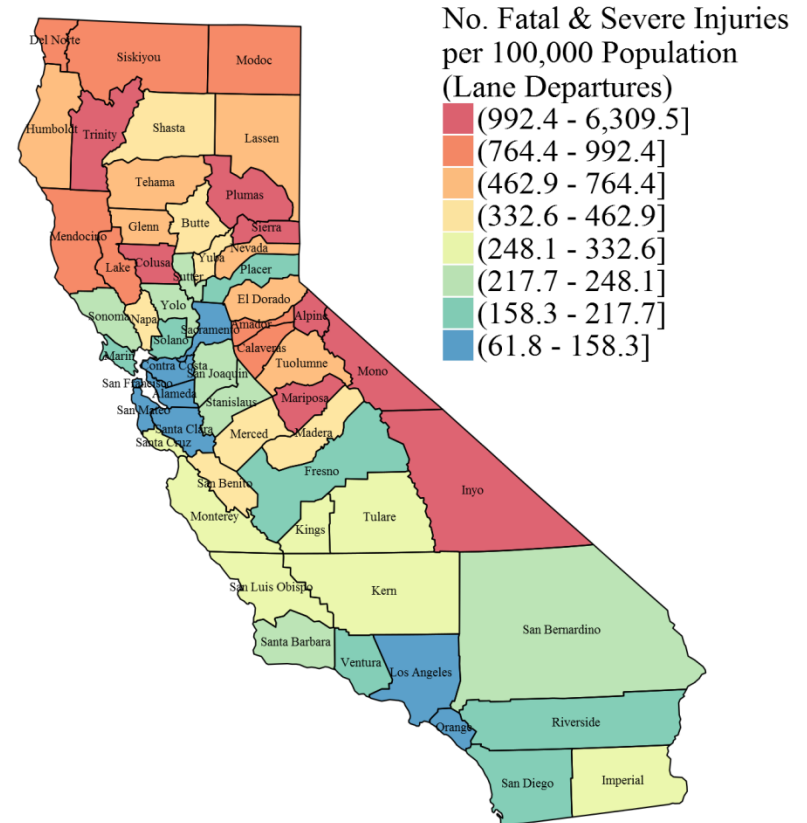


(b) Percent of Fatal and Severe Injuries

Fatal and Severe Lane Departure Injuries Number (Left) and Population-Based Rate (Right) by County



(a) Number of Fatal and Severe Injuries



(b) Ratio of Fatal and Severe Injuries per 100,000 Population

Roadway Departure – Percent of Total by County (2011-2015)

	Leave-Lane FSI Injuries			Total FSI Injuries			Percentage (%)		
County	Fatal	Severe Injuries	FSI	Fatal	Severe Injuries	FSI	Fatal	Severe Injuries	FSI
Fresno	271	705	976	596	1,408	2,004	45.5	50.1	48.7
Kings	47	139	186	100	279	379	47.0	49.8	49.1
Tulare	139	360	499	321	728	1,049	43.3	49.5	47.6
TOTAL	457	1,204	1,661	1,017	2,415	3,432	44.9	49.9	48.4
California	7,187	24,337	31,524	15,487	55,072	70,559	46.4	44.2	44.7

Roadway Departure Fatal and Severe Injuries Population Based Rates Per Year (2011-2015)

County	RwD Fatal / Severe Injuries	Population	Number / 100,000 Population / Year
Kings	186	149,785	24.8
Tulare	499	460,437	21.7
Fresno	976	979,915	19.9
Total	1,661	1,590,137	20.9
California	31,521	38,993,940	16.2

Roadway Departure Fatal and Severe Injuries Road Miles Based Rates Per Year (2011-2015)

County	RwD Fatal / Severe Injuries	Road Miles	Number per 1000 Road Miles/Year
Kings	186	1,545	24.1
Tulare	499	4,893	20.4
Fresno	976	6,955	28.1
Total	1,661	13,393	24.8
California	31,521	174,803	36.1

Roadway Departure Fatal and Severe Injuries VMT Based Rates Per Year (2011-2015)

County	RwD Fatal / Severe Injuries	VMT	Num per 100 Million VMT / Year
Kings	186	14.1	2.6
Tulare	499	36.7	2.7
Fresno	976	82.4	2.4
Total	1,661	133.2	2.5
California	31,521	3,398.4	1.9

