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The Relative Safety of Large and Small Passenger Vehicles

NHTSA Mass-Size Safety Symposium
Washington, DC • May 14, 2013

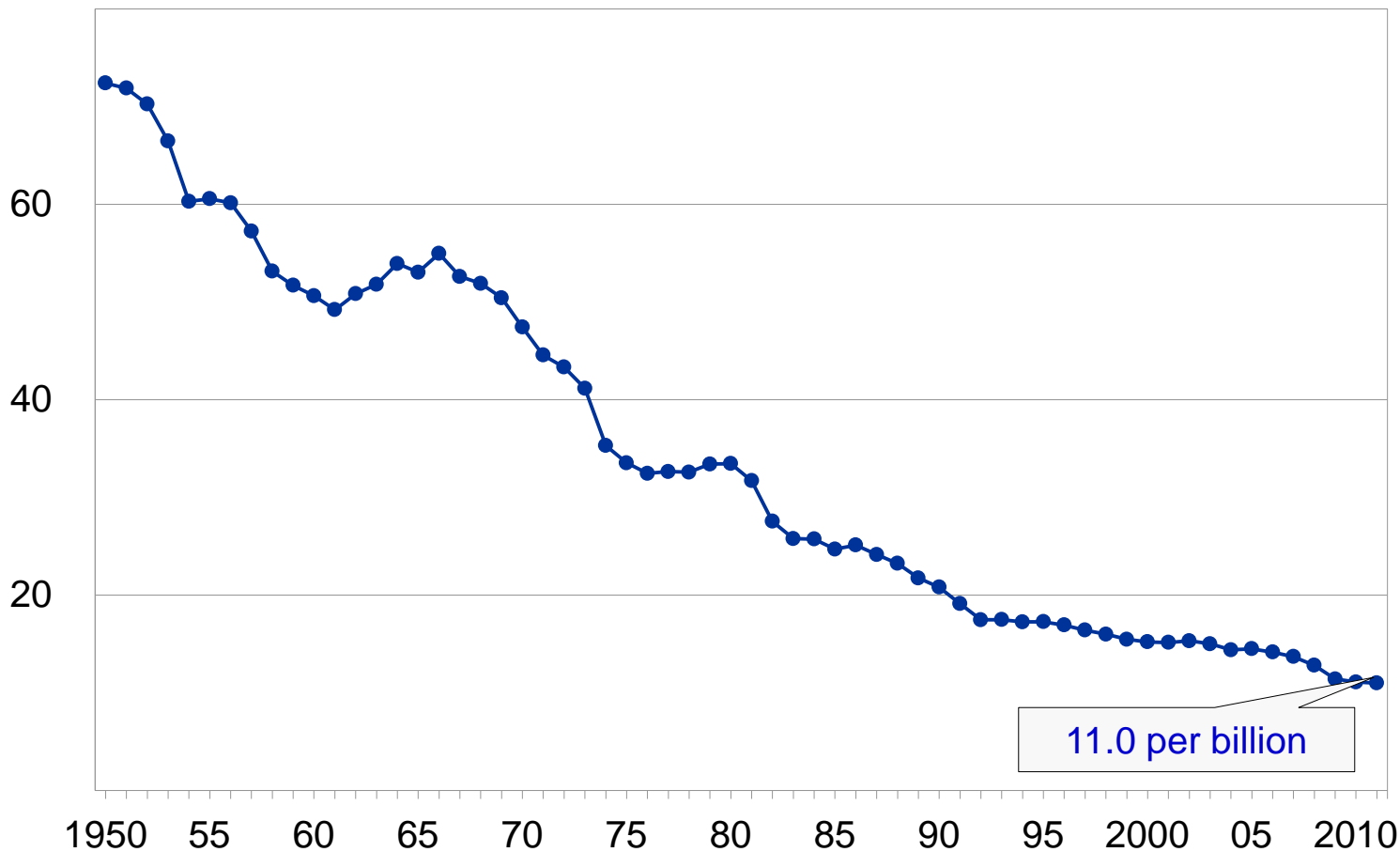
Joe Nolan



Historical trends

