Investigation Of The Performance Of Safety Systems For Protection Of The Elderly

AAAM 2005

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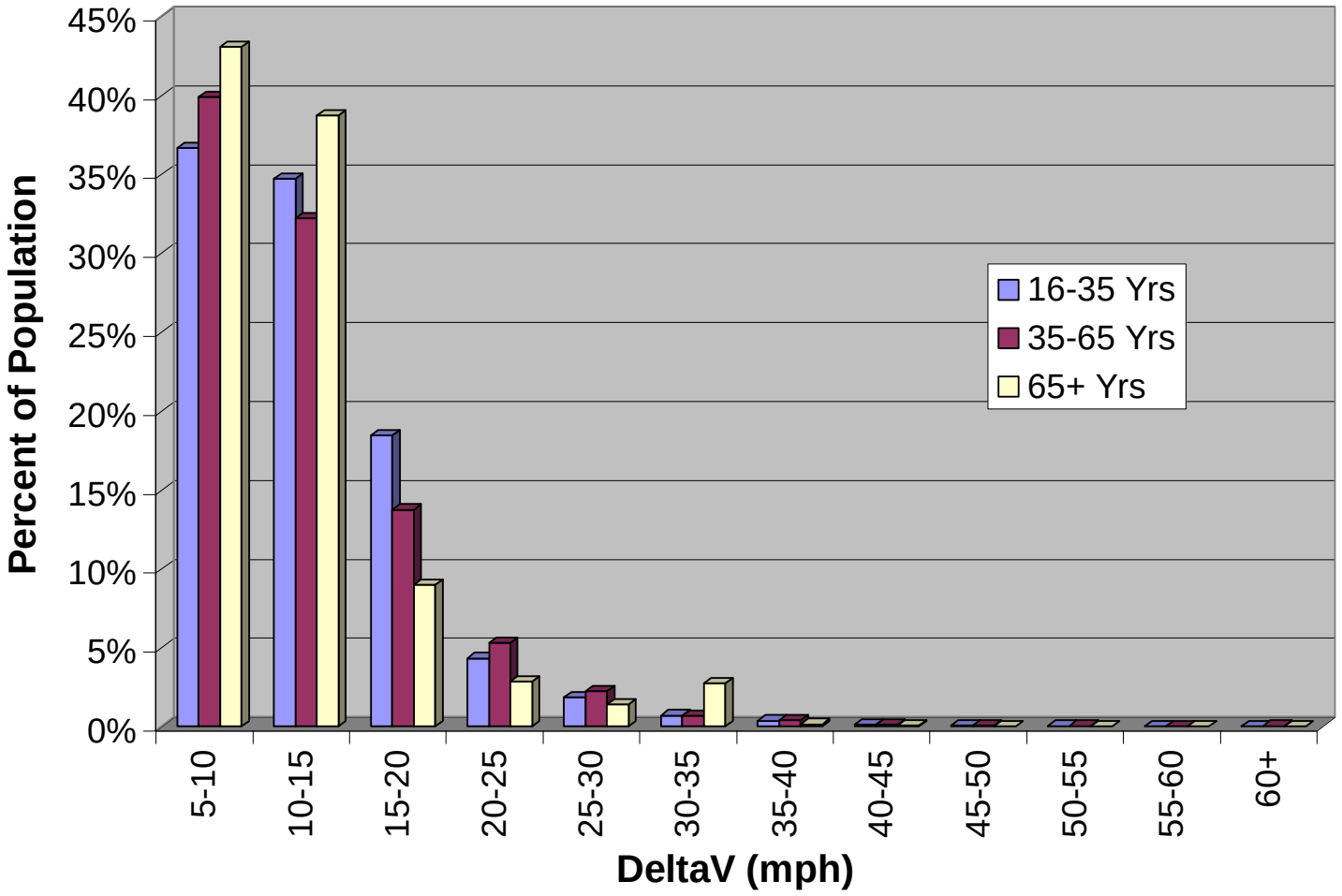
Study Purpose

This study investigates injury occurrence for belted occupants as a function of age

