Breakout Session 1:

One Size Doesn't Fit All: The Challenge Of Combating Impairment Across Age Groups

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Tara Kelley-Baker, Data and Information Group Leader, AAA Foundation for Traffic Safety

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One Size Doesn't Fit All: The Challenge of Combatting Impairment Across Age Groups

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National Center for Injury Prevention and Control (NCIPC)

10 Leading Causes of Death by Age Group, United States – 2017

Rank	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	Total
1	Congenital Anomalies 4,580	Unintentional Injury 1,267	Unintentional Injury 718	Unintentional Injury 860	Unintentional Injury 13,441	Unintentional Injury 25,669	Unintentional Injury 22,828	Malignant Neoplasms 39,266	Malignant Neoplasms 114,810	Heart Disease 519,052	Heart Disease 647,457
2	Short Gestation 3,749	Congenital Anomalies 424	Malignant Neoplasms 418	Suicide 517	Suicide 6,252	Suicide 7,948	Malignant Neoplasms 10,900	Heart Disease 32,658	Heart Disease 80,102	Malignant Neoplasms 427,896	Malignant Neoplasms 599,108
3	Maternal Pregnancy Comp. 1,432	Malignant Neoplasms 325	Congenital Anomalies 188	Malignant Neoplasms 437	Homicide 4,905	Homicide 5,488	Heart Disease 10,401	Unintentional Injury 24,461	Unintentional Injury 23,408	Chronic Low. Respiratory Disease 136,139	Unintentional Injury 169,936
4	SIDS 1,363	Homicide 303	Homicide 154	Congenital Anomalies 191	Malignant Neoplasms 1,374	Heart Disease 3,681	Suicide 7,335	Suicide 8,561	Chronic Low. Respiratory Disease 18,667	Cerebro-vascular 125,653	Chronic Low. Respiratory Disease 160,201
5	Unintentional Injury 1,317	Heart Disease 127	Heart Disease 75	Homicide 178	Heart Disease 913	Malignant Neoplasms 3,616	Homicide 3,351	Liver Disease 8,312	Diabetes Mellitus 14,904	Alzheimer's Disease 120,107	Cerebro-vascular 146,383
6	Placenta Cord. Membranes 843	Influenza & Pneumonia 104	Influenza & Pneumonia 62	Heart Disease 104	Congenital Anomalies 355	Liver Disease 918	Liver Disease 3,000	Diabetes Mellitus 6,409	Liver Disease 13,737	Diabetes Mellitus 59,020	Alzheimer's Disease 121,404
7	Bacterial Sepsis 592	Cerebro-vascular 66	Chronic Low. Respiratory Disease 59	Chronic Low Respiratory Disease 75	Diabetes Mellitus 248	Diabetes Mellitus 823	Diabetes Mellitus 2,118	Cerebro-vascular 5,198	Cerebro-vascular 12,708	Unintentional Injury 55,951	Diabetes Mellitus 83,564
8	Circulatory System Disease 449	Septicemia 48	Cerebro-vascular 41	Cerebro-vascular 56	Influenza & Pneumonia 190	Cerebro-vascular 593	Cerebro-vascular 1,811	Chronic Low. Respiratory Disease 3,975	Suicide 7,982	Influenza & Pneumonia 46,862	Influenza & Pneumonia 55,672
9	Respiratory Distress 440	Benign Neoplasms 44	Septicemia 33	Influenza & Pneumonia 51	Chronic Low. Respiratory Disease 188	HIV 513	Septicemia 854	Septicemia 2,441	Septicemia 5,838	Nephritis 41,670	Nephritis 50,633
10	Neonatal Hemorrhage 379	Perinatal Period 42	Benign Neoplasms 31	Benign Neoplasms 31	Complicated Pregnancy 168	Complicated Pregnancy 512	HIV 831	Homicide 2,275	Nephritis 5,671	Parkinson's Disease 31,177	Suicide 47,173

Data Source: National Vital Statistics System, National Center for Health Statistics, CDC.
Produced by: National Center for Injury Prevention and Control, CDC using WISQARS™.

Centers for Disease Control and Prevention
National Center for Injury Prevention and Control

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8	Circulatory System Disease 449	Septicemia 48	Cerebro-vascular 41	Cerebro-vascular 56	Influenza & Pneumonia 190	Cerebro-vascular 593	Cerebro-vascular 1,811	Chronic Low. Respiratory Disease 3,975	Suicide 7,982	Influenza & Pneumonia 46,862	Influenza & Pneumonia 55,672
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10 Leading Causes of Injury Deaths by Age Group Highlighting Unintentional Injury Deaths, United States – 2017

	Age Groups										
Rank	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	Total
1	Unintentional Suffocation 1,106	Unintentional Drowning 424	Unintentional MV Traffic 327	Unintentional MV Traffic 428	Unintentional MV Traffic 6,697	Unintentional Poisoning 16,478	Unintentional Poisoning 15,032	Unintentional Poisoning 14,707	Unintentional Poisoning 10,581	Unintentional Fall 31,190	Unintentional Poisoning 64,795
2	Homicide Unspecified 139	Unintentional MV Traffic 362	Unintentional Drowning 125	Suicide Suffocation 280	Unintentional Poisoning 5,030	Unintentional MV Traffic 6,871	Unintentional MV Traffic 5,162	Unintentional MV Traffic 5,471	Unintentional MV Traffic 5,584	Unintentional MV Traffic 7,667	Unintentional MV Traffic 38,659
3	Unintentional MV Traffic 90	Homicide Unspecified 129	Unintentional Fire/Burn 94	Suicide Firearm 185	Homicide Firearm 4,391	Homicide Firearm 4,594	Suicide Firearm 3,098	Suicide Firearm 3,937	Suicide Firearm 4,219	Suicide Firearm 5,996	Unintentional Fall 36,338
4	Homicide Other Spec., Classifiable 76	Unintentional Suffocation 110	Homicide Firearm 78	Homicide Firearm 126	Suicide Firearm 2,959	Suicide Firearm 3,458	Suicide Suffocation 2,562	Suicide Suffocation 2,294	Unintentional Fall 2,760	Unintentional Unspecified 5,125	Suicide Firearm 23,854
5	Undetermined Suffocation 56	Unintentional Fire/Burn 95	Unintentional Suffocation 36	Unintentional Drowning 110	Suicide Suffocation 2,321	Suicide Suffocation 3,063	Homicide Firearm 2,561	Suicide Poisoning 1,604	Suicide Suffocation 1,631	Unintentional Suffocation 3,920	Homicide Firearm 14,542
6	Unintentional Drowning 43	Unintentional Pedestrian, Other 88	Unintentional Other Land Transport 25	Unintentional Other Land Transport 66	Unintentional Drowning 469	Undetermined Poisoning 887	Suicide Poisoning 1,089	Homicide Firearm 1,447	Suicide Poisoning 1,459	Adverse Effects 2,902	Suicide Suffocation 13,075
7	Undetermined Unspecified 37	Homicide Other Spec., Classifiable 49	Homicide Suffocation 15	Unintentional Fire/Burn 56	Suicide Poisoning 463	Suicide Poisoning 788	Undetermined Poisoning 792	Unintentional Fall 1,248	Homicide Firearm 824	Unintentional Poisoning 2,871	Unintentional Suffocation 6,946
8	Homicide Suffocation 26	Homicide Firearm 44	Homicide Cut/pierce 14	Suicide Poisoning 39	Undetermined Poisoning 280	Unintentional Drowning 479	Unintentional Fall 522	Undetermined Poisoning 887	Unintentional Suffocation 811	Unintentional Fire/Burn 1,278	Unintentional Unspecified 6,606
9	Unintentional Natural/ Environment 18	Unintentional Natural/ Environment 34	Unintentional Firearm 14	Unintentional Poisoning 39	Homicide Cut/pierce 266	Homicide Cut/Pierce 404	Unintentional Drowning 397	Unintentional Drowning 451	Adverse Effects 773	Suicide Poisoning 1,111	Suicide Poisoning 6,554
10	Three Tied 16	Unintentional Firearm 31	Two Tied 13	Unintentional Suffocation 35	Unintentional Fall 212	Unintentional Fall 351	Homicide Cut/Pierce 337	Unintentional Suffocation 441	Undetermined Poisoning 732	Suicide Suffocation 919	Adverse Effects 4,459

Data Source: National Center for Health Statistics (NCHS), National Vital Statistics System.
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THE FULL IMPACT OF MOTOR VEHICLE CRASHES