Motor vehicle crash deaths per billion miles traveled

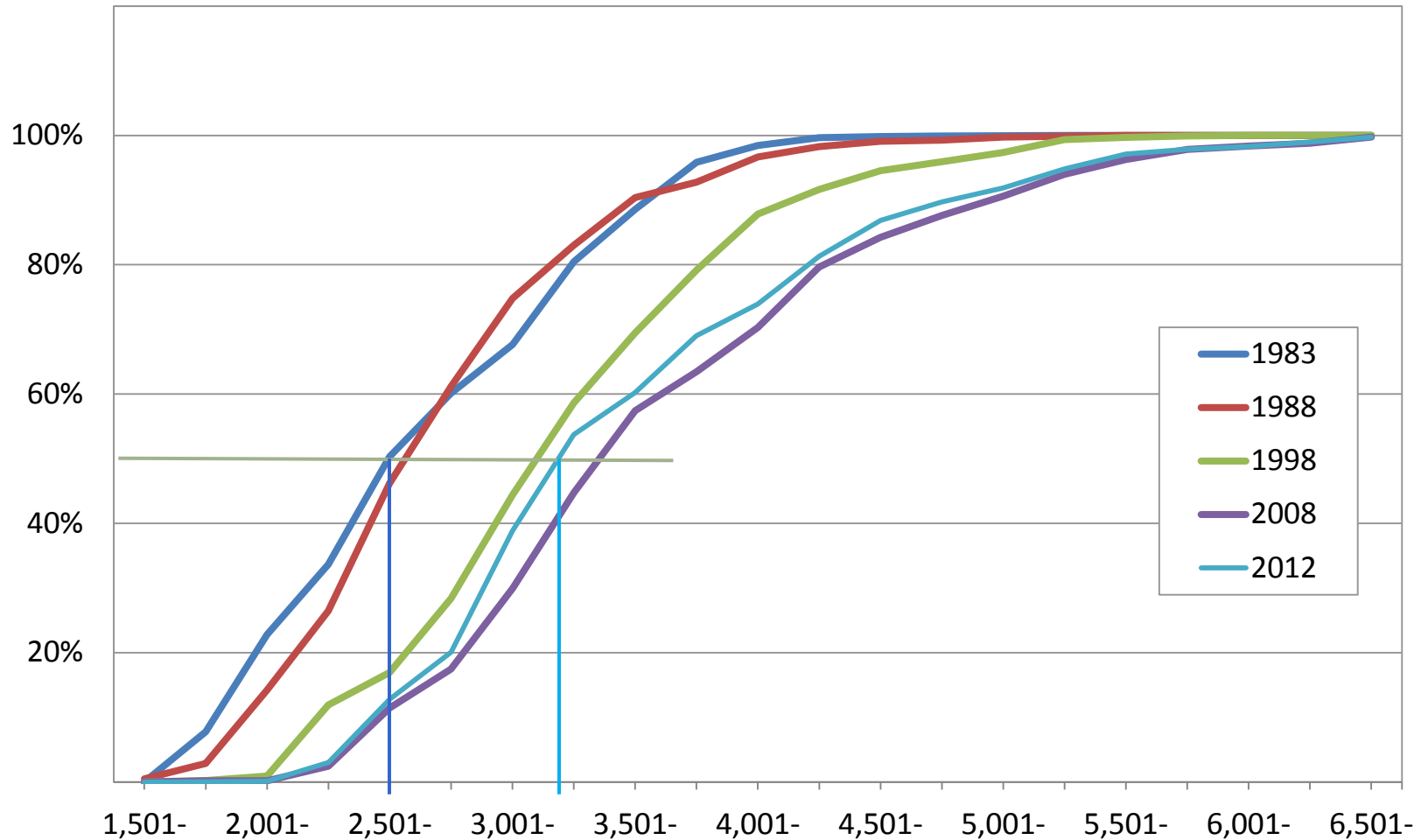
1950-2011



11.0 per billion

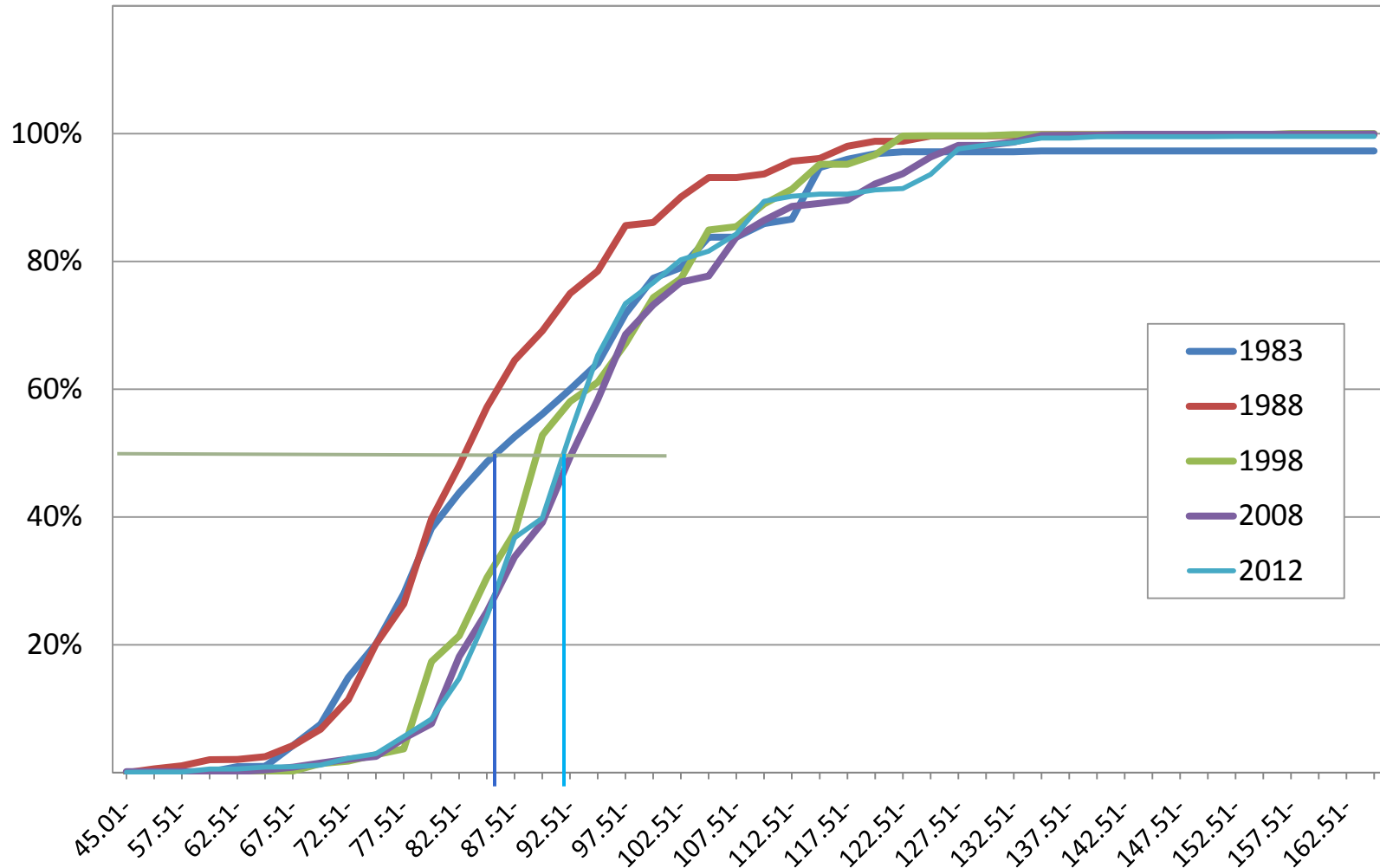
Historical changes in vehicle mass

Cumulative percent of passenger vehicles by weight (lbs.)



