nyc.gov/visionzero

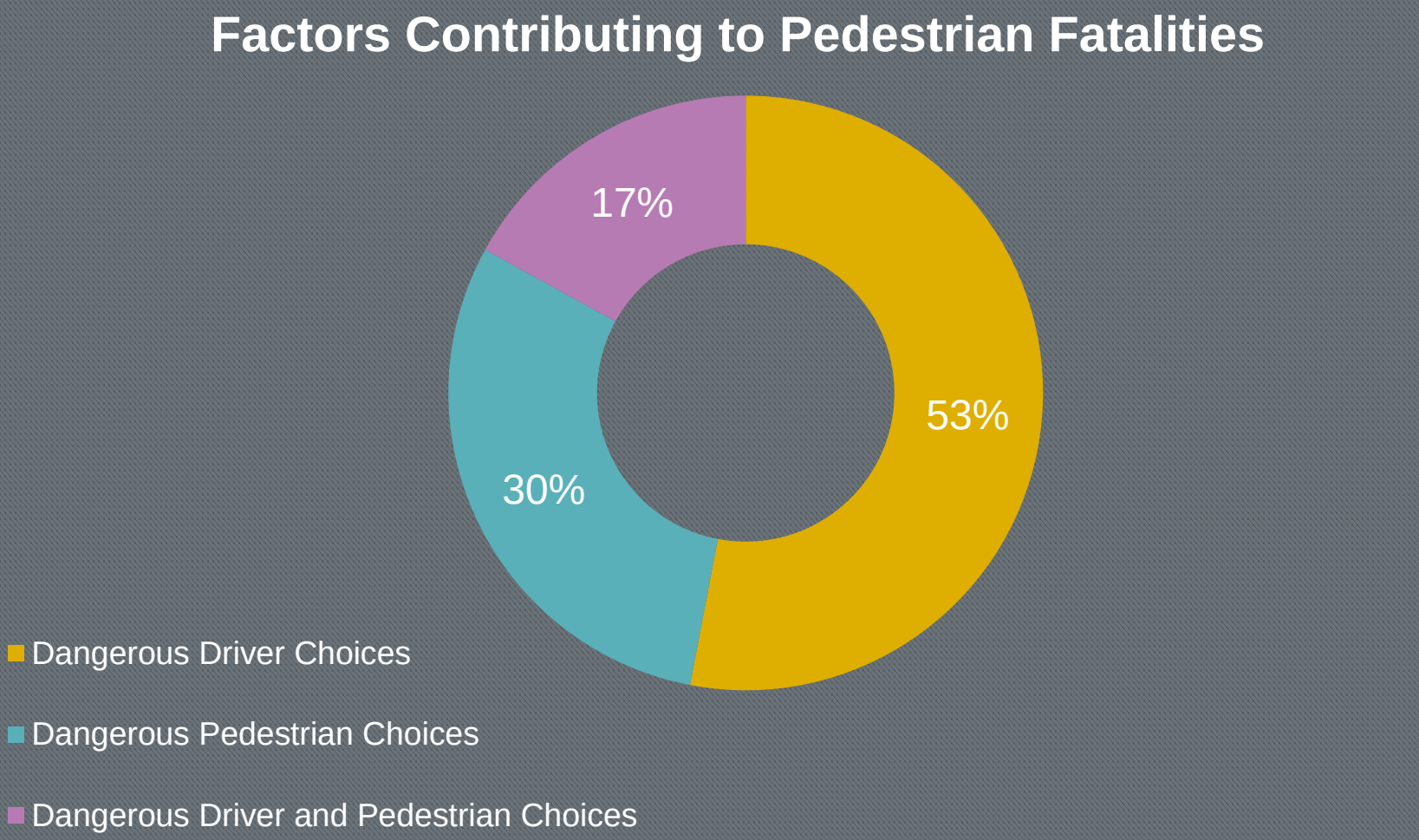
Vision Zero & For-Hire Transportation in New York City

2016 Vision Zero Fleets Safety Forum
November 29, 2016

NYC Taxi & Limousine Commission

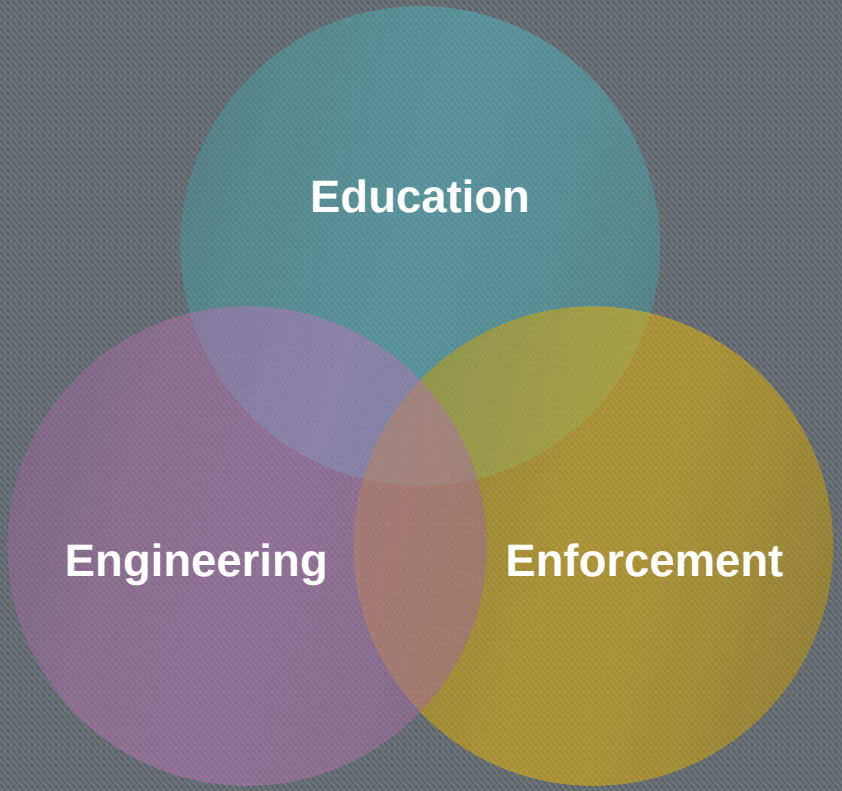

West 34th St
Make it here.
macy's

Causes of Fatal Crashes



Source: NYC DOT 2008-2012

Vision Zero: New York City



POLICE DEPARTMENT CITY OF NEW YORK

NEW YORK CITY DOT

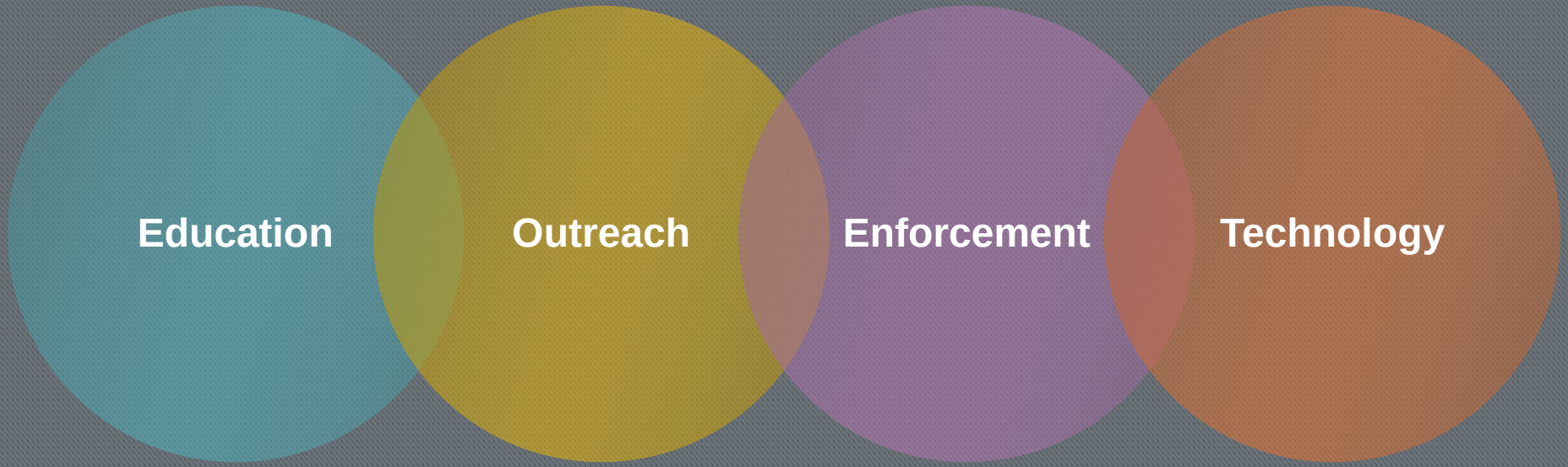
NYC Taxi & Limousine Commission

NYC Health

NYC Citywide Administrative Services


nyc TAXI
nyc TAXI

Vision Zero at TLC



Vision Zero: Education

- Pre-licensure Driver Course: Vision Zero Curriculum
  - Emphasis on sharing the road with other users
  - New types of streetscapes (e.g., bus lanes, bike lanes)
  - Unsafe driving behaviors that lead to serious crashes
  - Viewing of “Drive Like Your Family Lives Here” film
- Expanded Pre-Licensure Course to Livery, Black Car, and Limousine Drivers in December 2015
  - Highest growth sectors under TLC regulation in recent years
  - In 2016, over 25,000 active licensees passed the course
  - On average, 3,300 TLC applicants take the course each month

Vision Zero: Outreach

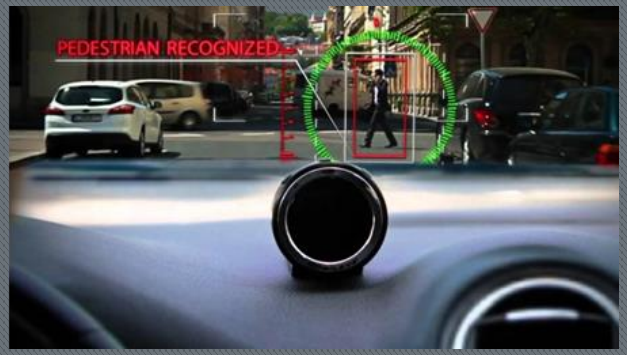
- Messaging to Drivers, Passengers, Base and Fleet Managers, and Industry Organizations
- Emphasis on changing driver behavior, victim perspectives
- Annual TLC Safety Honor Roll Ceremony
- Meetings with drivers at their base or garage
- PSAs and “Drive Like Your Family Lives Here” film available online

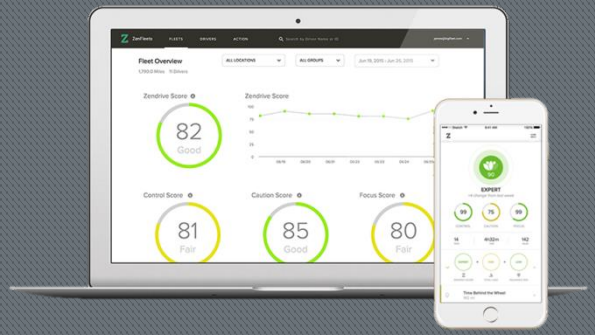
Vision Zero: Enforcement

- Vision Zero Safety Squad equipped with LIDAR guns
- Increased enforcement of traffic safety violations
  - Speeding
  - Failure to Yield Right of Way
  - Stop Sign & Signal Violations
- Fatigue Prevention Rules
- Critical Driver Program
- Coordination with NYPD & DOT on priority corridors

Vision Zero: Technology

- Vehicle Safety Technology Pilot
  - Black boxes, cameras, driver alert and collision avoidance systems, and analytics platforms





Vision Zero: Data-Driven Solutions

- Data analysis allows TLC to target and evaluate Vision Zero programs and enforcement
- Providing useful data for the public and licensees
- Vision Zero Base Reports
- Fatigue Prevention Rules
- Targeted Fleet Safety Outreach & Materials


Q59 VIA GRAND
SLEEPYS

Madeline Labadie
New York City Taxi & Limousine Commission

madeline.labadie@tlc.nyc.gov NYC.gov/taxi

Taxi & Limousine Commission

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NYC Citywide Administrative Services | Fleet

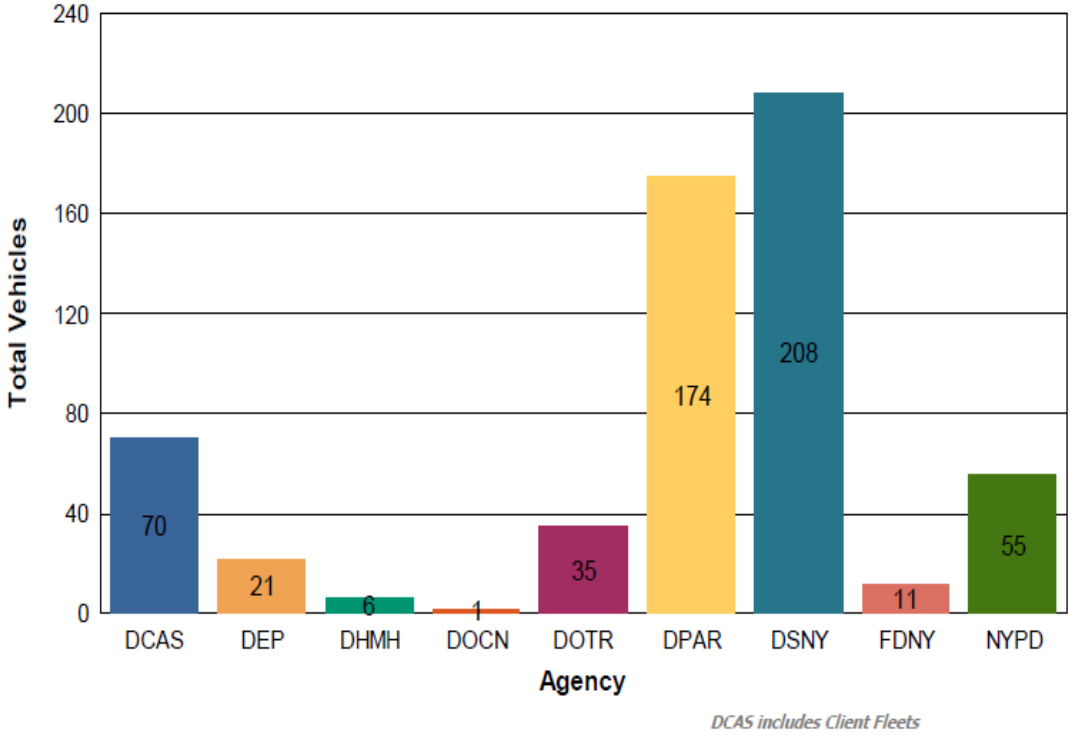
NYC Fleet

3rd Annual Vision Zero Fleets Forum

November 29, 2016

New York City Department of Citywide Administrative Services

Truck Sideguards Installed



DCAS includes Client Fleets

DCAS	70	12.05%
DEP	21	3.61%
DHMH	6	1.03%
DOCN	1	0.17%
DOTR	35	6.02%
DPAR	174	29.95%
DSNY	208	35.80%
FDNY	11	1.89%
NYPD	55	9.47%
Total	581	100.00%


C2664
8254
ULSD DIESEL FUEL ONLY


1508
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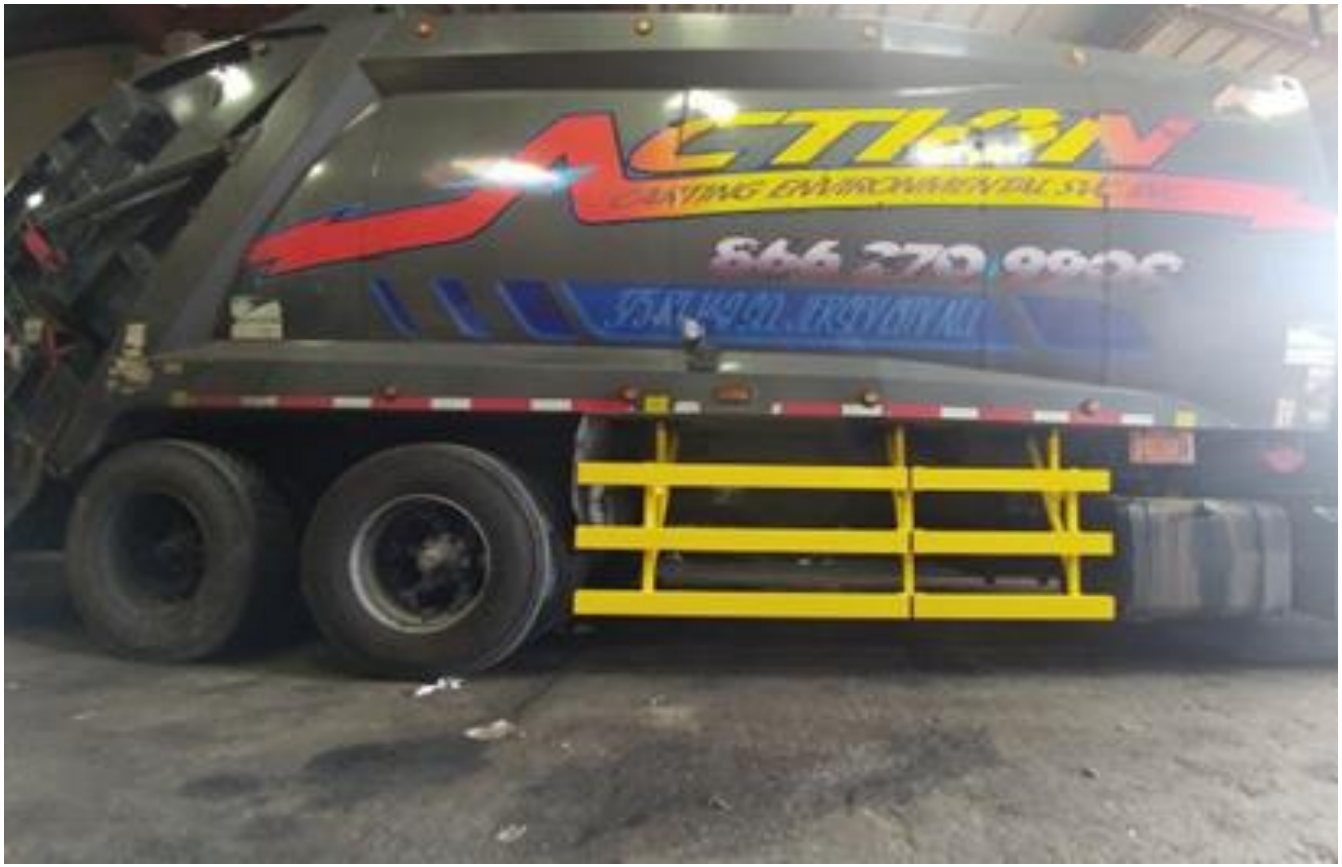
Your Online Grocer
NOW HIRING
2072
freshdirect
Faster from the farm,
fresher in your fridge.