For every **1** person killed in a motor vehicle crash

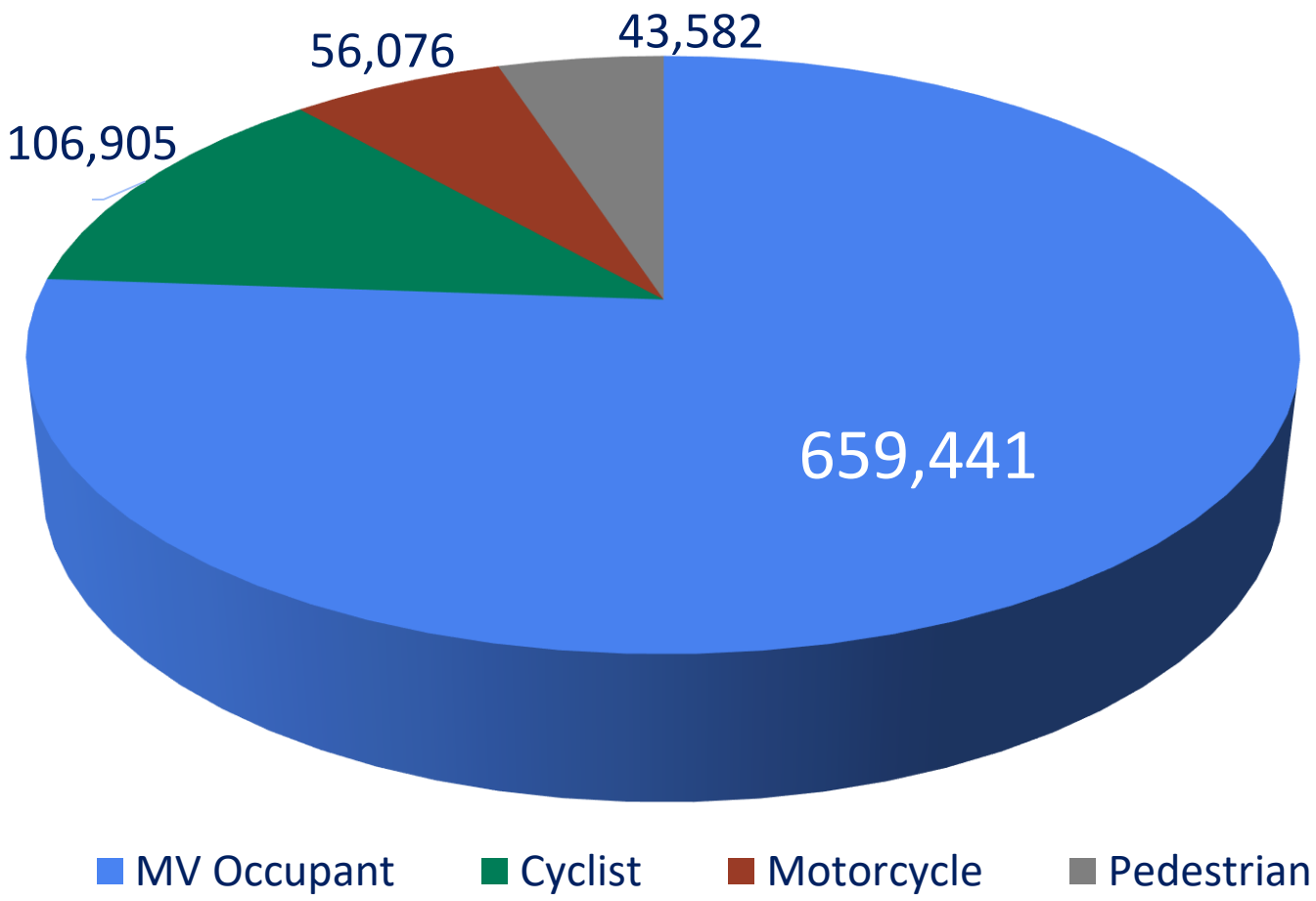
8 people were hospitalized

99 people were treated and released from emergency departments

Non-Fatal Injuries in 2017; Ages 10-24

Total: 982,855

- 67% MV Occupant
- 11% Cyclist
- 6% Motorcyclist
- 4% Pedestrian
- 12% Unknown



https://www.cdc.gov/injury/wisqars

Risk Factors: Crash, Injury and Death

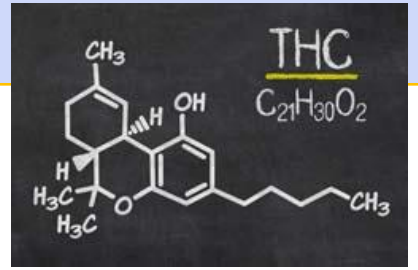
- Driver Inexperience
- Not Using Seat Belts
- Impaired Driving
- Distracted Driving
- Drowsy Driving
- Reckless Driving; Speed
- Nighttime Driving

CDC's Youth Risk Behavior Surveillance System (YRBSS); 2017
Among high school students, during the past 30 days

- **30% drank some amount of alcohol**
- **14% binge drank**
- **17% rode with a driver who had been drinking alcohol**
- **6% drove after drinking alcohol (among drivers)**

CDC's Youth Risk Behavior Surveillance System (YRBSS); 2017
Among high school students who drove in the last 30 days

Grade	Drove After Drinking Alcohol	Drove when they had been using Marijuana
Total	5.5%	13.0%
9th	3.2%	7.3%
10th	3.2%	11.3%
11th	5.5%	12.3%
12th	[illegible]	



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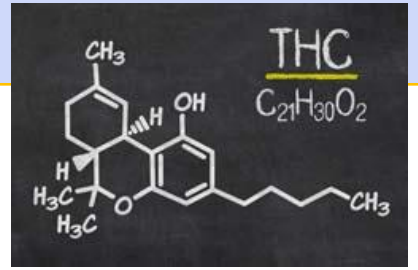
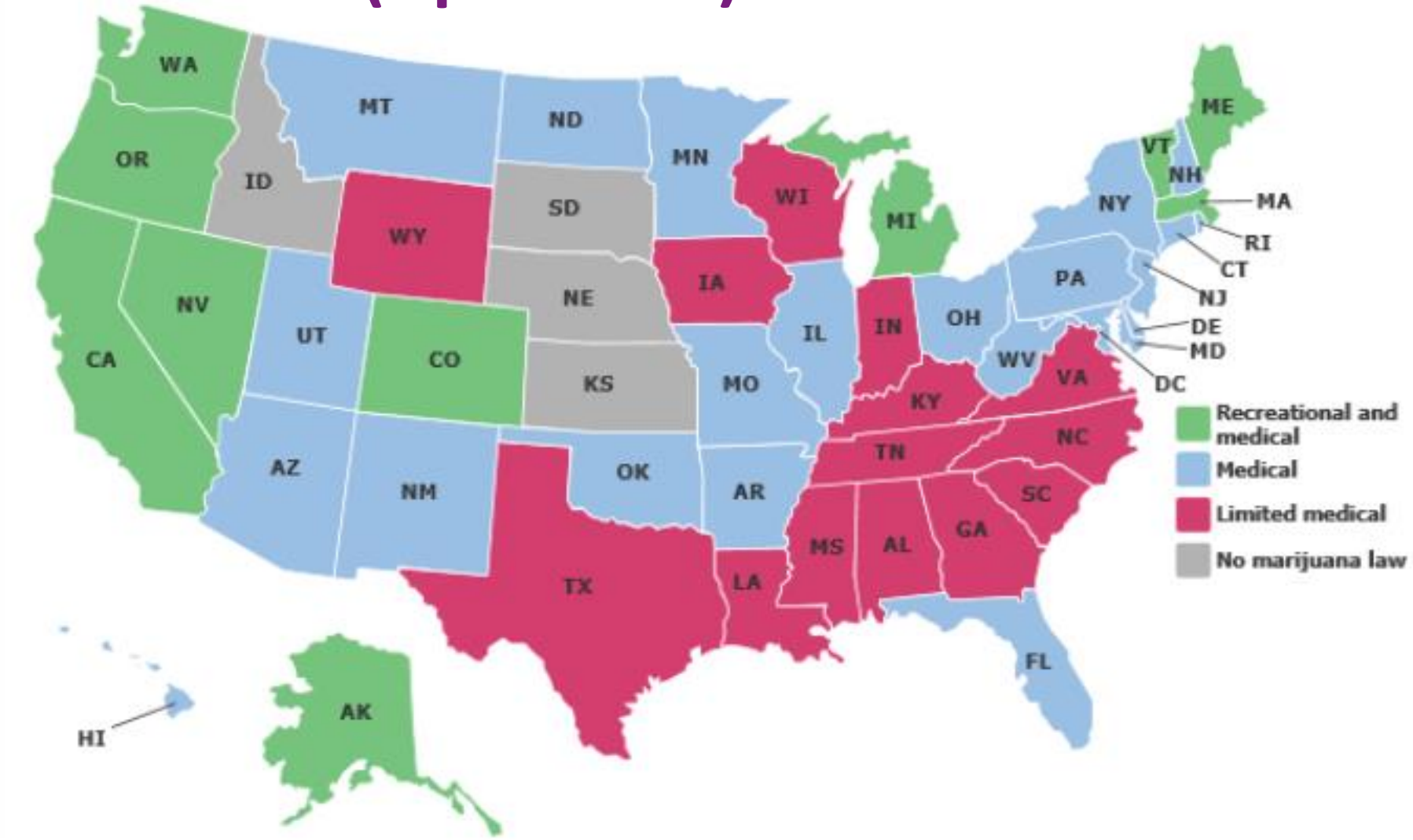


Insurance Institute for Highway Safety: Marijuana Laws (April 2019)



https://www.iihs.org/iihs/topics/laws/marijuana-laws/marijuana-map?topicName=alcohol-and-drugs

