

Changes in Injury Patterns in Frontal Crashes: Injuries to Drivers of Vehicles Model Year 1993-1997 *vs.* Drivers of Vehicles 1998-2002

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Blue Ribbon Panel Public Meeting, April 4, 2003

Objectives

- To evaluate whether there have been any detectable changes in the frequency and severity of injuries to drivers of vehicles model year 1998 and more recent in frontal crashes, and
- To investigate whether those changes related to differences in driver, vehicle or crash characteristics, including airbag deployment

Methods

- Cross sectional study design
- NASS CDS years 1993-2001.
 - Inclusion criteria:
 - Vehicles model year 1993-2002
 - Passenger cars, light trucks or minivans
 - Equipped with frontal driver-side airbags
 - Drivers, ages 16 or older
 - In frontal or near frontal crashes (10-2 o'clock)
 - With known longitudinal Delta V

Variables

- **Dependent:**
 - Driver injury severity: MAXAIS, MAXAIS2+, or MAXAIS3+
 - Body region of injury with highest MAXAIS
- **Independent:**
 - Model Year 93-97 or 98-02
 - Driver's gender
 - Driver's age
 - Longitudinal Delta V (km/h): <25, 25-31, 32-39, 40+
 - Passenger car, SUV, light truck and minivan
 - Safety belt use
 - Airbag deployment: yes, no, unknown

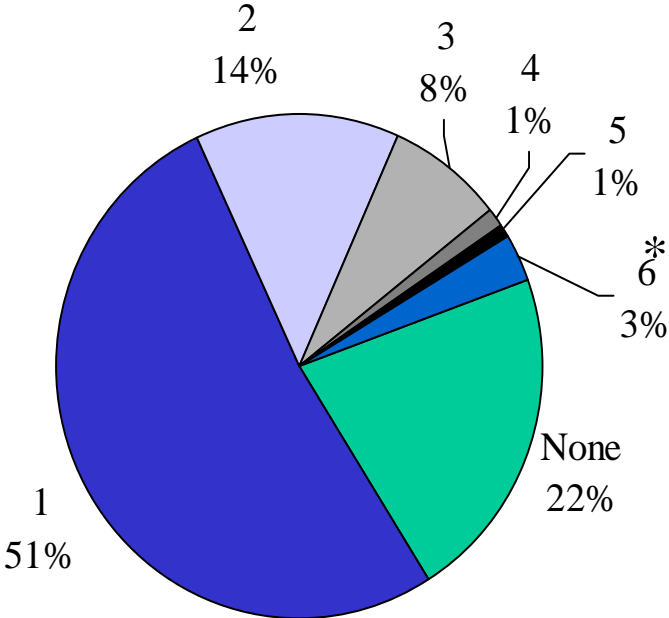
Analyses

- Descriptive
- Bivariate
 - Comparison of proportions of MAXAIS, MAXAIS2+, MAXAIS3+ and body region with MAXAIS between MY93-97 and MY 98-02. (Statistical significance defined at $p \leq 0.05$.)
- Logistic regression

