

Opportunities for Reducing Casualties in Far-side Crashes

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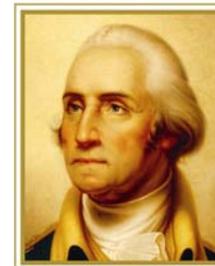
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Data Sources

NASS/CDS 1995-2004

Front seat occupants, Age 12 and older

Separated by:

- ≡ Far-side & Near-side
- ≡ Planar & Rollover
- ≡ Belted & Unbelted
- ≡ Ejected & Not Ejected

Definition of Injury Severity

MAIS 3- Serious

MAIS 4 – Severe

MAIS 5 – Critical

MAIS 6 – Fatal

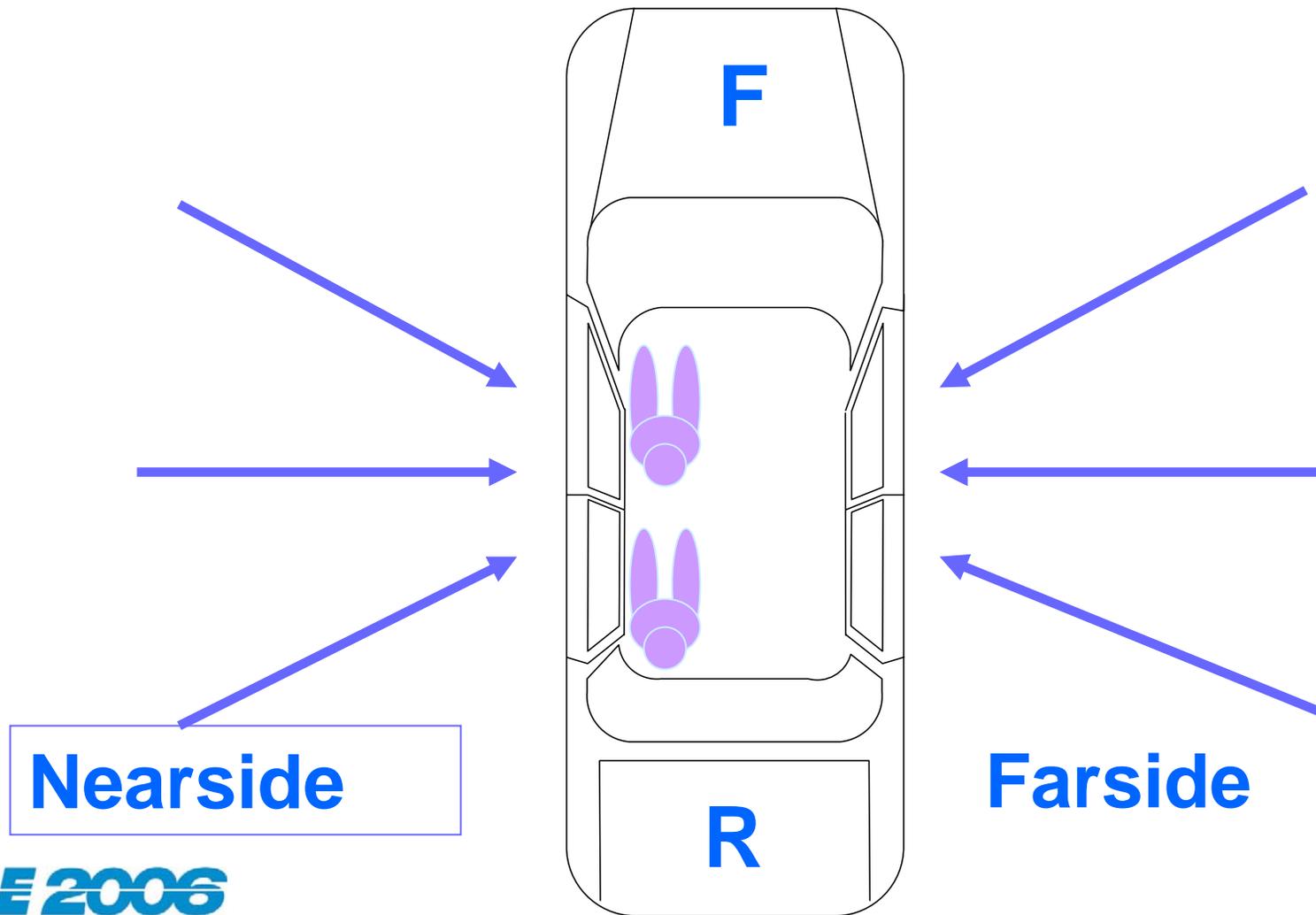
MAIS 3+ = All 3, 4, 5 & 6 Categories

Note:

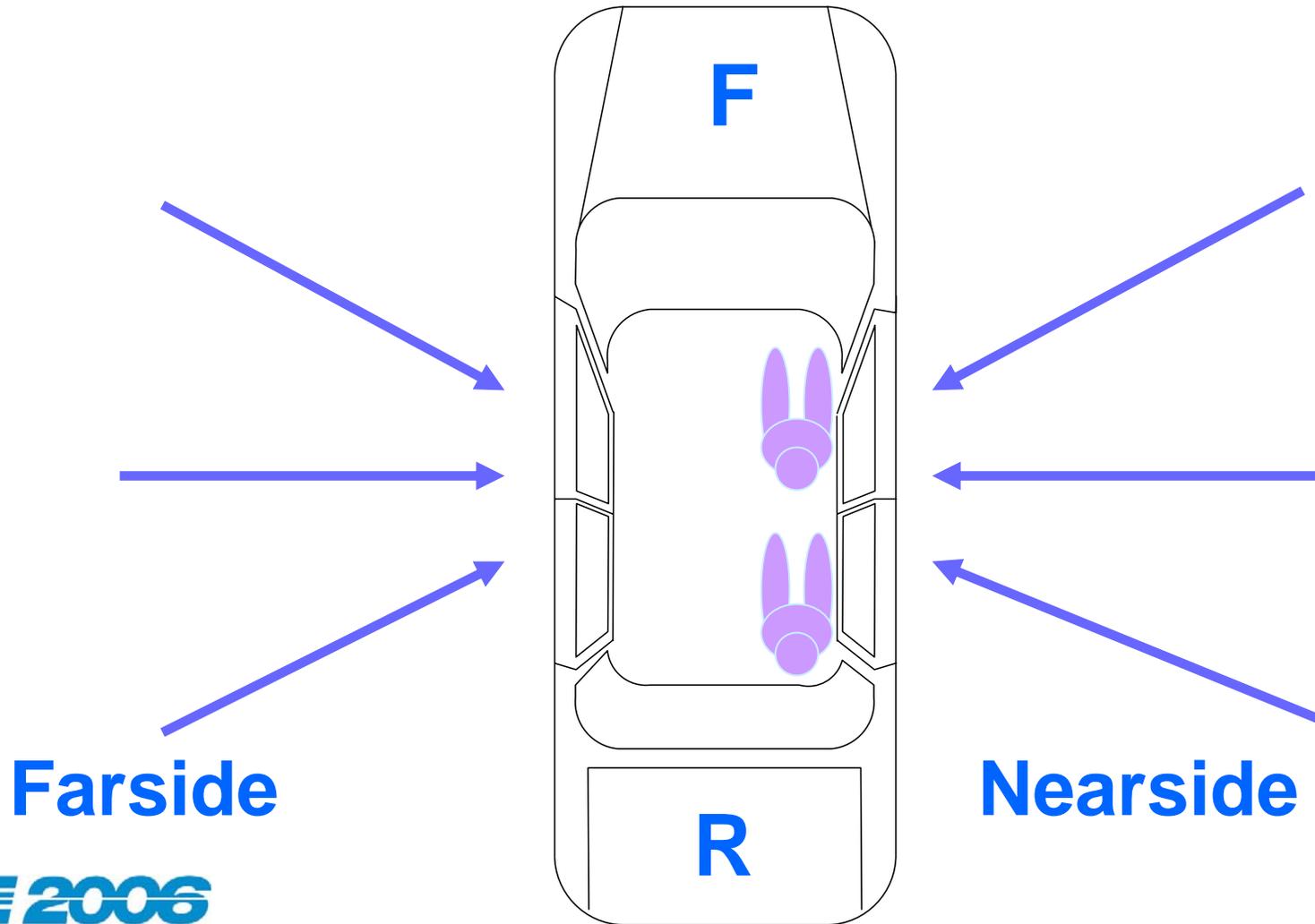
13% of fatalities are not included in the MAIS 3+ category