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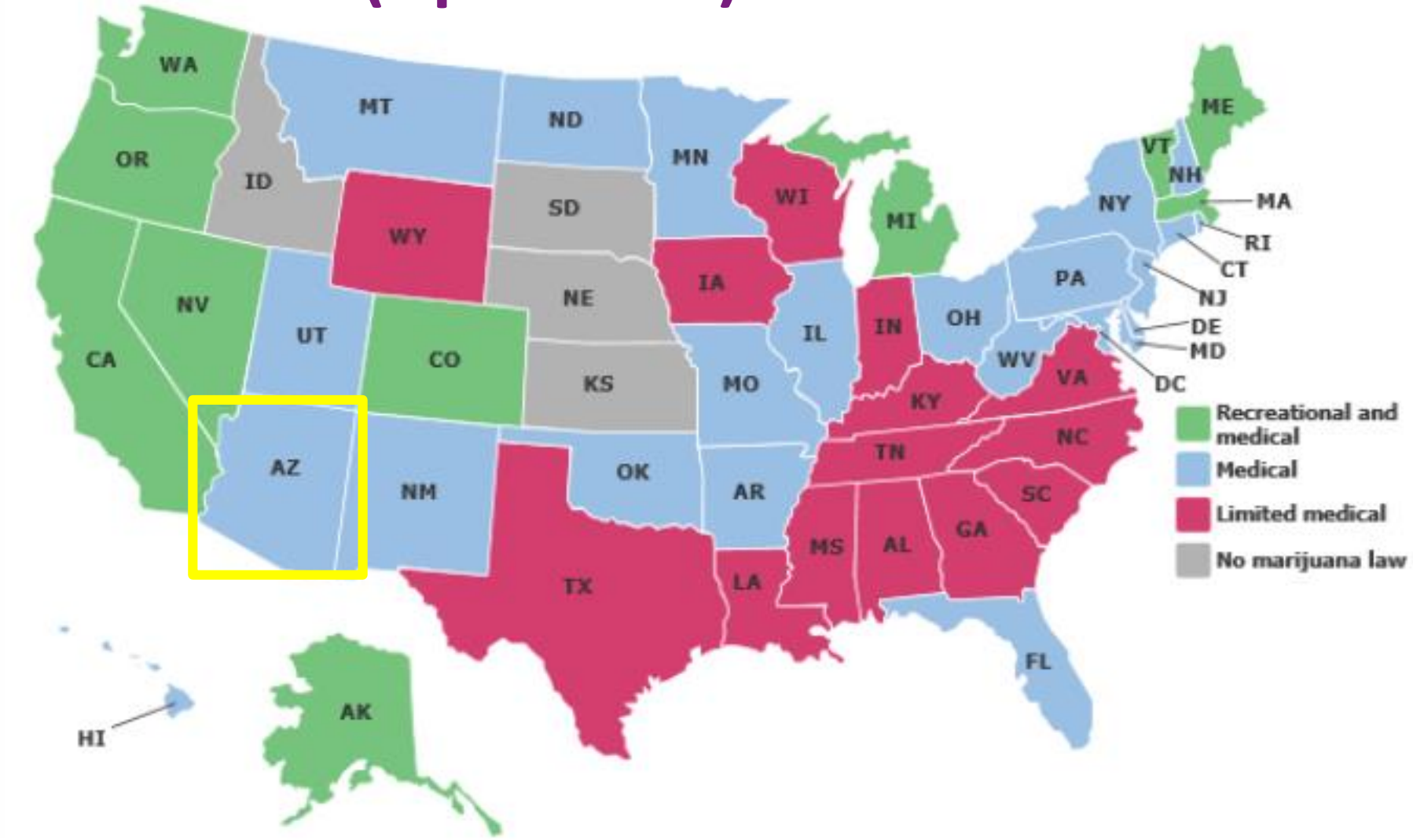

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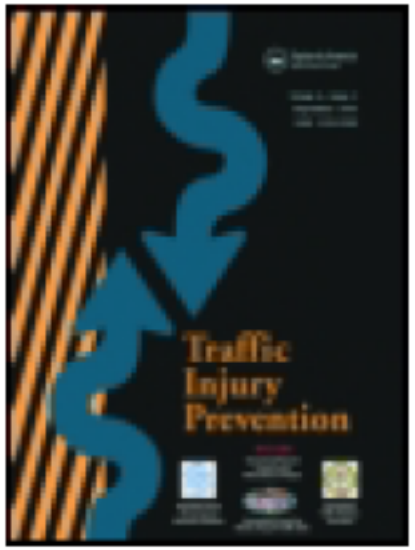

Traffic Injury Prevention

Alcohol and marijuana use among young injured drivers in Arizona, 2008–2014

Ruth A. Shults, Jefferson M. Jones, Kenneth K. Komatsu & Erin K. Sauber-Schatz

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BAC and THC testing results among Injured Drivers aged 16-20 years evaluated at Level 1 Trauma Centers, Arizona, 2008-2014

	2008	2009	2010	2011	2012	2013	2014	Total
Number of injured drivers	916	771	761	722	706	650	543	5.069
BAC testing								
Number (%) with BAC test results	674 (74)	541 (70)	565 (74)	544 (75)	554 (78)	544 (84)	427 (79)	3.849 (76)
Number (%)[a] with positive BAC	163 (18)	123 (16)	107 (14)	112 (16)	100 (14)	88 (14)	55 (10)	748 (15)
THC testing								
Number (%) with THC test results	511 (56)	362 (47)	356 (47)	327 (45)	339 (48)	307 (47)	274 (50)	2.476 (49)
Number (%)[a] with positive THC	139 (15)	105 (14)	109 (14)	95 (13)	100 (14)	91 (14)	77 (14)	716 (14)
BAC and THC testing								
Number (%) with BAC and THC test results	488 (53)	336 (44)	346 (45)	325 (45)	328 (46)	298 (46)	259 (48)	2.380 (47)
Number (%)[a] with positive BAC and THC	59 (6)	41 (5)	31 (4)	37 (5)	27 (4)	27 (4)	15 (3)	237 (5)

[a]Percentages represent the percentage positive among all drivers (tested and not tested).

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Table 2. Characteristics of injured drivers aged 16–20 years evaluated at level 1 trauma centers by BAC and THC testing and test results, Arizona, 2008–2014.

			BAC and THC testing						BAC and THC results					
	Total ($N = 5,069$)		Tested for alcohol ($N = 3,849$)		Tested for THC ($N = 2,476$)		Tested for alcohol and THC ($N = 2,380$)		Positive BAC ($N = 748$)		Positive THC ($N = 716$)		Positive BAC and THC ($N = 237$)	
Characteristic	*N*	Column %	*N*	Row %	*N*	Row %	*N*	Row %	*N*	Row %[a]	*N*	Row %[a]	*N*	Row %[a]
Age in years														
16	454	9	303	67	201	44	184	41	24	8	43	21	12	7
17	746	15	525	70	354	47	339	45	72	14	87	25	21	6
18	1,196	24	920	77	574	48	558	47	163	18	160	28	55	10
19	1,363	27	1,086	80	686	50	666	49	234	22	213	31	75	11
20	1,310	26	1,015	77	661	50	633	48	255	25	213	32	74	12
Sex														
Female	1,972	39	1,411	72	899	46	853	43	179	13	169	19	43	5
Male	3,097	61	2,438	79	1,577	51	1,527	49	569	23	547	35	194	13
Race[b]														
White	3,657	72	2,687	73	1,678	46	1,616	44	458	17	476	28	140	9
Other	885	17	734	83	498	56	479	54	135	19	131	26	39	9
American Indian	274	5	230	84	164	60	157	57	124	54	62	38	44	28
Black	195	4	158	81	110	56	103	53	24	15	42	38	11	11
Asian	35	1	21	60	13	37	12	34	1	5	1	8	0	0
Hispanic[c]	1,534	30	1,177	77	781	51	755	49	257	22	221	28	70	9
Vehicle type driven														
Motorcycle	918	18	715	78	402	44	388	42	63	9	119	30	23	6
Car, truck, van	4,151	82	3,134	75	2,074	50	1,992	48	685	22	597	29	214	11
Total	5,069	100	3,849	76	2,476	49	2,380	47	748	19	716	30	237	10

[a]Percentages represent percentage of drivers who tested positive among drivers who were tested.
[b]20 drivers with unknown race and 3 Pacific Islander drivers are not displayed due to small sample size.
[c]Hispanic is not mutually exclusive of any race.

Table 2. Characteristics of injured drivers aged 16–20 years evaluated at level 1 trauma centers by BAC and THC testing and test results, Arizona, 2008–2014.

			BAC and THC testing						BAC and THC results					
	Total ($N = 5,069$)		Tested for alcohol ($N = 3,849$)		Tested for THC ($N = 2,476$)		Tested for alcohol and THC ($N = 2,380$)		Positive BAC ($N = 748$)		Positive THC ($N = 716$)		Positive BAC and THC ($N = 237$)	
Characteristic	*N*	Column %	*N*	Row %	*N*	Row %	*N*	Row %	*N*	Row %[a]	*N*	Row %[a]	*N*	Row %[a]
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19	1,363	27	1,086	80	686	50	666	49	234	22	213	31	75	11
20	1,310	26	1,015	77	661	50	633	48	255	25	213	32	74	12
Sex														
Female	1,972	39	1,411	72	899	46	853	43	179	13	169	19	43	5
Male	3,097	61	2,438	79	1,577	51	1,527	49	569	23	547	35	194	13
Race[b]														
White	3,657	72	2,687	73	1,678	46	1,616	44	458	17	476	28	140	9
Other	885	17	734	83	498	56	479	54	135	19	131	26	39	9
American Indian	274	5	230	84	164	60	157	57	124	54	62	38	44	28
Black	195	4	158	81	110	56	103	53	24	15	42	38	11	11
Asian	35	1	21	60	13	37	12	34	1	5	1	8	0	0
Hispanic[c]	1,534	30	1,177	77	781	51	755	49	257	22	221	28	70	9
Vehicle type driven														
Motorcycle	918	18	715	78	402	44	388	42	63	9	119	30	23	6
Car, truck, van	4,151	82	3,134	75	2,074	50	1,992	48	685	22	597	29	214	11
Total	5,069	100	3,849	76	2,476	49	2,380	47	748	19	716	30	237	10