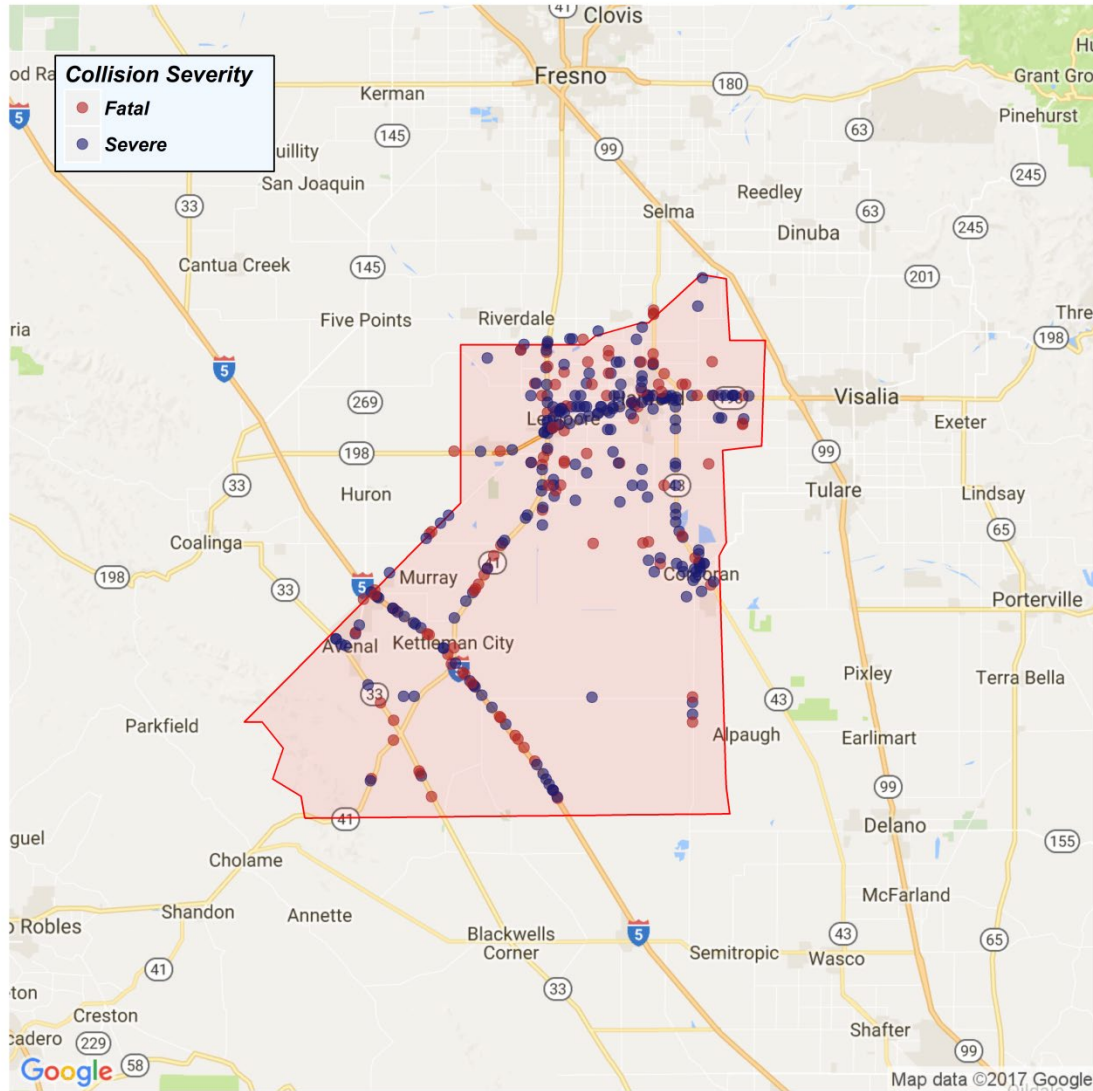
Comparison Among Counties (Summary)

- The percent of fatal and severe injury roadway departure are similar to the rest of the state
- Population-based rates are higher among Central San Joaquin Counties
- VMT-based rates vary among counties and are higher in Central San Joaquin Counties
- Road mile-based rates vary among counties and are somewhat lower in Central San Joaquin Counties (implications for systemic approach)

