

Predicting Truck Crash Involvement



www.truckcrash.com

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ATRI

- 501(c)(3) charitable research organization
- Governed by 15 member Board of Directors comprised of industry leaders – FedEx, Schneider, YRC Worldwide, CNF, J.B. Hunt
- Research agenda developed by external Research Advisory Committee (RAC)

ATRI

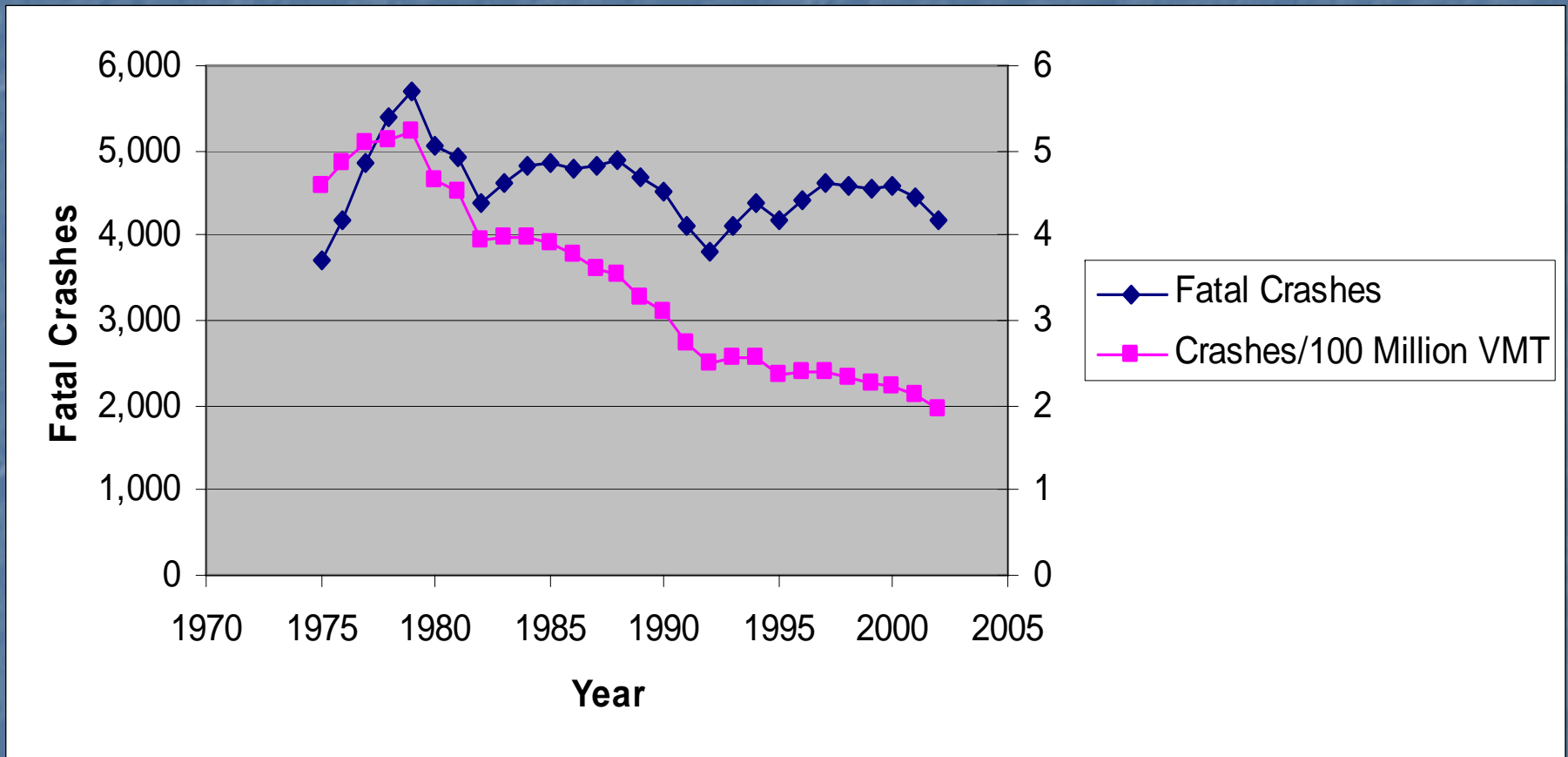
Research focused in five areas:

- Safety and Human Factors
- Technology
- Environmental Factors
- Economic Analysis
- Transportation Security

Complete research agenda and descriptions
available online at www.atri-online.org



Fatal Crash Rates



2003 – 1.9 fatal crashes per 100M VMT

2002 – 2.2 fatal crashes per 100M VMT

Research Background

- 2003 Truck Crash Data
 - 4,289 fatal crashes
 - 85,000 crashes with injuries
 - 347,000 crashes with property damage only
- In 2000, costs associated with truck crashes ranged between \$10.9B and \$40.3B
- Total cost of *all* motor vehicle crashes in 2000 was \$230.6B

Research Background

- Prior research points to driver-related factors as critical reason for crashes
- Focusing on driver behaviors will have most profound impact on crash reduction
- Analyses focused on whether there is a significant difference in future crash rates for drivers based on past roadside inspection, violations, conviction and/or crash information

Research Questions

- Can an overall driver performance-based model providing predictive capabilities be developed?
- Are specific types of driver violations or convictions more highly correlated with future crash involvement?
- Are there particular enforcement actions that could be effective in counteracting these behaviors and events?

Data Analysis

- Over 540,000 unique driver records analyzed
- Developed regression model based on longitudinal data (3 years)
- Dependent Variable: crash involvement
- Independent Variables: driver-specific behavior indicators
- Used statistical tests to assess significance of indicators in predicting truck crashes

Identifying “Top Tier” States

Developed performance metric to relate safety statistics to enforcement strategies

- Calculated percentage of total number of roadside inspections and inspections with traffic enforcement that occurred in each state
- Documented percentage of total number of crashes that occurred in each state
- Developed weighted relationship between higher inspections/enforcement and fewer crashes to identify “Top Tier” status

Identifying Countermeasures

Initial survey

- identified how enforcement agencies address CMV driver behavior/performance issues

Targeted survey

- identified details of “Top Tier” state strategies and best practices

In-depth interviews

- conducted with four states having strongest relationship between crashes and enforcement