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19	1,363	27	1,086	80	686	50	666	49	234	22	213	31	75	11
20	1,310	26	1,015	77	661	50	633	48	255	25	213	32	74	12
Sex														
Female	1,972	39	1,411	72	899	46	853	43	179	13	169	19	43	5
Male	3,097	61	2,438	79	1,577	51	1,527	49	569	23	547	35	194	13
Race[b]														
White	3,657	72	2,687	73	1,678	46	1,616	44	458	17	476	28	140	9
Other	885	17	734	83	498	56	479	54	135	19	131	26	39	9
American Indian	274	5	230	84	164	60	157	57	124	54	62	38	44	28
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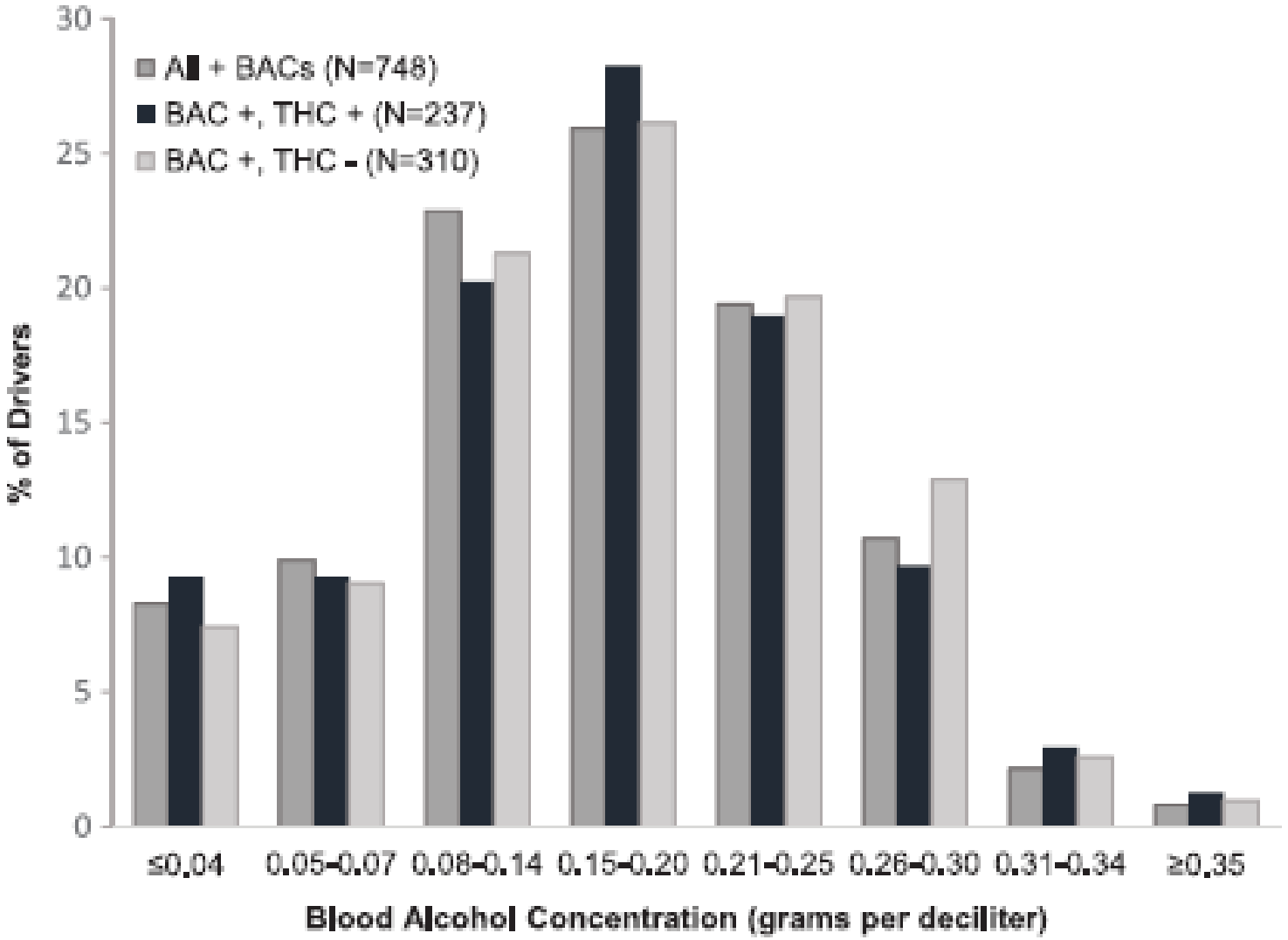

Figure 1. BACs among injured drivers aged 16–20 years who tested positive for alcohol regardless of whether they were tested for THC ($N = 748$), drivers who tested positive for alcohol and THC ($N = 237$), and drivers who tested positive for alcohol and negative for THC ($N = 310$).

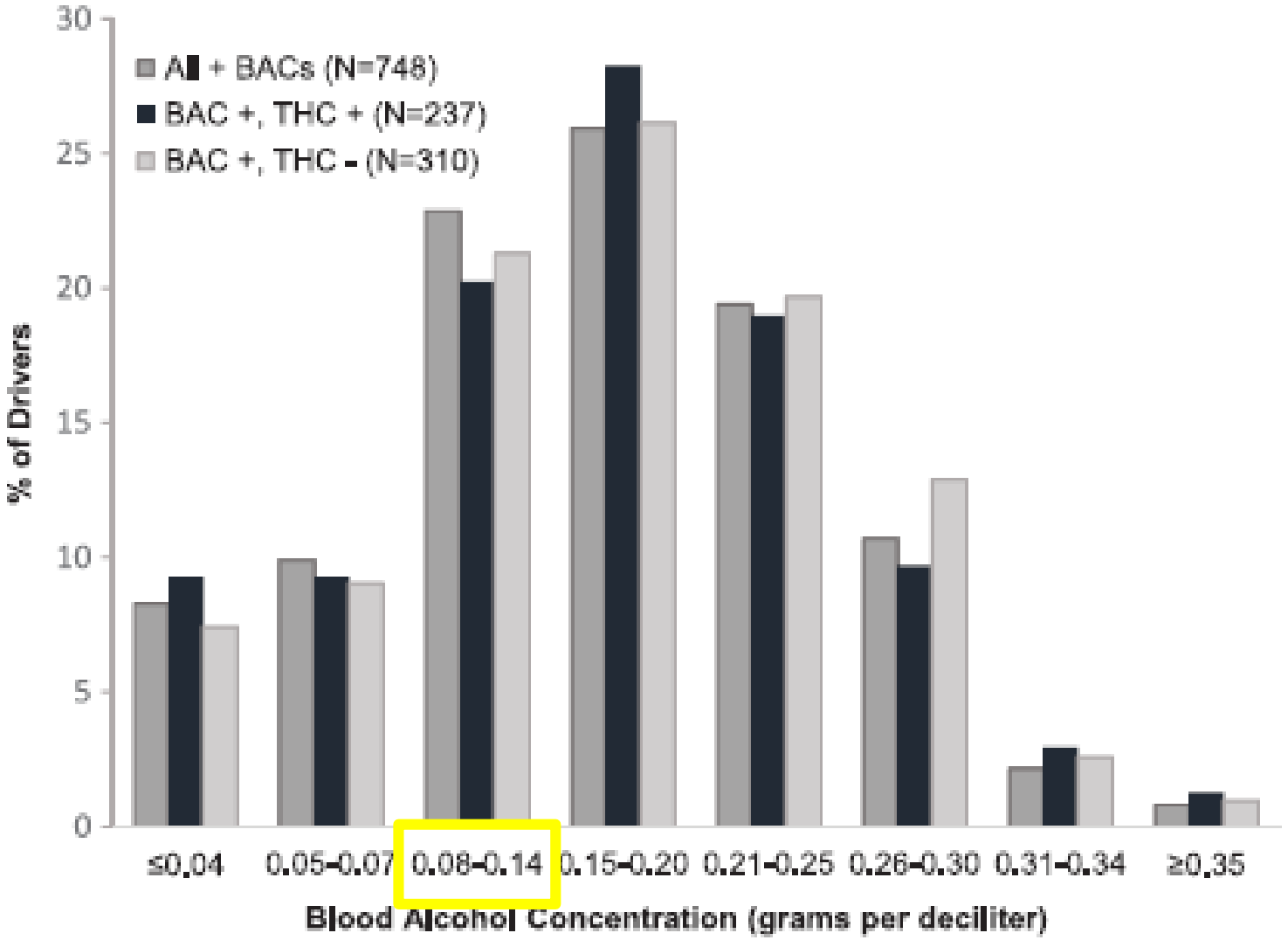

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Table 3. Crude associations between substance use status and protective equipment use and substance use status and injury severity among injured drivers aged 16–20 years who were tested for substance use at level 1 trauma centers, Arizona, 2008–2014.