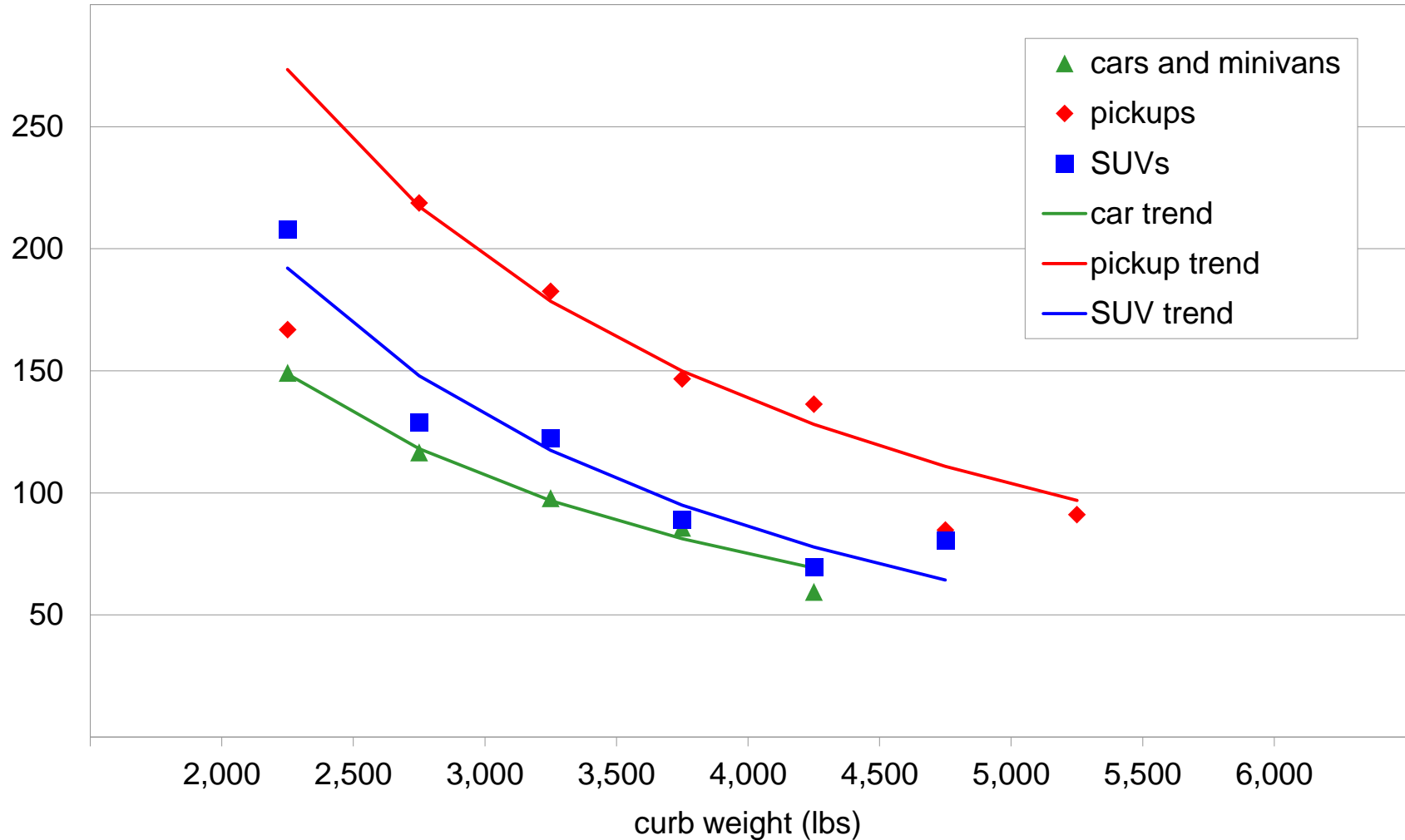
Historical changes in vehicle size

Cumulative percent of passenger vehicles