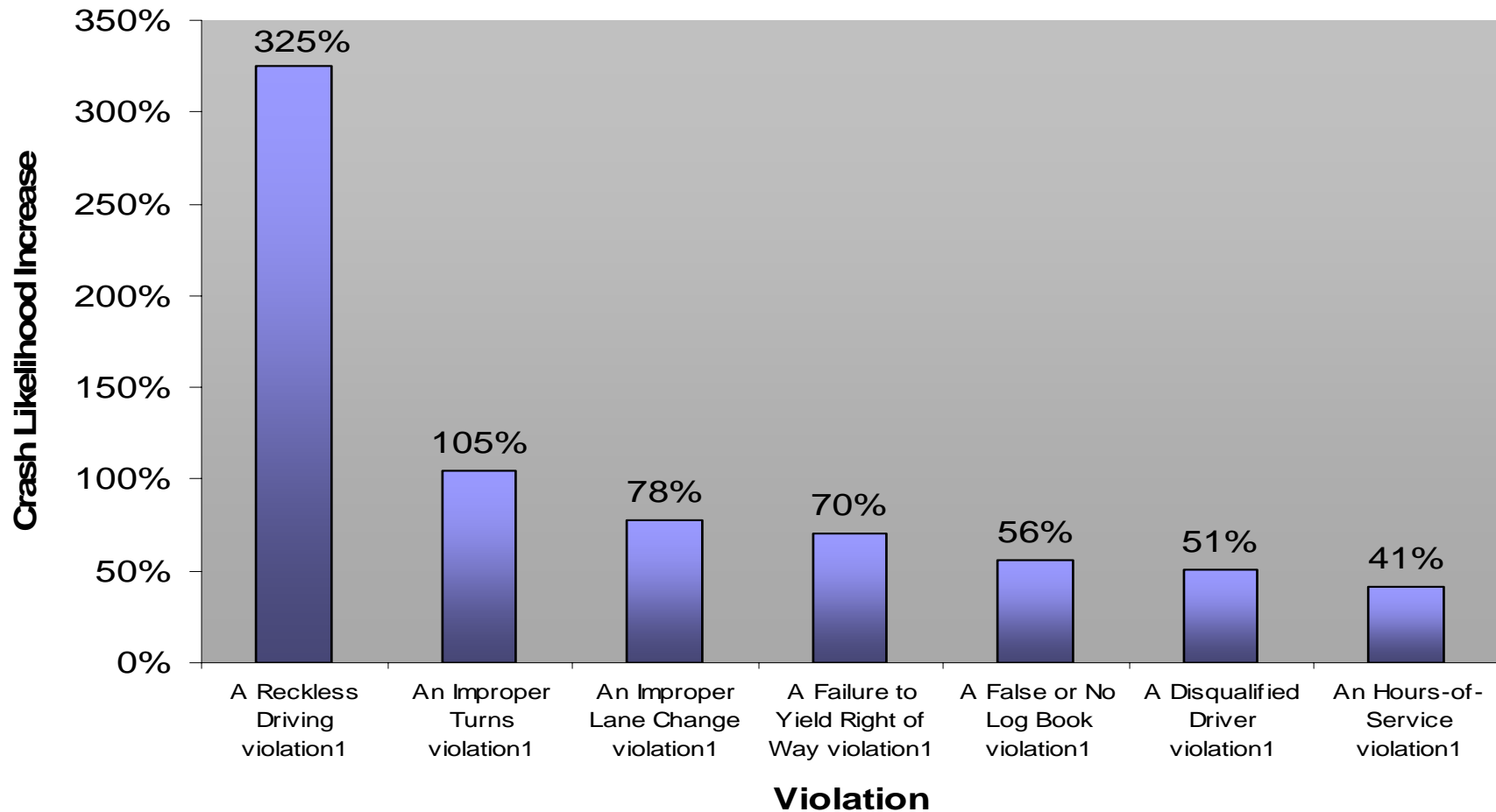
Telephone interviews

- conducted with “recognized” motor carrier safety directors

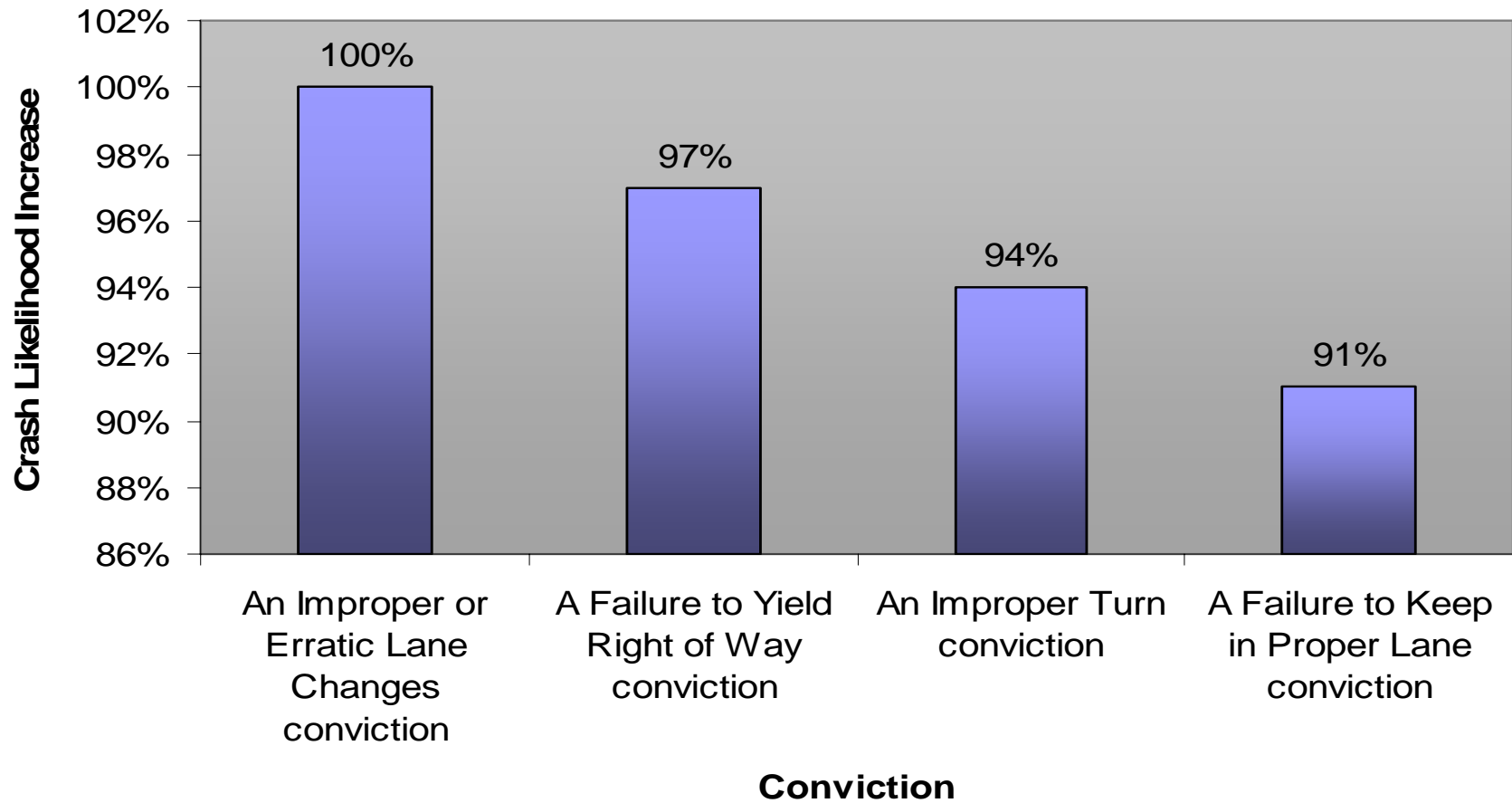
Convictions/Violations and Increased Likelihood of Crash

If a Driver has:	The Crash Likelihood Increases:
A Reckless Driving violation	325%
An Improper Turn violation	105%
An Improper or Erratic Lane Change conviction	100%
A Failure to Yield Right of Way conviction	97%
An Improper Turn conviction	94%
A Failure to Maintain Proper Lane conviction	91%
A Past Crash	87%
An Improper Lane Change violation	78%
A Failure to Yield Right of Way violation	70%
A Driving Too Fast for Conditions violation	62%

Violations Associated with Increase in Likelihood of a Future Crash



Convictions Associated with Highest Increase in Likelihood of a Future Crash



Quantitative Findings: Top Tier States

States with strongest relationship between enforcement and number of crashes

Washington

Tennessee

Iowa

New Mexico

California

Michigan

Indiana

Illinois

Kansas

Louisiana

Qualitative Findings: Countermeasures

Effective Enforcement Countermeasures

- Dissect rather than aggregate
- Exception: create comprehensive aggressive driving programs/initiatives
- Focus on both CMV and non-CMV behavior patterns
- Blend highly visible & covert enforcement activities
- Use internal performance-based monitoring programs to relate enforcement to specific crash types, driver behaviors, and locations

Qualitative Findings: Countermeasures

Effective Industry Countermeasures

- Initial training
 - Hiring practices
 - New driver orientation/training
- Sustainment training
 - Driver awareness programs
 - Safety incentive programs
 - Annual/quarterly driver review
- Corrective measures in response to specific behaviors

Putting the Findings to Work

- Communicate data and results of this research to CMV and non-CMV enforcement agencies
- Create more formal process for documenting and disseminating best practices of enforcement strategies on problem driver behaviors

Putting the Findings to Work

- Review hiring practices to identify problem driver behaviors
- Focus driver training on avoiding at risk behaviors
- Continue to explore and document ways to mitigate and eliminate problem driver behaviors in driver pool

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