Condition	Crude prevalence ratio	95% Confidence interval
No helmet		
BAC+ vs. BAC−	1.9	1.5, 2.5
THC+ vs. THC−	1.9	1.5, 2.4
BAC+ and THC+ vs. BAC− and THC−	2.9	2.2, 3.9
No seat belt		
BAC+ vs. BAC−	1.7	1.6, 1.9
THC+ vs. THC−	1.4	1.3, 1.6
BAC+ and THC+ vs. BAC− and THC−	2.1	1.8, 2.3
Severe injury[a]		
BAC+ vs. BAC−	1.4	1.2, 1.6
THC+ vs. THC−	1.2	1.0, 1.5
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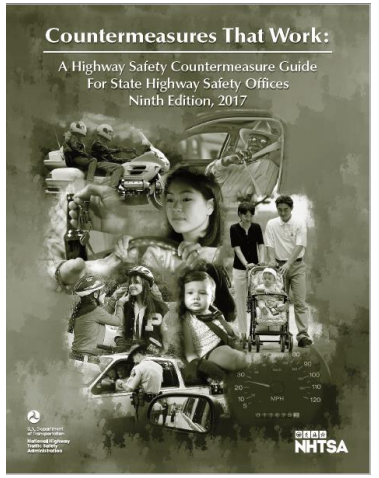
What Works?

NHTSA's Countermeasures That Work



6. Underage Drinking and Drinking and Driving

Countermeasure	Effectiveness	Cost	Use	Time
6.1 Minimum Drinking Age 21 Laws	★★★★★	$$$	High	Low
6.2 Zero-Tolerance Law Enforcement	★★★	$	Unknown	Short
6.3 Alcohol Vendor Compliance Checks†	★★★	$$	Unknown	Short
6.4 Other Minimum Legal Drinking Age 21 Law Enforcement	★★★	$$	Varies	Varies
6.5 Youth Programs	☆☆	Varies	High	Medium

† Proven for reducing sales to underage people

Effectiveness:

★★★★★ - Demonstrated to be effective by several high-quality evaluations with consistent results

★★★★ - Demonstrated to be effective in certain situations

★★★ - Likely to be effective based on balance of evidence from high-quality evaluations or other sources

☆☆ - Effectiveness still undetermined; different methods of implementing this countermeasure produce different results

☆ - Limited or no high-quality evaluation evidence

Effectiveness is measured by reductions in crashes or injuries unless noted otherwise. See individual countermeasure descriptions for information on effectiveness size and how effectiveness is measured.

https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/812478_countermeasures-that-work-a-highway-safety-countermeasures-guide-.pdf

7. Drug-Impaired Driving

Countermeasure	Effectiveness	Cost	Use	Time
7.1 Enforcement of Drug-Impaired Driving	★★★	$$	Unknown	Short
7.2 Drug-Impaired-Driving Laws	☆	Unknown	Medium†	Short
7.3 Education Regarding Medication	☆	Unknown	Unknown	Long

† Use for drug per se laws

Effectiveness:

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Reducing Alcohol-Impaired Driving

Intervention	CPSTF Finding
0.08% Blood Alcohol Concentration (BAC) Laws	Recommended (strong evidence) August 2000
Ignition Interlocks	Recommended (strong evidence) April 2006
Lower BAC Laws for Young or Inexperienced Drivers	Recommended (sufficient evidence) June 2000
Maintaining Current Minimum Legal Drinking Age (MLDA) Laws	Recommended (strong evidence) August 2000
Mass Media Campaigns	Recommended (strong evidence) June 2002
Multicomponent Interventions with Community Mobilization	Recommended (strong evidence) June 2005
Publicized Sobriety Checkpoint Programs	Recommended (strong evidence) August 2012

https://www.thecommunityguide.org/topic/motor-vehicle-injury

MV PICCS

Motor Vehicle Prioritizing Interventions and Cost Calculator for States

- Helps state decision makers prioritize and select from a suite of 14 evidence-based interventions
- Selected interventions based on
  - Type
  - Effectiveness
  - State role in implementation
  - Current use
- To prioritize, states can use information about costs and benefits of each option
- Available at: https://www.cdc.gov/motorvehiclesafety/calculator

MV PICCS Interventions

1. Automated Red-Light Enforcement
2. Automated Speed-Camera Enforcement
3. Alcohol Interlocks
4. Sobriety Checkpoints
5. Saturation Patrols
6. Bicycle Helmet Laws for Children
7. Universal Motorcycle Helmet Laws
8. Primary Enforcement of Seat Belt Laws
9. High-Visibility Enforcement for Seat Belts and Child Restraint and Booster Laws
10. License Plate Impoundment
11. Limits on Diversion and Plea Agreements
12. Vehicle Impoundment
13. In-Person License Renewal
14. Increased Fines for Seat Belt Use

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Polysubstance Use

Centers for Disease Control and Prevention
Your Online Source for Credible Health Information

Research Grants to Support Etiologic and Effectiveness Research on Driving While Polysubstance Impaired

On December 12, 2018, the CDC released RFA-CE-19-004, *Etiologic and Effectiveness Research to Address Polysubstance Impaired Driving*. CDC intends to commit up to $1,400,000 in Fiscal Year 2019 to support four awards. The maximum award amount will be $350,000 per award for the first 12 month budget period. The purpose of this funding is to support etiologic and effectiveness research on driving while polysubstance impaired. Polysubstance impaired driving means driving while impaired by alcohol plus at least one other drug, such as marijuana or opioids. Specifically, the agency is soliciting research to address **one of two priorities**:

- **Priority #1:** Identify risk and protective factors associated with polysubstance impaired driving and its associated deaths and injuries. Projects funded under Research Priority #1 of this notice of funding opportunity (NOFO) will investigate the risk and protective factors and crash characteristics associated with impaired driving involving alcohol plus other drugs that result in deaths and injuries.
- **Priority #2:** Identify effective interventions to prevent polysubstance impaired driving and its associated deaths and injuries. Projects funded under Research Priority #2 of this NOFO will evaluate the effectiveness of intervention programs for reducing deaths and injuries associated with polysubstance impaired driving.

Resources/Learn More


Road to Zero
NHTSA
www.nhtsa.gov
FHWA
FMCSA
NATIONAL SAFETY COUNCIL

State-Based Fact Sheets
Being updated!

- Restraints https://www.cdc.gov/motorvehiclesafety/seatbelts/states.html
- Alcohol-impaired driving https://www.cdc.gov/motorvehiclesafety/impaired_driving/states.html
- Costs of motor vehicle crash deaths https://www.cdc.gov/motorvehiclesafety/statecosts/index.html

Tribal Road Safety

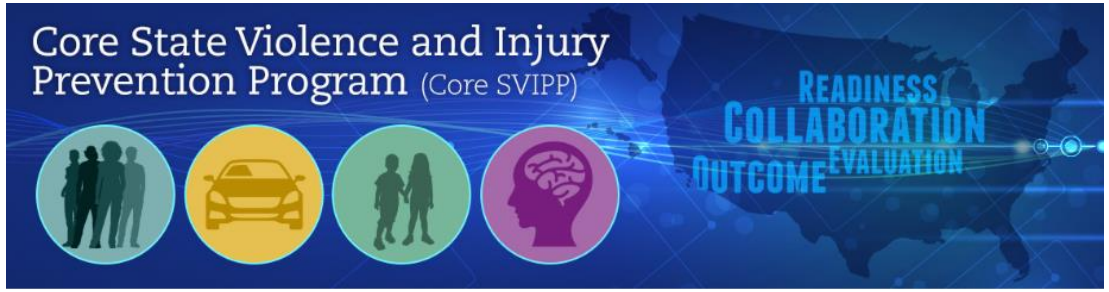
- Tribal Communities Toolkit
  https://www.cdc.gov/motorvehiclesafety/native/toolkit.html

- Best Practices Guide
  https://www.cdc.gov/motorvehiclesafety/native/best_practices_guide.html

Injury Center Funded Programs

- Core State Violence and Injury Prevention Program (Core SVIPP)
  https://www.cdc.gov/injury/stateprograms/

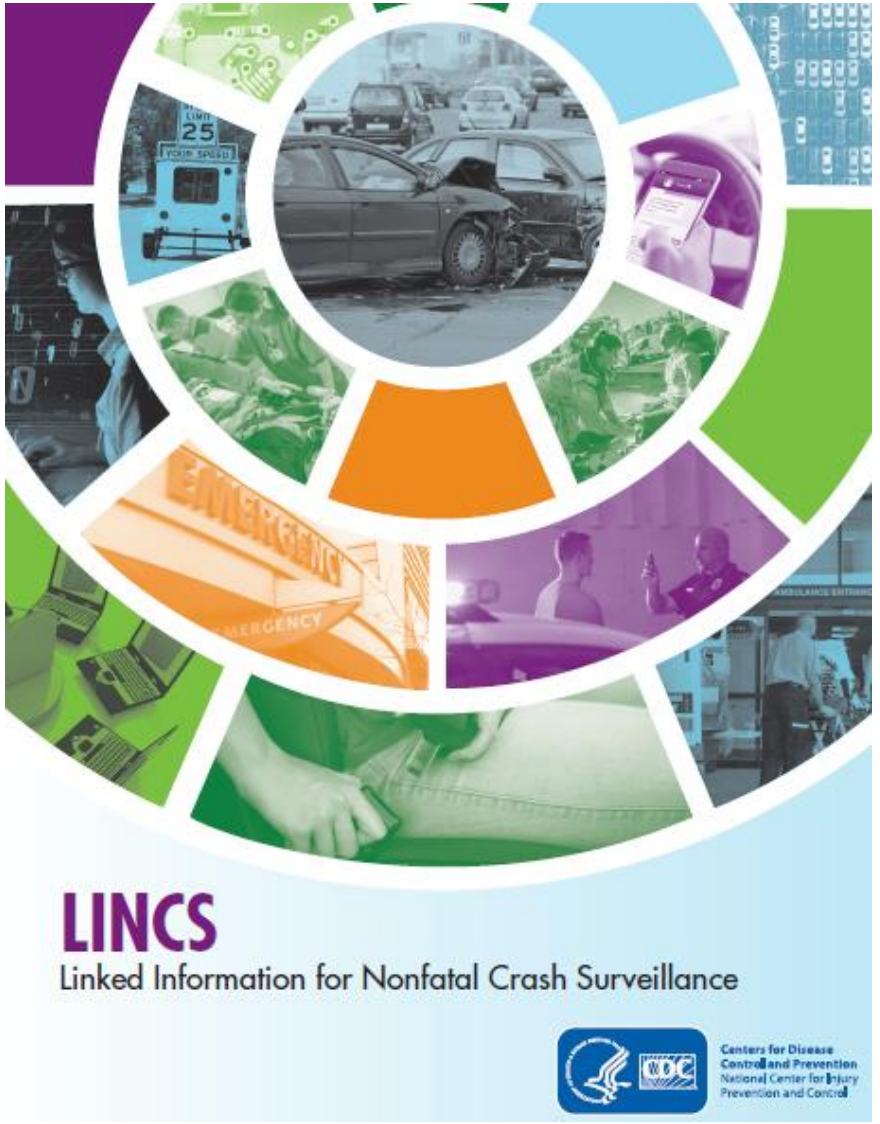
- Injury Control Research Centers (ICRC)
  https://www.cdc.gov/injury/erpo/icrc/