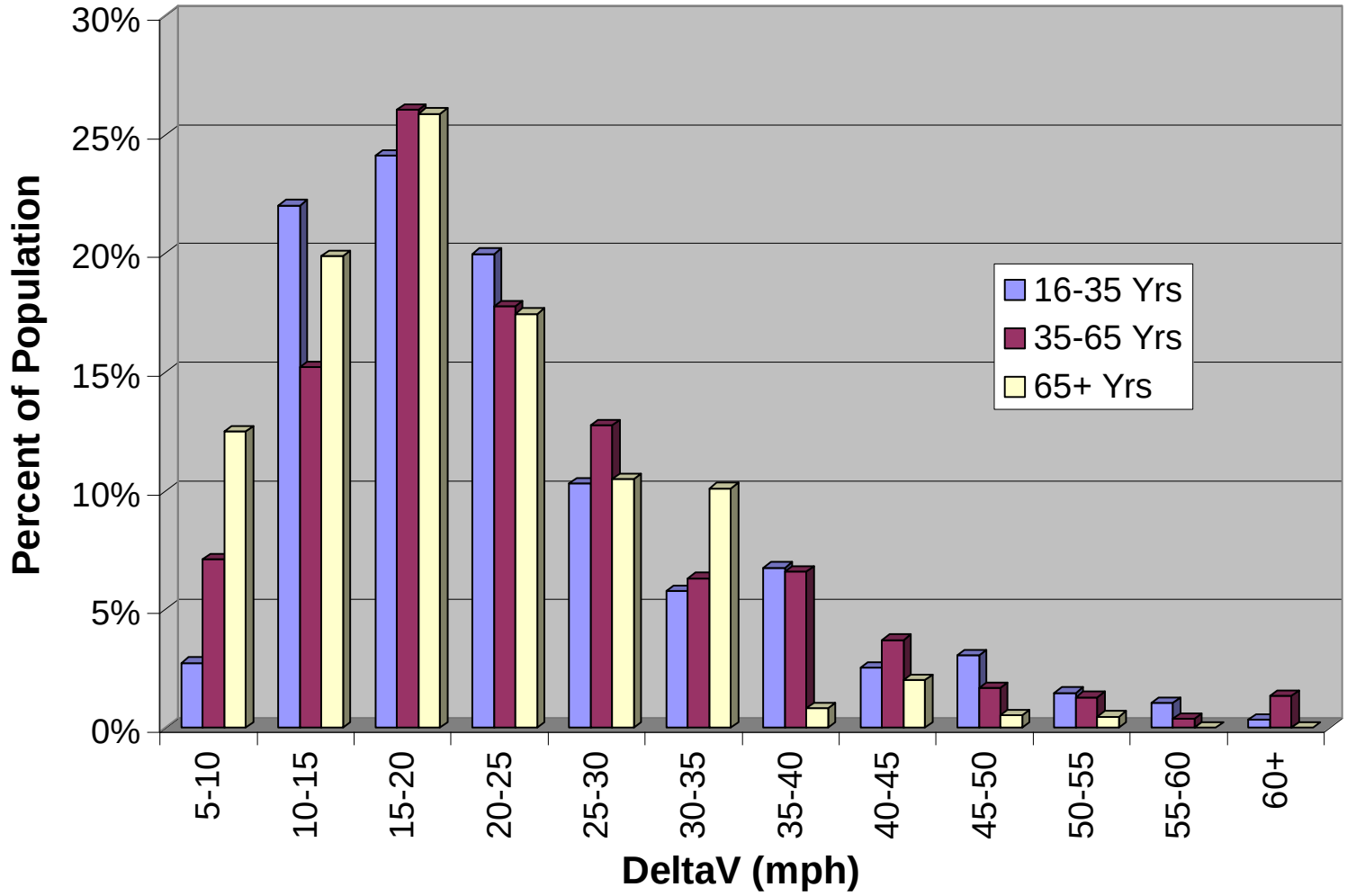
Methodology

- Data source: NASS/CDS 1997-2003 & WLIRC Cases
- Compare different age groups
- Examine difference in exposure and injury rate vs. crash severity
- Examine differences in injured body regions
- Observations and conclusions