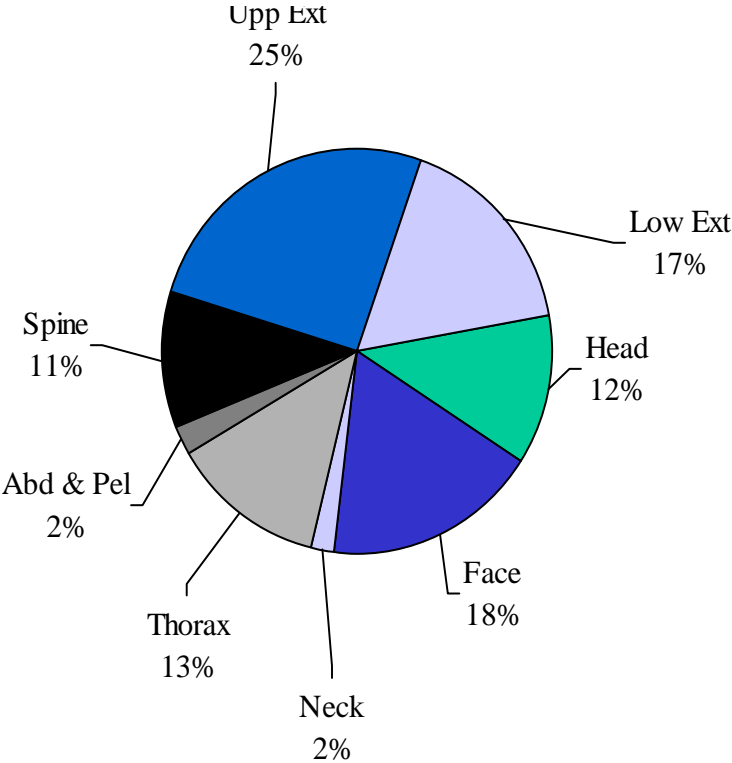
Results

- All drivers in NASS CDS 93-01 = 57,122
Meeting inclusion criteria= **7,266 (wgt 3,2M)**
 - MY: 93-97 71%; 98-02 29%.
 - Male 51%; Female 49%
 - Age: 16-25 29%; 26-39 31%; 40+ 40%
 - Long Delta Vs (km/h): <25 65%; 26-31 17%; 32-39 8%; 40+ 10%
 - Passenger car: 75%; SUV 9%; light truck 10%; minivan 7%
 - Single car crash: 12%; multiple 88%
 - Safety belt use: 78%
 - Airbag deployment:72%

MAXAIS & MAXAIS Body Region



MAXAIS (N=6,834)