by shadow (sq ft)



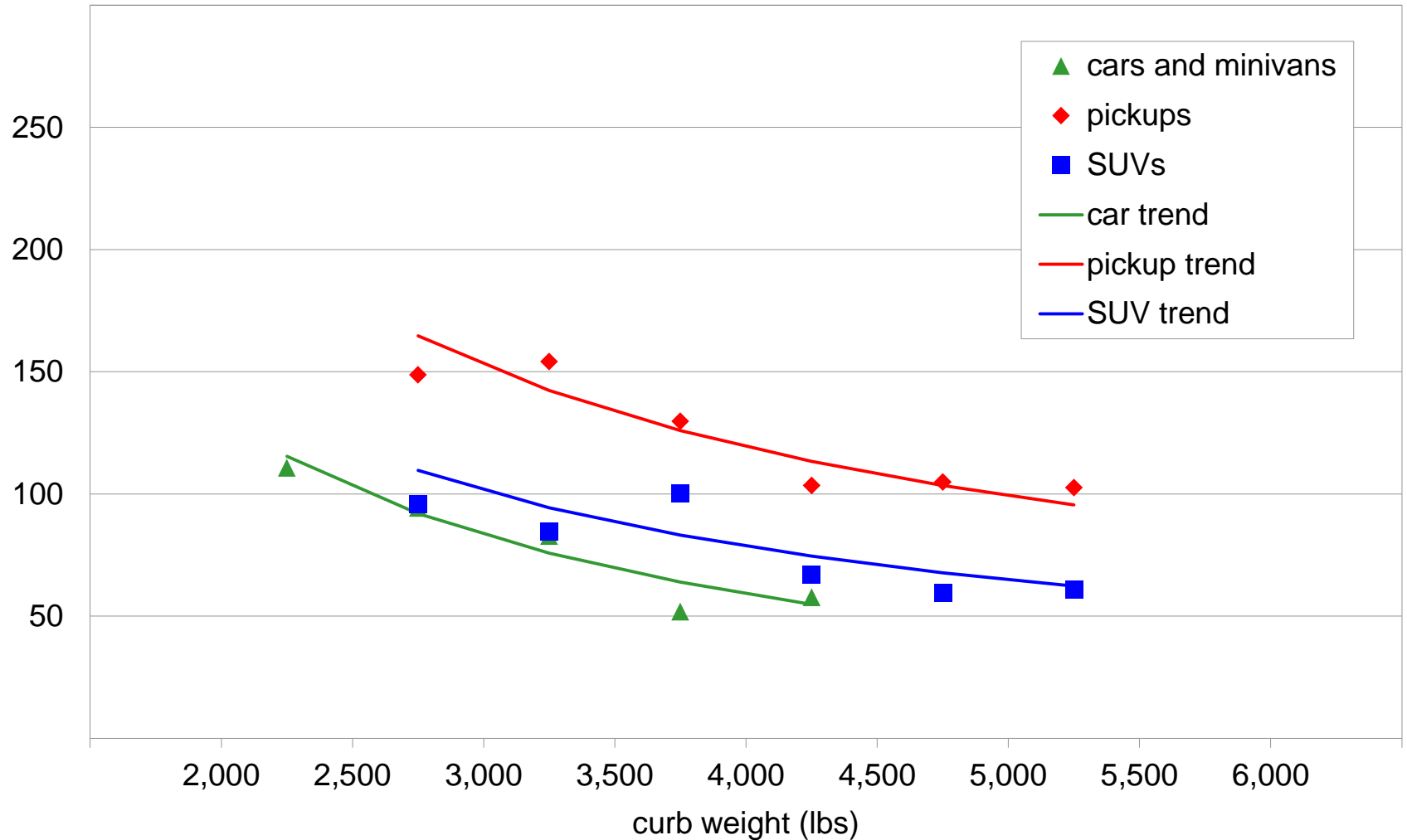
Driver fatality risk by vehicle weight 20 years ago