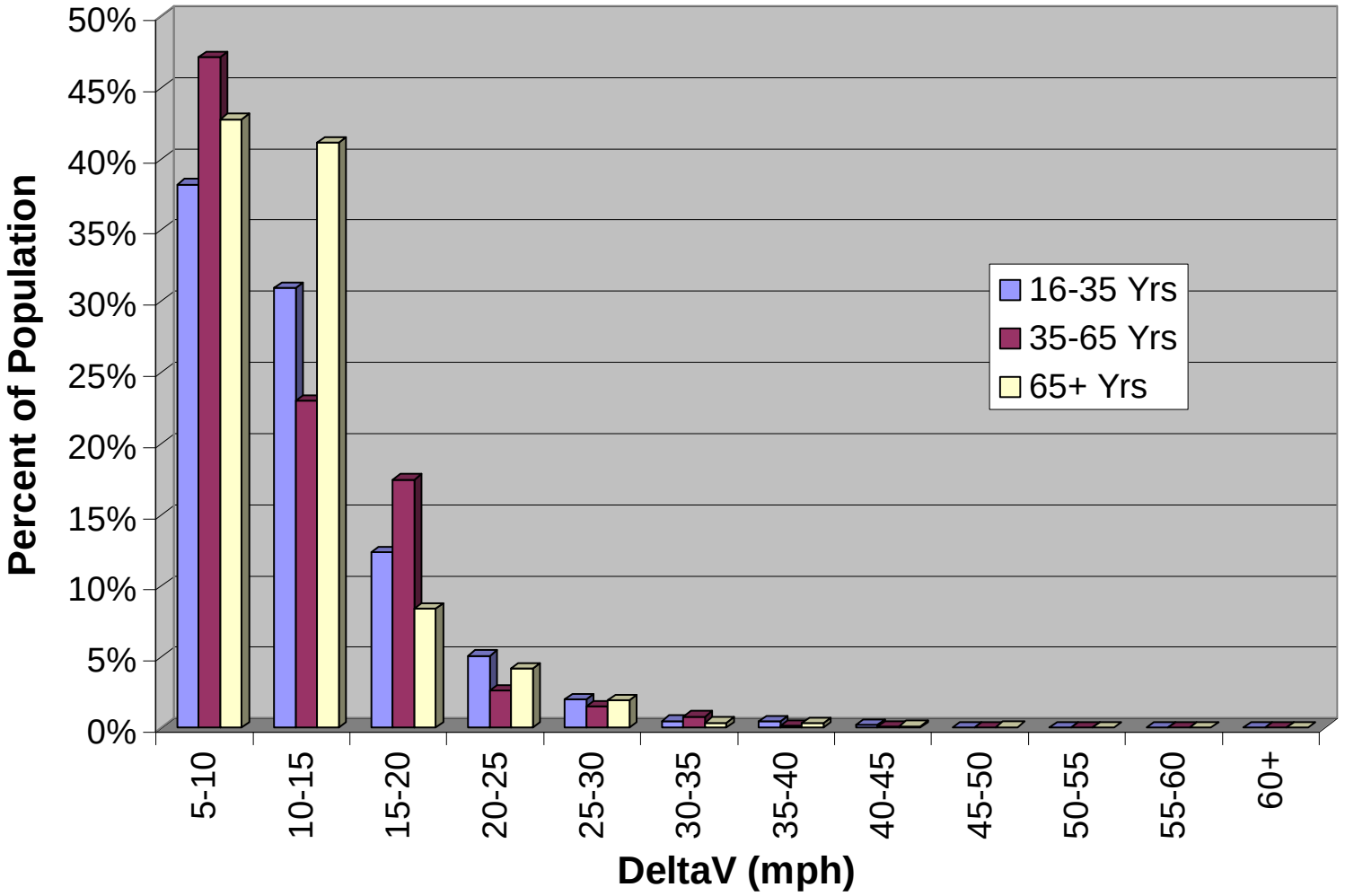
Frontal Crash Involvement: Belted Occupants by Age (NASS/CDS 1997-2003)



MAIS3+ Injured Occupants in Frontal Crashes:
Belted Occupants by Age (NASS/CDS 1997-2003)