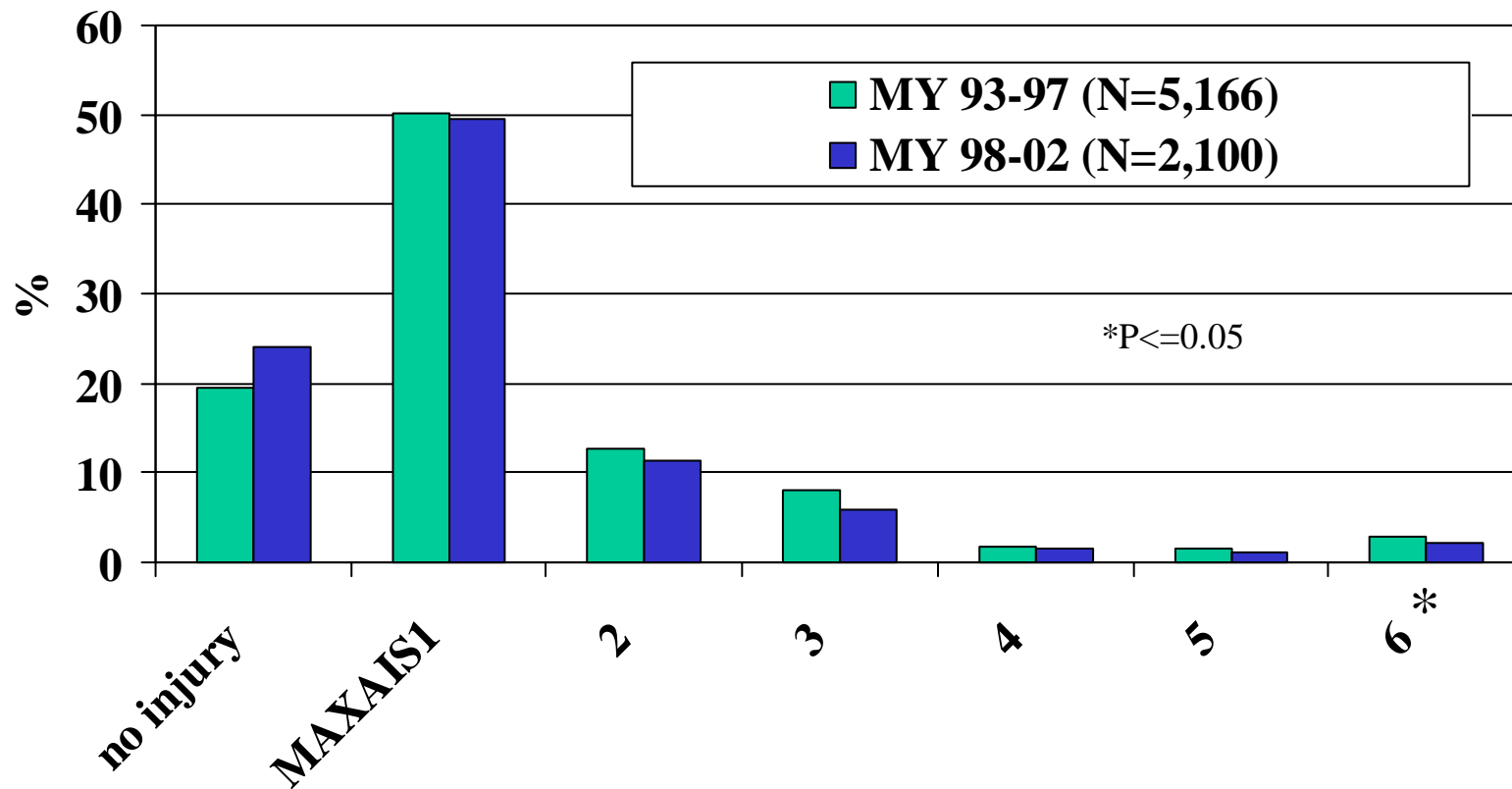
MAXAIS Body Region

* Includes 234 deaths

By MY (N =5,166 vs. 2,100)

- No differences in
 - gender distribution
 - age distribution
 - crash severity distribution
- MY1998-2002 more likely to
 - be SUVs or minivans (34% vs. 22%)
 - Use their safety belt (83% vs 76%)
 - not have airbag deploy (32% vs. 26%)than MY 1993-1997
- And...
 - Sustain fewer injuries ...