VY DUTY
AIR AREA


ACTION


CROWN
718-335-6845
61


MR. T
L-9877


Impact of Defensive Driving Program


SAFE DRIVING IS
FOCUSED DRIVING!
NO CELL PHONES
INCLUDING
HANDS FREE
AND NO TEXTING
WHILE DRIVING.
VISION
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TURN CAUTIOUSLY.
MOST NYC
PEDESTRIAN
INJURIES AND
FATALITIES
OCCUR AT
INTERSECTIONS.
VISION
ZERO
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SLOW DOWN
FOR A SAFER NYC
SPEED LIMIT 25
VISION ZERO
nyc.gov/visionzero


BUCKLE UP!
THE LIFE
YOU SAVE
WILL BE
YOUR OWN.
SEAT BELTS REDUCE
CRASH-RELATED
INJURIES AND DEATHS
BY HALF
VISION
ZERO
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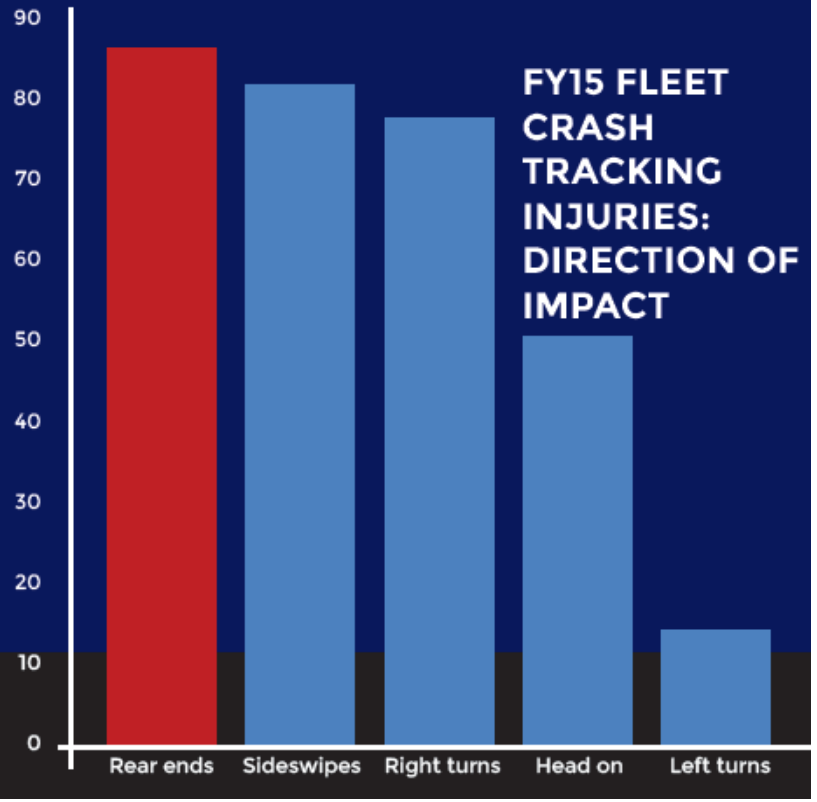
THE LEADING CAUSE OF FLEET INJURIES IS REAR-END COLLISIONS. KEEP A SAFE FOLLOWING DISTANCE AT ALL TIMES



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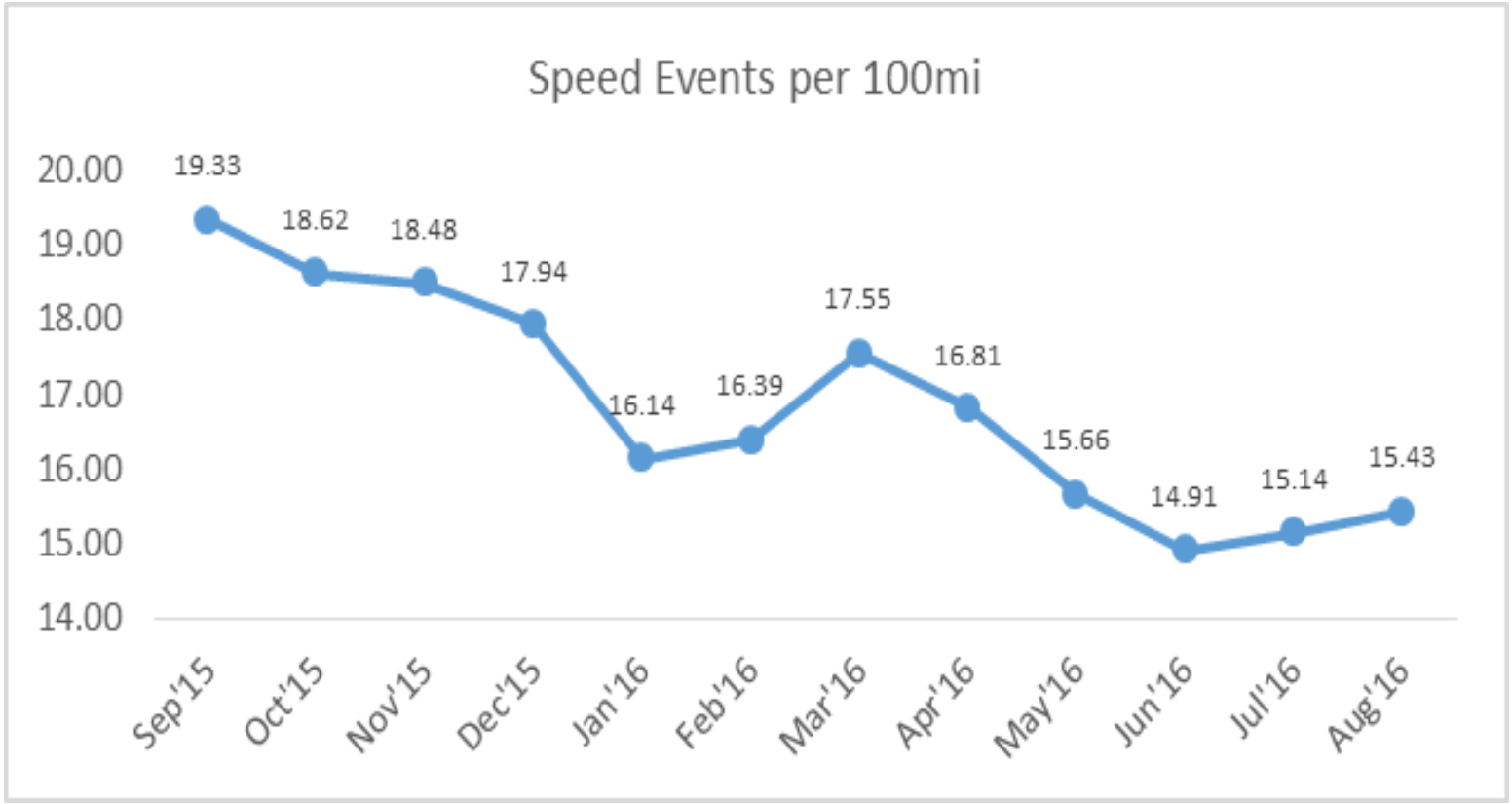
Speed Events per 100mi
20.00
19.00
18.00
17.00
16.00
15.00
14.00
19.33
18.62
18.48
17.94
16.14
16.39
17.55
16.81
15.66
14.91
15.14
15.43
Sep'15
Oct'15
Nov'15
Dec'15
Jan'16
Feb'16
Mar'16
Apr'16
May'16
Jun'16
Jul'16
Aug'16

Which type of equipment do you consider the most important to improving safety?		
Safety Feature	**Respondents**	**Percent**
Backup Camera	6,761	34.8%
Backup Alarm	3,639	18.7%
Navigational System	3,102	16.0%
Driver Alert System	3,068	15.8%
Extra Mirrors	2,821	14.5%
Extra Lights	38	0.2%
Other Cameras	4	0.0%
Total	19,433	100.0%

-Multiple responses were allowed

Contact

Keith Kerman
Chief Fleet Officer
New York City
Deputy Commissioner,
Department of Citywide Administrative Services

kkerman@dcas.nyc.gov

THANK YOU

nyc.gov/visionzero

MyCarDoesWhat™.org
Know More. Drive Safer.

Advanced Driving Assistance Systems

And Other Programs to Save Lives Now

Alex Epstein
Sr. Director, Digital Strategy & Content
National Safety Council
Alex.Epstein@nsc.org

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The National Safety Council eliminates preventable deaths at work, in homes and communities, and on the road through leadership, research, education and advocacy

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The University of Iowa

Key Transportation Initiatives

Road To Zero

National Safety Council, National Highway Traffic Safety Administration, Federal Highway Administration and Federal Motor Carrier Safety Administration, announced the Road to Zero initiative. The aim is to eliminate traffic fatalities within the next 30 years. Participating are scores of safety advocates including Vision Zero through executive director Leah Shahum

Distraction

Working toward total Cell Phone Ban in all driving environments. Evolving problem is that distractions come from so many aspects of our environment

Fatigue

Blue Ribbon Panel to be constituted in December – NSC managing

Teen – GDL

Continued work in passing stronger GDL laws – and parents of new teen driver campaign - DriveitHOME

Child Passenger Safety Seats / Hot Cars

Manage National Child Passenger Safety Board – support other advocates

Defensive Driver Courses

Train over one million each year

Advanced Technology

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TPMS

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Lane Keeping Assist

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Drowsiness Alert

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Why This Initiative?

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Why This Initiative?

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Vehicle Experience

- **40% reported their vehicle had acted in a way that startled them or in a manner they did not expect**

- **33% sought information to understand <u>why</u> their vehicle behaved the way it did**

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Bottom Line: Drivers Uncertain

While drivers had exposure to <u>ALL</u> of the technologies, there was <u>significant uncertainty</u> about all of the them

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It's All About Improving Safety

- NHTSA assigned the critical reason for crashes (the last event in the crash causal chain) to be the driver in 94% of crashes investigated.
- When we consider the top three factors in crashes: alcohol, speed and distraction - autonomous vehicles that are not drunk, reckless or distracted have the potential to impact preventable deaths in an unprecedented way.

Source: USDot -NHTSA – Traffic Safety Facts – February 2015, Critical Reasons for crashes Investigated in the National Motor Vehicle Crash Causation Survey

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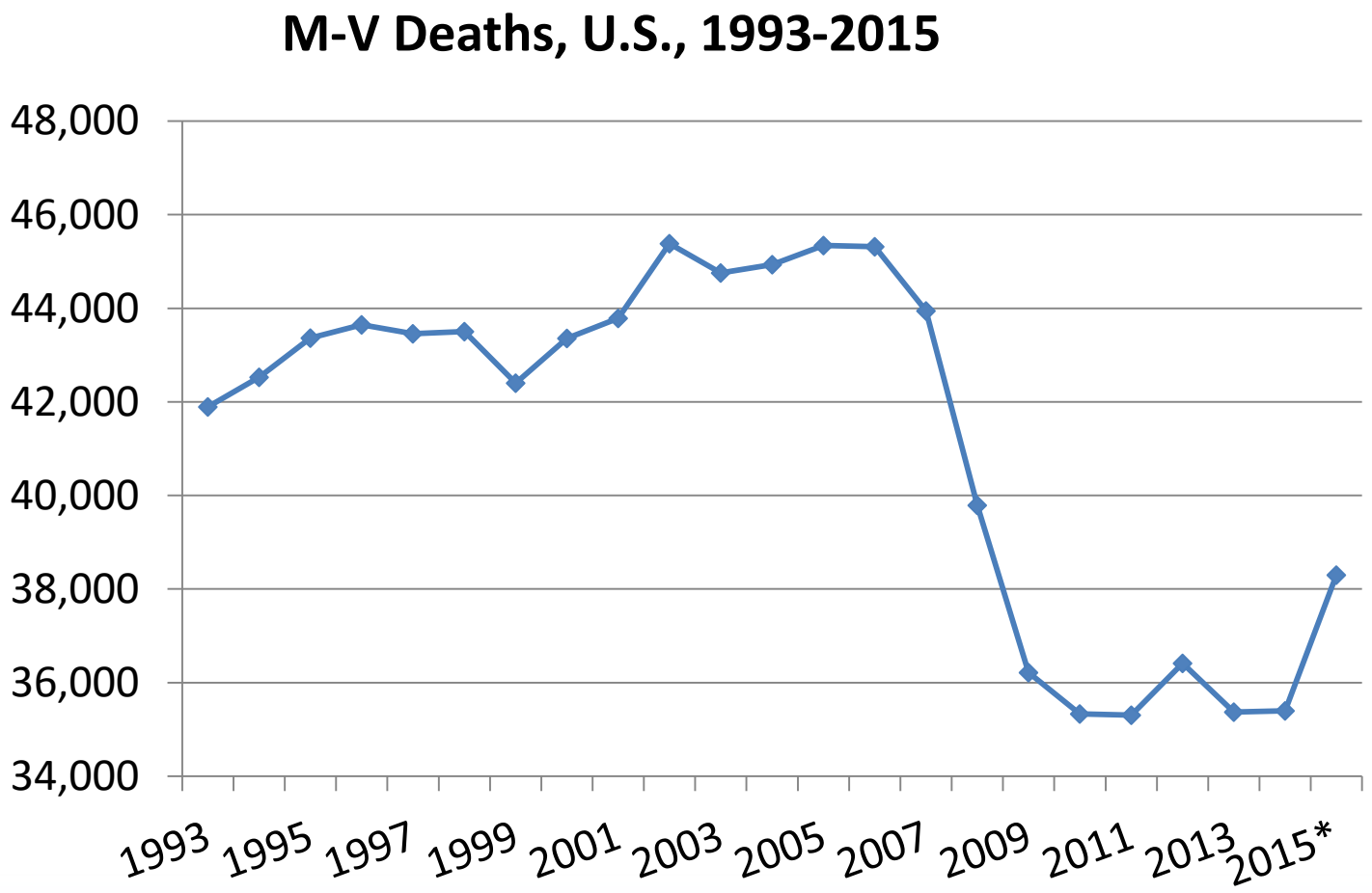
Traffic deaths climb 8%
Highest one-year jump in 50 years



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Active Safety Features May Provide Huge Potential Benefit!

- IIHS estimates:
  - 32% decrease in crashes
  - 21% decrease in injuries
  - 31% decrease in fatalities

  If forward collision warning, lane departure warning, side view assist, and adaptive headlights were available in all cars.
- Boston Consulting Group estimates:
  - A reduction of 9,900 fatalities a year

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Workplace Fatalities

- BLS Estimates:
  - Transportation deaths are leading cause of death in the workplace. 1,865 in 2013 – latest final BLS count.
  - Roadway incidents are highest in this category. 1,099 – this subcategory alone also would rank as the leading cause of workplace deaths.

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Challenges

- Safety Features Have Different Brand Names
- Safety Features Have Different Capabilities across Manufacturers, Trim Levels and Time
- Safety Feature Limitations May Not Be Intuitive or Obvious
- Warning or Icon standardization issues

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The Solution:

MyCarDoesWhat™.org

Know More. Drive Safer.

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What is MyCarDoesWhat?

- MyCarDoesWhat is the first of its kind – evidence based and independent.
- Vehicle Agnostic
- Partnership between University of Iowa and NSC
- Almost 6 billion exposures – U.S. population 18+

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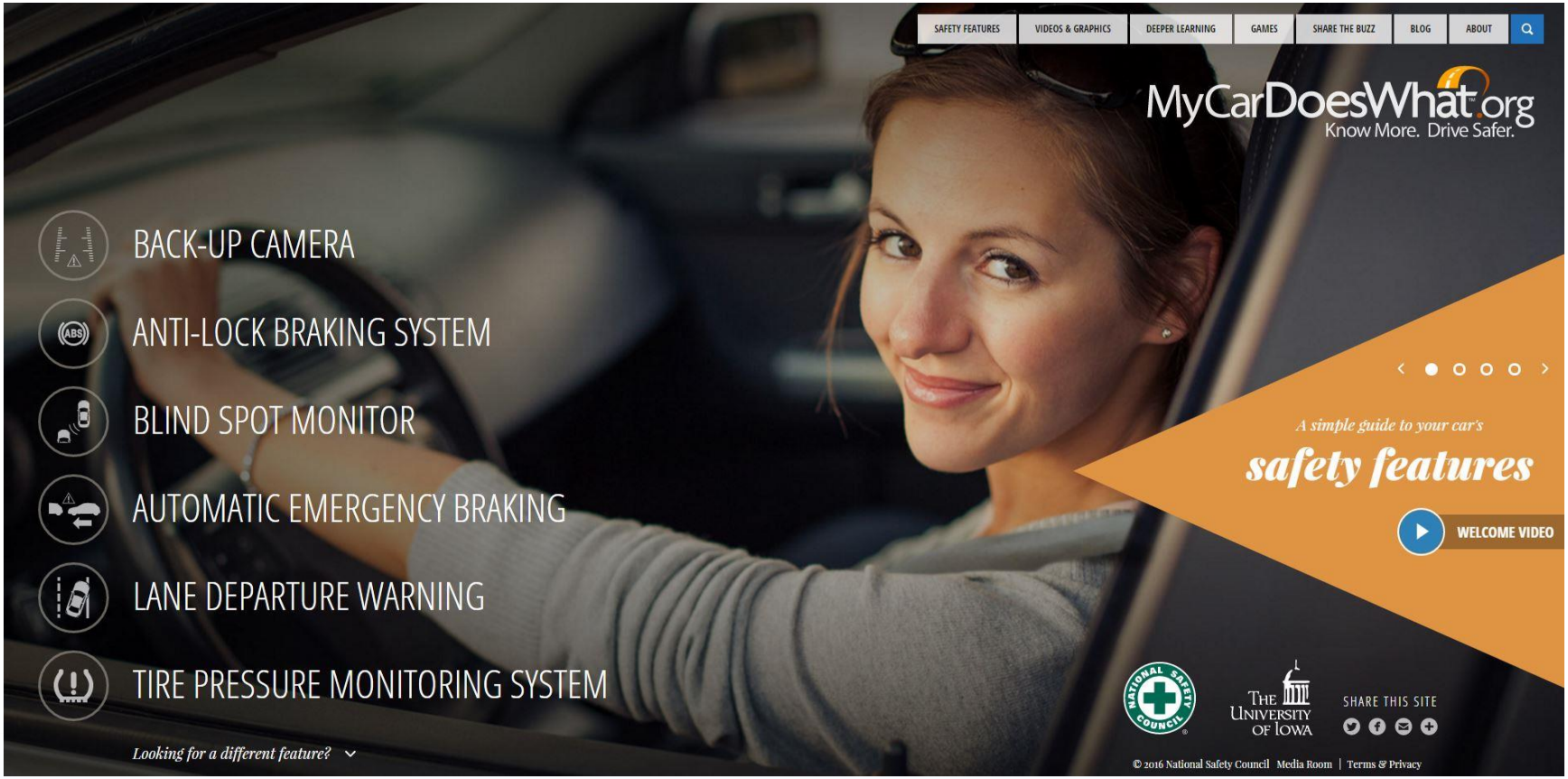
Website



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THE UNIVERSITY OF IOWA

What You Can Do

- Suggest vehicles with “5-Star” ratings and advanced safety features
- Share MyCarDoesWhat.org with your members, drivers, staff, families – It is a trusted, credible, non-branded source
- Tell us what you think!
- Email alex.epstein@nsc.org
- Follow us

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The Nation's Premier Youth Health & Safety Organization

YOUR PARTNERS IN TEEN TRAFFIC SAFETY

Reaching teens through strategic partnerships

HISTORY

1981

Founded

after suffering the loss of several students in separate, alcohol-related crashes in Wayland, MA

1997

Mission Expands

Student leaders request expansion of mission and a name change

Mission expands to address other issues that matter to teens.

Teen Traffic Safety
Substance Abuse
Personal Health & Safety

2016

Today

SADD's network of 7,500+ chapters in middle, high schools and community organizations in 50 states

OUR FIELD

7,500 + ACTIVE CHAPTERS

Student-led chapters in schools and community organizations in all 50 states

ADULT ADVISORS

Each chapter has at least one adult advisor to guide and faciliate the group

STATE COORDINATORS and AFFILIATES

Prevention professionals tasked with implementation of grants, growing the network, providing technical assistancw and program support in their state

SADD AS A RESOURCE

PROGRAMMING

Develop and disseminate effective peer-to-peer programing, communications, and educational tools in our core areas of teen traffic safety, substance abuse, and personal health & safety issues

RESEARCH

Conduct relevant and cutting-edge research on teen behavioral health related to traffic safety to benefit teens, parents, educators, and the highway safety community

EXPERTISE

Ensure state level leaders have expert guidance to carry out their work, build strong relationships within the community, and implement an effective annual plan for SADD's partners in safety

SADD PROGRAMS

EVIDENCE-BASED STRATEGIES

COUNTERMEASURES THAT WORK

This means we want to do what works! SADD programs now use evidence-based strategies and Countermeasures that Work to ensure that our efforts are going to end teen injury and death behind the wheel.

EVALUATION

Each of our programs comes with an evaluation tool, which allows our chapters, our states, and our national team to look at the data and see what's happening. Is this working? What should be modified?

NATIONAL IMPACT

To create some consistency, we launched what we call the SADD Strong programs. These are core programs and campaigns that we are asking all chapters to implement at certain times of the year to magnify the message and the impact across the country.

SADD Programs

ROCK THE BELT

IS IT WORTH THE RISK?

EMPOWERING TEENS

ENGAGING PARENTS

MOBILIZING COMMUNITIES

CHANGING LIVES

Our Partnerships

Our Partnerships

students against SADD destructive decisions®

FOUNDATION FOR
ADVANCING ALCOHOL
RESPONSIBILITY.ORG

Our Partnerships

Why Involve Youth?

- Car crashes remain the leading cause of death for teens in the United States.
- Youth want to be a part of a positive solution!
- Leaders of today- not tomorrow!

How to Involve Youth?

- Partner with SADD at the local, state, or national level!
- Reach out to a local SADD chapter or other student group!
- Engage youth in the collation- ask us what we think. We may surprise you ☺

EMPOWERING TEENS

ENGAGING PARENTS

MOBILIZING COMMUNITIES

CHANGING LIVES

Alyssa Royce

National Student Leadership Council- Vice President

SADD, Inc.