ICRC | INJURY CONTROL RESEARCH CENTERS
RESEARCH | OUTREACH | TRAINING

LINCS: Linking Information for Nonfatal Crash Surveillance

- Coming soon!
  - https://www.cdc.gov/motorvehiclesafety/linkage/index.html



For more information please contact Centers for Disease Control and Prevention

1600 Clifton Road NE, Atlanta, GA 30333
Telephone: 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348

E-mail: cdcinfo@cdc.gov Web: www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

The LongROAD Study: Older Drivers and Impaired Driving

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Data and Information Group Leader
AAA Foundation for Traffic Safety

National Governors Association Impaired Driving Summit
Columbus, Ohio
May 2, 2019

AAA Foundation LongROAD Studies

- Overview of LongROAD
  - Longitudinal Research On Aging Drivers
- Medications
  - Identifying patterns of medication use in senior drivers and potential risks
- Alcohol
  - Patterns of self-reported use and driving while intoxicated
- Marijuana
  - Use in older drivers in Colorado

Overview of the LongROAD Study

Columbia University
University of Michigan
Johns Hopkins University
University of California San Diego
University of Colorado Denver
Bassett Research Center

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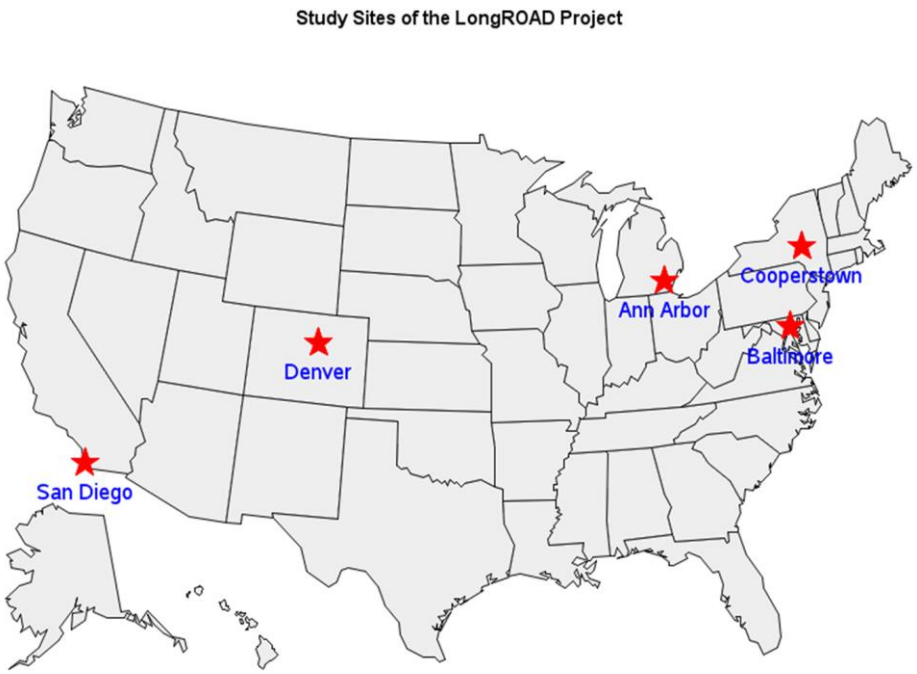
Study Objective and Design



- To understand and meet the safety and mobility needs of the nation's growing population of older adult drivers.
- Prospective cohort
  - Age 65-79 at baseline
- Multisite
  - CA, CO, MI, NY, and MD
- In-vehicle data recording device
- Longitudinal
  - Baseline assessment
  - Annual follow up (in-person and phone)

Today's three studies are limited to baseline data

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Key Components of the Research Protocol

- In-vehicle data recording device
- Vehicle inspection
- Vehicle technology questionnaire
- Driving health and functioning questionnaire
- In-person assessments
- Medical records
- Driving crash records
- Driving cessation
- Mortality data

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Results: Baseline Demographics (N = 2,990)

Age group	
65-69 years	42%
70-75 years	35%
75-79 years	24%
Sex	
Men	47%
Women	53%
Race	
White, Non-Hispanic	88%
Black/African American	7%
Asian	3%
Education	
HS deg. or less	11%
Some college	18%
Associates/Bachelor's deg.	30%
Advanced college deg.	41%
Household income	
Less than $20,000	5%
$20,000 - $49,999	21%
$50,000 - $79,999	24%
$80,000 - $99,999	14%
$100,000 or greater	32%

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Medications: Identifying Patterns of Medication Use in Senior Drivers and Potential Risks

Hill, L., Andrews, H., Pepa, P., Li, G., Merle, D., Kelley-Baker, T., Eby, D. and the LongROAD Team

Background: Why do we care about medication use in older drivers?

- Side effects that impair driving skills may include:
  - drowsiness, confusion, hypotension, syncope (fainting), hypoglycemia, weak muscle tone, and poor coordination
- Less common are problems such as:
  - double vision, blurred vision, nausea, and memory impairment
- Increased crash rate reported for a number of drug classes

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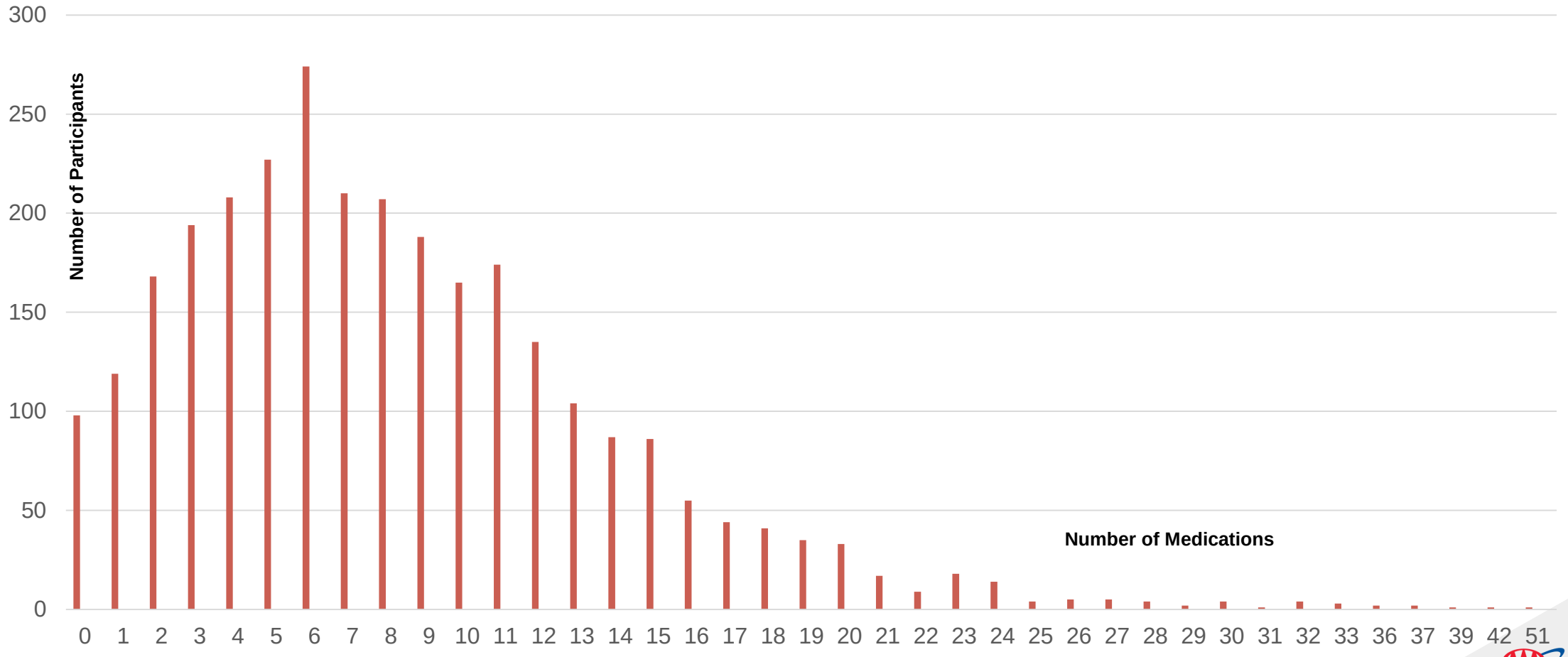
Number LongROAD Participants by Number of Medications Used (N=2,949)