MAIS 3+F = MAIS 3+ and all other Fatalities

Crash Mode Definitions



Crash Mode Definitions



Belted Dummy Motion in Far-side Crash

60° Far-side Impact



Annual Distribution of MAIS 3+F Injuries in Far-side & Near-side Crashes

Crash Modes & Belt Use	Annual Number	
	Planar	
Far Belted	2,244	
Far Unbelted	5,022	
Far Total	7,265	

76% belt use

Annual Distribution of MAIS 3+F Injuries in Far-side & Near-side Crashes

Crash Modes & Belt Use	Annual Number	
	Planar	
Far Belted	2,244	
Far Unbelted	5,022	
Far Total	7,265	Far-side Planar Crash Opportunities
Near Belted	7,620	
Near Unbelted	7,006	
Near Total	14,625	FMVSS 214 Opportunities
Near + Far Total	21,891	

Annual Distribution of MAIS 3+F Injuries in Far-side & Near-side Crashes

Crash Modes & Belt Use	Annual Number	
	Planar	Rollover
Far Belted	2,244	3,499
Far Unbelted	5,022	6,429
Far Total	7,265	9,929
Near Belted	7,620	3,652
Near Unbelted	7,006	5,695
Near Total	14,625	9,347
Near + Far Total	21,891	19,275

Annual Distribution of MAIS 3+F Injuries in Far-side & Near-side Crashes

Crash Modes & Belt Use	Annual Number		Total
	Planar	Rollover	
Far Belted	2,244	3,499	5,743
Far Unbelted	5,022	6,429	11,451
Far Total	7,265	9,929	17,194
Near Belted	7,620	3,652	11,272
Near Unbelted	7,006	5,695	12,700
Near Total	14,625	9,347	23,972
Near + Far Total	21,891	19,275	41,166