201 Boston Post Road
Suite 202
Marlborough, MA 01752
(508) 481-3568
info@sadd.org

SADD.org

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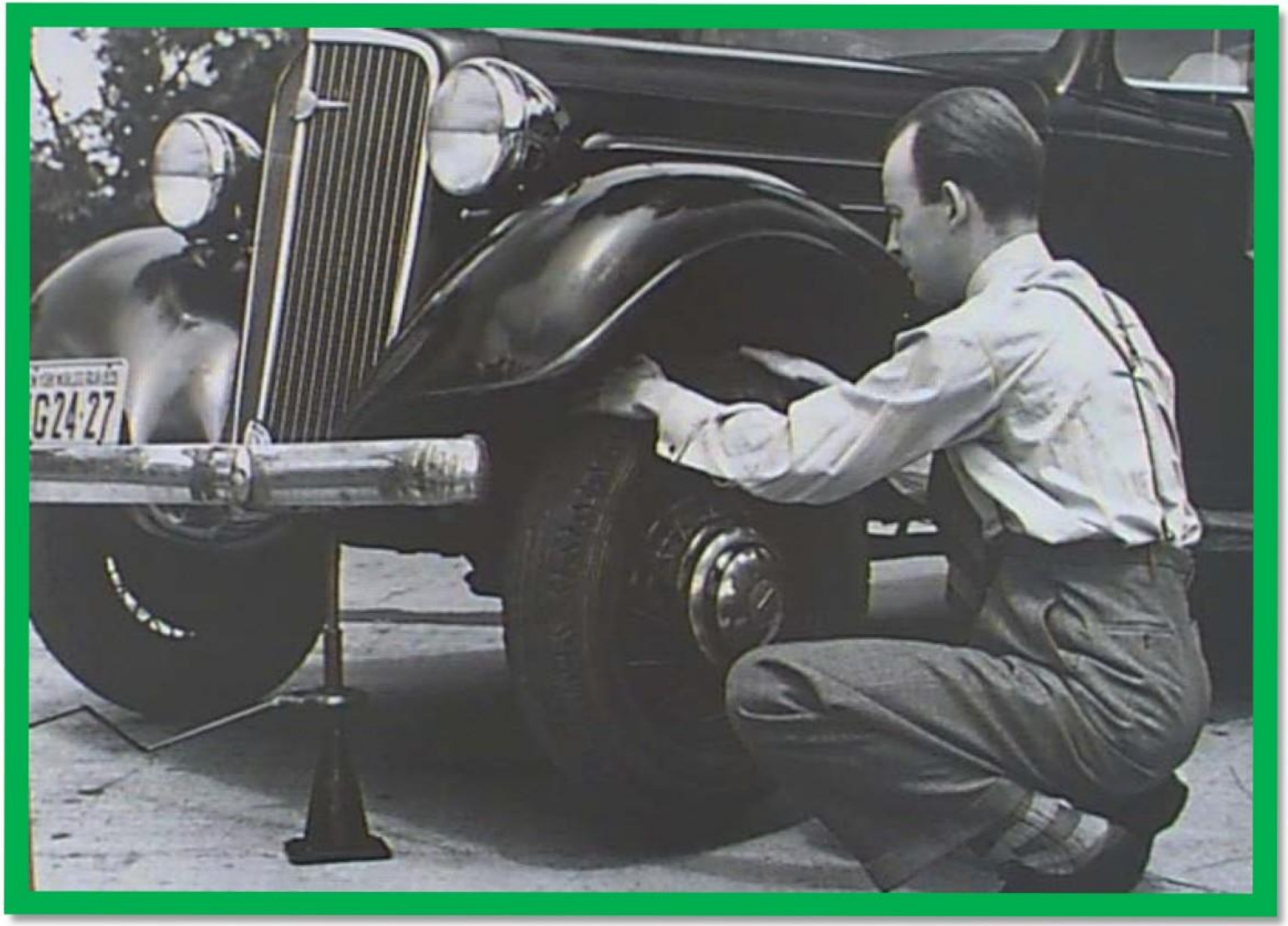
Child Seat Test Program

Emily A. Thomas, PhD
Automotive Safety Engineer

Vision Zero Fleet Safety Forum
November 29, 2016

Consumer Reports Auto Test Center

Automotive Testing Since 1936



Leading the Charge to Protect Our Most Vulnerable Consumers: 1972-Present

- 1970: NHTSA adopts 1st federal safety standard for child seats – FMVSS 213 (not a dynamic crash test)
- 1972: Consumer Reports publishes child seat crash test results for the 1st time – 12 out of 15 seats deemed “Not Acceptable”

FORD TOT GUARD—FRONT CRASH

REAR CRASH

SIDE CRASH

Crash tests of car safety restraints for children

INADEQUATE STRUCTURAL STRENGTH—PERMITTED BY A DEFICIENT GOVERNMENT SAFETY STANDARD—RESULTED IN 12 OF THE TEST MODELS BEING RATED NOT ACCEPTABLE

SEARS SAFETY HARNESS—FRONT CRASH

REAR CRASH

SIDE CRASH

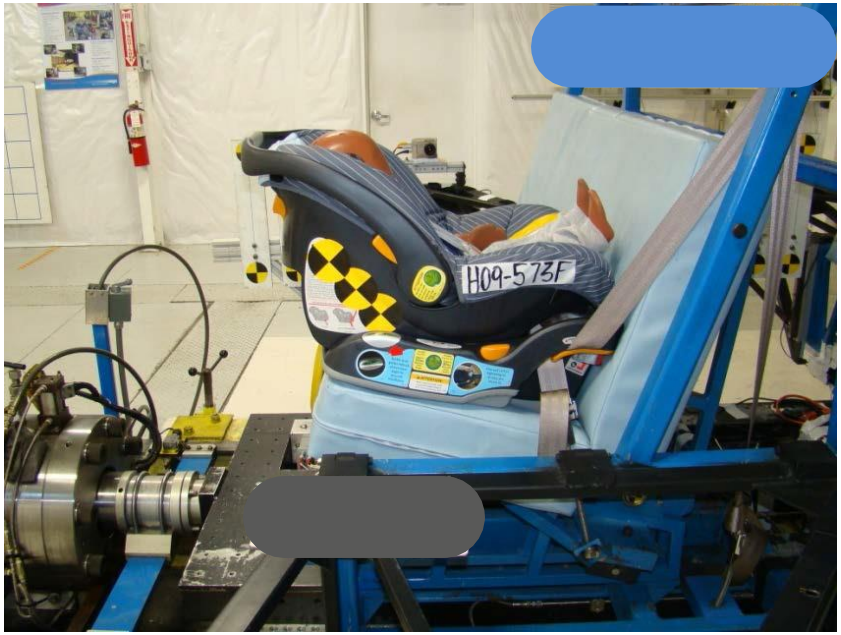
Leading the Charge to Protect Our Most Vulnerable Consumers: 1972-Present

- 1972-1977: Consumer Reports tests child seats 4x with dynamic sled tests
- 1974: NHTSA submits Notice of Proposed Rulemaking (NPRM) for FMVSS 213 to include dynamic crash test
- 1979: NHTSA adds Final Rule for FMVSS 213 to include 30 mph simulated frontal crash effective January 1, 1981

Leading the Charge to Protect Our Most Vulnerable Consumers: 1972-Present

- 1995: Consumer Reports deems 3 child seats as “Not Acceptable” (poor crash performance)
  - 1 manufacturer issued voluntary recall
  - 1 manufacturer implemented replacement buckle design to remedy the problem
- 2008: Child Restraint testing moves to CT Auto Test Center & CPS Techs conduct testing
- April 2014: Consumer Reports releases new child seat crash test protocol
  - Updating sled test environment & crash pulse
- October 2014: NHTSA submits NPRM to upgrade FMVSS 213 bench and pulse
  - Awaiting Final Rule

FMVSS213 vs. CR Crash Test



Soft, thick cushion

Excursion/back angle requirement

30mph acceleration pulse

Minimum standard/compliance test

Cushion from actual vehicle

Simulated front seatback

35mph acceleration pulse

Comparative ratings for Consumers

Messaging to Drive the Future

Crash Protection Benefit: Load Leg

Consumer Reports:

- 4 infant seats rated “BEST” for crash protection
- Reduced head injury risk by 46% compared to seats without load leg (CR crash testing)

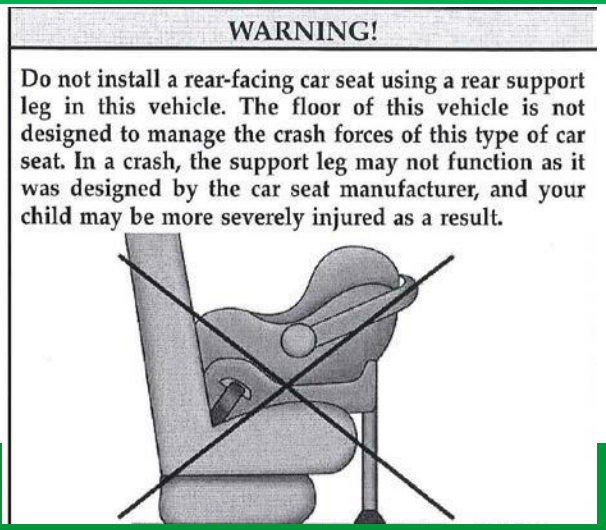
Government Limitation:

- Seats need to comply without using load leg → 213 sled lacks a floor

Industry Limitation:

- Can’t use load leg in some vehicles → floors with hatches can’t withstand additional forces

2017 Chrysler Pacifica with Stow ‘n Go seats



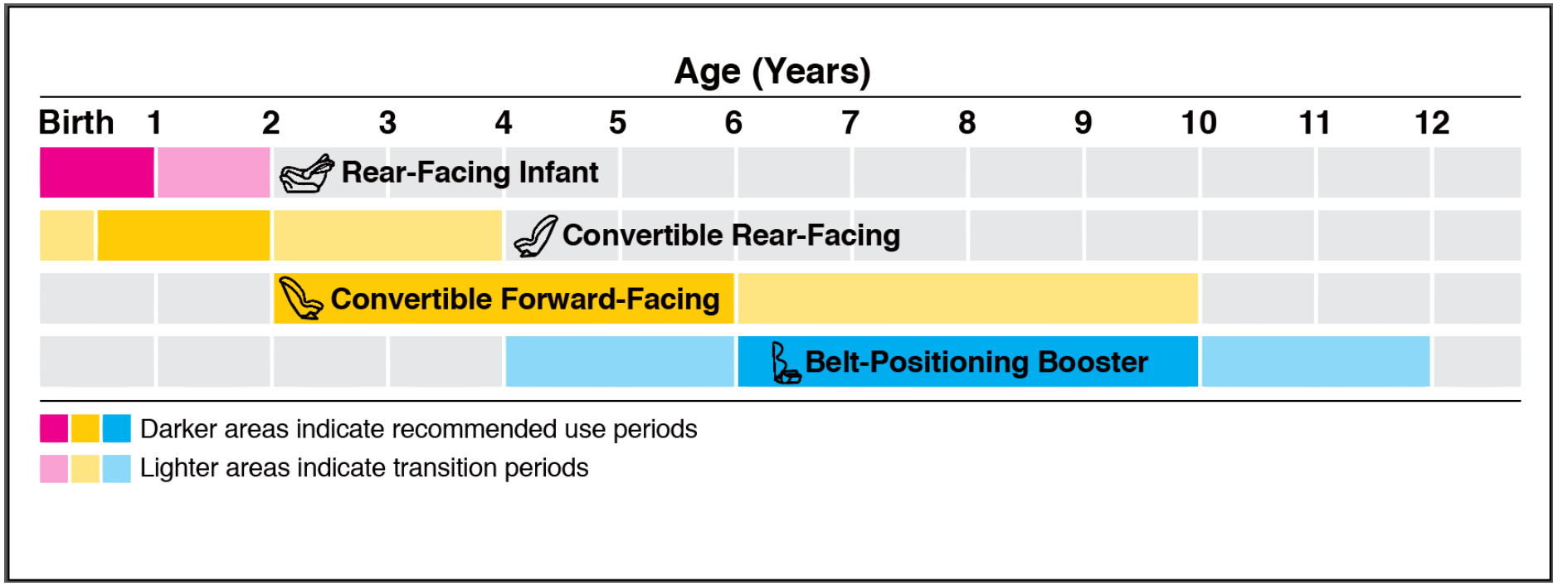
Head Contact: Rear-facing Only vs. Convertibles

- Our tests showed greater frequency of head contact with 12 month dummy in rear-facing infant seat than with rear-facing convertible
  - Infant seats: 16 of 30 (excludes those with structural issues)
  - Rear-facing convertible seats: 1 of 23

- New advice: **Switch to rear-facing convertible no later than 1st birthday**

Child Seat Timeline

- Our updated Real Child Seat Timeline reflects the recommendation to switch from infant seat to rear-facing convertible seat no later than 1st birthday



HOT CARS Act
(Helping Overcome Trauma for Children Alone in Rear Seats)

- Vehicle integrated reminder system to alert driver if child is left unattended
- Requires DOT to issue final rule within 2 years
- Consumer Reports has signed in support of proposed bill
  - On record: Integrated reminder systems would be most effective and life-saving
  - Evaluated Evenflo SensorSafe (child seat integrated) and GMC Acadia Rear Seat Reminder (vehicle integrated)

Thank you!

Questions?

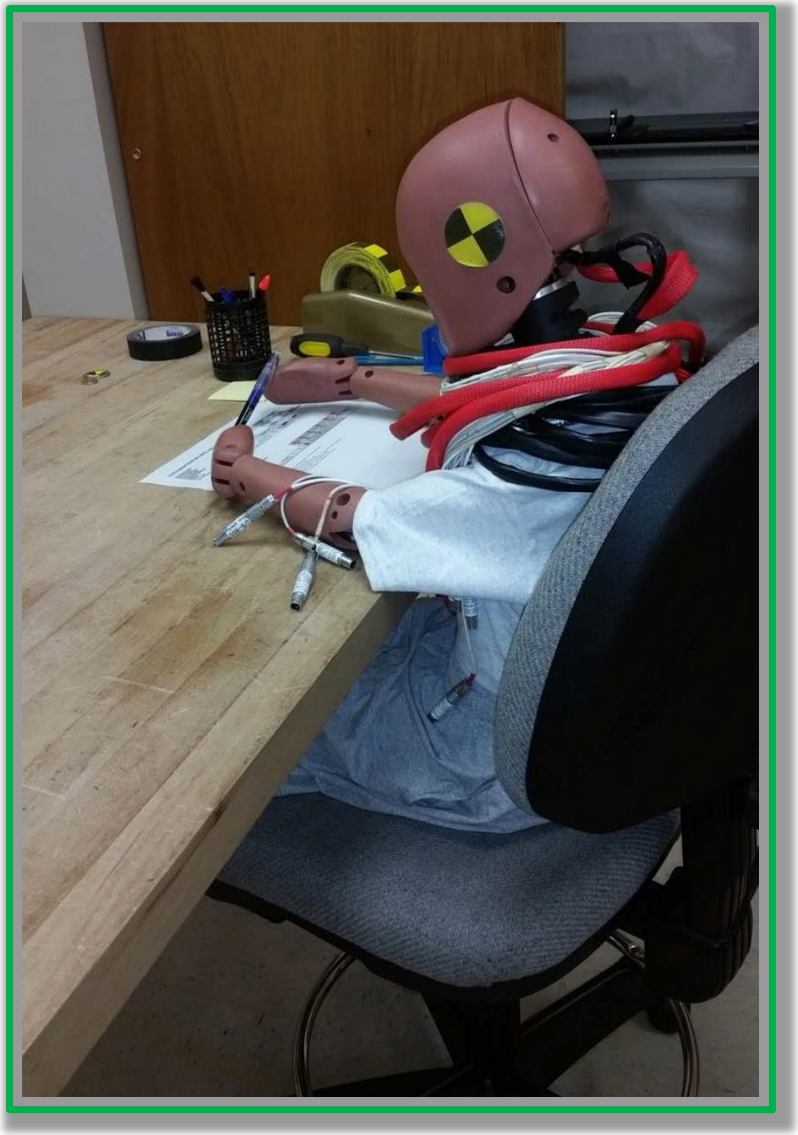
Contact:

Jennifer Shecter

Director,

Content Impact & Corporate Outreach

externalrelations@cr.consumer.org



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SAFE KIDS WORLDWIDE™

Protecting **kids** from preventable injuries

Our Mission

We work to keep **all** kids safe from preventable injuries

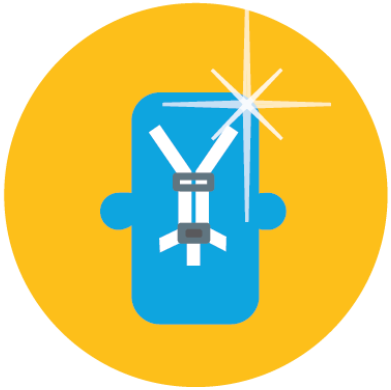
About Us

- A global leader in childhood injury prevention, saving children's lives for almost **30 years**.
- Recognized as the **most influential** childhood injury prevention organization in U.S. and worldwide and the most quoted in news outlets.
- Unites parents, communities and corporations to prevent childhood injuries **on the road, at home and at play.**

How We Work

RESEARCH

Collect and analyze data and measure impact



PROGRAMS

Reach parents, caregivers, educators and kids

AWARENESS

Deliver consistent, compelling messaging

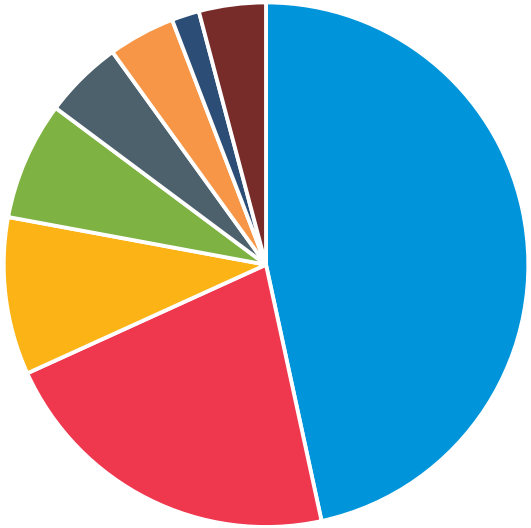
ADVOCACY

Advocate for new and improved laws

Where We Work: Global Network

Safe Kids Coalitions: Who They Are

Safe Kids Lead Agencies: United States



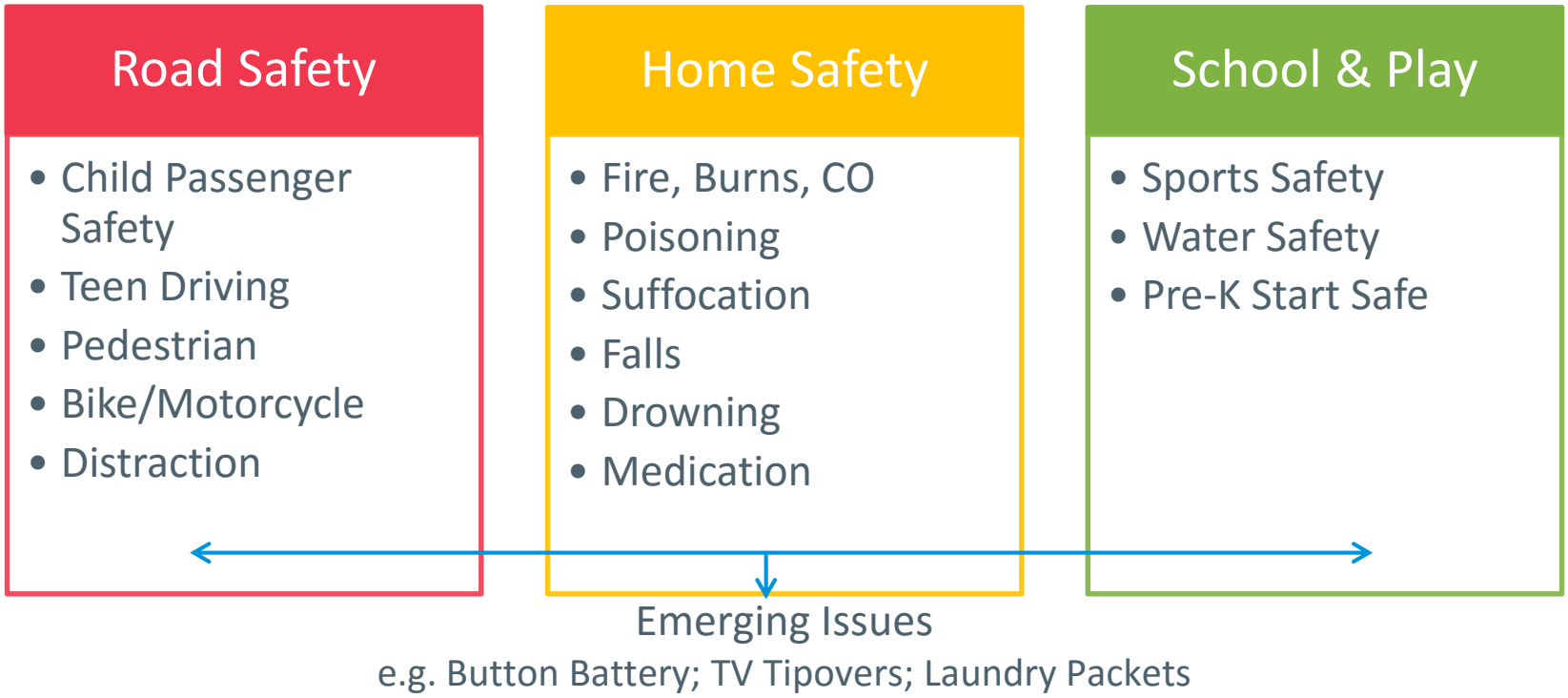
- Hospitals (47%)
- Health Departments (22%)
- Non-Profits (10%)
- Fire Departments (7%)
- Law Enforcement (5%)
- EMS (4%)
- Other Government Agencies (2%)
- Other (4%)

A **grassroots collaboration of individuals and organizations supported** by a **"lead agency"** in a community that conducts multifaceted childhood injury prevention efforts.

Safe Kids Worldwide has **over 400 coalitions** in the United States.

Our Work

Safe Kids Worldwide provides resources to **deliver community programs**.



Our Partners

Road Safety

GM
CHEVROLET
FedEx
DENSO
Safety 1st
britax
GRACO
StateFarm
UBER
NHTSA

Home Safety

Honeywell
McNeil Consumer Healthcare
Nationwide
Kidde
Consumer Technology Association
P&G
SANUS

School & Play

Founding Sponsor
Johnson & Johnson
BELL
Children's Motrin

Our Reach

MEDIA IMPRESSIONS

16,750,000,000

(2015)

FACEBOOK FANS

1,279,922

(as of 11/28/16)

TWITTER FOLLOWERS

72,064

(as of 11/28/16)

ROAD SAFETY

Pedestrian Safety

Challenge: Road crashes are a leading cause of death around the world.

Response: Safe Kids teaches safe behavior to motorists and child pedestrians to create safer, more walkable communities

- ***Walk This Way*** is currently implemented in Brazil, Canada, China, India, South Korea, Philippines, South Africa, Thailand, United States and Vietnam
- Annual research report – e.g. *Alarming Dangers in School Zones*
- Awareness – International Walk To School Day
- Education and Needs Assessment - Take Action Against Distraction
- Environmental Improvements – Creating Safer School Zones

Program Reach to Date:

- Annually, the program reaches more than **1.3** million children in **2,500** schools globally

Buckle Up Program

Challenge: 3,045 children die each year in car crashes in the United States.

Response: Multi-dimensional program to prevent motor vehicle related injuries to kids.

- ***Buckle Up*,** Safe Kids' signature child passenger safety (CPS) program launched in the United States 20 years ago
- Annual research report- e.g. *Reducing Risks for Teen Drivers*
- Educational outreach and support
- Parent-friendly tips and resources – e.g. The Ultimate Car Seat Guide
- Annual national awareness campaign- CPS Week
- Advocacy for stronger laws in the U.S. and global road safety

Program Reach to Date:

- **99,815** car seat check up events hosted
- Nearly **2** million car seats checked
- **698,620** car seats distributed

Priorities in 2017

Pedestrian Safety Program

- Education and Awareness in School Zones
- Improving School Zone Environments
- Distraction

Buckle Up Program

- Protecting Teen Drivers and Passengers
- Reaching Multicultural and Diverse Communities
- Reinforcing Our Primary Message of Buckle Up with ALL Passengers

How You Can Get Involved

Find Your Safe Kids	• Connect with your community and join the people who truly care about keeping kids safe.
Share Our Resources	• Help spread the word by printing our tip sheets and sharing them at community events, schools, child care centers or in neighborhoods.
Partner With Us	• Become a trusted partner and champion to help us innovate and improve how we reach parents, caregivers and kids.
Take Action	• Support legislation that affects how leaders approach important issues relating to child safety.