Topics

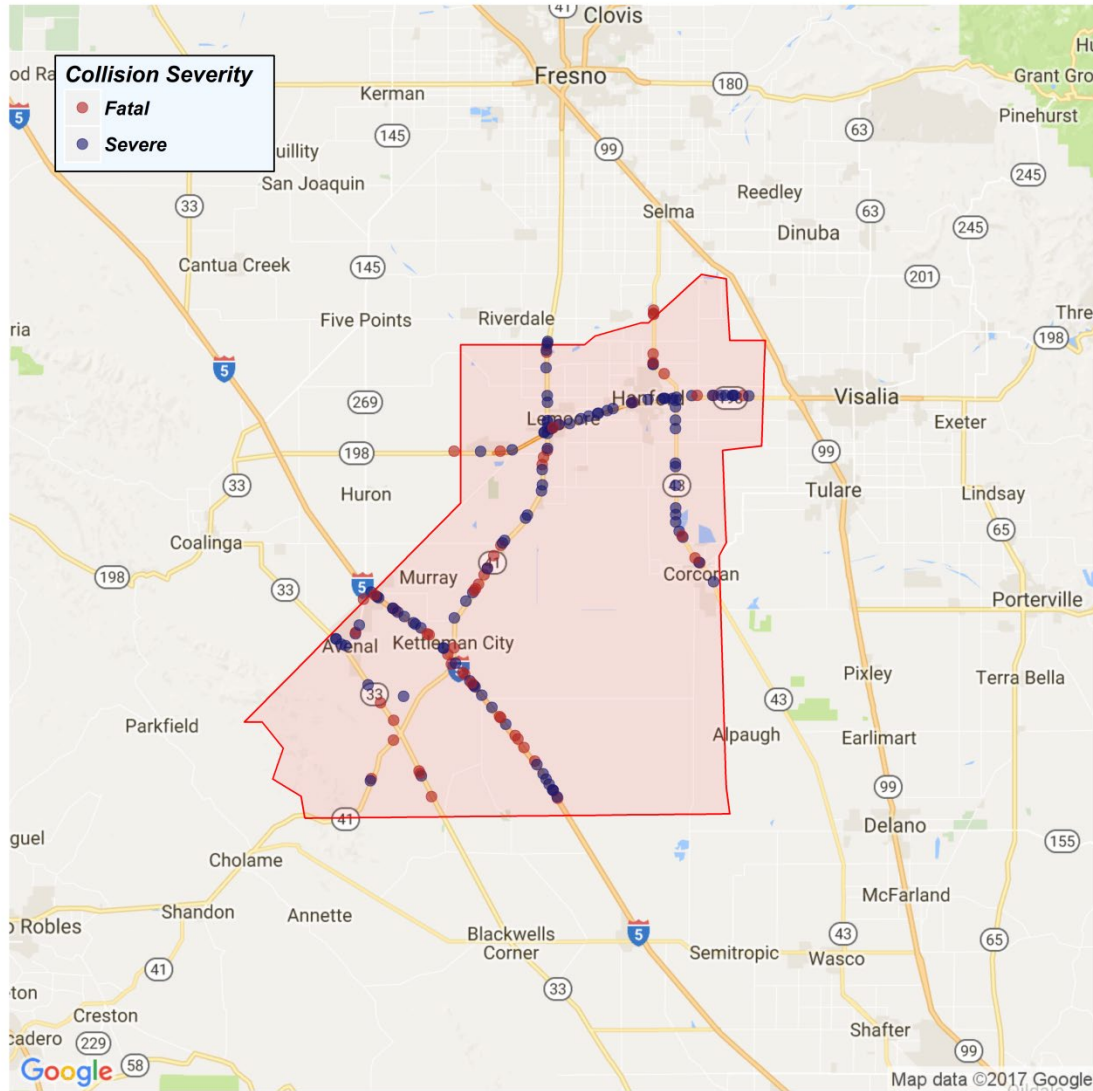
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Kings County Road Departure Collisions (2006 – 2015)