Drivers' MAIS by MY

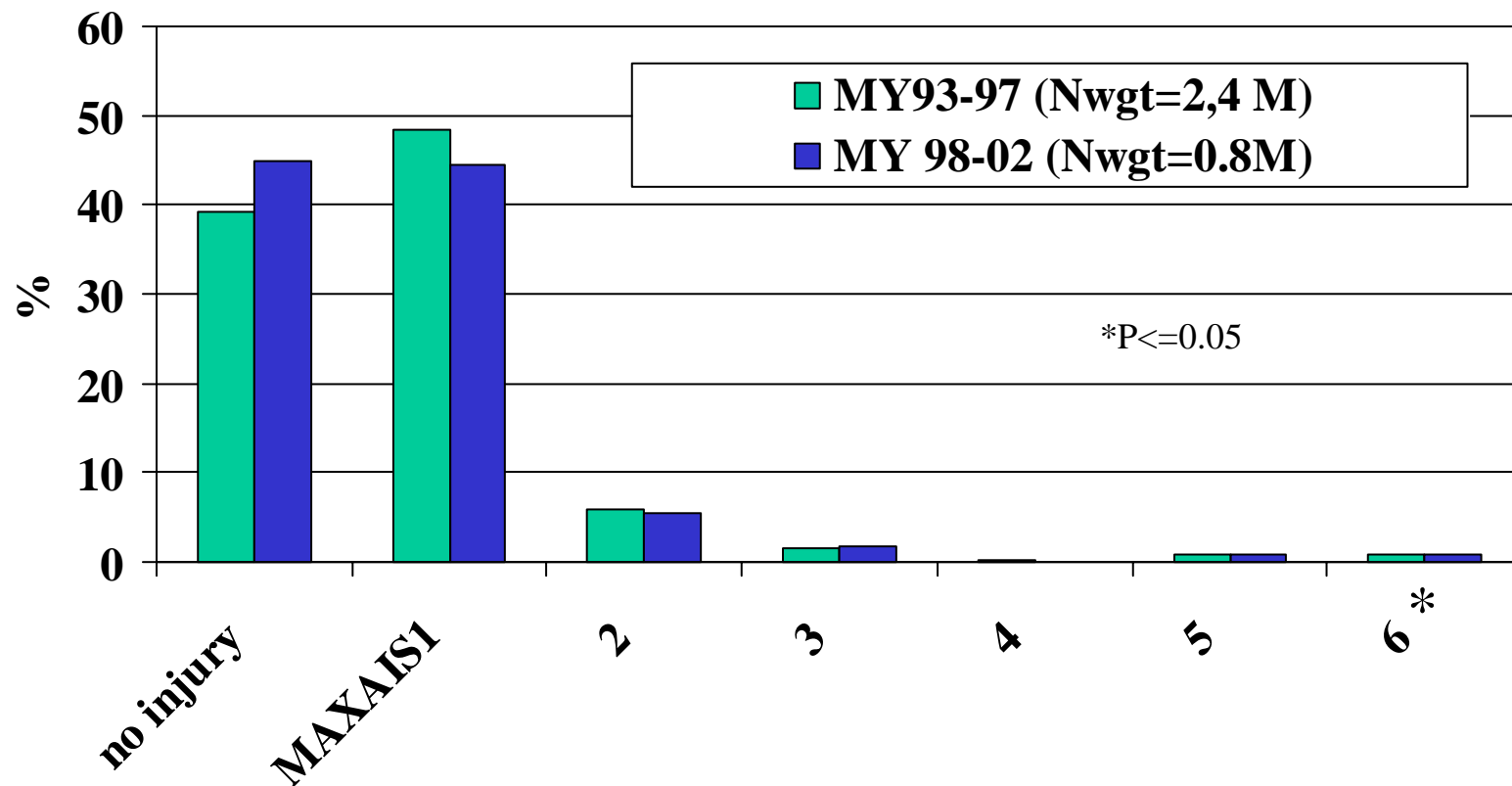


NASS CDS 1993-2001. See inclusion criteria.

* Includes fatalities

Drivers' MAIS by MY

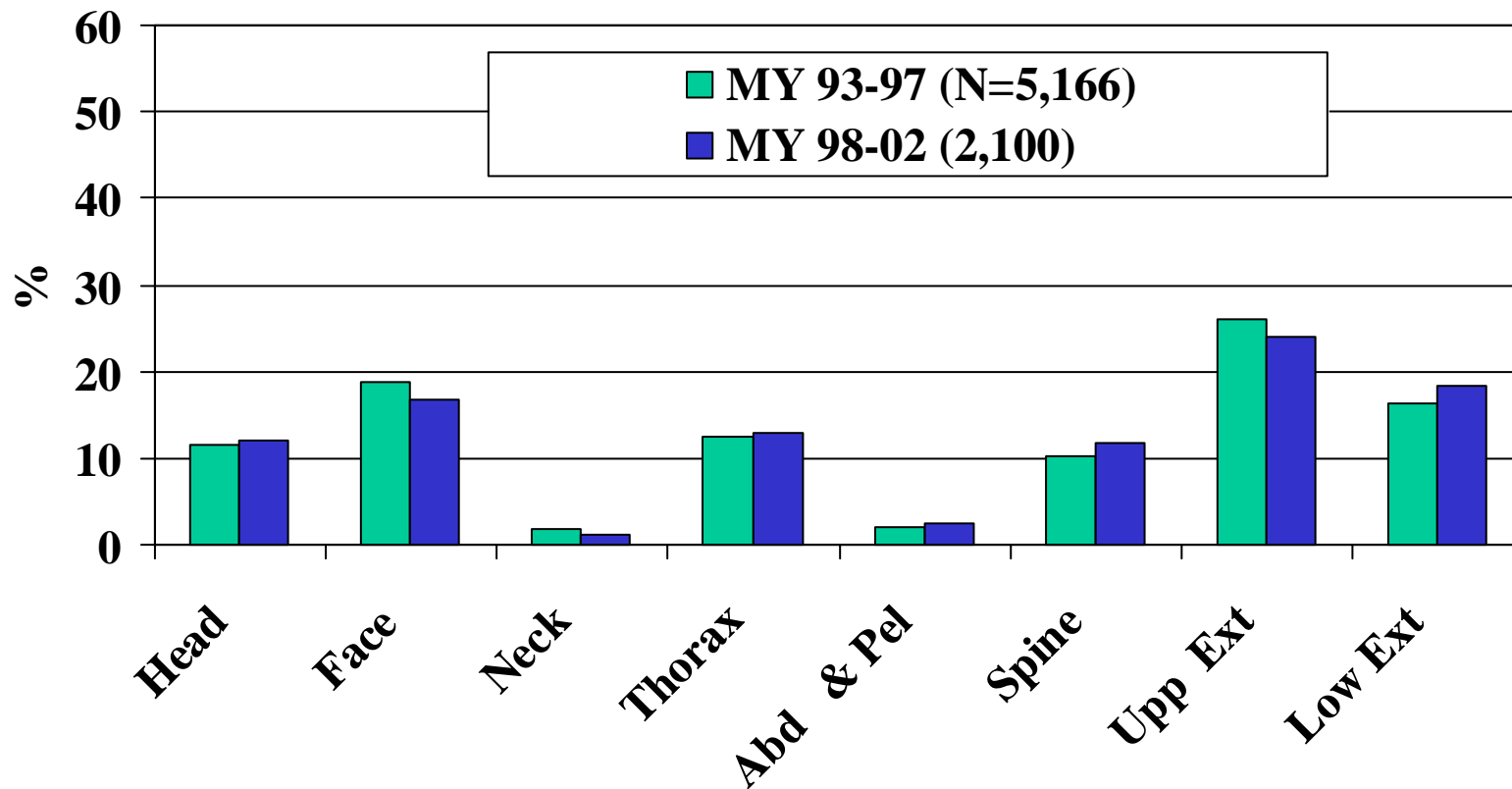
(weighted drivers)