Make **every** kid a **safe** kid.

Torine Creppy
Chief Program Officer
Tcreppy@safekids.org

For more tips, facts, and background information visit www.safekids.org

nyc.gov/visionzero

So you want to drive in the city: Do you have the vision of an athlete?

Daniel M. Laby, MD
Associate Professor, SUNY College of Optometry
Director, Sports and Performance Vision Center

Disclosure

- I have a financial interest in the EVTS system.
- I have no financial interest in any of the other systems presented in this discussion
- I am honored to have been part of 4 World Series Championship and 1 American League Championship teams

Background …

- Sports Vision research begun in 1992 at UCLA with the LA Dodgers
- Teams: **LA Dodgers**, LA Kings, NY Mets, St Louis Cardinals, **Boston Red Sox, Tampa Bay Rays, Cleveland Indians**, NY Yankees, **Houston Astros, Chicago Cubs**, Boston Celtics, US Olympic team, Boston College … Professional race car drivers
- Currently Associate Professor, SUNY Optometry
- Director – Sports and PerformanceVision Center

SPORTS & PERFORMANCE VISION CENTER

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THE BEATLES

LET IT BE

Some data and facts …

- NY State Department of Motor Vehicles: 15,182 Pedestrians involved in accidents
- NYC 2012 data: 148 of 274 (54%) traffic related deaths were Pedestrians
- 2013: 173 Pedestrians struck and killed
- 80% survival rate if hit by vehicle at 30 mph
- 30% survival rate If hit by a vehicle at 40 mph
- Manhattan: 1.00 injured pedestrian per million miles traveled for all vehicles, in other boroughs 0.60 pedestrian per million miles (***1.5X more dangerous in Manhattan***)

Vehicles on the road in NYC

- ~2.7 Million vehicles enter NYC each day
- ~29,000 vehicles are NYC/DCAS
- ~13,500 medallion taxis in NYC
- ~40,000 for hire Black/Luxury vehicles
- Goals:
  - Develop common accident tracking and training offerings across all agencies
  - Improve fleet reporting and metrics

Statistical Summary

- Anything above zero Pedestrians killed is too much
- In NYC, more than half of all traffic deaths were Pedestrians
- Survival rate for Pedestrians plummets with increased speed
- Increased risk of being struck in Manhattan (1.5 X)

DANGER

Driving is similar to athletic competition

- In sports competition, **athletes are at their best** to perform optimally and hopefully bring home the gold medal
- In driving there are no gold medals, the equivalent is reaching one's destination safely
- This doesn't happen by "accident" and also requires a good deal of training, experience and focus on the task (of driving)
- **Athletes who do not perform well do not remain on the competitive team, drivers who do not perform well simply keep driving …**

Current visual requirements to drive in NY

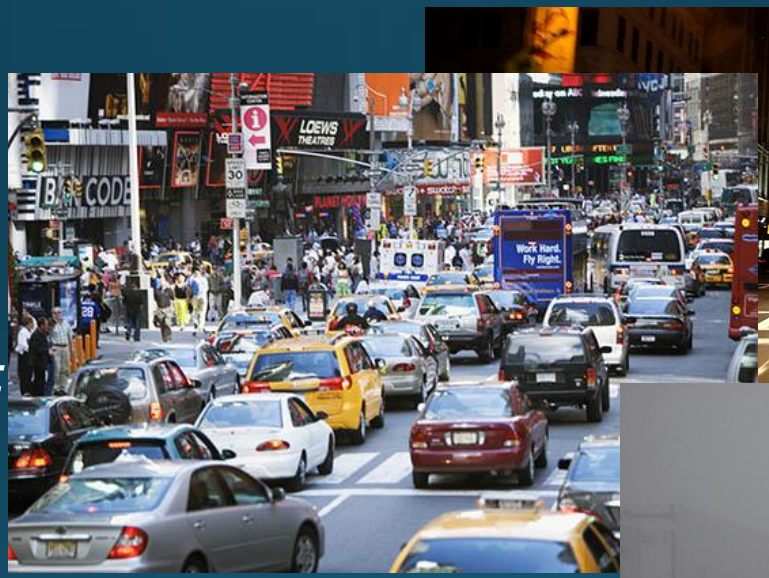
- Vision in one eye of at least 20/40. (20/40 *vs.* 20/20 vs. 20/8)
- Current requirements use high contrast, infinite viewing time, stationary target … Far removed from the vision demands encountered while driving
- In sports we are not happy with minimal ability (20/40), but strive for maximal ability to aid performance – why are we satisfied with 20/40 vision on an unrelated test of vision?

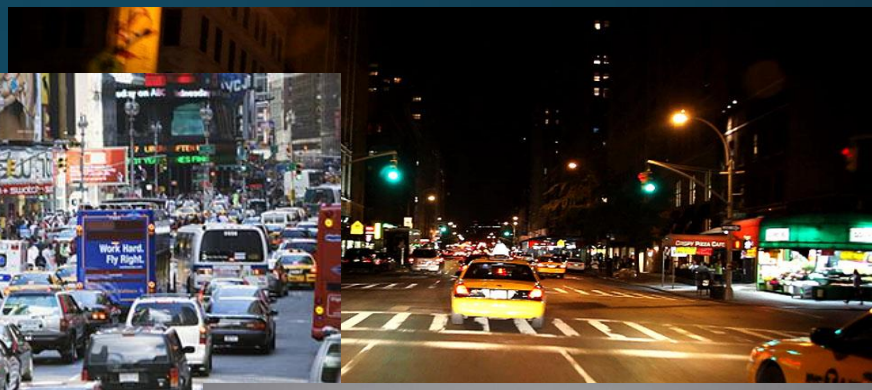
Vision requirements & restrictions

You must pass a vision test when you apply for a driver license or to renew your license. The test must show that you have visual acuity of at least 20/40 (based on the Snellen Visual Acuity Scale) in either or both eyes, with or without corrective lenses.

Visual Challenges in the big city

- Targets often of ***small size, low contrast and brief viewing time***
- ***Constantly moving targets require efficient eye-hand and eye-foot coordination***
- Need to ***track multiple objects simultaneously***





Snellen Chart vs. Real World Vision

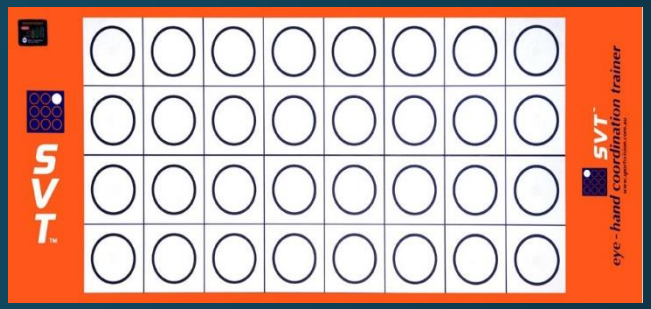
Scientific Literature - Acuity

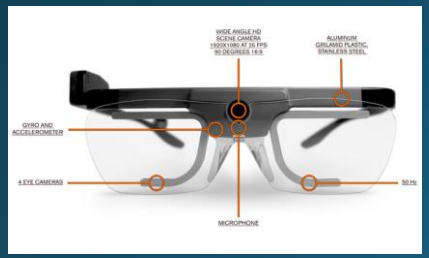
- Reduced vision (+2.00 D blur) resulted in delayed hazard response times as well as changes in eye movement patterns while driving
- Both Blur and Distraction independently resulted in delayed hazard response times
- Noted decrease in number of fixations and duration of fixations in blur groups
- Wood et al report "Drivers' ability to recognize pedestrians at night is degraded by common visual impairments, ***even when the drivers' mean visual acuity meets licensing requirements***.

EVTS – Acuity/Contrast/Exposure time

- MLB study (580 unique MLB players) of top 20% visually vs bottom 20% … **Top 20% had**:
- 57% **better** miss percent score
- 74% **fewer** missed fastballs in the zone score
- 52% **less** chasing pitches out of strike zone
- 31% **better** in-zone fastball swing percentage
- 64% **better** walk rate (number of at-bats before gaining a walk)
  - 18 at-bats vs 6.5 at-bats before gaining a walk
  - For 610 at-bats, this translates into an additonal 20 runs for the season

Eye-Hand Coordination





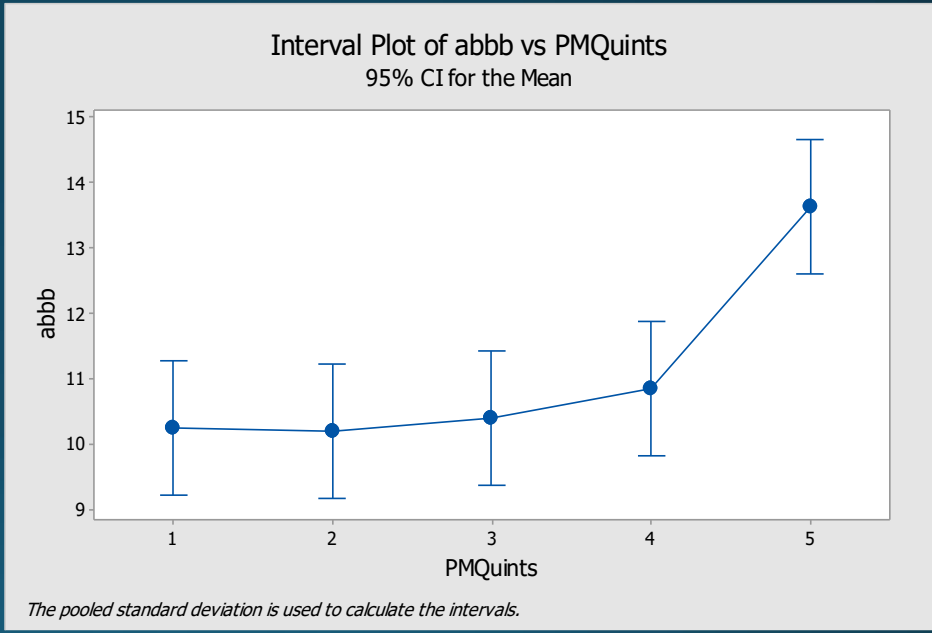
Scientific Literature – Eye/Hand Coordination

- **Brief interruption** of vision **effects** a driver's ability to resume appreciation of a pre-cued hazard.
- Report suggests that even **when the driver resumes looking at the road in front, they have a decreased sensitivity for coming hazards** as compared to those who did not look away.
- Authors note that drivers who are even momentarily distracted or are no longer viewing the road are at risk of **missing important information even after they return to viewing** the roadway.
- **False sense of security**: Drivers who looked away felt driving was "easier" than those drivers who did not look away and felt the same drive was more "difficult".

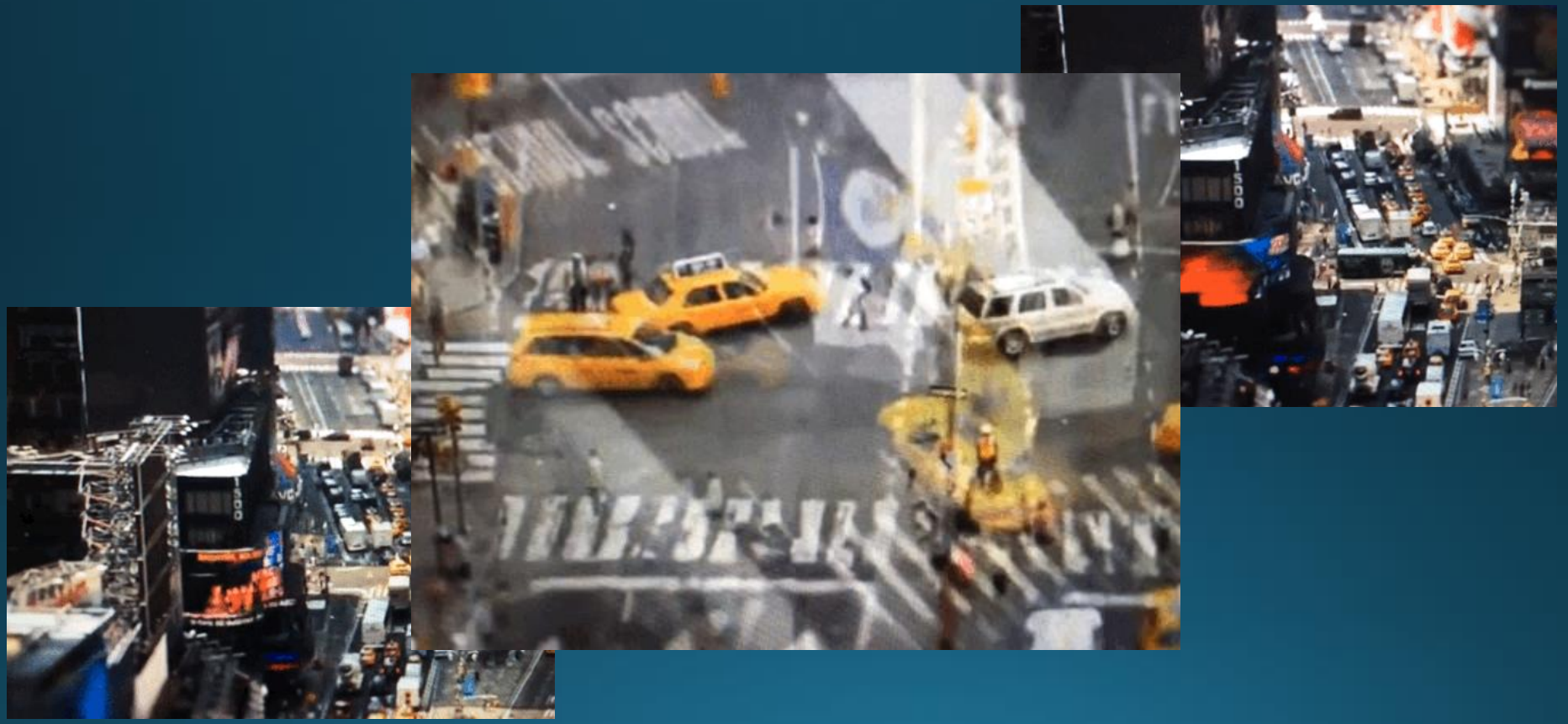
Eye-Hand Coordination in Baseball

Better H/E coordination group had:

- **Three fewer at bats before gaining a walk** (10.28 vs 13.11, 22% increase (percent change = 100*((mean Bot-Mean Top)/Mean Bot)))
- **Missed 15% less** fast-balls in the strike zone (0.094 vs 0.080)
- **Chased 12% fewer** fast-balls out of the strike zone (0.152 vs 0.134)
- **Missed on swings 8% less often** (0.232 vs 0.212)



Concentration/Multiple Object Tracking



Scientific Literature – "MOT"

- Thought to be ***integral to visuo-motor coordination and driving*** (Feria, 2008; Horowitz et al., 2007; Kunar, Carter, Cohen, & Horowitz, 2008; Trick, Enns, Mills, & Vavrik, 2004)
- Multiple-object tracking ***performance decreases with age*** (Trick, Perl, & Sethi, 2005)
- multiple-object tracking ***predicts road-test performance in older drivers*** (Bowers et al., 2013)

Scientific Literature - 2014

Atten Percept Psychophys (2014) 76:2326–2345
DOI 10.3758/s13414-014-0694-3

Multiple-object tracking while driving: the multiple-vehicle tracking task

Martin J. Lochner · Lana M. Trick

Published online: 20 June 2014
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Abstract Many contend that driving an automobile involves multiple-object tracking. At this point, no one has tested this idea, and it is unclear how multiple-object tracking would coordinate with the other activities involved in driving. To address some of the initial and most basic questions about multiple-object tracking while driving, we modified the tracking task for use in a driving simulator, creating the multiple-vehicle tracking task. In Experiment 1, we employed a dual-task methodology to determine whether there was interference between tracking and driving. Findings suggest that although it is possible to track multiple vehicles while driving, driving reduces tracking performance, and tracking compromises headway and lane position maintenance while driving. Modified change-detection paradigms were used to assess whether there were change localization advantages for tracked targets in multiple-vehicle tracking. When changes occurred during a blanking interval, drivers were more accurate (Experiment 2a) and ~250 ms faster (Experiment 2b) at locating the vehicle that changed when it was a target rather than a distractor in tracking. In a more realistic driving task where drivers had to brake in response to the sudden onset of brake lights in one of the lead vehicles, drivers were more accurate at localizing the vehicle that braked if it was a tracking target, although there was no advantage in terms of braking response time. Overall, results suggest that multiple-object tracking is possible while driving and perhaps even advantageous in some situations, but further research is required to determine whether multiple-object tracking is actually used in day-to-day driving.

Keywords Object-based attention · Perception and action · Dual-task performance · Driving · Multiple-object tracking

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Springer

The multiple-object tracking task (Pylyshyn, 1989; Pylyshyn & Storm, 1988) was originally devised to test a hypothetical mechanism purported to select a small number of visual items at once (targets) and monitor their independent positions as they moved among other identical items (distractors). This tracking mechanism was thought to be integral to visual–motor coordination (Pylyshyn, 2009), and in the basic research, many have argued that multiple-object tracking is critical to driving an automobile (e.g., Feria, 2008; Horowitz et al., 2007; Kunar, Carter, Cohen, & Horowitz, 2008; Trick, Enns, Mills, & Vavrik, 2004). However, although tracking has been studied for over 25 years, there has never been much interest in multiple-object tracking among those who actually do driving research, and there are no investigations of the topic in that literature. In fact, it is not even clear whether it is possible to perform multiple-object tracking while driving or whether there are any advantages or disadvantages to tracking while driving. In this article, we present a series of experiments that investigate multiple-object tracking in the context of a driving task. In the sections that follow, we will begin with a brief summary of the tracking literature as it relates to driving and then go on to describe the experiments.

When multiple-object tracking was first studied, Pylyshyn and Storm (1988) proposed that it relied on a mechanism that assigned mental indices or tags to a small number of target objects at once (three to five in most adults). This mechanism allowed people to refer to and thus track a small number of moving objects (targets) among others with similar properties, even if the objects' properties and positions changed from

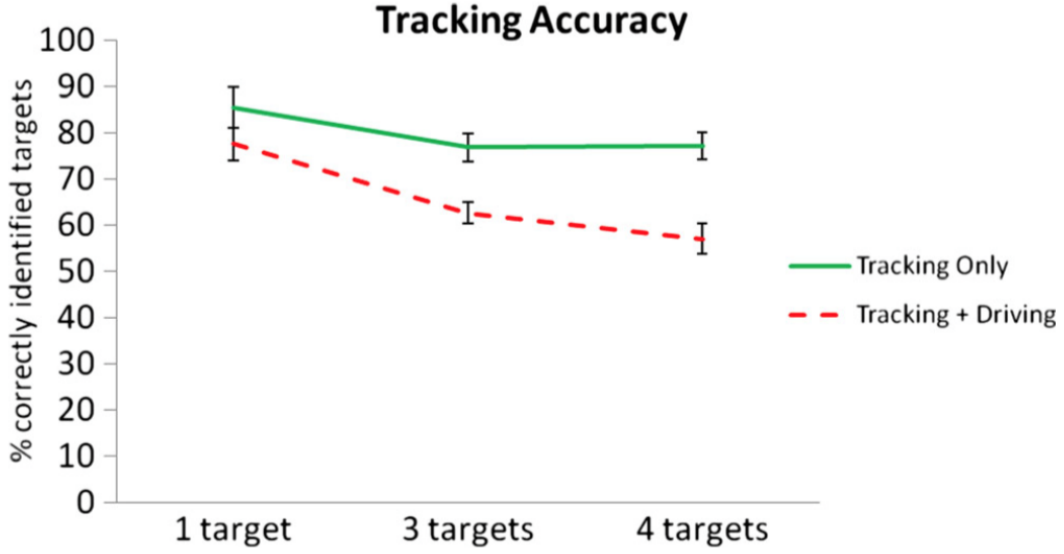

Fig. 2 Percentages of correctly identified targets in tracking in the single- (tracking only) and dual-task (tracking + driving) conditions. Standard error bars are included

Basketball: MOT and Concentration

Visual Tracking Speed Is Related to Basketball-Specific Measures of Performance in NBA Players

Gerald T. Mangine,[1] Jay R. Hoffman,[1] Adam J. Wells,[1] Adam M. Gonzalez,[1] Joseph P. Rogowski,[2] Jeremy R. Townsend,[1] Adam R. Jajtner,[1] Kyle S. Beyer,[1] Jonathan D. Bohner,[1] Gabriel J. Pruna,[1] Maren S. Fragala,[1] and Jeffrey R. Stout[1]

[1]Sport and Exercise Science, Institute of Exercise Physiology and Wellness, University of Central Florida, Orlando, Florida; and [2]Strength and Conditioning, Orlando Magic Basketball Club, Orlando, Florida

Abstract

Mangine, GT, Hoffman, JR, Wells, AJ, Gonzalez, AM, Rogowski, JP, Townsend, JR, Jajtner, AR, Beyer, KS, Bohner, JD, Pruna, GJ, Fragala, MS, and Stout, JR. Visual tracking speed is related to basketball-specific measures of performance in NBA players. *J Strength Cond Res* 28(9): 2406–2414, 2014—The purpose of this study was to determine the relationship between visual tracking speed (VTS) and reaction time (RT) on basketball-specific measures of performance. Twelve professional basketball players were tested before the 2012–13 season. Visual tracking speed was obtained from 1 core session (20 trials) of the multiple object tracking test, whereas RT was measured by fixed- and variable-region choice reaction tests, using a light-based testing device. Performance in VTS and RT was compared with basketball-specific measures of performance (assists [AST]; turnovers [TO]; assist-to-turnover ratio [AST/TO]; steals [STL]) during the regular basketball season. All performance measures were reported per 100 minutes played. Performance differences between backcourt (guards; $n = 5$) and frontcourt (forward/centers; $n = 7$) positions were also examined. Relationships were *most likely* present between VTS and AST ($r = 0.78$; $p < 0.003$), STL ($r = 0.77$; $p < 0.003$), and AST/TO ($r = 0.78$; $p < 0.003$), whereas a *likely* relationship was also observed with TO ($r = 0.49$; $p < 0.109$). Reaction time was not related to any of the basketball-specific performance measures. Backcourt players were *most likely* to outperform frontcourt players in AST and *very likely* to do so for VTS, TO, and AST/TO. In conclusion, VTS seems to be related to a basketball player's ability to see and respond to various stimuli on the basketball court that results in more positive plays as reflected by greater number of AST and STL and lower turnovers.