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FMVSS 214
Opportunities

Far-side Opportunities
With Rollover

Annual Distribution of MAIS 3+F Injuries in Far-side & Near-side Crashes

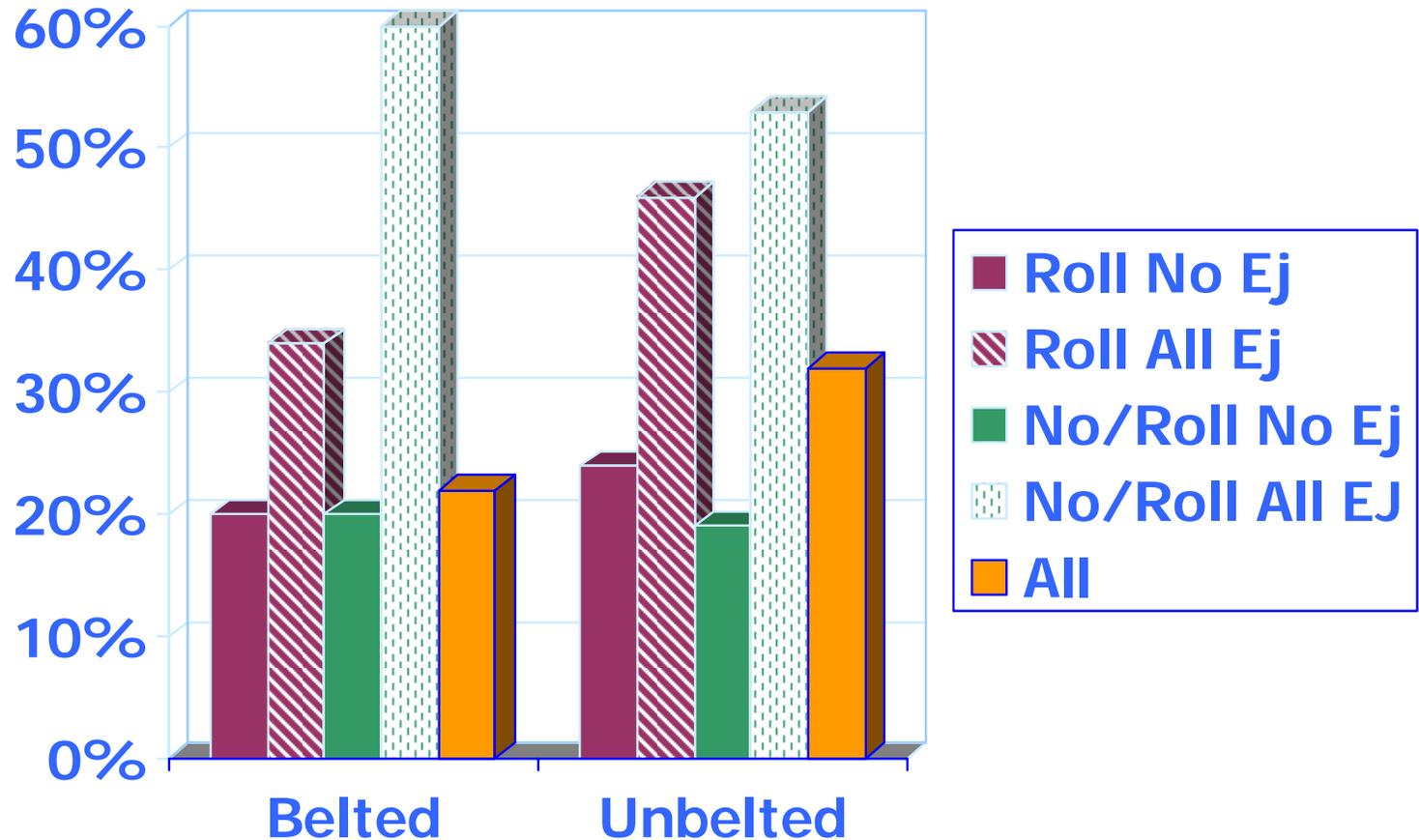
Crash Modes & Belt Use	Percent of All Side & Roll		
	Planar	Rollover	Total
Far Belted	5%	9%	14%
Far Unbelted	12%	16%	28%
Far Total	18%	24%	42%
Near Belted	19%	9%	27%
Near Unbelted	17%	14%	31%
Near Total	36%	23%	58%
Near + Far Total	53%	47%	100%

Annual Distribution of MAIS 3+F Injuries in Far-side & Near-side Crashes

Crash Modes & Belt Use	Annual Number		Total
	Planar	Rollover	
Far Belted	2,244	3,499	5,743
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Far Total	7,265	9,929	17,194
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Near Total	14,625	9,347	23,972
Near + Far Total	21,891	19,275	41,166

Not all cells of MAIS 3+F injuries carry the same fraction of fatalities!!!