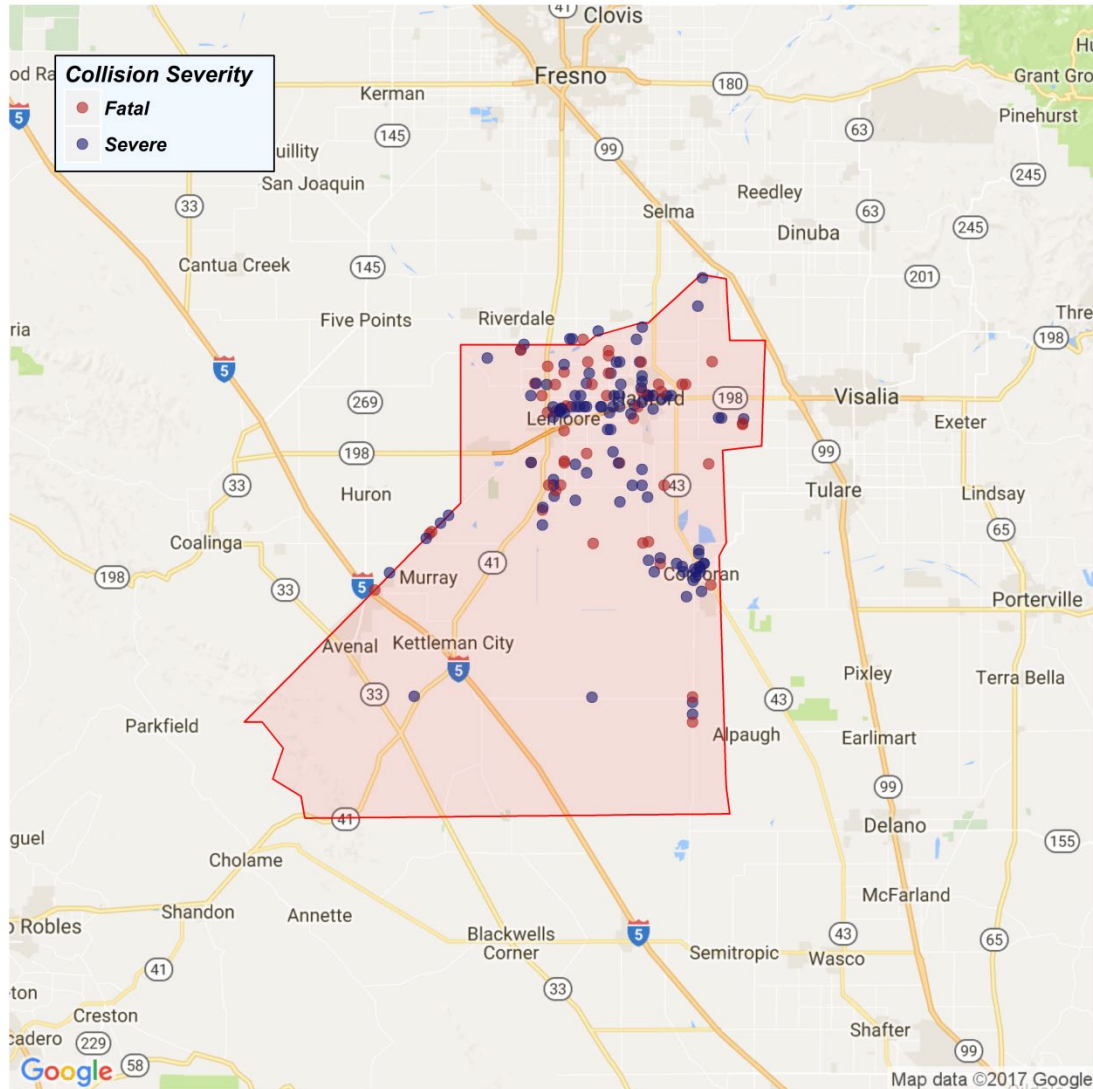
317 fatal or severe road departure collisions from 2006 to 2015 [kings: county total]

Kings County State-Highway Road Departure Collisions (2006 – 2015)



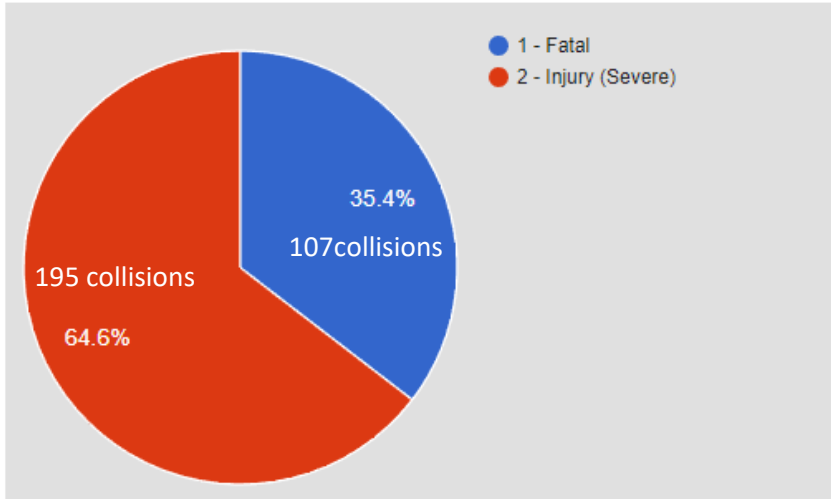
163 fatal or severe road departure collisions from 2006 to 2015 [kings: state_highway]