Key Words visual tracking speed, visual perception, reaction time methods, decision making, sport science, fitness assessment

Introduction

In professional basketball, each position has a predefined strategic role where aptitude is measured by game-related statistics of productivity (31,36). The ability of a specific player to meet the demands of their role is considered to be a function of several physiological, visual-motor reaction speed, and perceptual-cognitive capability measures (7,15,21,28,32). To date, however, only 1 study has related player-specific characteristics to game-related performance measures in professional basketball players (25). McGill et al. (25) reported that stability, agility, and flexibility were associated with minutes played, assists (AST), rebounds, blocked shots, and steals (STL) per game. However, the specific roles of visual-motor reaction speed and perceptual-cognitive capability to game-related measures of performance in professional basketball players are unknown.

Although conceptually unique, a clear distinction of how visual-motor reaction speed and perceptual-cognitive capability affect athletic performance does not exist. Visual-motor reaction speed is a measure of the length of time encompassing the onset of a stimulus, an individual's recognition of the stimulus, and the length of time necessary to complete their response to the stimulus (15,26,33). Presumably, athletes who are capable of recognizing and responding (to a stimulus) within a shorter amount of time would possess a competitive advantage. To date, however, research demonstrating a positive relationship with athletic performance is equivocal (7,15,21,26,29,34). However, perceptual-cognitive capability may be related to an athlete's ability to efficiently devote attentive resources in response to the movement patterns of several key components within a dynamic environment

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28(9)/2406–2414

Journal of Strength and Conditioning Research

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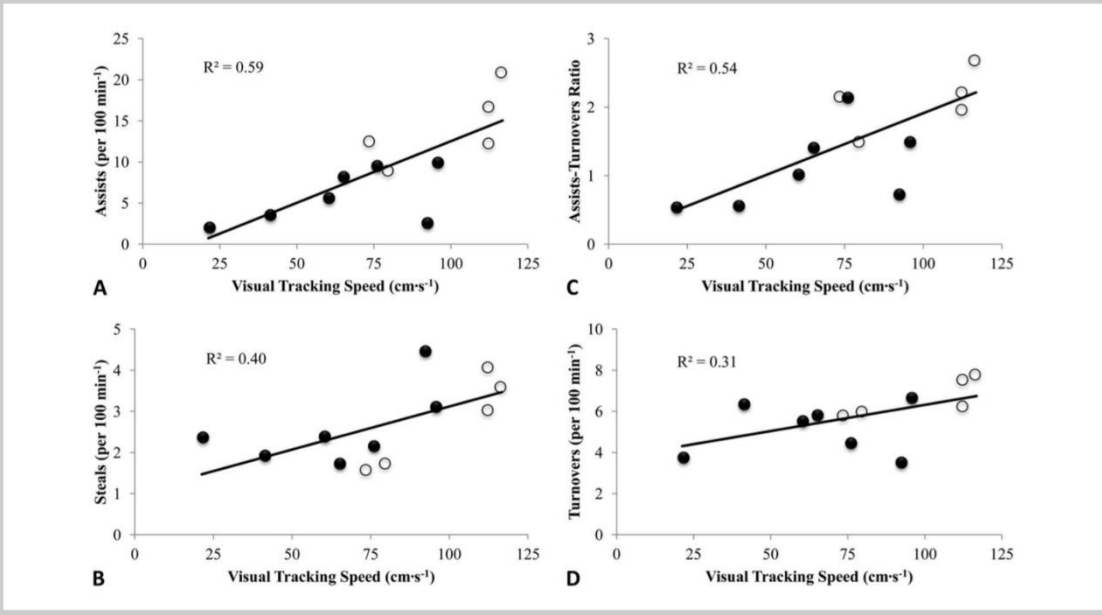
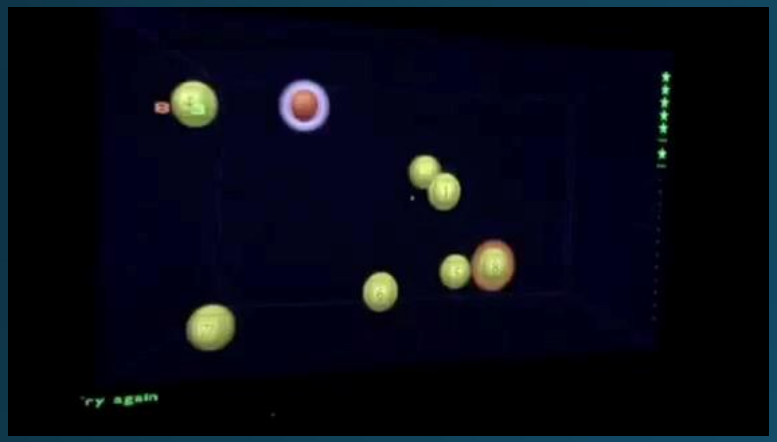
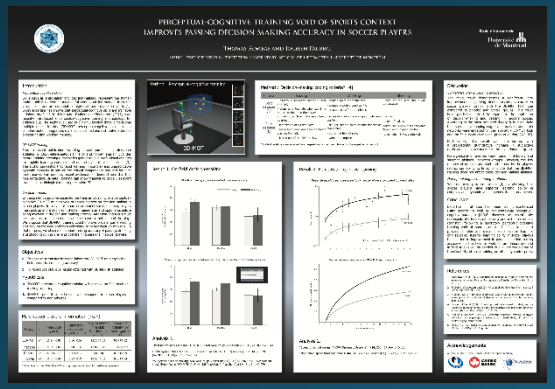
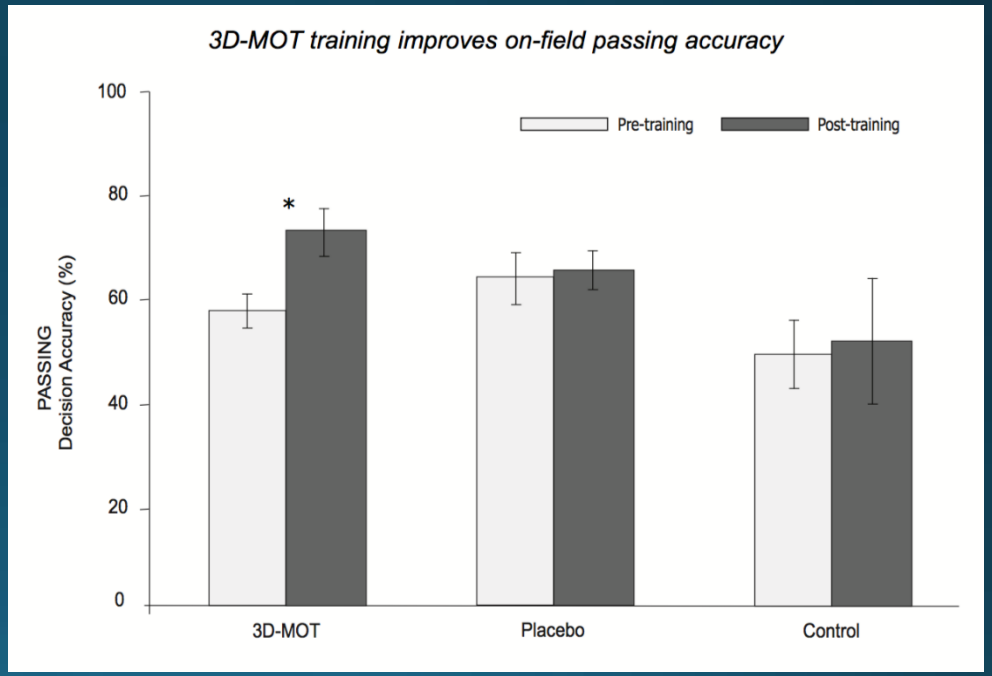


Figure 3. Bivariate relationships between visual tracking speed and game-related measures of performance in professional basketball backcourt ($n = 5$) and frontcourt ($n = 7$) players: (A) assists (100 per minute), (B) steals (100 per minute), (C) assists-to-turnovers ratio, and (D) turnovers (100 per minute). Open spheres = back court players; closed spheres = front court players; solid black line = line of best fit.

MOT and Concentration: Benefit of Training in Soccer







Improved City Driving Performance

- Apply knowledge learned from Sports Vision to driving
- Determine tasks critical to driving and treat drivers as athletes – in terms of visual ability
- Willingness to move beyond basic 20/40 standard, to level of visual function needed to make roads safer
- Apply higher level visual and integrative abilities (H/E coordination and MOT) to further enhance safety
- Correction and Training possibilities

"What we know is a drop, what we don't know is an ocean"

- Sir Isaac Newton

Daniel M. Laby, MD : dlaby@sunyopt.edu

nyc.gov/visionzero

TOGETHER FOR® SAFER ROADS

COMPANIES DRIVEN TO SAVE LIVES™

Together for Safer Roads: Advancing Road Safety Best Practices for Companies and Their Fleets

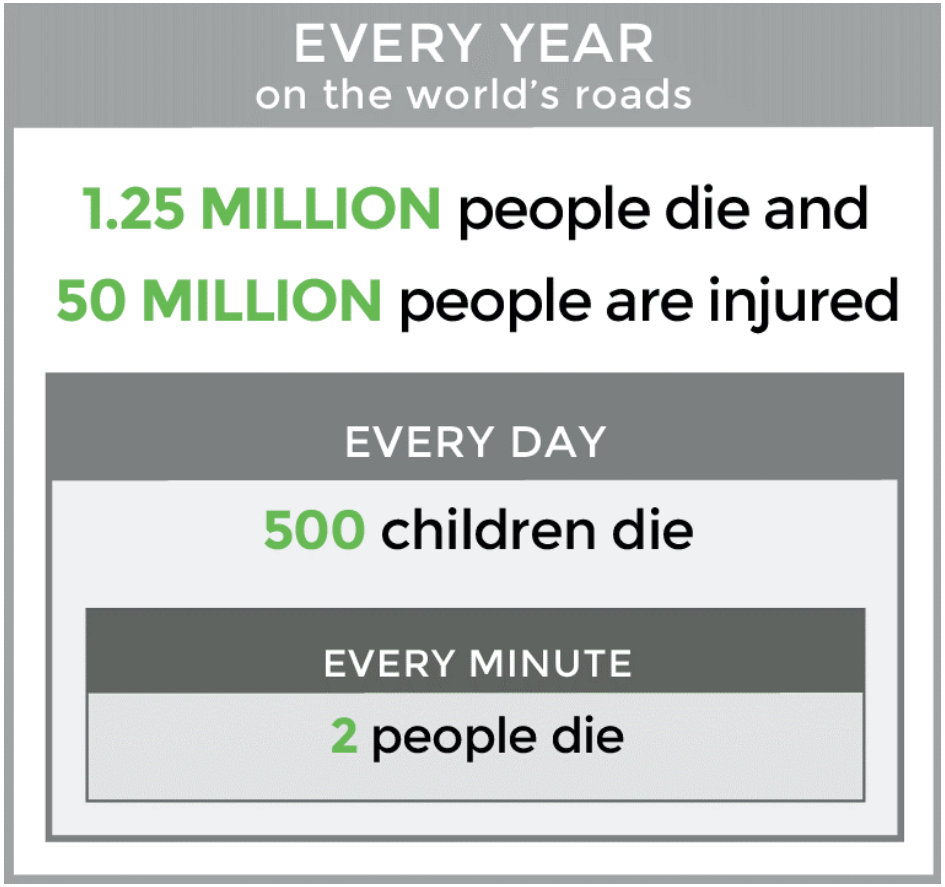
Vision Zero Fleets Safety Forum

November 29, 2016

A Life and Death Issue

Road safety is a critical global public health challenge and a barrier to human development and economic growth.

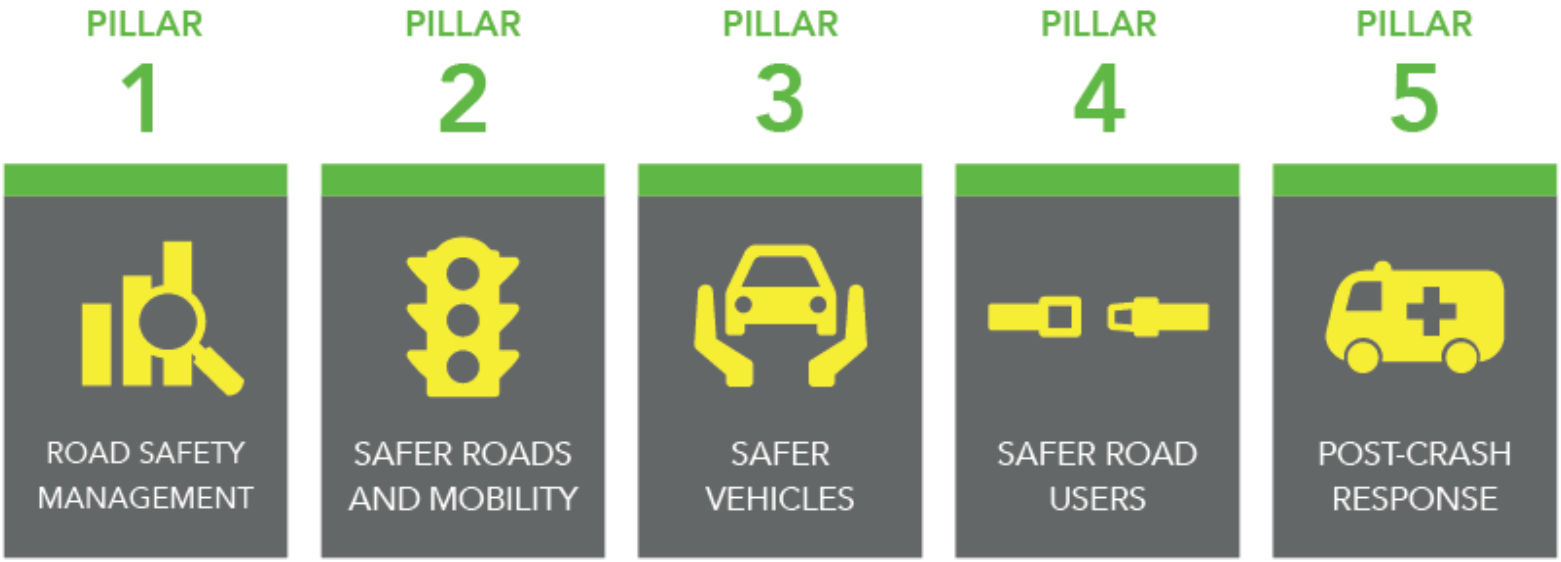
Road crashes are rising to the **7th leading** cause of death by 2030 and already cost the world **USD $518 billion** a year.



Source: World Health Organization (2015). "Global Status Report on Road Safety 2015."

Five Pillars to Solving the Problem

The United Nations General Assembly proclaimed the **Decade of Action for Road Safety 2011-2020** in a landmark resolution co-sponsored by 100 countries.



TSR's Vision

A world where roads are safer for all people.

TSR's Mission and Values

Working together, we aim to **bend the curve on road traffic collisions,** so they are no longer one of the leading causes of death and injuries worldwide.

Action • Collaboration • Engagement

TSR's Goals

To create a measurable and sustainable impact in road safety through results-driven initiatives by:

- Leveraging member companies' collective intellectual capital and expertise to advance best practices for companies and their fleets;
- Addressing strategic road safety challenges in select locations by working with local government and stakeholders;
- Identifying actionable insights through data collection and management to advance innovative solutions; and
- Collaborating with the broader road safety community to be the leading voice for the private sector.

World Day for Safety and Health at Work

Together in 2016, member companies **engaged more than 1 million people across 45 countries** on how to be safer road users.

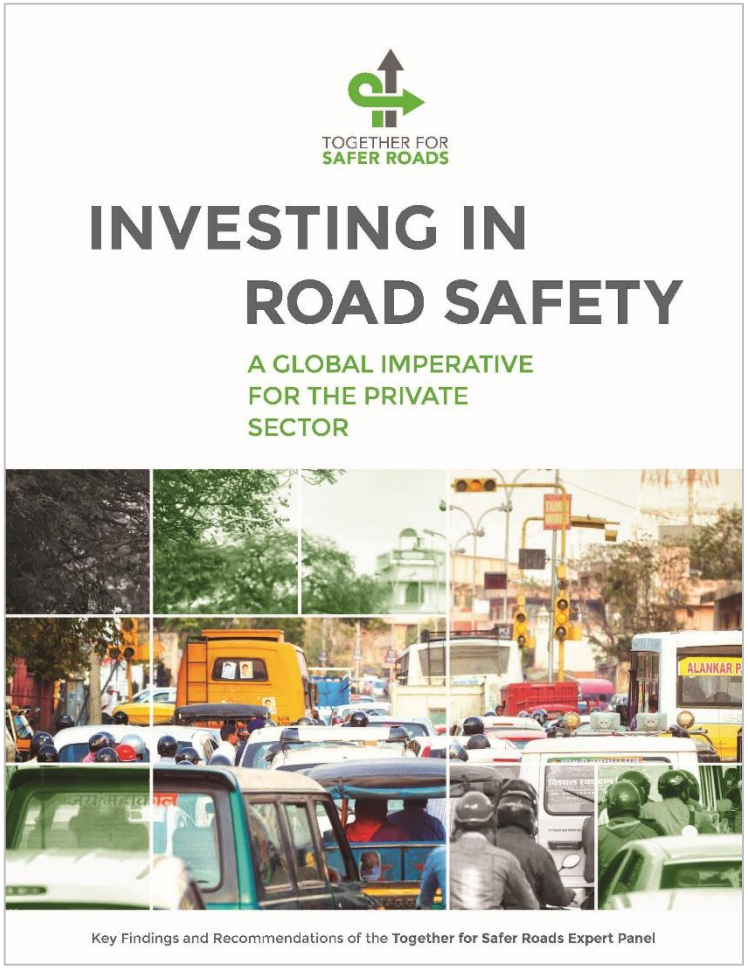
Launch Three Safer Roads Challenges

Support safer roads in:

- Atlanta, Ga., United States
- São Paulo, Brazil
- Shanghai, China

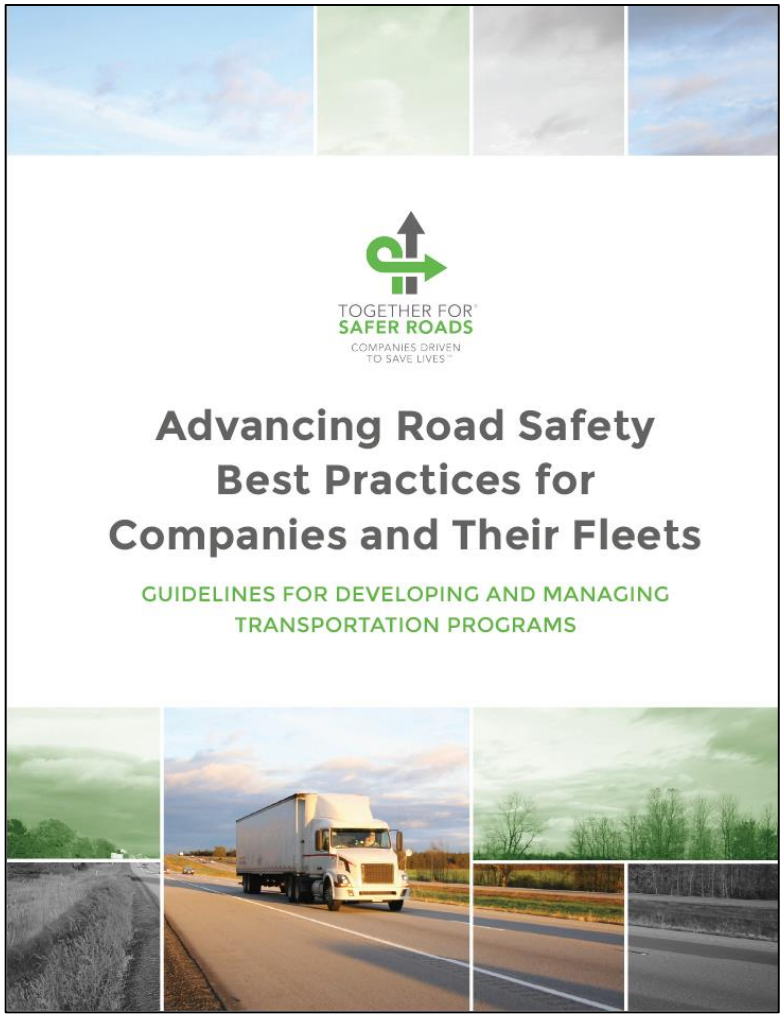
Global Imperative for the Private Sector

Working with TSR's **independent Expert Panel** to make the role the private sector can play in road safety a global imperative.



Best Practices for Companies and Their Fleets

Leveraging member companies' collective insights, TSR created **best practice guidelines** for developing and managing transportation programs.