NASS CDS 1993-2001. See inclusion criteria.

* Includes fatalities

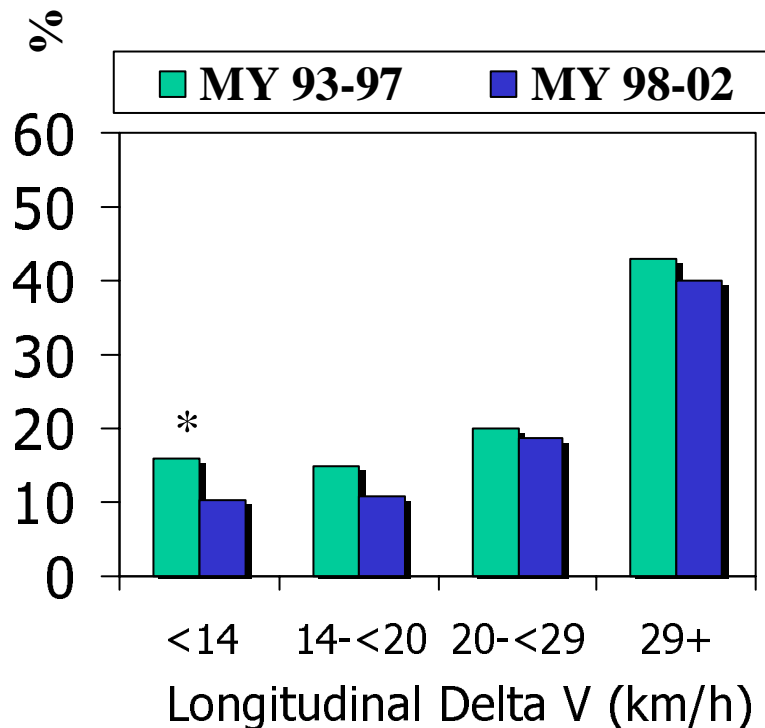
Drivers' MAIS Body Region by MY



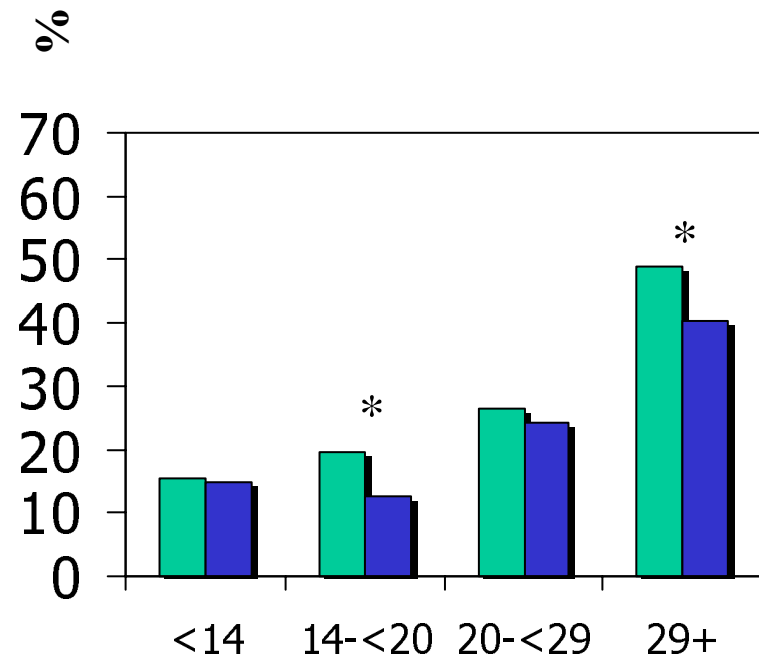
NASS CDS 1993-2001. See inclusion criteria.