Kings County Non-State-Highway Road Departure Collisions (2006 – 2015)



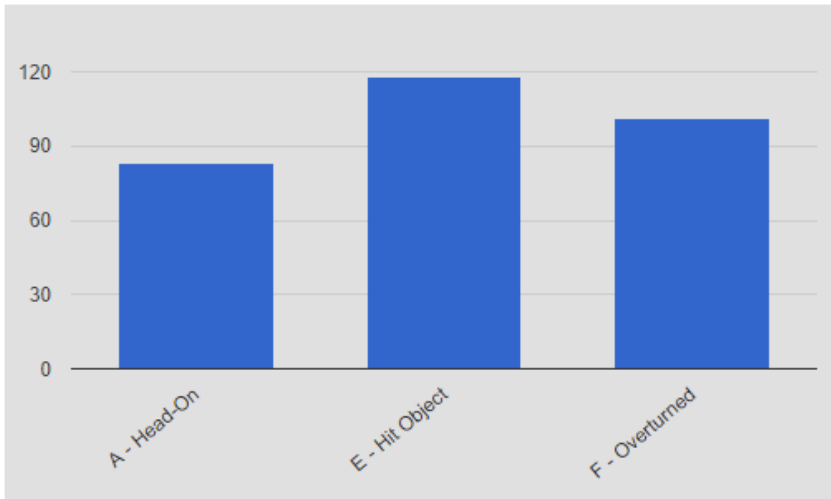
154 fatal or severe road departure collisions from 2006 to 2015 [kings: non_state_highway]

Kings County Summary Statistics



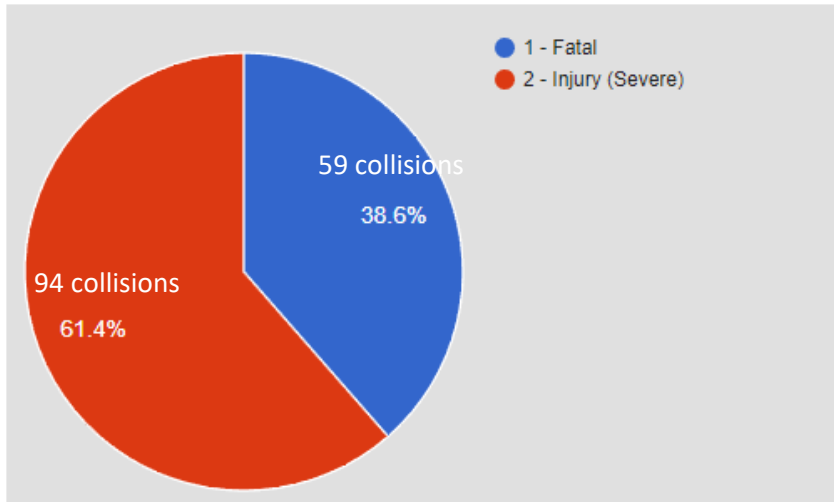
- Summary statistics for 302 collisions.

Primary Collision Factor	Collisions	Percentage
Improper Turning	117	38.7%
Driving or Bicycling Under the Influence of Alcohol or Drug	87	28.8%
Unsafe Speed	38	12.6%
Wrong Side of Road	32	10.6%
Automobile Right of Way	11	3.6%
Improper Passing	8	2.6%
Other Than Driver (or Pedestrian)	3	1%
Other Improper Driving	3	1%
Unsafe Lane Change	1	0.3%
Pedestrian Right of Way	1	0.3%
Traffic Signals and Signs	1	0.3%