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Cardiovascular Drugs	2167	73%
Central Nervous System Agents	2078	70%
Vitamins	1909	65%
Electrolytic, Caloric, and Water Balance	1548	52%
Hormones and Synthetic Substitutes	1311	44%
Gastrointestinal Drugs	952	32%
Eye, Ear, Nose, and Throat (EENT) Preparations	710	24%
Autonomic Drugs	641	22%
Skin and Mucous Membrane Agents	486	16%
Blood Formation, Coagulation, and Thrombosis Agents	390	13%
Miscellaneous Therapeutic Agents	379	13%
Antihistamine Drugs	392	13%
Anti-infective Agents	291	10%
Respiratory Tract Agents	106	4%
Antineoplastic Agents	112	4%

Study Methods: Medications and Driving Outcomes

(not currently available as AAA Foundation Briefs)

- GPS accelerometer
- One year
- Outcomes included:
  - Miles
  - Decelerations
    (surrogate for hard breaking)
  - Speed >80 mph
  - Right-to-left turn ratio

- 97% had both medication data and at least 30 days of driving data
- Mean medications = 8.37
- Average miles = 9,230
- Mean number of sudden deceleration events/1000 = 5.47
- Mean number of speeding events (>80mph) per 1000 miles = 8.26
- Mean ratio of right to left turns = 9.3

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Results: Medications and Speeding, Deceleration and Right-to-Left Turn Ratio

- Speeding
  - CNS agents were the only drug class significantly associated with speeding
    - Analgesics, Opiates, Anticonvulsants, Anti-parkinson's drugs, Anti-emetics, Stimulants, Anxiolytics
- Deceleration
  - Hormone classes of drugs were positively associated
    - Insulin, estrogens, corticosteroids, thyroid, etc.
  - Electrolyte/Caloric/Water Balance were significantly associated
    - Diuretics, and uricosuric agents likely being the most common drugs, but it includes sugar and salt substitutes
- Right-to-Left Turn Ratios
  - Positively associate with antihistamine use
  - Negatively associated with vitamin use

Patterns of Self-Reported Alcohol Use and Driving While Intoxicated

Authors:

Amish, T., Hill, L., DiGuiseppi, C., Betz, M.E., Eby, D.W., Molnar, L.J., Kelley-Baker, T., Villavicencio, L., Andrews, H.F., Li, G., Strogatz, D., and the LongROAD Team.

Background

- Drinking and driving continues to be a major public health problem
- Older adults form a significant proportion of the population of drivers who drink and drive
- NSDUH (2016) - 4% of adults age 65 yrs+ reported driving under the influence of alcohol in the past year
- Risks of alcohol use in older drivers are exacerbated by
  - delayed alcohol metabolism, increased use of medications, and declining physical and cognitive functioning.
- Study objective was to examine self-reported alcohol use and alcohol use while driving

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Study Methods: Questionnaire Items

- Alcohol Use
  - Frequency
    - days drinking in past 3 months
  - Quantity
    - how many drinks on the days drank

- Alcohol Use and Driving
  - How often do you drive even though you realize that you may be over the legal blood-alcohol limit?
    - never, hardly ever, occasionally, quite often, frequently, and nearly all the time
- Other items
  - Demographics, avoidance of hazardous driving, driving comfort, risky driving

Results: Alcohol Use

- 72% reporting any drinking in the last 3 months
- 15% reported ‘high risk’ drinking in the last three months
  - High risk drinking = 7 drinks in one week
- Demographics significantly less associated with high-risk drinking.
  - Female
  - Black
  - Not being married or partnered
  - Possessing less than a graduate degree
  - Having an income less than $100,000

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Results: Alcohol Use and Driving

- 3.3% of respondents reported driving while over the legal limit at least occasionally
- High-risk drinking was found to be significantly associated with driving over the limit at least occasionally
- Engaging in risky driving behaviors was associated with self-reported DWI at least occasionally
- Avoidance of hazardous driving conditions and higher level of comfort less associated with self-reported DWI

Marijuana Use in Older Drivers in Colorado

Authors

DiGuiseppi, C., Smith, A., Betz, M. E., Hill, L., Lum, H., Eby, D. W., Li, G and the LongROAD Team

Background: Cannabis Use Among Older Adults

- Greatest increase in use among 50+ yrs
  - 65 yrs+ greatest increase in use overall
- National Survey on Drug Use and Health (NSDUH)
  - Prevalence of past year use in 2015 and 2016 was 2.9% ≥65
  - Users had higher AUDs, nicotine use, cocaine use, and misuse of Rx
  - Prevalence of past year use increased from 0.15% in 2003 to 2.04% in 2014
- **Use is becoming more prevalent in this population and users are also at high risk or other drug use**

Background: Cannabis Use and Driving Among Older Adults

- Little research on cannabis use in relation to driving behaviors or crashes among older drivers
- Recent study using 2013-2014 NSDUH data found:
  - 1/3 of past-year marijuana users (50 years+) reported past-year DUI
  - Those with marijuana abuse/dependence were 2.6 times to report DUI
- Study Aim to describe the current epidemiology of cannabis use and examine its relationship to driving outcomes
  - LongROAD Colorado participants only

Methods: Cannabis Use and Driving

- Cannabis use definitions
  - *Cannabis Users*: Participants who reported using cannabis, marijuana or hash one or more times in the 12 months before the baseline visit
- Cannabis use and driving
  - Have driven a motor vehicle within an hour of using cannabis, marijuana, or hash in the past 30 days
- Driving Outcomes
  - Lapses, errors or violations (forget where left car, miss yield signs, speeding)
  - Driving While Intoxicated (DWI) with alcohol
  - Any crashes or police actions in the past year
- Demographics
- Health-related characteristics
- Mental and social health symptoms and functions

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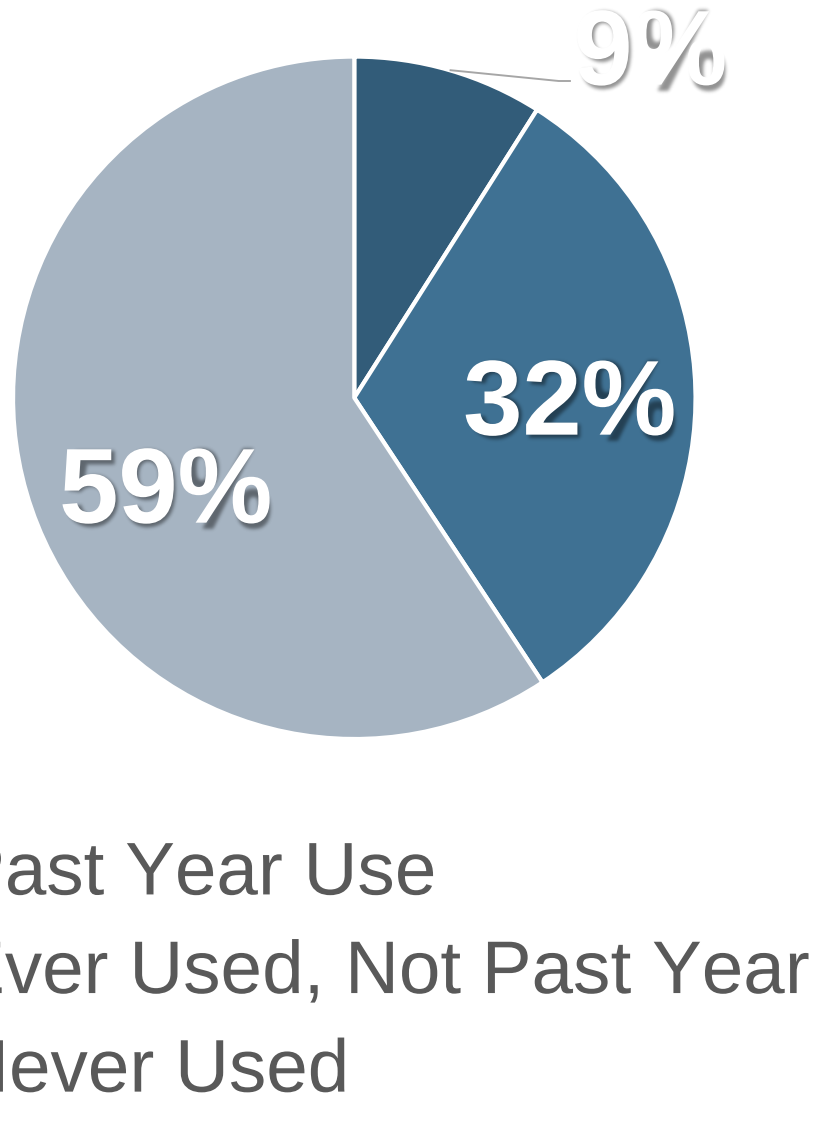
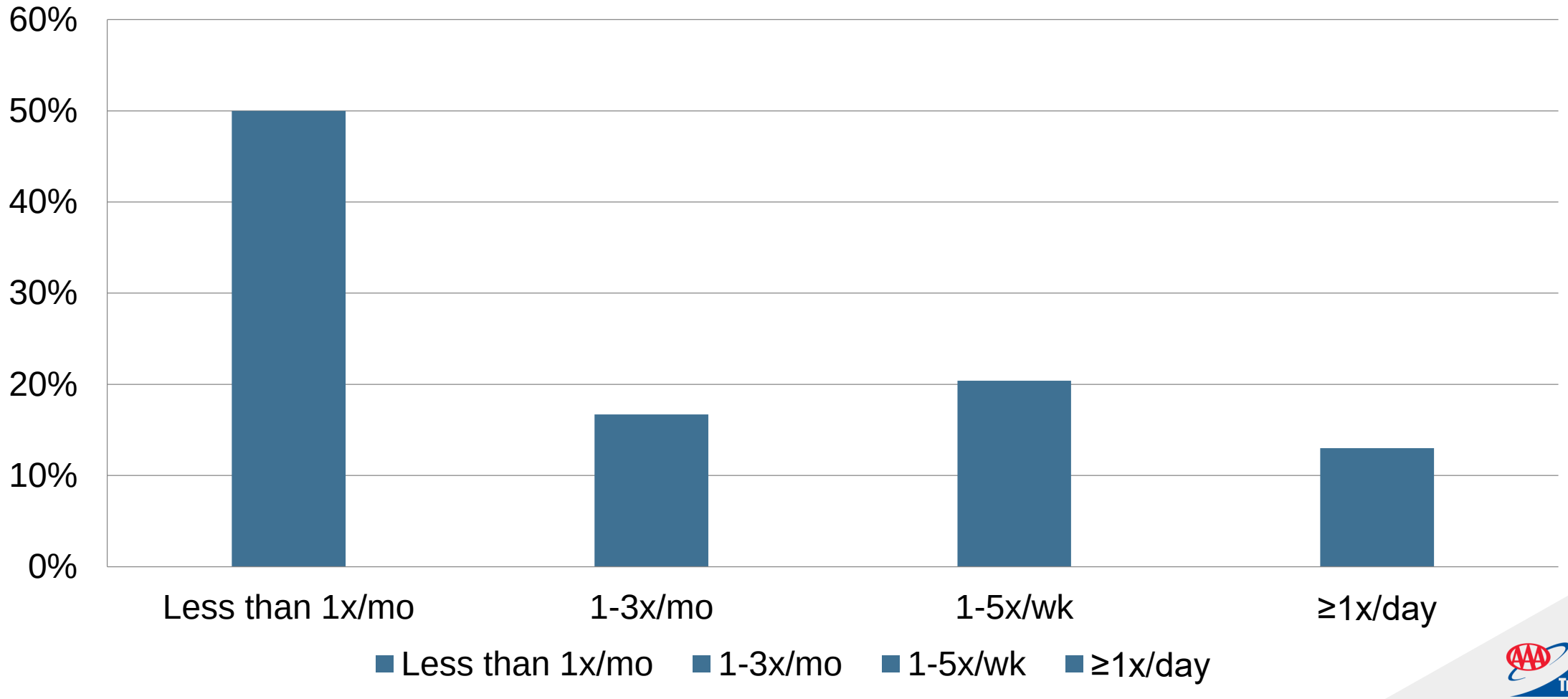
Results: Cannabis Use (Colorado drivers aged 65-79)