Deaths per million registration years, 1987-90 passenger vehicles during 1988-91



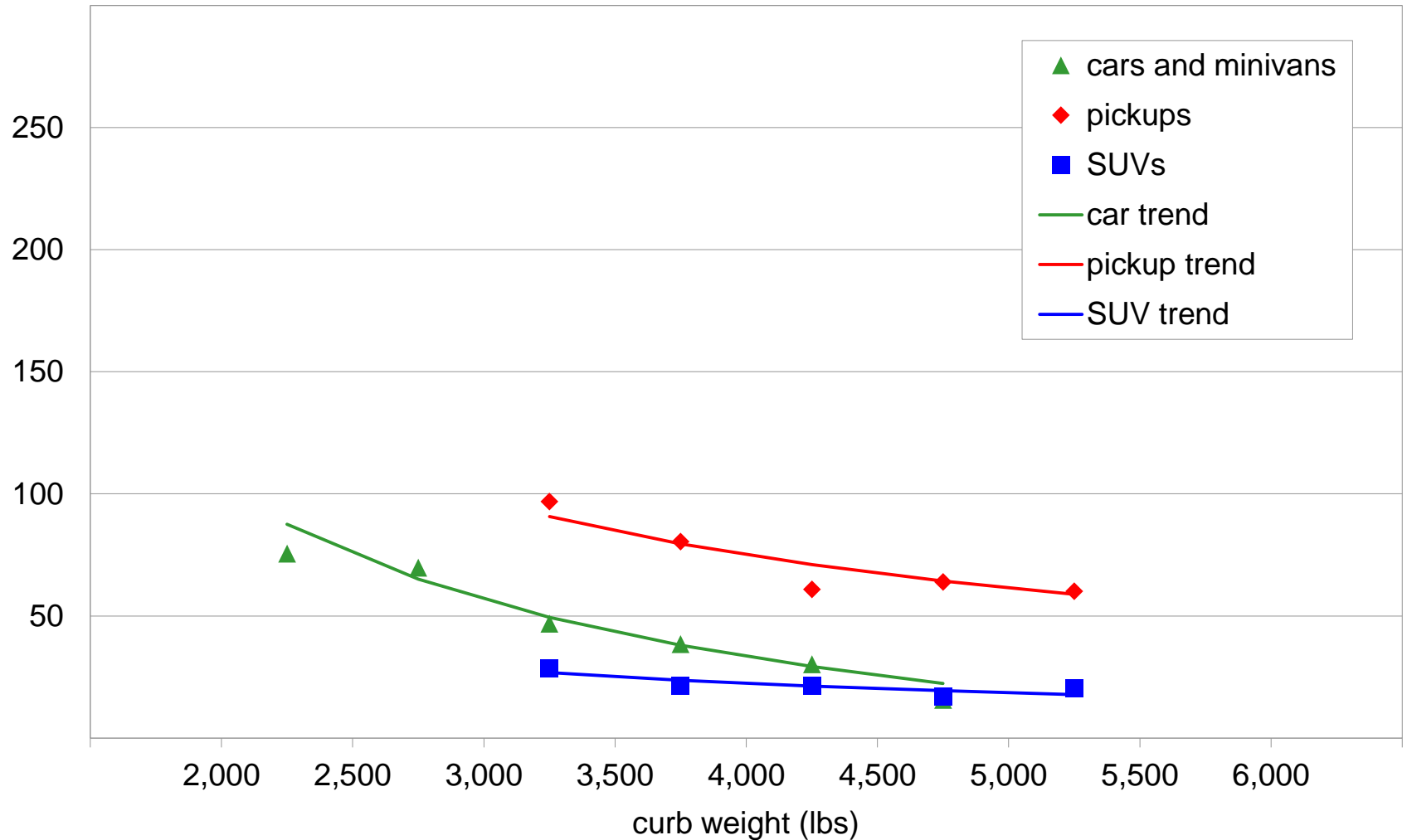
Driver fatality risk by vehicle weight 10 years ago