Fatality/MAIS 3+F Injuries in Far-side Crashes

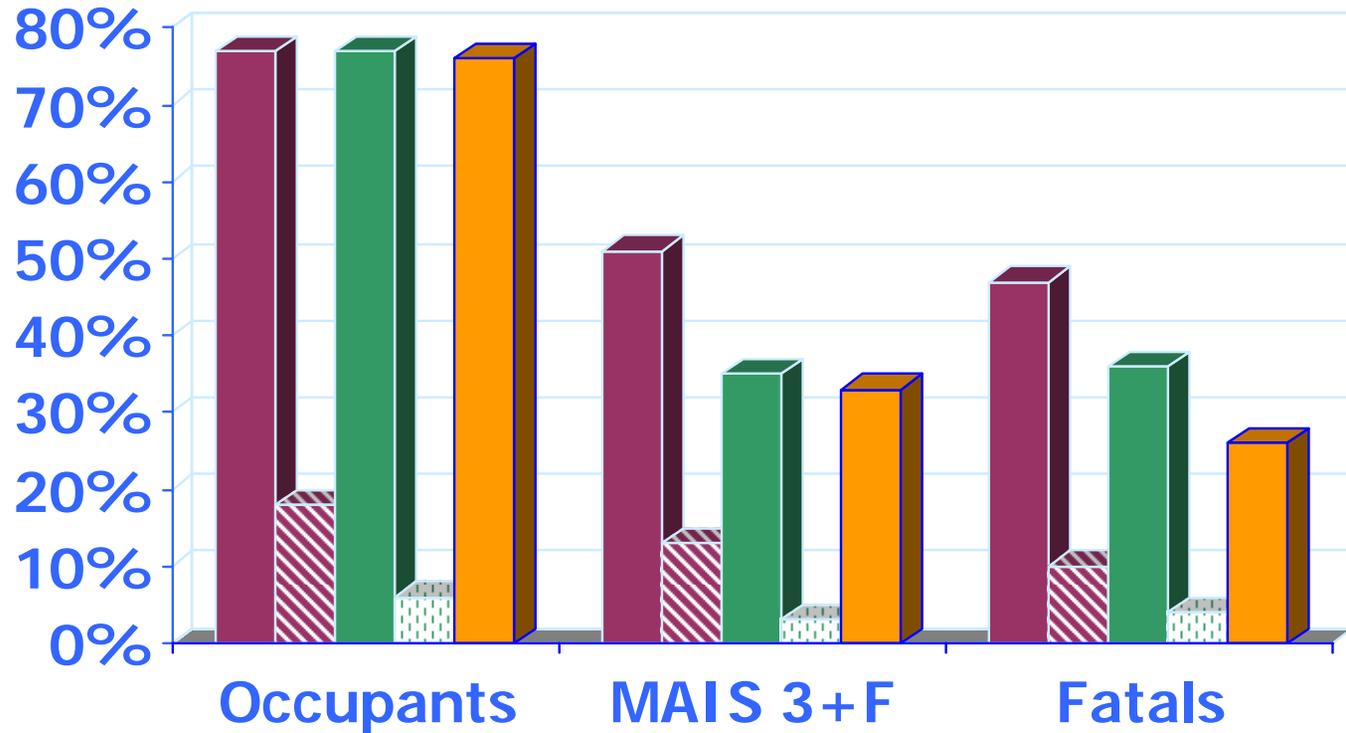


Not all MAIS 3+F Cells Have the Same Fatality Content

Not-ejected – 20% to 24%

Partially Ejected & Ejected – 34% to 53%

Belt Use Rates in Far-side Crashes by Roll and Ejection – Exposed, Injured, Fatal