Results: Frequency of Cannabis Use in Past-Year Users



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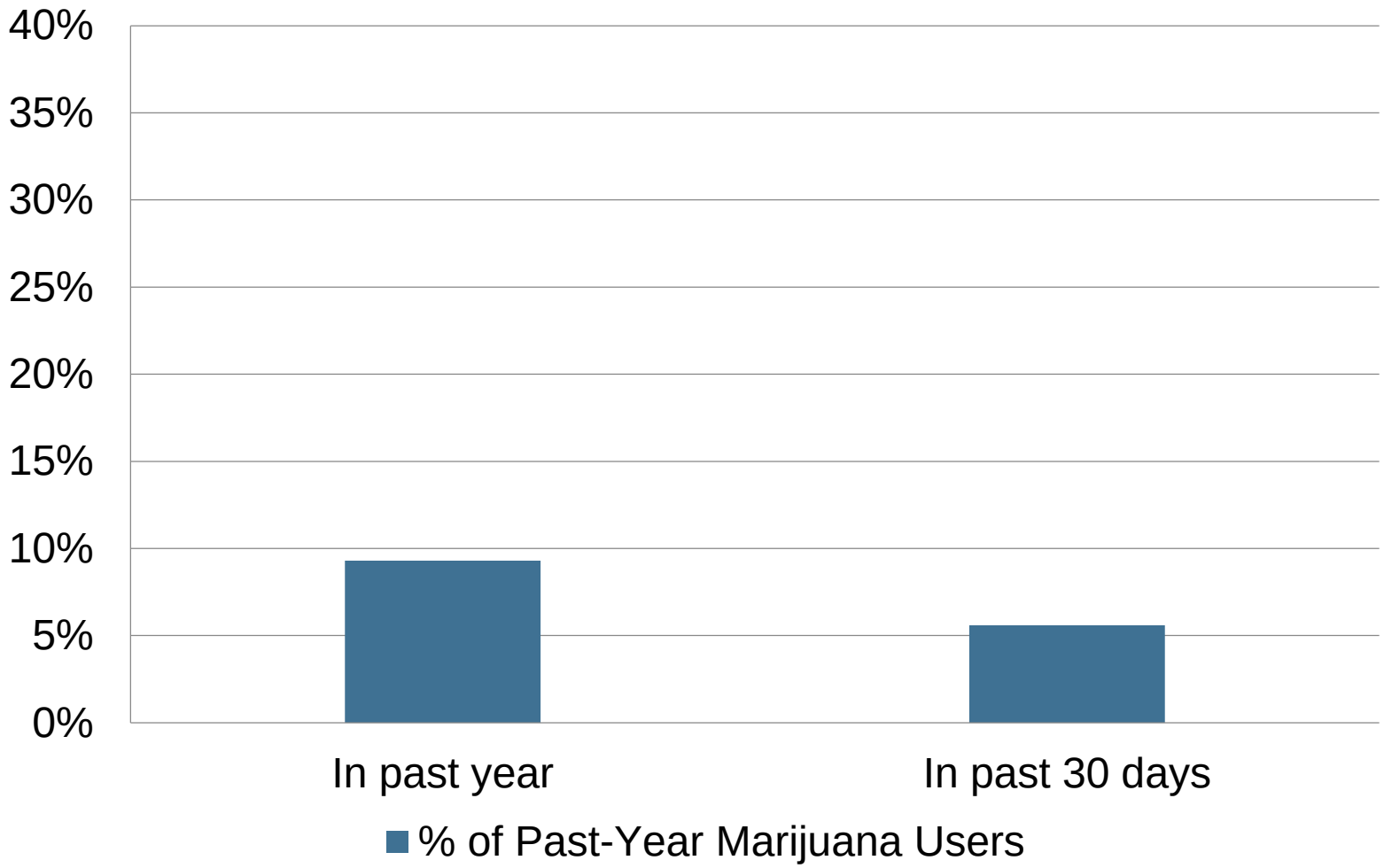
Results: Driving within an hour of cannabis use in past-year users



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Results: Cannabis Use and Driving

- Cannabis users were statistically more:
  - Younger
  - Less likely to have a Masters degree or higher
  - Poorer (HH income <$50,000)
  - Mental condition
  - Score worse of measures of mental and social health
    - Moderate to severe depression
    - Moderate to severe anxiety
    - Mild and moderate-severe anger
    - Less emotional support
    - More social isolation

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Conclusion

- Older people often take many medications
  - High use of poly drug use is concerning
  - Many older people do not know there medications are potentially impairing
- Older people drink and some report drinking and driving
  - High-risk drinking associated with DUI
- Older people are increasingly using cannabis
  - Fewer cannabis users report DUI
  - Past-year cannabis users 4x as likely to report alcohol DUI

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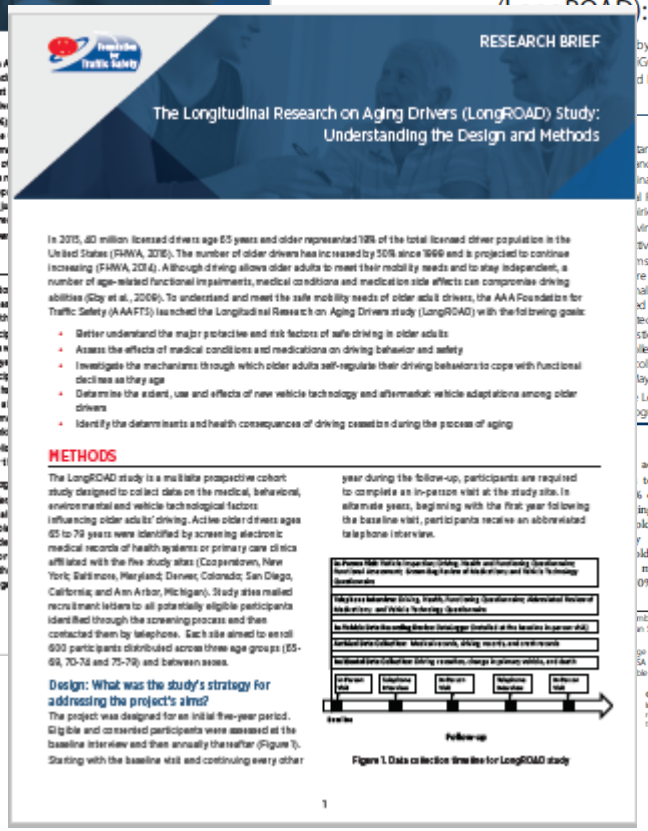

Questions?

Answers!