Deaths per million registration years, 1997-00 passenger vehicles during 1998-01



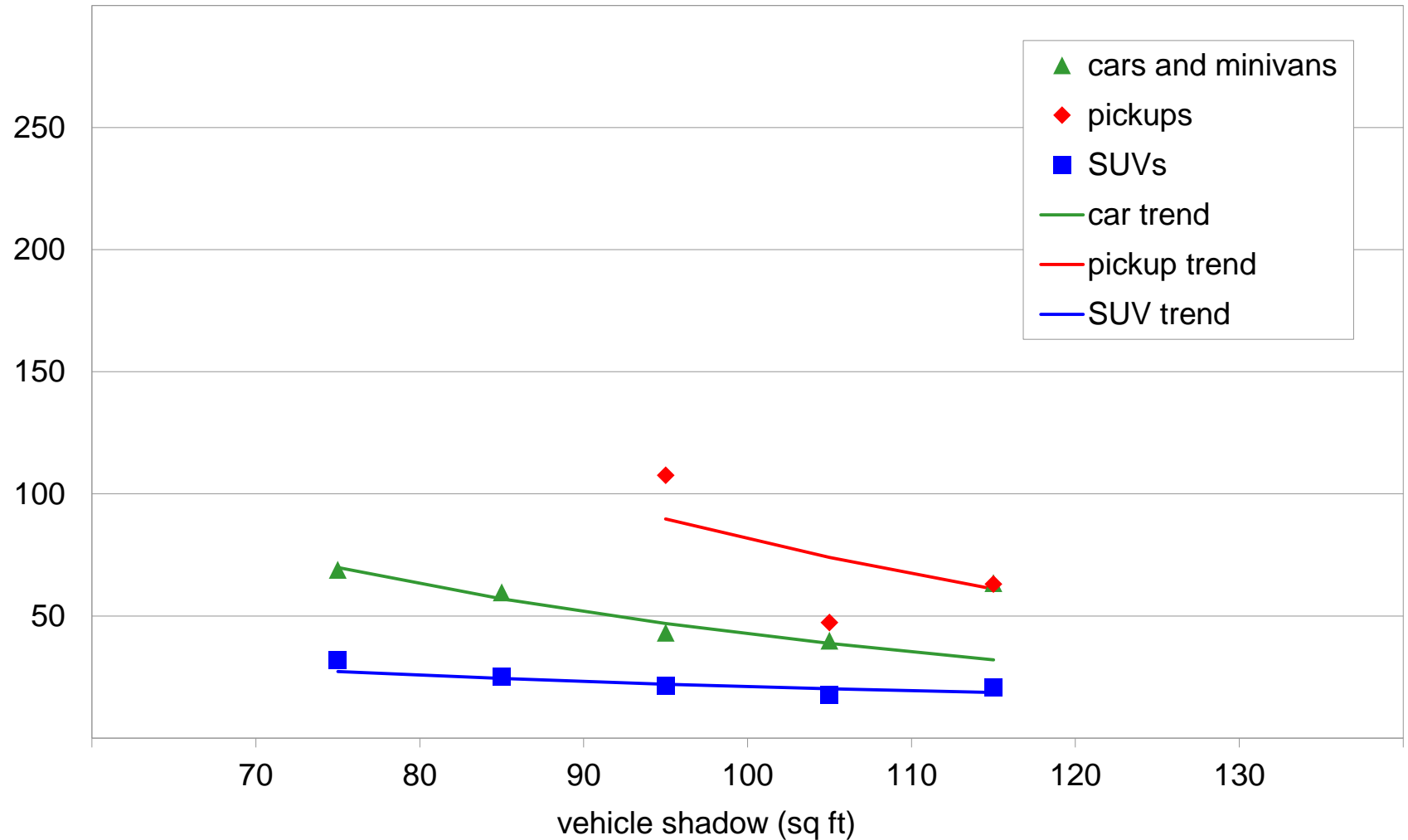
Driver fatality risk by vehicle weight today