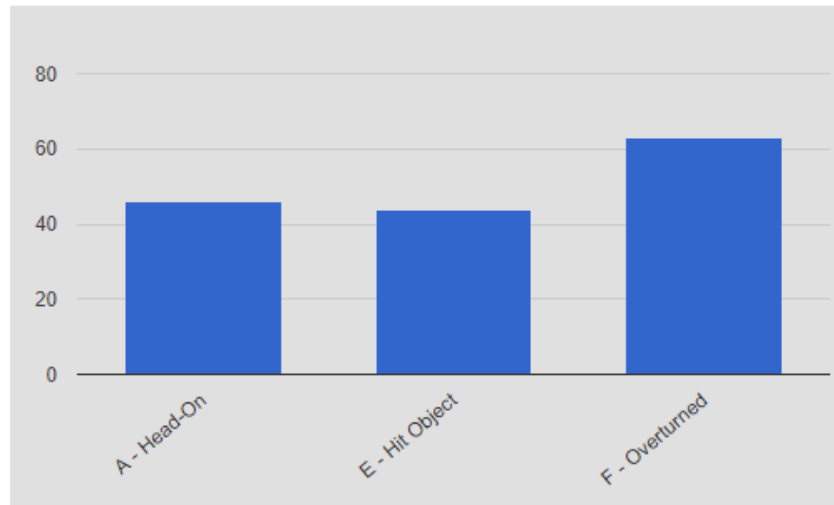
Motor Vehicle Involved With	Collisions	Percentage
Fixed Object	122	40.4%
Non-Collision	86	28.5%
Other Motor Vehicle	77	25.5%
Other Object	11	3.6%
Parked Motor Vehicle	3	1%
Motor Vehicle on Other Roadway	2	0.7%
Pedestrian	1	0.3%

Kings County Summary Statistics for State Highway Only Road Departure Collisions



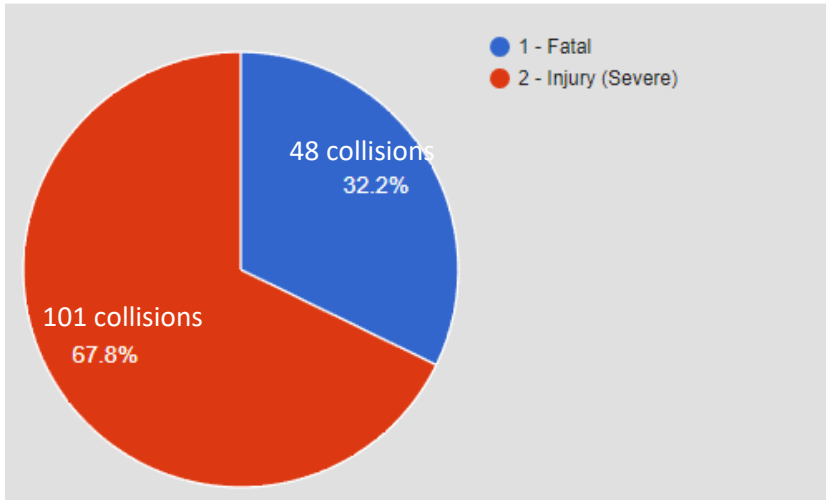
- Summary statistics for 153 collisions.

Primary Collision Factor	Collisions	Percentage
Improper Turning	71	46.4%
Driving or Bicycling Under the Influence of Alcohol or Drug	41	26.8%
Unsafe Speed	16	10.5%
Wrong Side of Road	10	6.5%
Improper Passing	7	4.6%
Automobile Right of Way	4	2.6%
Other Improper Driving	2	1.3%
Unsafe Lane Change	1	0.7%
Other Than Driver (or Pedestrian)	1	0.7%



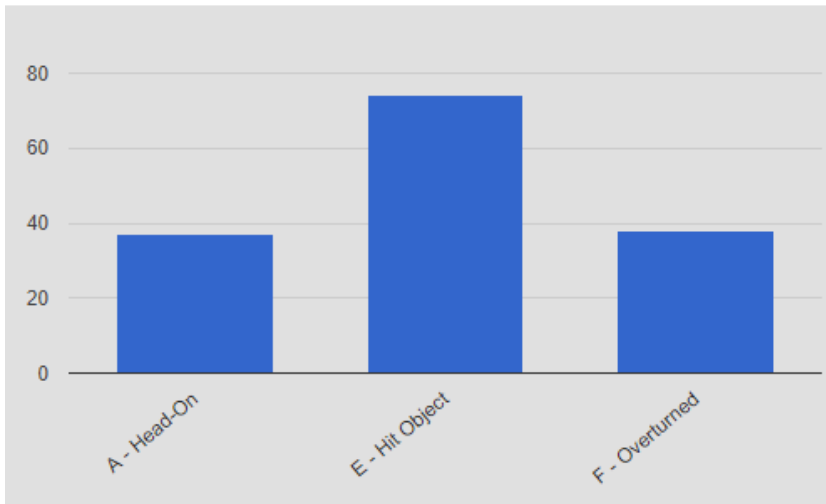
Motor Vehicle Involved With	Collisions	Percentage
Non-Collision	52	34%
Fixed Object	50	32.7%
Other Motor Vehicle	44	28.8%
Other Object	5	3.3%
Motor Vehicle on Other Roadway	2	1.3%