Pillar 1 – Road Safety Management

- Institute safe transportation policies
  - Use Motor Vehicle Safety (MVS) Policy
- Manage external contractors
  - Appoint contractors
  - Influence vendors
  - Set road safety standards
- Collect and analyze data
  - Perform data collection on company vehicles and drivers
  - Conduct review and analysis
  - Establish baseline on driver behavior
  - Share and report data

Pillar 2 – Safer Roads and Mobility

- Plan journeys
  - Set realistic schedules
  - Account for speed limits, rush hour, other possible hold ups
  - Schedule multiple drivers on long journeys
- Map hazardous routes
  - Avoid residential communities and areas with heavy foot traffic
  - Avoid areas with steep hills, sharp turns, poor road conditions, etc.
  - Develop a Journey Management Plan (JMP)

Pillar 3 – Safer Vehicles

- Create vehicle selection criteria
  - Tailored to specific task
  - Equipped with standard and functioning safety requirements
- Maintain and service vehicles
  - Vehicle inspections
  - Servicing and vehicle turnover
  - Reporting on malfunctions

Pillar 4 – Safer Road Users

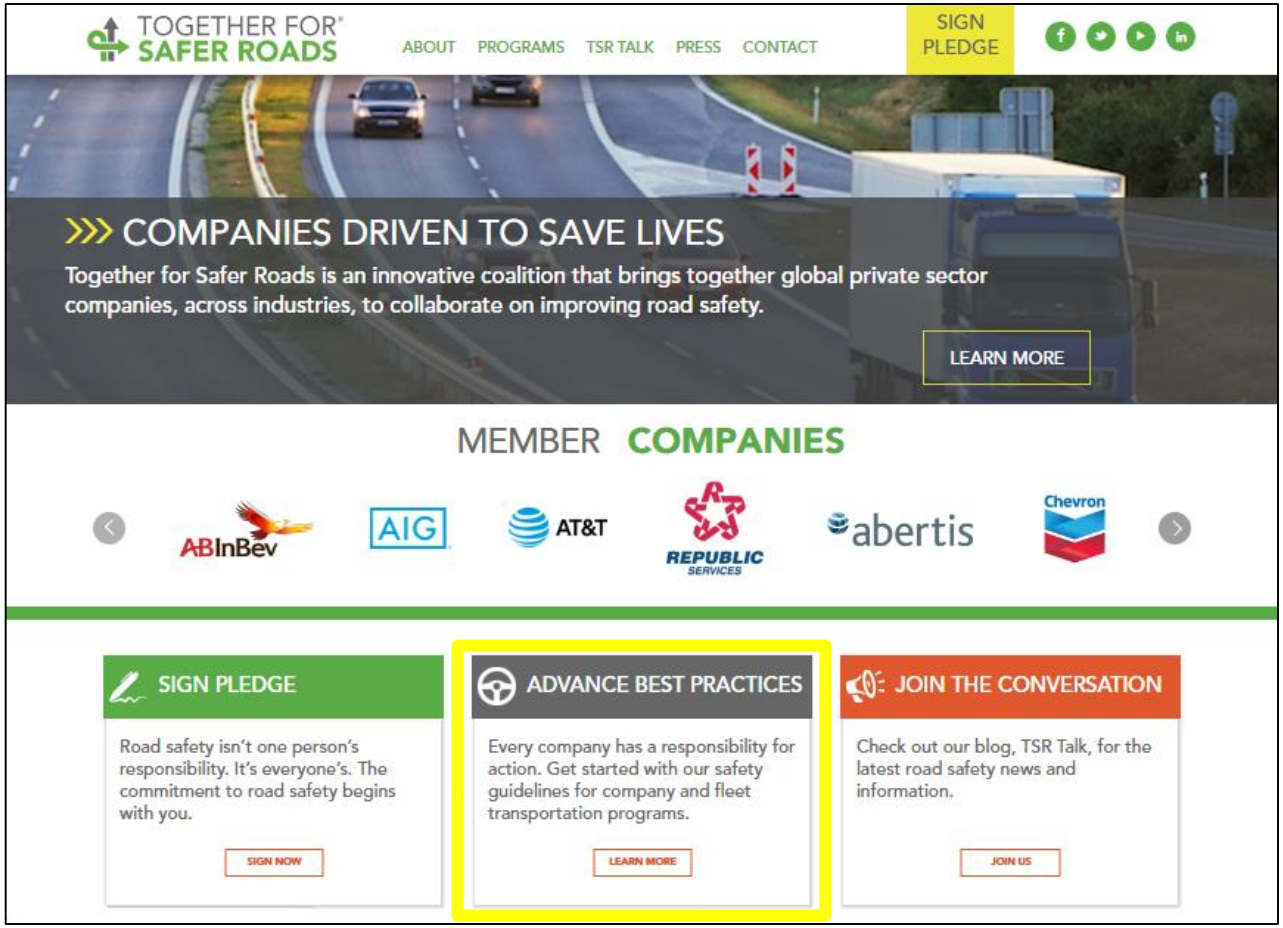
- Develop a safety culture
- Assess drivers' skills and qualifications
- Establish driving guidelines and key performance indicators
- Train, educate, and develop drivers
- Monitor drivers

Pillar 5 – Post-crash Response

- Prepare for post-crash scenarios
  - Equip truck with first aid kits
  - Train drivers on administering first aid
- Report and investigate incidents
  - Create policies and procedures for reporting
  - Set deadline for reporting

Access the Report Online

www.TogetherforSaferRoads.org



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Twitter.com/TSRcoalition

Youtube.com/user/tsrcoalition

www.TogetherforSaferRoads.org

Contact us at **info@togetherforsaferroads.org.**

Thank you.

nyc.gov/visionzero

Princeton University

Vehicle Automation:
Its Role in Fleet Safety

by

Alain L. Kornhauser, PhD

Professor, ORFE
(Operations Research & Financial Engineering)
Director, CARTS
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Faculty Chair, PAVE
(Princeton Autonomous Vehicle Engineering)
Princeton University

Presented at

VISION ZERO

November 29, 2016
Queens Theater
Corona Park, NY

VISION ZERO
Fleet Safety Forum

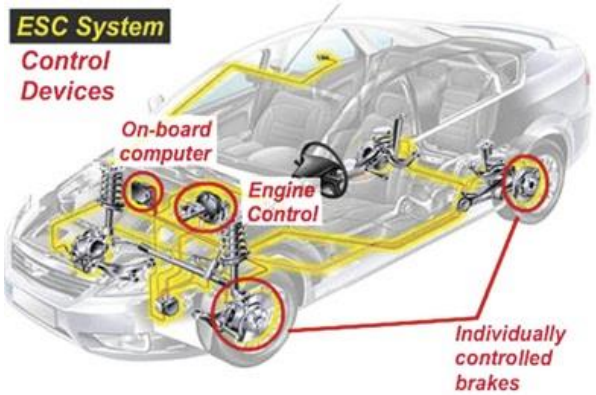
PAVE PRINCETON AUTONOMOUS VEHICLE ENGINEERING

Making Sure We Are Using the Same Terminology…

- **Lots of confusion… 'Connected'; 'Autonomous', 'Automated', '4 NHTSA Levels' '5 SAE Levels'…**
- **Only 3 kinds:**
  - **'Safe-Driving … (Cars, Trucks or Buses)'**
    - **Always on Automated Emergency Braking & Lane Centering**
    - **Delivers Safety**
  - **'Self-Driving … (Cars, Trucks or Buses)'**
    - **Safe-Driving + Sometimes Capable / User Choice: Hands-Off &/or Feet-Off**
    - **Delivers User Convenience + some Environmental Benefits**
  - **'Driverless … (Cars, Trucks or Buses)'**
    - **Safe-Driving + Always: Hands-Off, Feet-Off**
    - **Delivers Fleet Productivity + Environmental Benefits**

Why should Fleets be Focused on 'Safe-Driving …'???

- They 'Bail out' Drivers when they do something 'stupid'…
- We already accept some of this automated technology…
  - Anti-lock Brakes
  - Electronic Stability Control

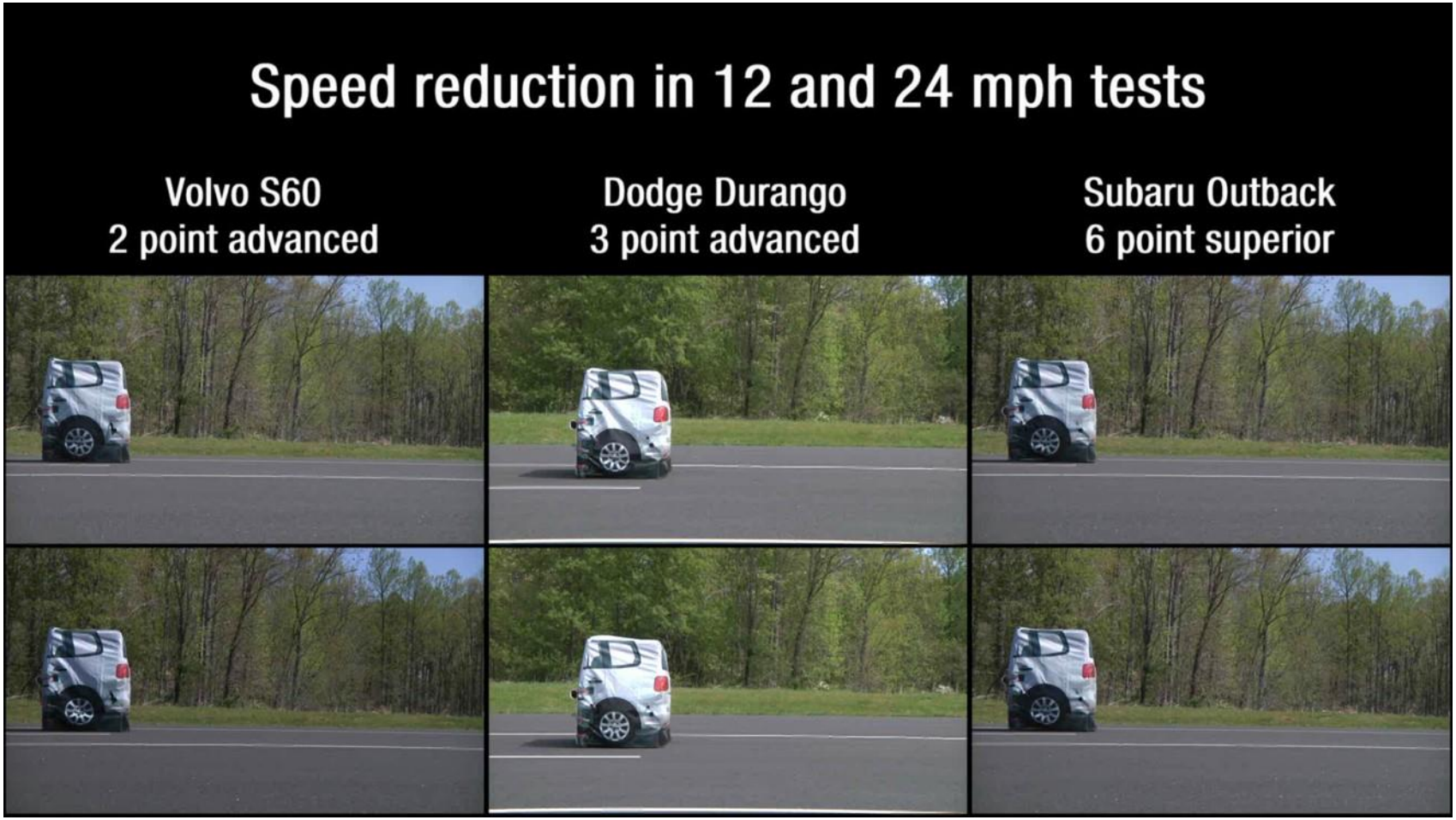


Both: Override the driver and "Do the right thing"

Why should Fleets be Focused on 'Safe-Driving Cars'???

- They 'Bail out' Drivers when they do something 'stupid'…
- We already accept some of this…
  - Anti-lock Brakes
  - Electronic Stability Control
  - Extend these to…
    - Don't run into things
  - These Must Work much better than they have been…

	12 mph test			25 mph test				Forward collision warning
Speed reduction (mph)	less than 5	5 to 9	10 or more	less than 5	5 to 9	10 to 21	22 or more	n/a
Points	0	1	2	0	1	2	3	1

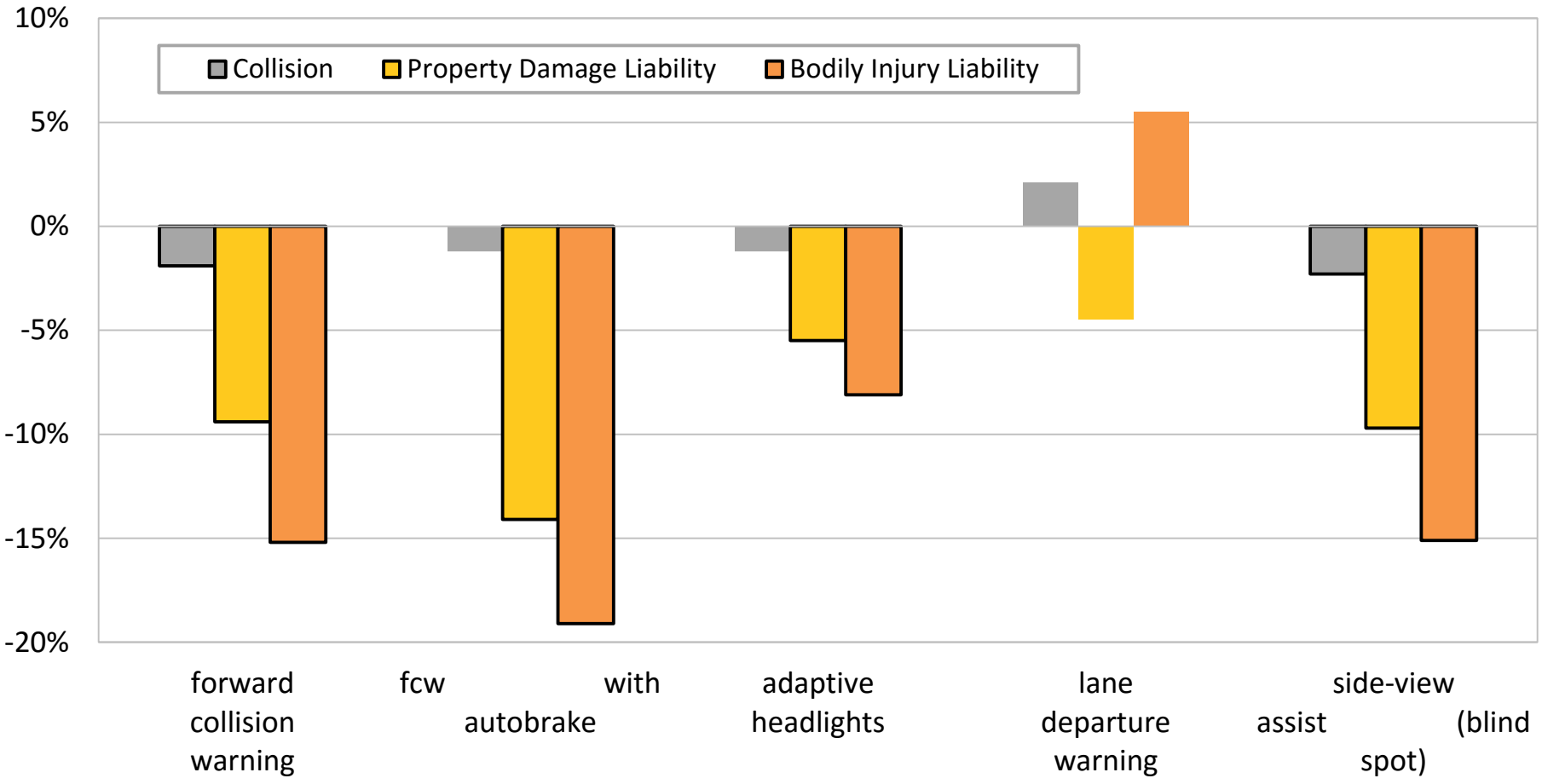


	12 mph test			25 mph test				Forward collision warning
Speed reduction (mph)	less than 5	5 to 9	10 or more	less than 5	5 to 9	10 to 21	22 or more	n/a
Points	0	1	2	0	1	2	3	1

	12 mph test			25 mph test				Forward collision warning
Speed reduction (mph)	less than 5	5 to 9	10 or more	less than 5	5 to 9	10 to 21	22 or more	n/a
Points	0	1	2	0	1	2	3	1

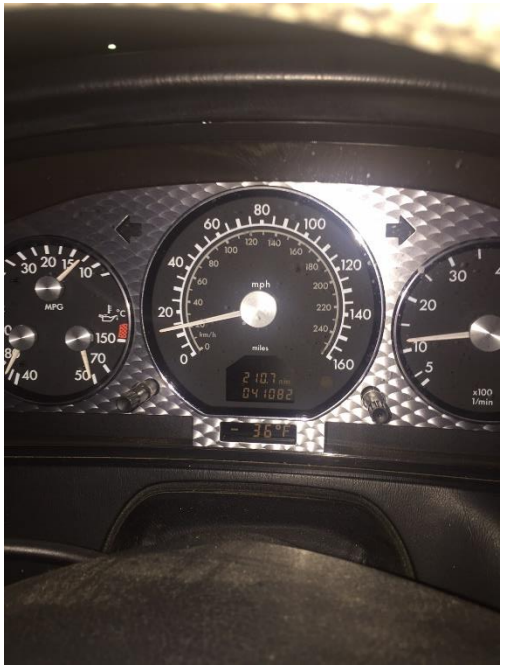
Summary of technology effects on insurance claim frequency

Results pooled across automakers



Why should Fleets be Focused on 'Safe-Driving Cars'???

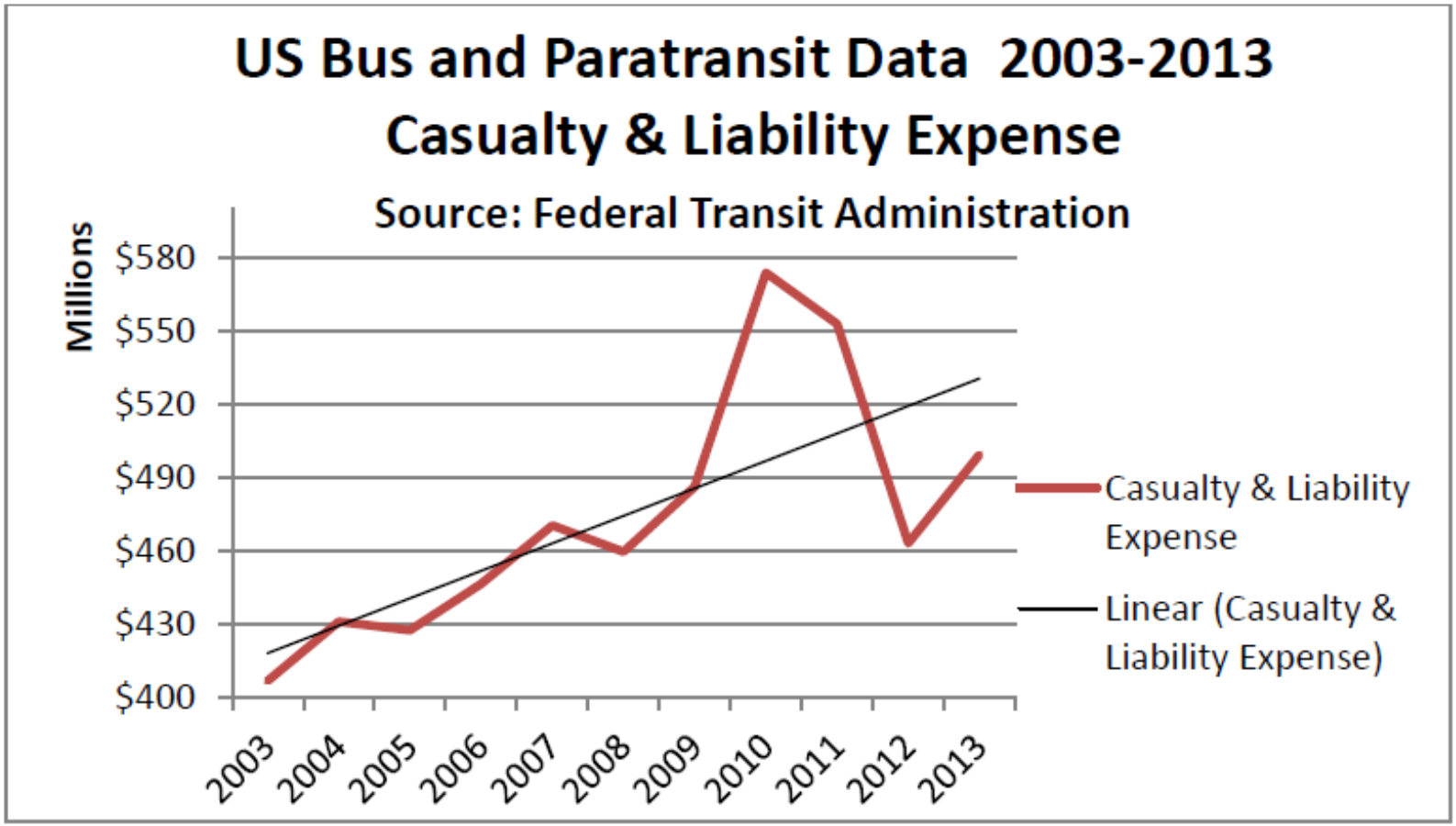
- **They 'Bail out' Drivers when they do something stupid..**
- **We already accept some of this…**
  - Anti-lock Brakes
  - Electronic Stability Control
  - **Extend these to…**
    - Don't run into things
    - **Don't depart from the lane unless you signal**
    - **No Crazy speeding**



Why should Fleets be Focused on 'Safe-Driving Cars'???