Deaths per million registration years, 2007-10 passenger vehicles during 2008-11



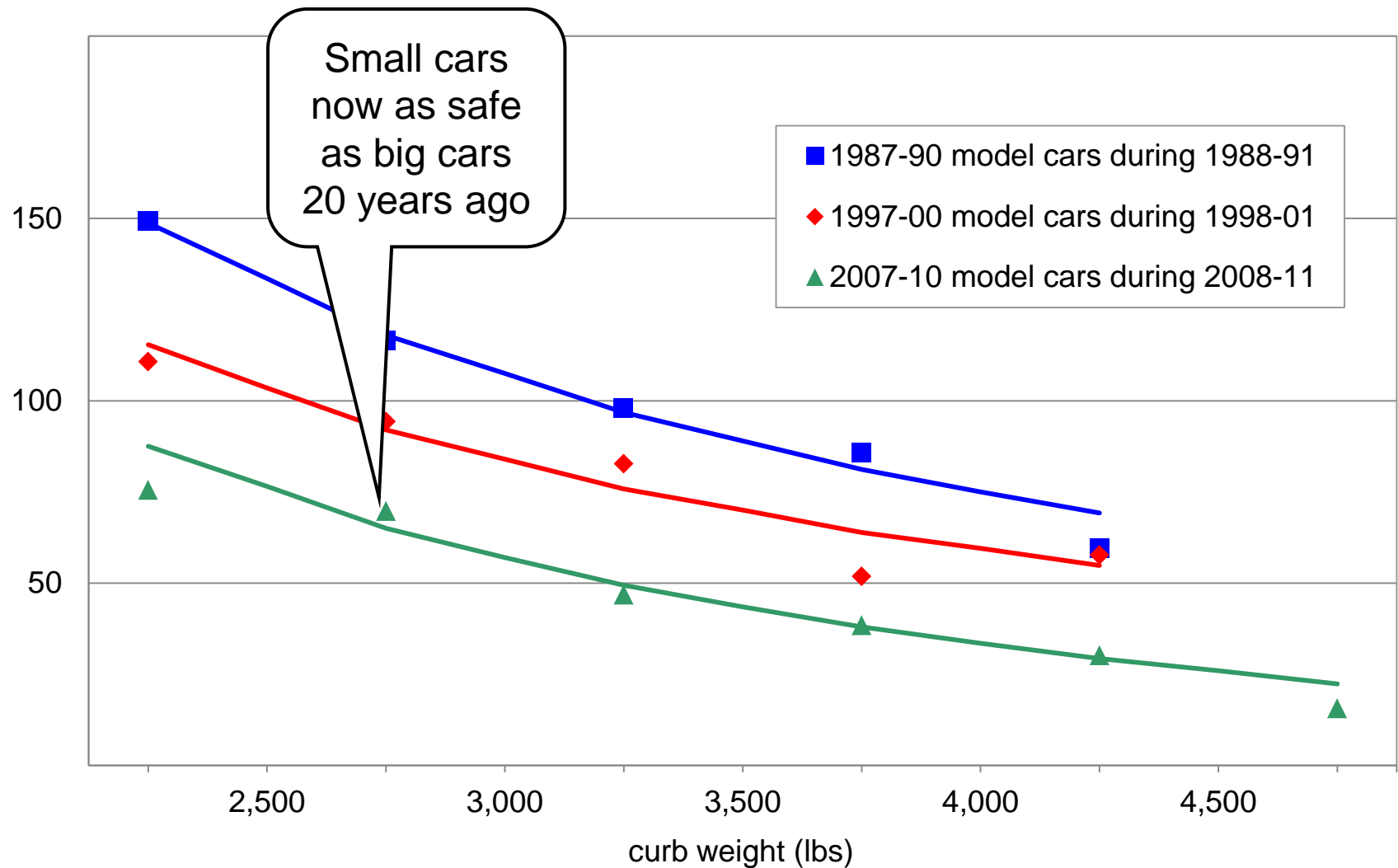
Driver fatality risk by vehicle size today