Percent Drivers' MAXAIS2+ by MY and Crash Severity

Percent Males with
MAXAIS 2+



Percent Females with
MAXAIS 2+



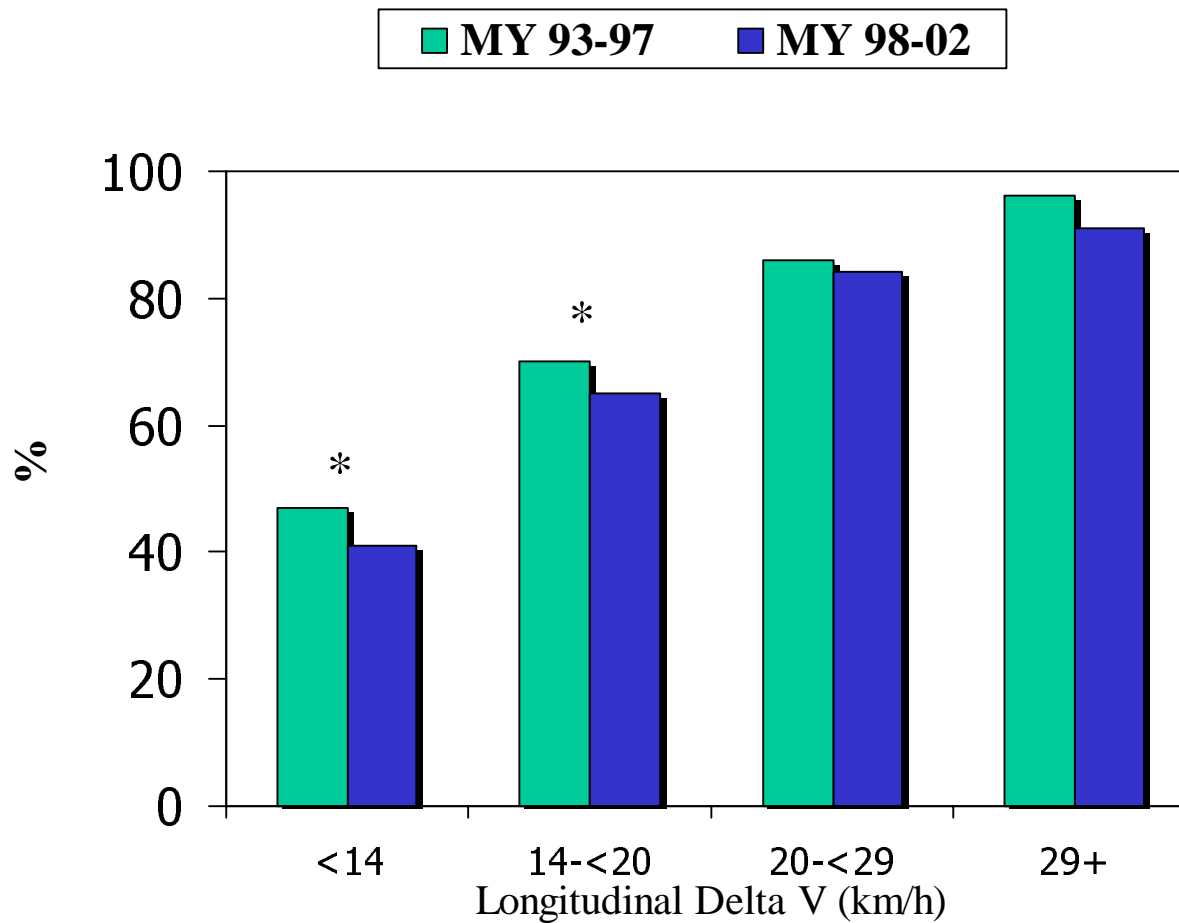
*P<=0.05

NASS CDS 1993-2001 (N=7,266). See inclusion criteria.