- They 'Bail out' Drivers when they do something stupid..
- We already accept some of this…
  - Anti-lock Brakes
  - Electronic Stability Control
  - Extend these to…
    - Don't run into things
    - Don't depart from the lane unless you signal and it is safe
    - No Crazy speeding
- **Should be able to reduce Collisions by > 50%**
  - **Make real progress towards VISION ZERO**
  - **Print $$$$**

Print $$$$
Fleet Example from Transit Industry…



Print $$$$
Fleet Example from Transit Industry…

2013 Nationwide
Bus Casualty and Liability Expense
Source FTA NTD

Casualty and Liability Amount	Vehicle-related	119 Fatalities 15,351 Injuries

Print $$$$
Fleet Example from Transit Industry…

2013 Nationwide Bus Casualty and Liability Expense Source FTA NTD		
Casualty and Liability Amount	Vehicle-related	119 Fatalities 15,351 Injuries $499,872,628.
Total Buses Commuter Bus (CB), Motor Bus (MB), Bus Rapid Transit (RB), Demand Responsive (DR)		80,795
Sub-Total Casualty and Liability Amount Per Bus		$6,187/Bus/Year

Print $$$$

Bottom Line…

Fundamental Business Model:

Cost of ‘Safe-Driving … (Cars, Trucks or Buses)’ Technology

<

Present Value {Expected Liability Savings over life of the …}

- **It Prints $$$$** & **Makes a Dramatic Move** Towards **Vision Zero**

- **All** by just **adopting** near-term **‘Safe-Driving … (Cars, Trucks or Buses)’ Technology**

Discussion!

Thank You

alaink@princeton.edu

www.SmartDrivingCar.com

nyc.gov/visionzero

Toyota Safety Sense™

Overview

TSS is a Driver's Partner for a Safer World

TOYOTA has developed TSS to be "a driver's partner in an injury-free environment."

IIHS 2016 Top Safety Picks +

2016 New Standards

11 models received 2016 IIHS Top Safety Pick +

To qualify for **2016 Top Safety Pick+**, a vehicle must earn good ratings in the five crashworthiness tests and an advanced or superior rating for front crash prevention.

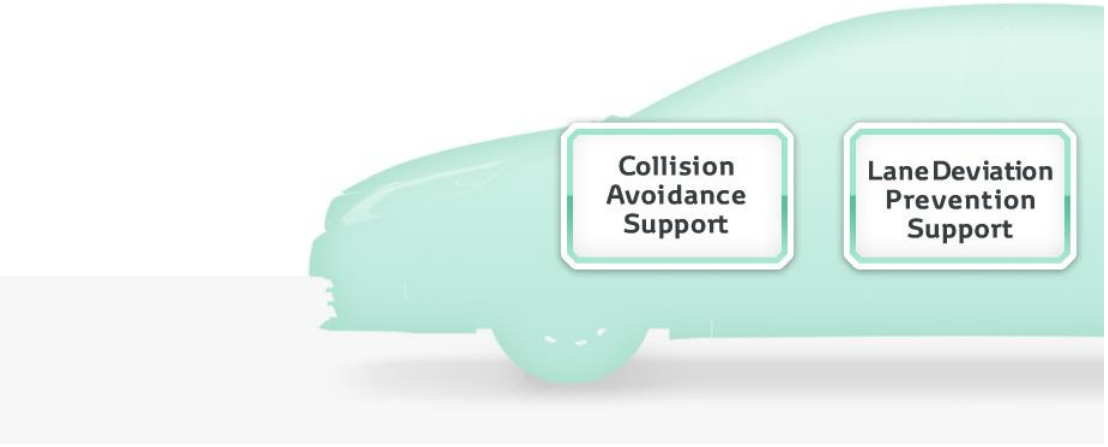
TSP+ CAMRY TSP+ AVALON TSP+ PRIUS V TSP+ IA TSP+ RAV4 TSP+ HIGHLANDER

TSP+ CT TSP+ ES TSP+ RC TSP+ NX TSP+ RX

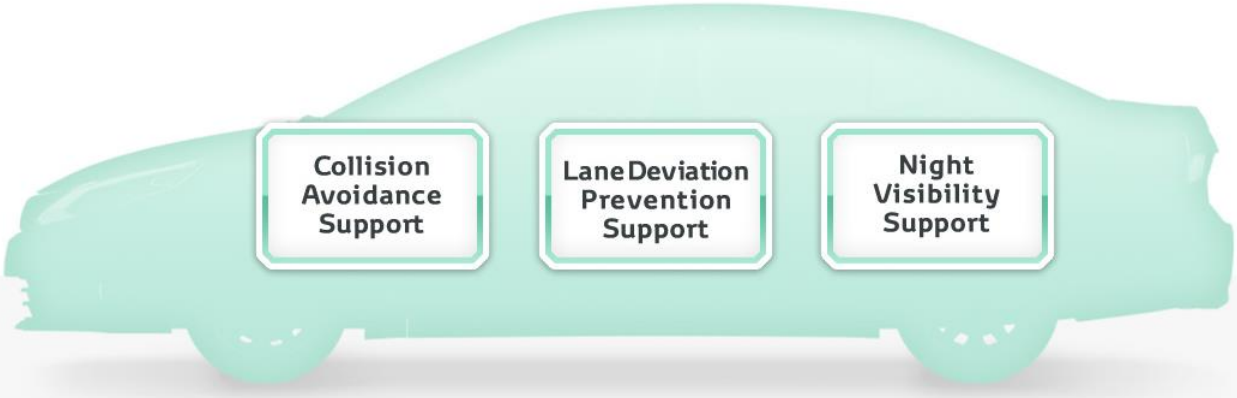
FOCUS ON THE THREE MOST COMMON CAUSES OF ACCIDENTS

Frontal Collisions

Unintended Lane Departures



Night Visibility Accidents



Toyota's Response: Toyota Safety Sense™

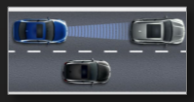
MULTIPLE ACTIVE -SAFETY TECHNOLOGIES

Toyota Safety Sense

- Pre-Collision System

- Pedestrian Pre-Collision System

- Auto High Beam



- Lane Departure Alert

- Dynamic Radar Cruise Control

SUPPORTS COLLISION AVOIDANCE AND DRIVER AWARENESS

Two TSS Systems

TSS-C

Compact models

TSS-P

Mid-sized models
Large models

"Toyota will begin to include the *Lexus Safety System+™* and *Toyota Safety Sense™* packages, anchored by automatic emergency braking (AEB), on almost every new vehicle by the end of 2017. 26 out of 30 models"

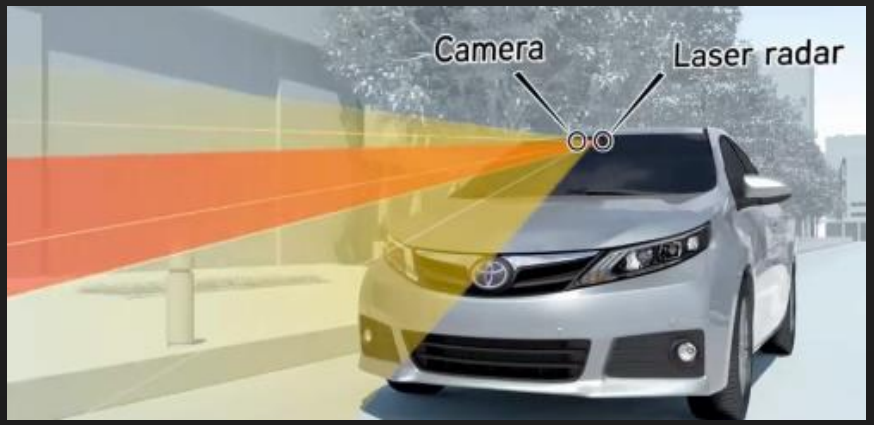
- **Earlier than ANY automaker**
- **4 years ahead of NHTSA's target**

- Bill Fay
General Manager, Toyota Division
Toyota Motor Sales

- Pre-Collision System (PCS)
- Automatic High Beams (AHB)
- Lane Departure Alert (LDA)

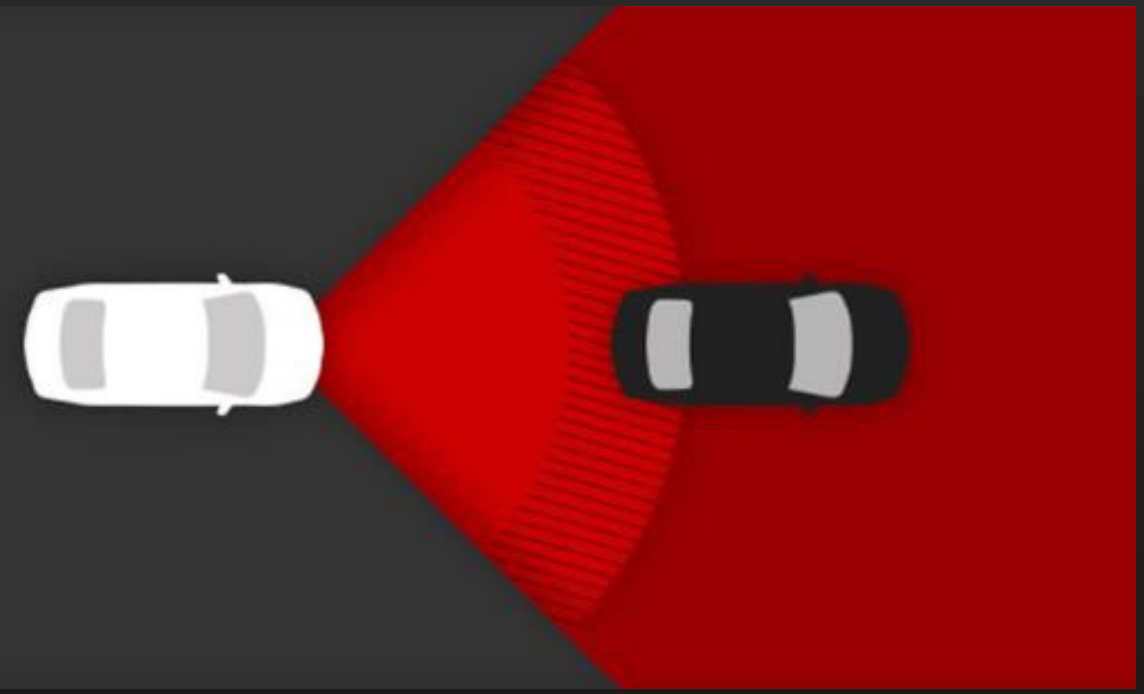
TSS-C

Compact Models



Pre-Collision System

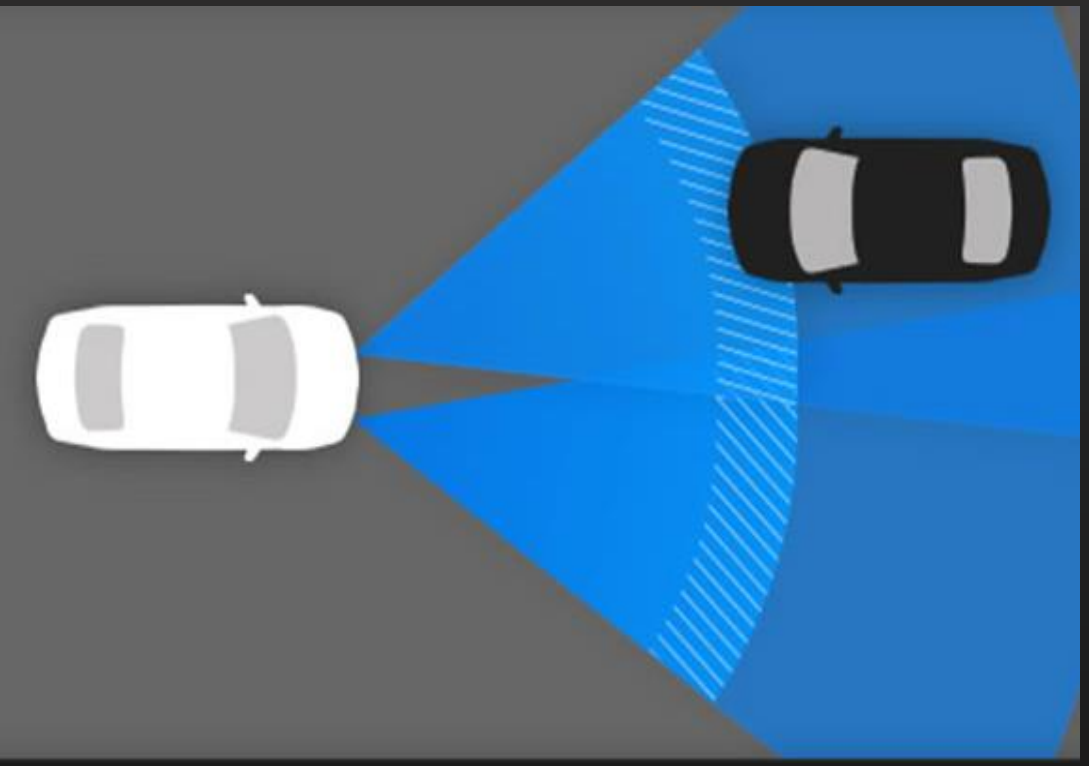
(PCS) on TSS-C



Provides warning & automatic braking for possible collisions with a **preceding vehicle**

- **Alerts approx. 7-85 MPH**
- **AEB approx. 7-50 MPH**

Automatic High Beams
(AHB) on TSS-C and TSS-P

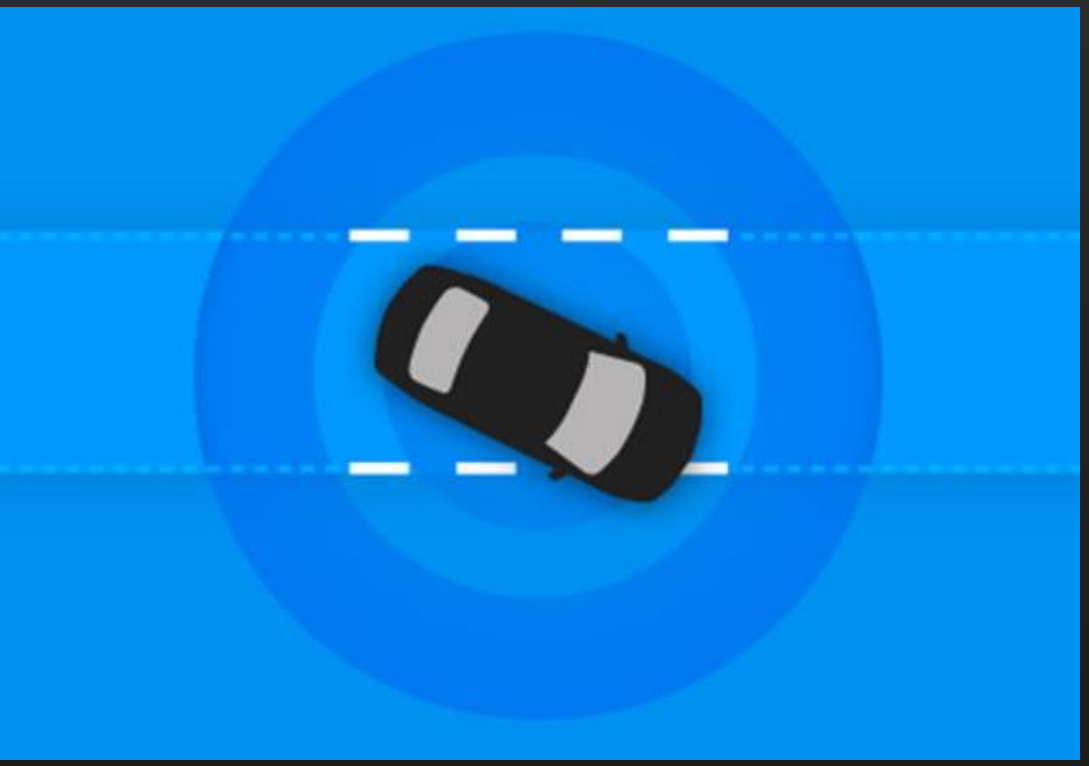


Automatically switches between high and low beams

- Speeds over 25 MPH

Lane Departure Alert

(LDA) on TSS-C



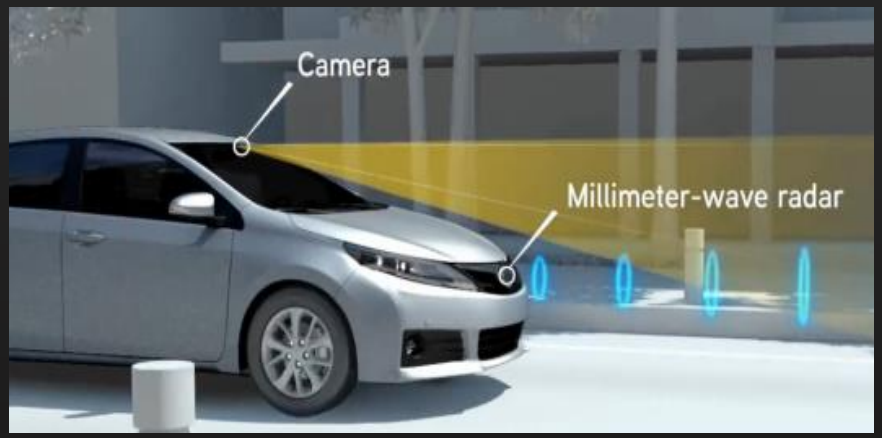
Warns driver when vehicle is about to deviate from a visibly marked lane

- Speeds over 32 MPH

- Pre-Collision System (PCS) with Pedestrian Detection function
- Automatic High Beams (AHB)
- Lane Departure Alert (LDA) with Steering Assist function* *EPS models
- Dynamic Radar Cruise Control (DRCC)

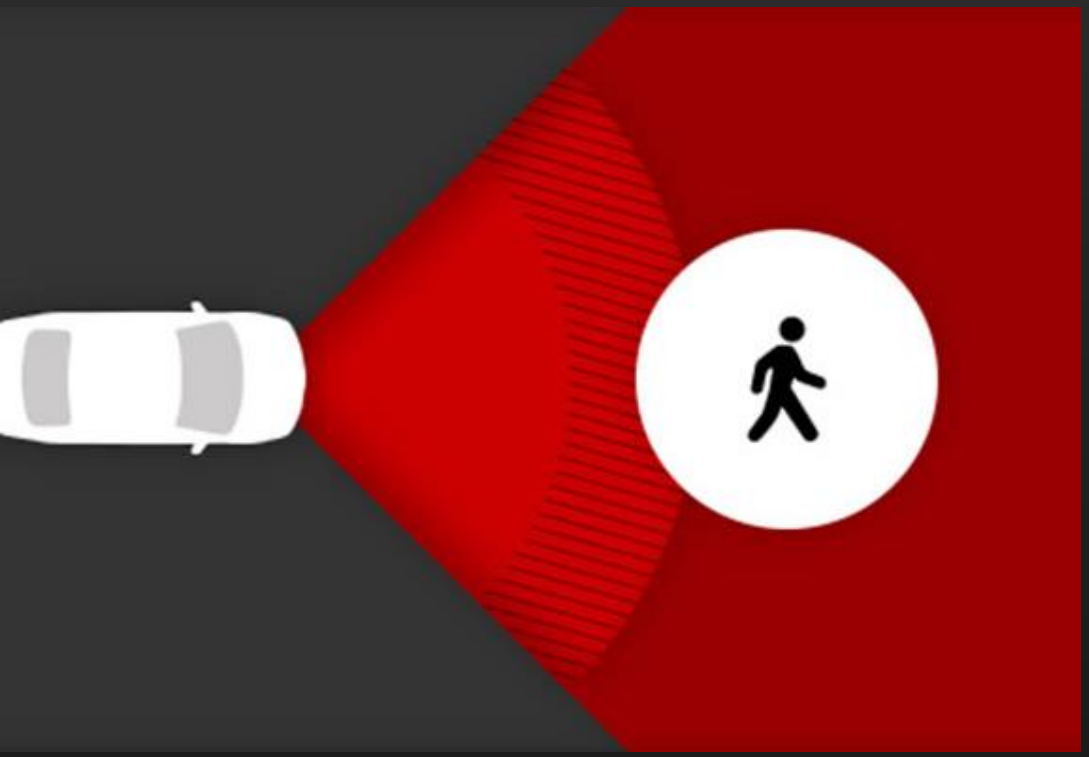
TSS-P

Mid-sized Models
Premium Models



Pre-Collision System with Pedestrian Detection

(PCS w/PD) on TSS-P



Provides warning & automatic emergency braking for potential collisions with a preceding vehicle **or a pedestrian**

Vehicle

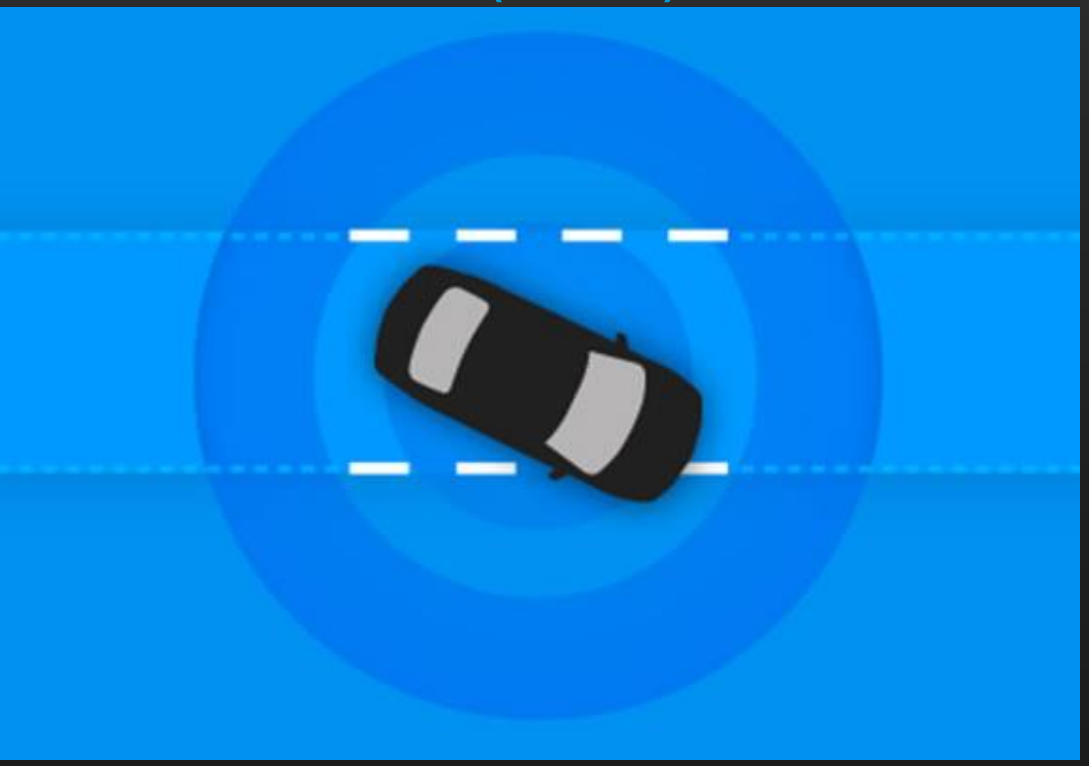
- **Alerts approx. 7-110 MPH**
- **AEB approx. 7-110 MPH**