Kings County Summary Statistics for Non-State Highway Road Departure Collisions

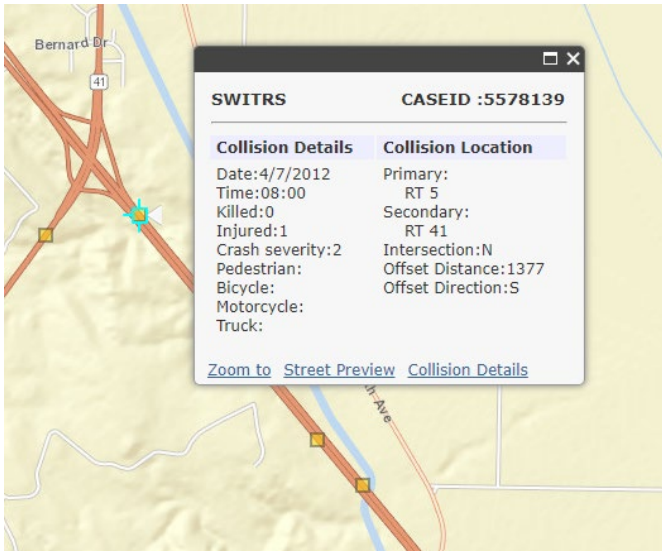


- Summary statistics for 149 collisions.

Primary Collision Factor	Collisions	Percentage
Driving or Bicycling Under the Influence of Alcohol or Drug	46	30.9%
Improper Turning	46	30.9%
Unsafe Speed	22	14.8%
Wrong Side of Road	22	14.8%
Automobile Right of Way	7	4.7%
Other Than Driver (or Pedestrian)	2	1.3%
Improper Passing	1	0.7%
Pedestrian Right of Way	1	0.7%
Traffic Signals and Signs	1	0.7%
Other Improper Driving	1	0.7%



Motor Vehicle Involved With	Collisions	Percentage
Fixed Object	72	48.3%
Non-Collision	34	22.8%
Other Motor Vehicle	33	22.1%
Other Object	6	4%
Parked Motor Vehicle	3	2%
Pedestrian	1	0.7%



Collision Details: Case ID **5578139**

Collision Factors

County	KINGS	City	UNINCORPORATED
Date (M-D-Y)	04-07-2012	Time	08:00
Intersection	RT 5 & RT 41		
Dist. & Dir. from Intersection	1377 ft South		
Coordinate Location	35.97860499, -119.956902587		
State Highway	Y	Route	5N Postmile 16.382
Killed & Injured	0 Killed 1 Injured	Crash Type	Overtured
Alcohol	No	Weather	Clear
Primary Collision Factor	Unsafe Speed	Involved with	Non-Collision
Pedestrian Involved	No	Bicycle Involved	No

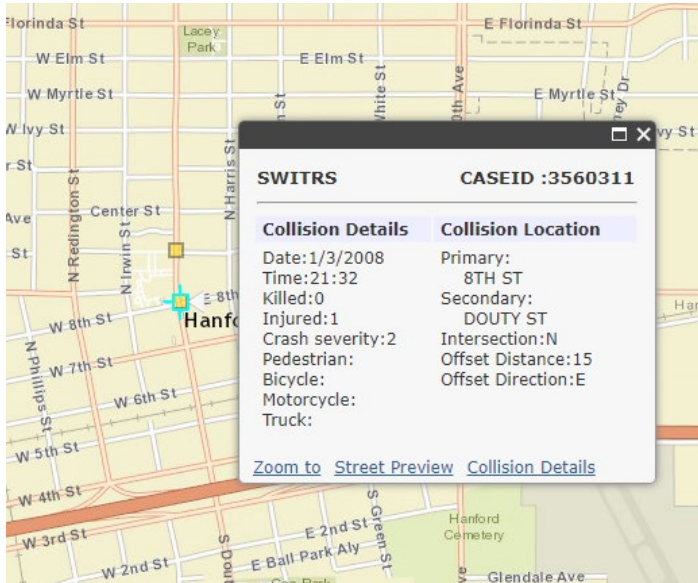
Party Factors

Number of Parties Involved		1	
Party Type	At Fault	Party Direction	Movement Preceding Collision
Driver	Yes	North	Ran Off Road