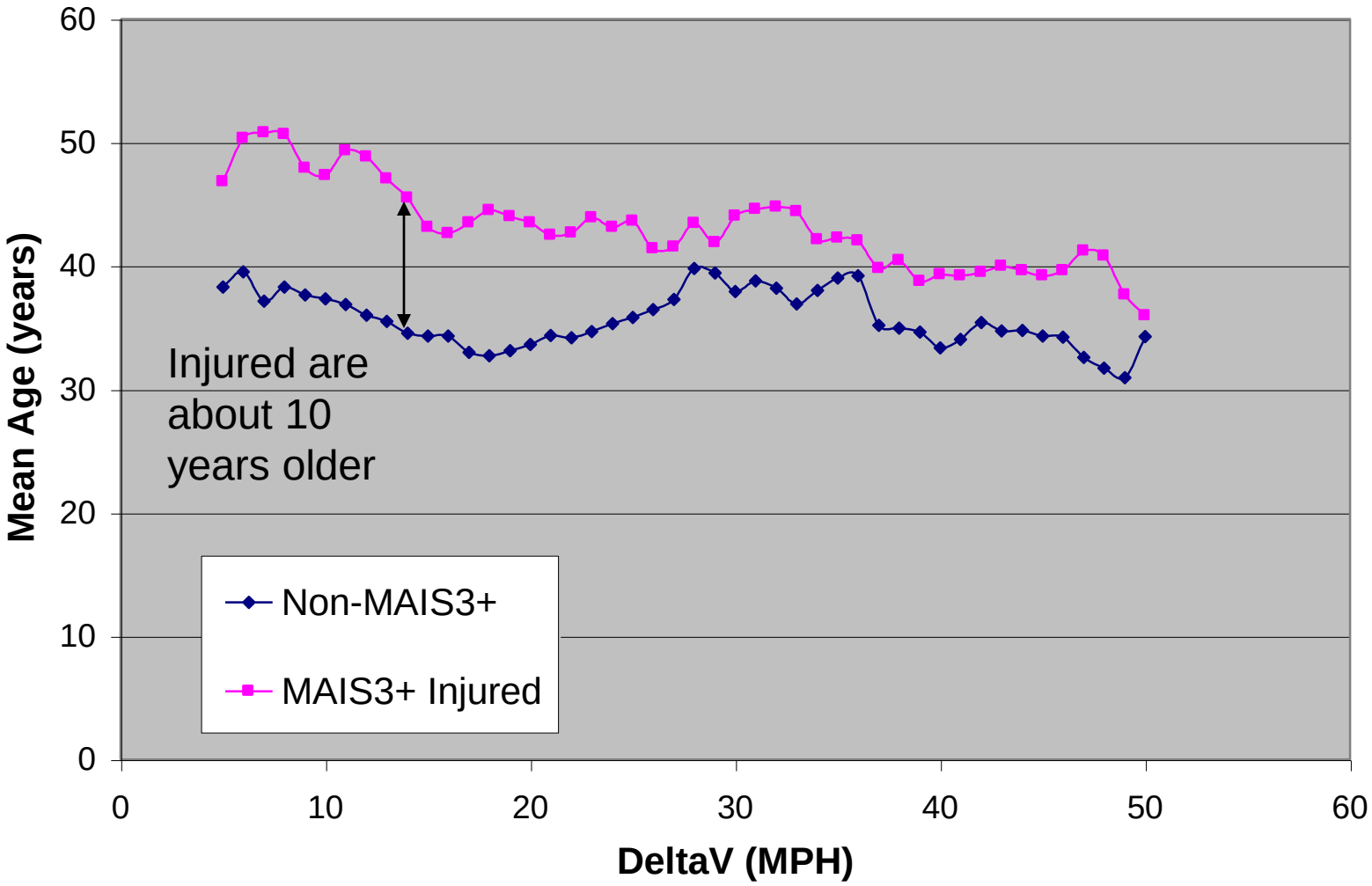
Nearside Crash Involvement: Occupants by Age
(NASS/CDS 1997-2003)