Pedestrian

- **Alerts approx. 7-50 MPH**
- **AEB approx. 7-50 MPH**

Lane Departure Alert w/ Steering Assist

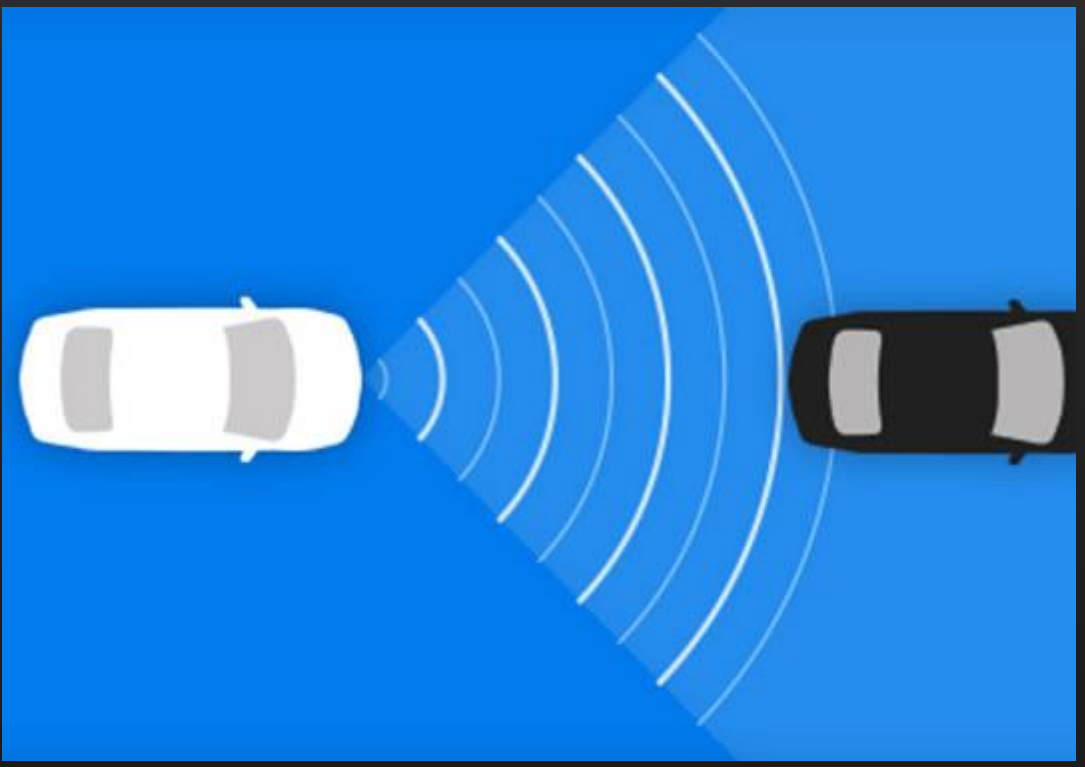
(LDA) on TSS-P with EPS



Along with alerts, provides a slight Steering Assist

- Speeds over 32 MPH

Dynamic Radar Cruise Control
(DRCC) on TSS-P

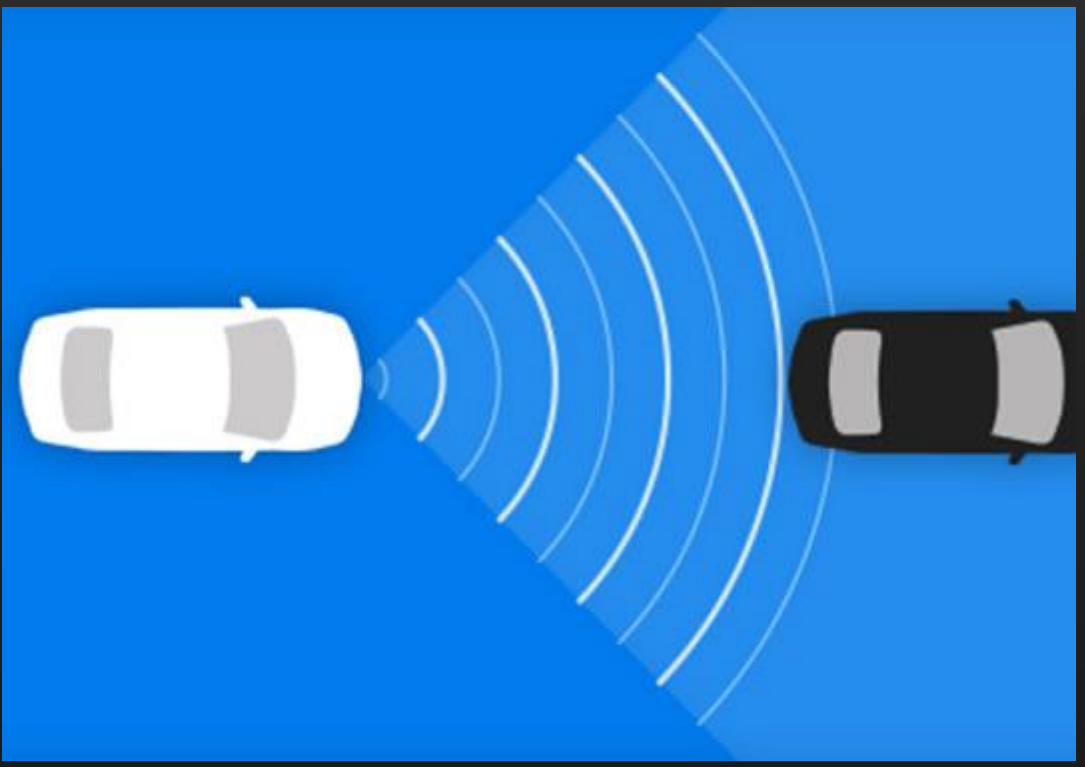


Detects speed & distance of vehicle ahead and adjusts speed accordingly

- Approx. 25-110 MPH

Full-Speed Range Dynamic Radar Cruise Control

(DRCC) on 16MY/17MY Prius & Prime



- Approx. 0-110 MPH

MID Screens


P
LDA
PCS
BSM On
Parking Assist On
:Change Settings
TRIP A 0.0miles
BSM
P
LDA
Steering Assist On
Sensitivity Standard
Sway Warning On
Sway Sensitivity Standard
:LDA Steering Assist On/Off
TRIP A 0.0miles
BSM
P
LDA
Steering Assist On
Sensitivity Standard
Sway Warning On
Sway Sensitivity Standard
:Change LDA Sensitivity
TRIP A 0.0miles
BSM
P
LDA
Steering Assist On
Sensitivity Standard
Sway Warning On
Sway Sensitivity Standard
:Lane Sway Warning Status
TRIP A 0.0miles
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Sensitivity Standard
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Sway Sensitivity Standard
:Sway Warning Sensitivity
TRIP A 0.0miles
BSM


Toyota
Safety
Sense

nyc.gov/visionzero

GLOBAL VEHICLE SAFETY

Larry Kwiecinski

Senior Manager Global Safety Center

GM MISSION STATEMENT: BEHAVIORS & VALUES

GLOBAL VEHICLE SAFETY MISSION STATEMENT

SET A NEW STANDARD FOR CUSTOMER SAFETY - WITH THE CUSTOMER AT THE CENTER OF EVERYTHING WE DO

"Quality and safety – both customer and workplace – are foundational commitments, never compromised. We've also made a clear commitment to become the industry leader in workplace and vehicle safety, and we are working diligently and making steady progress toward achieving this goal."

CHAIRMAN & CEO MARY BARRA

May 10, 2016

GM

GLOBAL VEHICLE SAFETY

TRAFFIC SAFETY FACTS: US

PER YEAR

32,675 DEATHS

2.3 MILLION INJURIES

6.1 MILLION CRASHES

94% of **CRASHES** related to **HUMAN ERROR/CHOICE**

RISKY BEHAVIORS — ODDS OF CRASH ARE

5.9 TIMES HIGHER DUE TO

HANDHELD CELL PHONE TEXTING AND DRIVING

RISKY BEHAVIORS — ODDS OF CRASH ARE

3.4 TIMES HIGHER DUE TO

DROWSY DRIVING

RISKY BEHAVIORS — ODDS OF CRASH ARE

10 TIMES HIGHER DUE TO

EMOTIONALLY IMPAIRED DRIVING (Angry, Sad or Agitated)

RISKY BEHAVIORS — ODDS OF CRASH ARE

14 TIMES HIGHER DUE TO

SPEEDING

(Over Limit or Too Fast for Conditions)

RISKY BEHAVIORS — ODDS OF CRASH ARE

36 TIMES HIGHER DUE TO

DRUG/ALCOHOL IMPAIRED DRIVING

GM

GLOBAL VEHICLE SAFETY

GM GLOBAL CONTINUOUS SAFETY STRATEGY

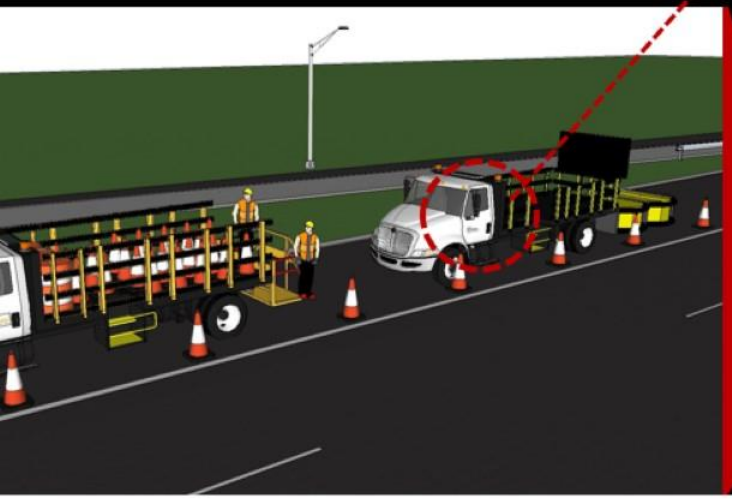
nyc.gov/visionzero

THE ATMA™ (THE AUTONOMOUS TMA)

PRESENTED BY:

ANDREW ROBERTS
STRATEGIC ACCOUNT DIRECTOR
Royal TRUCK & EQUIPMENT, INC.

*NO DRIVER NEEDED



THE NEXT GENERATION OF SAFETY

ATMA AS SEEN IN

INSIDE edition · CBS NEWS · NBC · BUSINESS INSIDER · THE HUFFINGTON POST · msn · U.S.News & WORLD REPORT · übergizmo · POPULAR SCIENCE · YAHOO! NEWS · abc NEWS · Discovery CHANNEL · MarketWatch THE WALL STREET JOURNAL.

WHO IS ANDREW ROBERTS?

- Has worked as Royal Truck & Equipment's Strategic Account Director for 4 years
- Has presented to over 40 DOT agencies throughout the U.S. about TMA Truck best practices
- Heads up the Autonomous Research and Outreach Group within Royal Truck & Equipment
- Manages all Government-related activity for Royal
- Travels as Royal's spokesperson for the new Autonomous TMA Truck
- Is an industry-expert when it comes to TMA Truck safety

Royal TRUCK & EQUIPMENT, INC.

FOUNDED IN 1981.

- Is America's largest manufacturer of TMA Trucks
- Owns over 80,000 sq. ft. of facility space to manufacturer trucks
- Has won 5 awards all relating to innovation and safety:
    1. 2011 ATSSA Innovation Award
    2. 2014 ARTBA Innovation in Technology
    3. 2014 ATSSA Innovation Award
    4. 2015 ARTBA Innovation in Technology
    5. 2016 Best of Coopersburg Awards – Transportation Manufacturers

- Founder of the world's only Autonomous TMA Truck (launched in August of 2015)
- All of Royal's initiatives contribute to Royal's position as the industry leader in TMA trucks by producing trucks with the highest efficacy for keeping construction zones safe, and providing the greatest liability protection available for customers.

THE TMA INDUSTRY IN AMERICA

20,000* TMAs nationwide →→ **most *not* built to industry standard**

*ONLY the TMA Trucks in shadow operations would use the autonomous technology

As states adopt MUTCD build standards, TMA Truck usage increases

Growth in TMA usage is in line with infrastructure spending

Currently working on industry best for autonomous lane accuracy (centimeters not inches)

INTRODUCING THE NEXT GENERATION OF SAFETY

A SELF-DRIVING (AUTONOMOUS) TMA → THE ATMA

- GPS WAYPOINT NAVIGATION
- REMOTE CONTROL DRIVING
- LEADER/FOLLOWER

HOW DOES IT WORK? THE VEHICLE KIT

1. THE VEHICLE CONTROL MODULE

- ✓ CONVERTS MANNED VEHICLE INTO UNMANNED SYSTEM

2. THE STEERING RING

- ✓ SHORT INSTALLATION TIMES

3. THE ACTUATORS

- ✓ MODULAR DESIGN

MARKET INTRODUCTION

VEHICLE CONTROL MODULE

STEERING RING

ACTUATORS

- ✓ DEMONSTRATED A WORKING PROTOTYPE TO FLORIDA DOT OFFICIALS
- ✓ JUNE 2015 - MADE A PRESENTATION ABOUT THIS REVOLUTIONARY PRODUCT TO FEDERAL DOT OFFICIALS AT THE AASHTO INTERMODAL CONFERENCE IN CHEYENNE, WYOMING
- ✓ APRIL 2016 – DEMONSTRATED FIRST ATMA DEMO TO INTERNATIONAL COMPANY OUTSIDE OF EUROPE

THE WORLD'S FIRST AUTONOMOUS TMA TRUCK

THANK YOU!

ANDREW ROBERTS | STRATEGIC ACCOUNT DIRECTOR

ROYAL TRUCK AND EQUIPMENT / COOPERSBURG, PA

ANDREW@ROYALTRUCKEQUIP.COM / WWW.ROYALTRUCKANDEQUIPMENT.COM

Royal TRUCK & EQUIPMENT, INC.

*Driverless TMA Truck in shadow operation

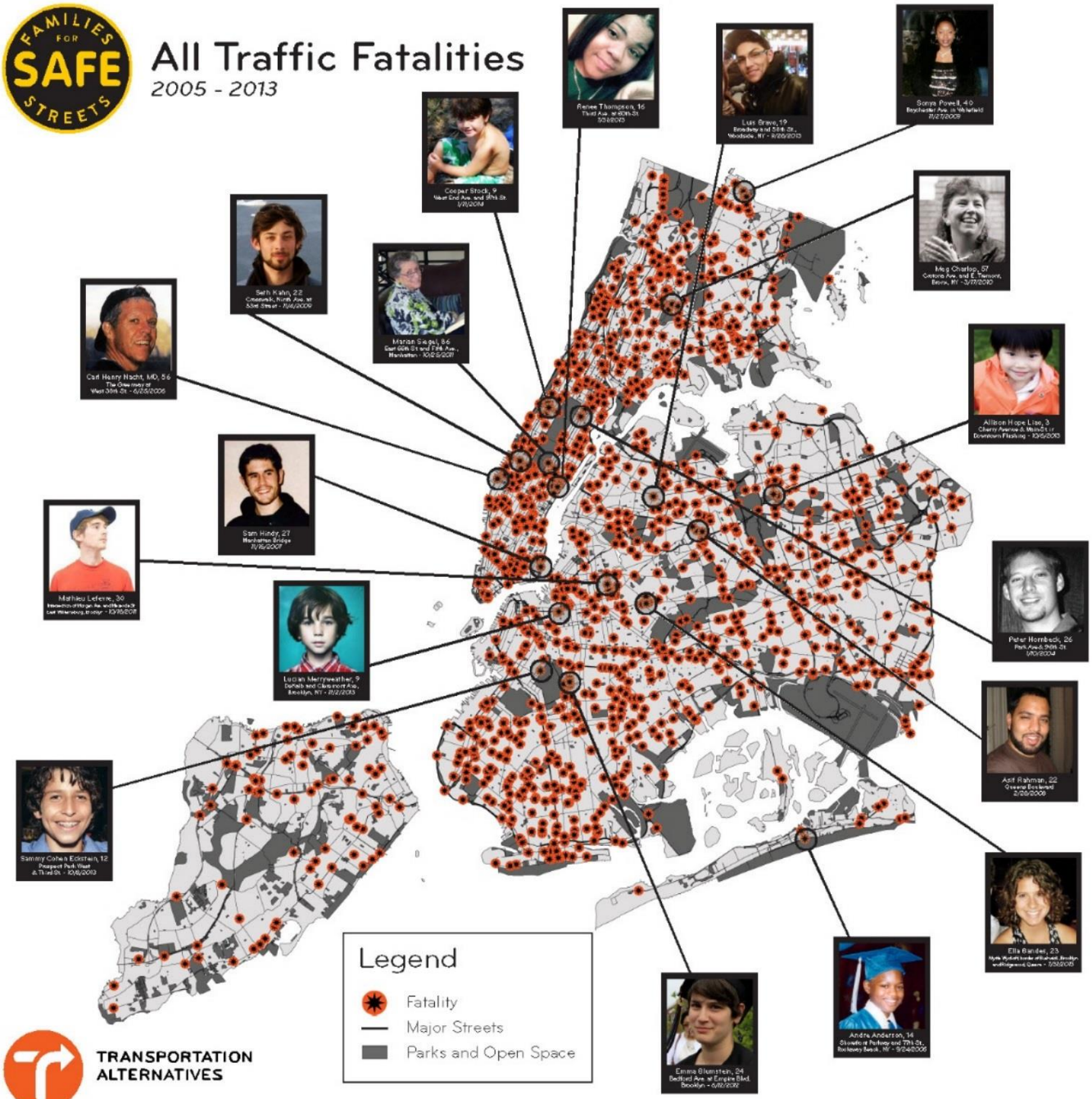
nyc.gov/visionzero


FAMILIES
FOR
SAFE
STREETS


1171457 GSE
FedEx
Express

All Traffic Fatalities

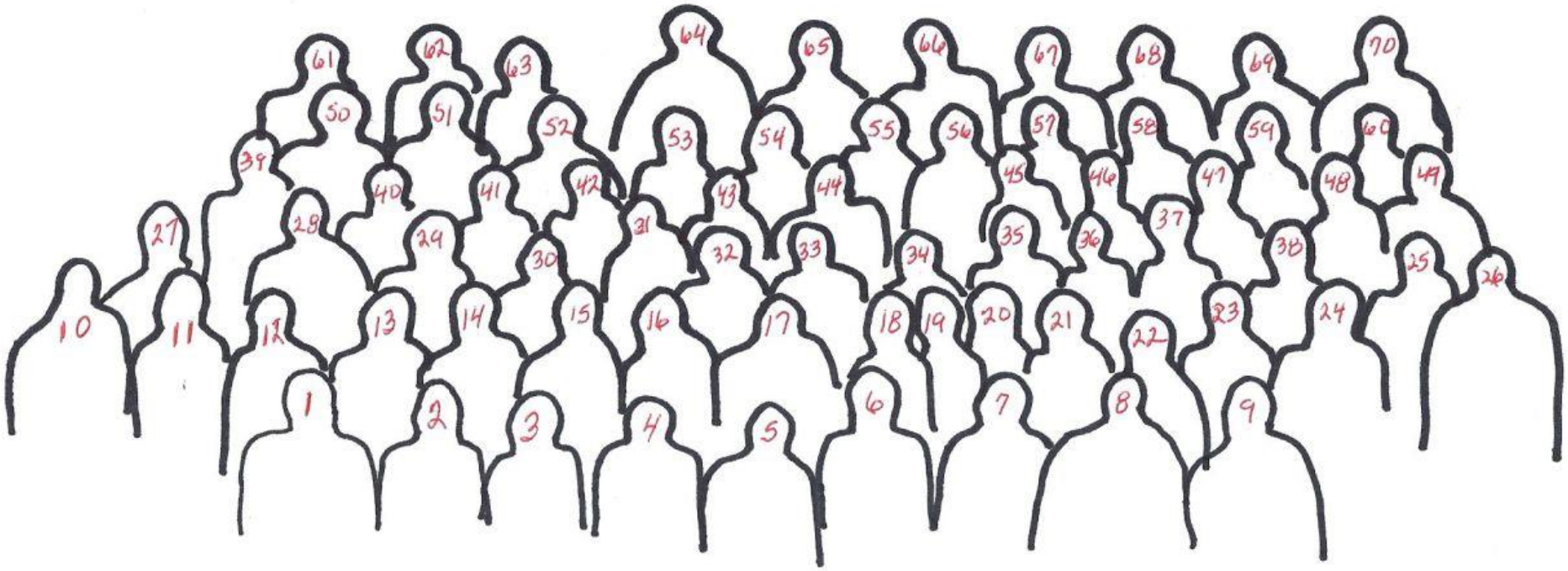
2005 - 2013



FAMILIES FOR SAFE STREETS

TRANSPORTATION ALTERNATIVES


737
BOEING
737-800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End distracted, rushed and angry driving
Sign the #SafeDriverPledge »

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