Map View

Street View

Example of Road Departure Collision on RT-5



Collision Details: Case ID **3560311**

Collision Factors

County	KINGS	City	HANFORD
Date (M-D-Y)	01-03-2008	Time	21:32
Intersection	8TH ST & DOUTY ST		
Dist. & Dir. from Intersection	15 ft East		
Coordinate Location	36.3277435303, -119.645882411		
State Highway	N	Route	- Postmile -
Killed & Injured	0 Killed 1 Injured	Crash Type	Hit Object
Alcohol	No	Weather	Clear
Primary Collision Factor	Unsafe Speed	Involved with	Fixed Object
Pedestrian Involved	No	Bicycle Involved	No

Party Factors

Number of Parties Involved		1	
Party Type	At Fault	Party Direction	Movement Preceding Collision
Driver	Yes	North	Proceeding Straight

Map View

Street View

The Street View image shows a street intersection with a white arrow pointing left across the road. A red pin is placed on the map at the intersection of 8th St and Douty St. The map shows various buildings, including Kings County Library, Superior Dairy Product, and Hanford Parks and Recreation Department. The address 234 N Douty St is visible.

Example of Road Departure collision on non-state highway road

CALIFORNIA **PUBLIC** 2014 **ROAD DATA**

Statistical Information Derived from the
Highway Performance Monitoring System

Kings County

Maintained Miles and DVMT

Table 6

**2014 Maintained Miles & DVMT
Estimates by Jurisdiction**

COUNTY JURISDICTION	MAINTAINED MILES			DVMT [1,000]			
	RURAL	URBANIZED	TOTAL	RURAL	URBANIZED	TOTAL	
KINGS							
Cities:	AVENAL	9.18	23.34	32.52	3.25	21.26	24.51
	CORCORAN	1.08	50.34	51.42	0.38	93.45	93.83
	HANFORD	5.05	215.66	220.71	6.29	539.10	545.39
	LEMOORE	2.85	90.14	92.99	1.01	151.48	152.49
Other:	BUREAU OF INDIAN AFFAIRS	1.50		1.50	0.09		0.09
	KINGS COUNTY	881.15	60.96	942.11	612.36	217.09	829.45
	STATE HIGHWAYS	114.72	41.99	156.71	1,622.97	571.00	2,193.97
	U.S. NAVY		47.06	47.06		30.35	30.35
KINGS TOTAL		1,015.53	529.48	1,545.01	2,246.36	1,623.72	3,870.08

Kings County

Rate per 1000 Road/Miles/Year SHS versus Non-SHS (2011-2015)

Kings County SHS Versus Non-SHS	RwD Fatal / Severe Injuries	Road Miles	Number per 1000 Road Miles/Year
SHS	94	157	120.5
Non-SHS	92	1,389	13.2
Total	186	1,545	24.1

Kings County (Summary)

- Different spatial patterns for SHS versus non-SHS
- Higher percent of Hit Object on non-SHS
- Higher percent of fatal crashes on SHS
- Higher density of crashes on SHS

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Potential Countermeasures

(To be discussed later in the program)

- Start smart program,
- Age wise, Drive smart program
- DUI checkpoints and roving enforcement
- Radar trailer deployment
- High Friction Surface Treatment
- Rumble strips
- Safety Edge

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Summary

- From 2006-2015 trends downward to about 2010 and then shift upward, for both total and roadway departure injuries (for Central San Joaquin Counties and for the rest of the state)
- Percent of roadway departure injuries are similar among counties and to rest of the state.
- Population-based rates of roadway departure injuries are higher in Central San Joaquin Counties compared to rest of the state.
- State highway and rural involvement for roadway departure injuries are higher in Central San Joaquin Counties compared to rest of the state.
- VMT-based rates vary among counties and are higher in Central San Joaquin Counties
- Road mile-based rates vary among counties and are somewhat lower in Central San Joaquin Counties (implications for systemic approach)
- Effective Roadway Departure countermeasures are available and will be discussed later

Questions and Contact Information

David Ragland, PhD, MPH

Emeritus Adjunct Professor, School of Public Health

Co-Director, Safe Transportation Research and Education Center (SafeTREC)

(<http://safetrec.berkeley.edu/>)

University of California, Berkeley

[925-457-3682](tel:925-457-3682)

davidr@berkeley.edu

Transportation Injury Mapping System (TIMS):

<http://tims.berkeley.edu/>