Logistic Regression

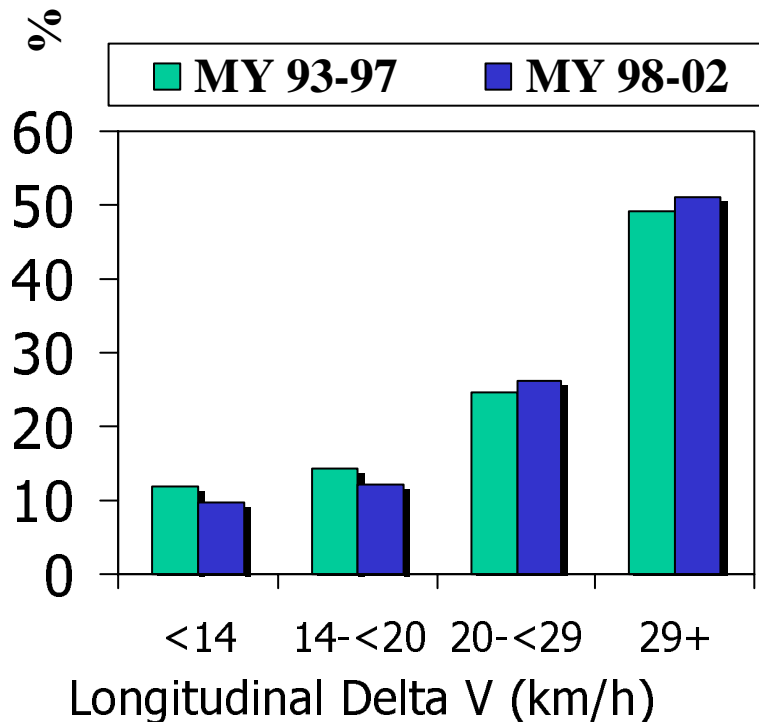
- $P(\text{mais}_+) = f\{\text{pre1998, dvlong, sb use, vehicle type, gender age}\}$
 - MAIS2+
 - $\text{OR}_{1998-2002 \text{ vs } 1993-1997} = 0.86, 95\% \text{ CI } (0.75-0.98)$
 - MAIS3+
 - $\text{OR}_{1998-2002 \text{ vs } 1993-1997} = 0.83, 95\% \text{ CI } (0.68-1.0)$
- (both models loose significance if run with weighted cases)

Percent Drivers whose airbag deployed by MY

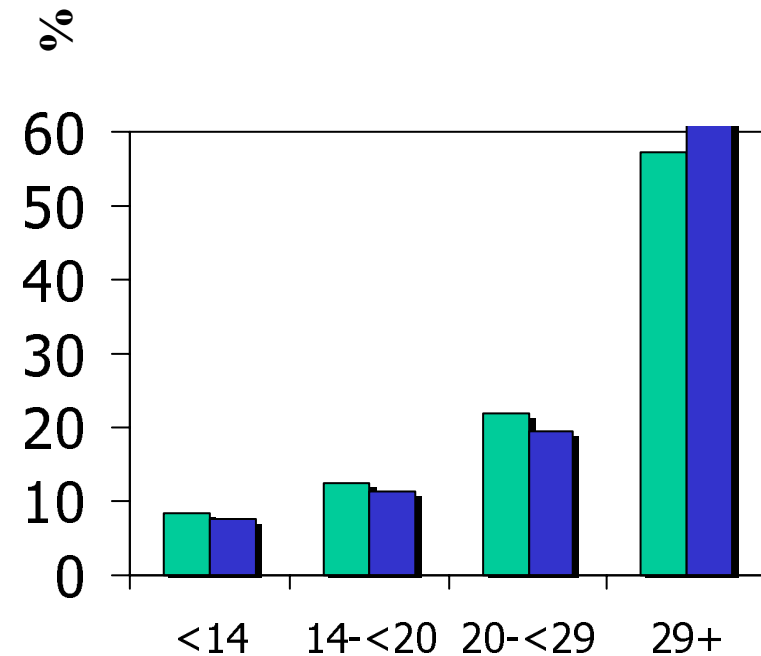


Drivers Injury Severity when Airbags Deployed

Percent with MAXAIS 2+



Percent with MAXAIS 3+



NASS CDS 1995-2001 (N=5,083). See inclusion criteria.

Conclusions (1)

- Drivers in frontal crashes of known severity in vehicles MY 98-02 sustain significantly fewer and less severe injuries than their counterparts in MY pre 1998
- This is true for all drivers, males, females, MAXAIS2+, 3+, and across crash severity, however it does not hold true if one evaluates airbag deployment