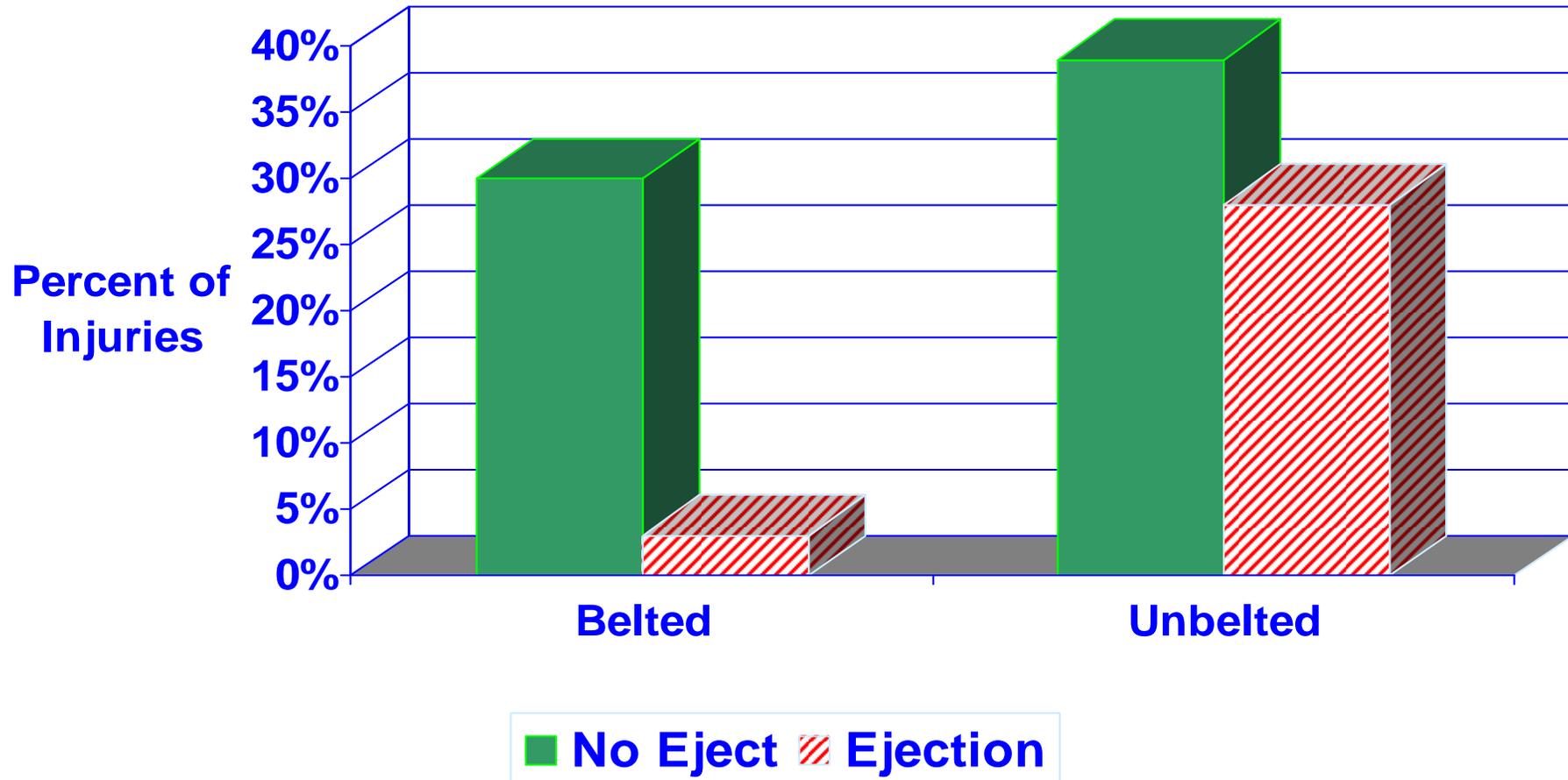


Belt Use Rates

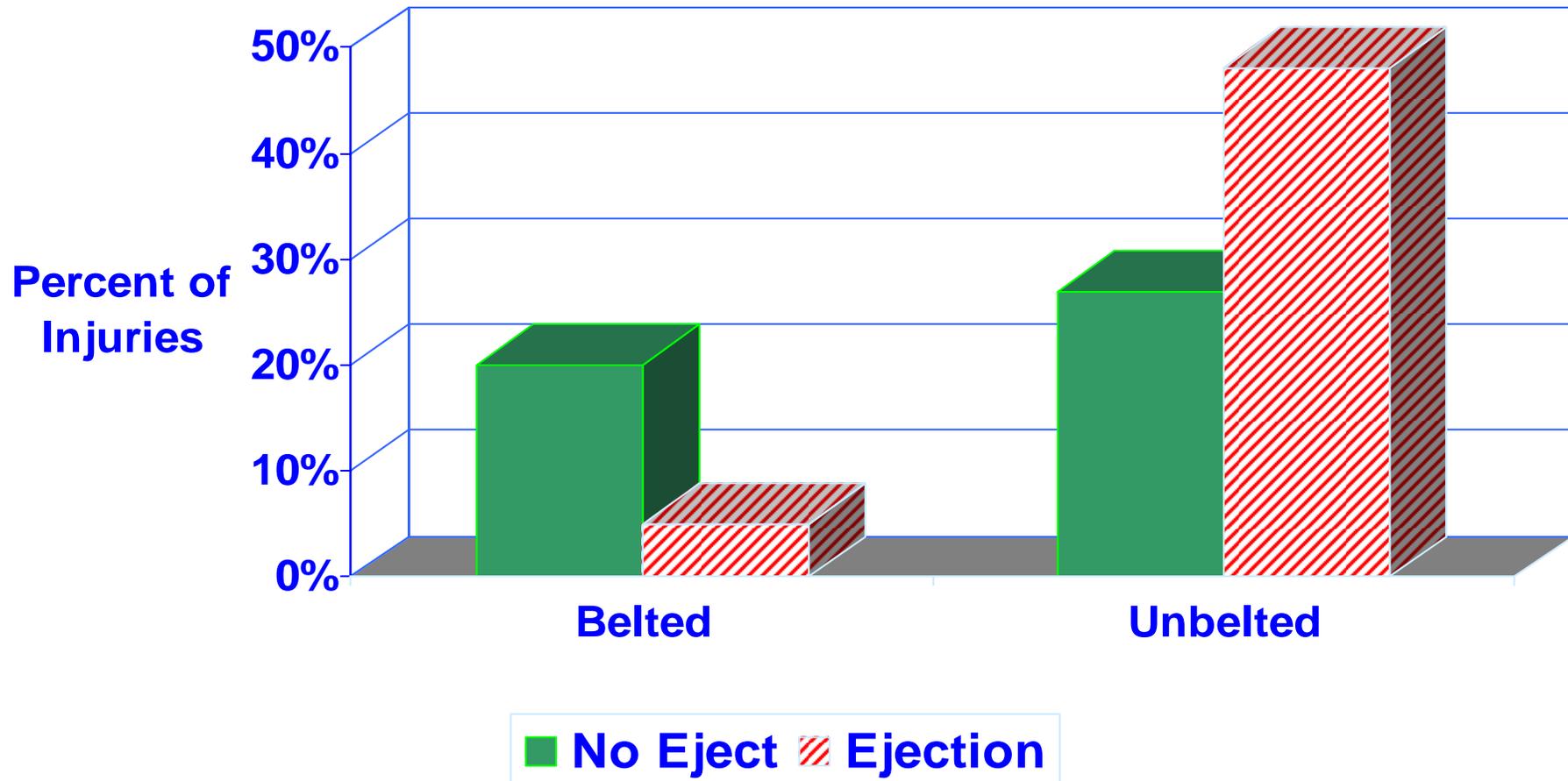
Average Belt Use:

- ⌘ Exposed Population – 76%
- ⌘ MAIS 3+ Injuries – 33%
- ⌘ Fatalities – 26% of the MAIS 3+F Injuries

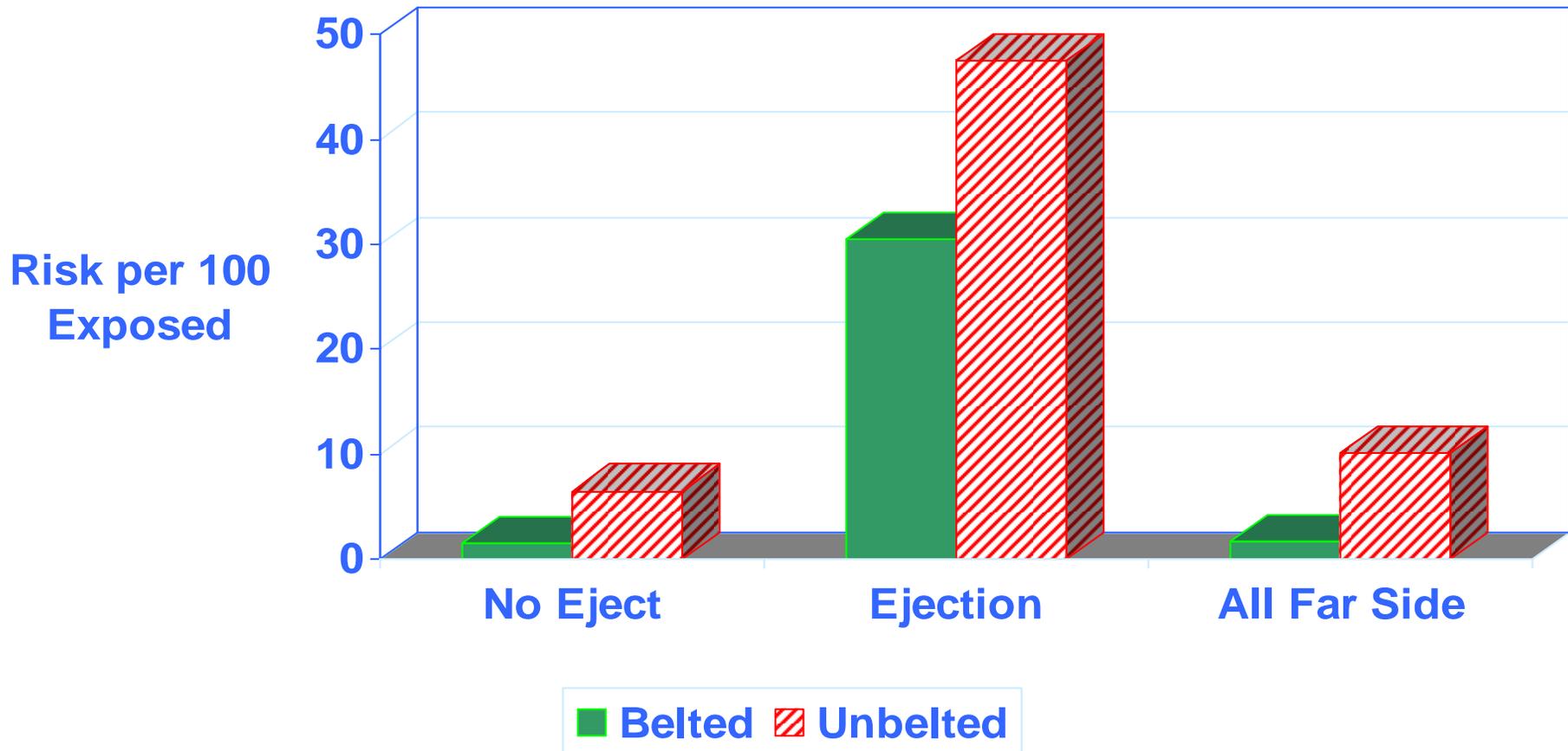
All Far-Side MAIS 3+F by Belt Use and Ejection