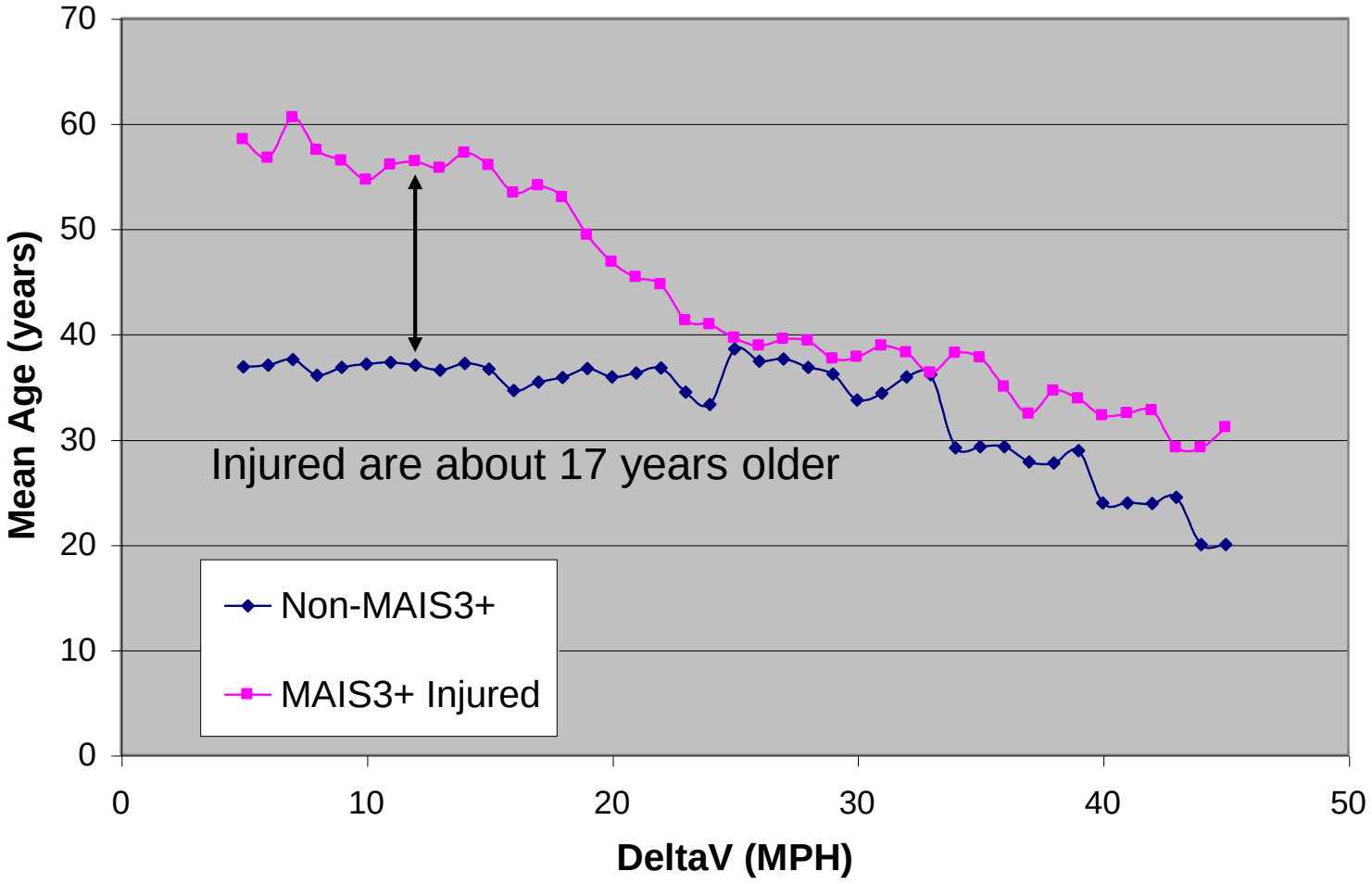
Exposure and MAIS 3+ Injuries by Dellta-V

- Examine average age of exposed and injured by delta-V
- Examine belted occupants in frontal and side impact
- Use 10 point moving average to smooth delta-V relationship

Mean Age By DeltaV: Frontal Crashes
(Belted Occupants, 10 Pt. Moving Average , NASS/CDS 1997-2003)



Mean Age By DeltaV: Nearside Crashes
(Belted Occupants, 10 Pt. Moving Average, NASS/CDS 1997-2003)



Observations

- Injured generally older than the exposed population
- The difference is greatest in low severity crashes
- Older occupants are a larger percent of the injured population in lower severity crashes
  - older by 10 years in frontals
  - older by 17 years in side

Injured Body Region by Crash Direction

Crash Direction	Frontal	Frontal	Near-Side	Near-Side
Ages	15-35	65+	15-35	65+
Head	27%	23%	25%	32%
Chest	30%	42%	49%	50%
Abdomen	6%	9%	5%	5%
Lower Limb	24%	16%	13%	12%
Upper Limb	13%	10%	8%	1%

Observations

- The chest/abdominal injuries are the most frequent injured body region for belted occupants
- Chest/abdominal injuries are more frequent for older occupants than for the younger
- The difference is larger in frontal crashes than in side crashes

Discussion

- Older occupants have lower injury tolerance than younger occupants
- Older occupants are more freqyently injured in low severity crashes than younger occupants
- Chest injuries are the most frequent among older occiupants
- Safety systems should adjust to provide lower forces on the body in lower severity crashes

Discussion

- Reduction of chest injury through softer side protection and softer belts and air-bags in low severity crashes should be a priority for reducing injuries to the elderly.

Discussion

- Present and proposed US federal regulations do not reduce injury tolerance in lower severity crash tests.
  - FMVSS 208 40 kph frontal test with 5% female has same injury allowable as the 56 kph test
  - New FMVSS 214 proposal does not address lower injury tolerance for elderly in lower severity side crashes