All Far-Side Fatalities by Belt Use and Ejection



Far-Side Risk of MAIS 3+F by Belt Use and Ejection



Distribution of MAIS 3+F Injuries in Far-side Crashes – Belts as Used

Crash Modes & Ejection	Percentage	
	Belted	Unbelted
No Ej No/Roll	13%	22%
No Ej Roll	17%	17%
All Far Side Ejection	3%	28%
Total	33%	67%

Total – About 17,000 MAIS 3+F injuries annually at 76% belt use

Distribution of Fatal Injuries in Far-side Crashes – Belts as Used

Crash Modes & Ejection	Percentage	
	Belted	Unbelted
No Ej No/Roll	10%	15%
No Ej Roll	12%	13%
All Far Side Ejection	5%	45%
Total	26%	74%

Total – About 5,000 fatalities annually
at 76% belt use

Conclusions

NASS/CDS 1995-2004 annual averages:

- ⌘ Far-side Planar crashes -7,000 MAIS 3+F
- ⌘ Far-side Rollovers -10,000 MAIS 3+F
- ⌘ Near-side Planar crashes – 14,000 MAIS 3+F

The average fatality content of the MAIS 3+F population is:

- ⌘ 21% for not-ejected
- ⌘ 48% for ejected
- ⌘ 22% for belted
- ⌘ 32% for unbelted

Conclusions

The injury reduction opportunities in far-side protection are about as large as those being addressed by FMVSS 214 - when far-side rollover is considered.

About 12,000 MAIS 3+ and 5,000 Fataals occur annually in far-side crashes

Conclusions

The largest fatality reduction opportunity is for the prevention of far-side ejection:

- ≡ 2,500 Fatalities
- ≡ 2,800 MAIS 3+ injuries

Belted occupants injury prevention opportunity:

- ≡ 1,340 Fatalities
- ≡ 4,400 MAIS 3+ injuries

Conclusion

Far-side occupant protection offers large opportunities for injury and fatality reduction

Research Collaboration in Far-side Protection

Ford

Participants in Far-side Research

- Australian Research Board
- Ford
- GM Holden
- Autoliv
- Australian Ministry of Transport
- Monash University
- GW University
- Va Tech
- Wake Forest
- Medical College of Wisc
- Miami School of Medicine
- Wayne State U
- Consultants & Students
 - ≡ US, Australia, Sweden

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Opportunities for Reducing Casualties in Far-side Crashes

Questions?