Deaths per million registration years, 2007-10 passenger vehicles during 2008-11



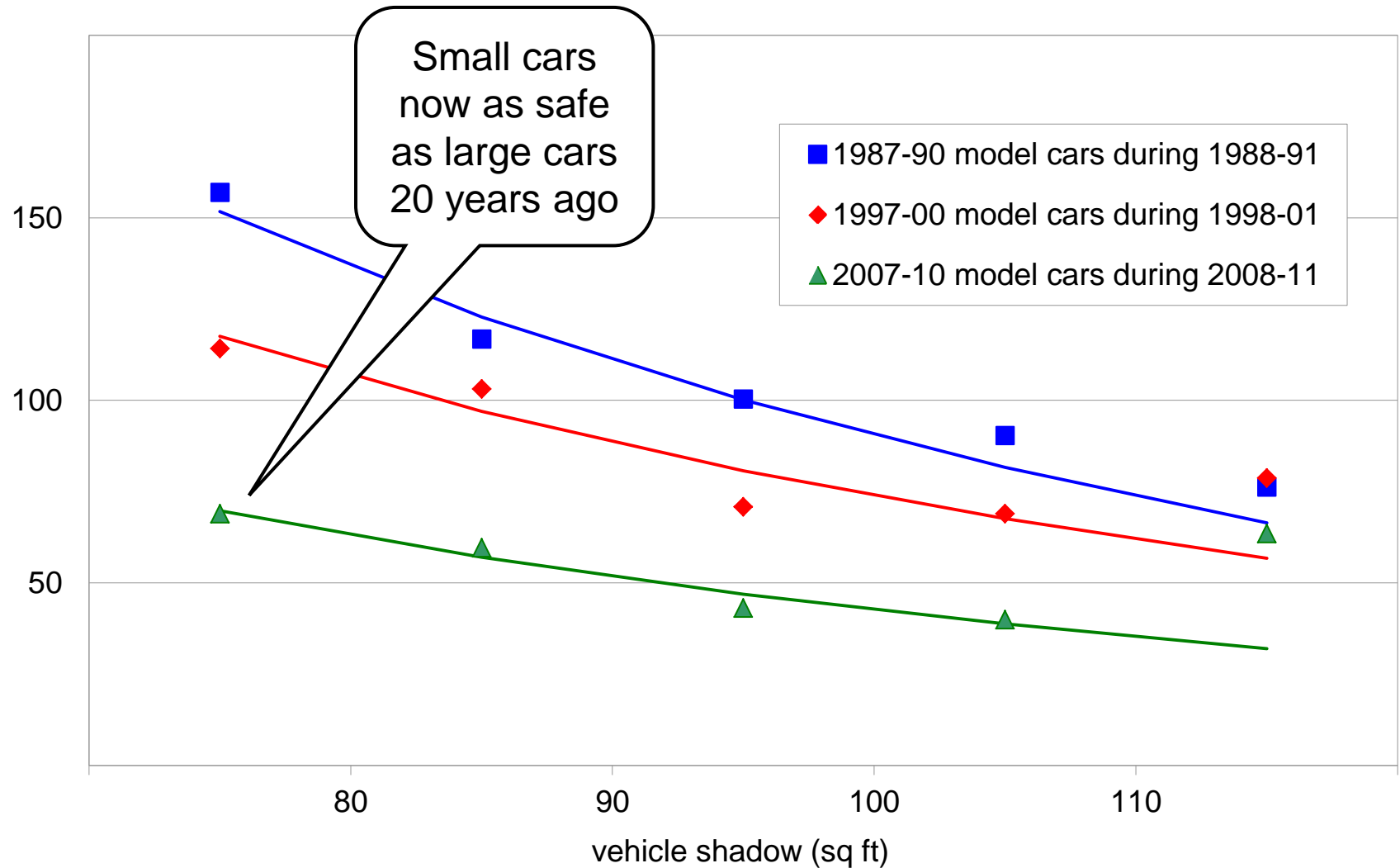
Changes in driver fatality risk of cars by weight

Deaths per million registration years



Changes in driver fatality risk of cars by size

Deaths per million registration years



Historical conclusions

- Passenger vehicles of all types and sizes provide their occupants with greater protection today than just a decade ago and much greater protection than two decades ago
- Occupants of the smallest and/or lightest vehicles still have higher death rates as occupants of the largest and/or heaviest vehicles
 - Some evidence the gap in death rates is narrowing



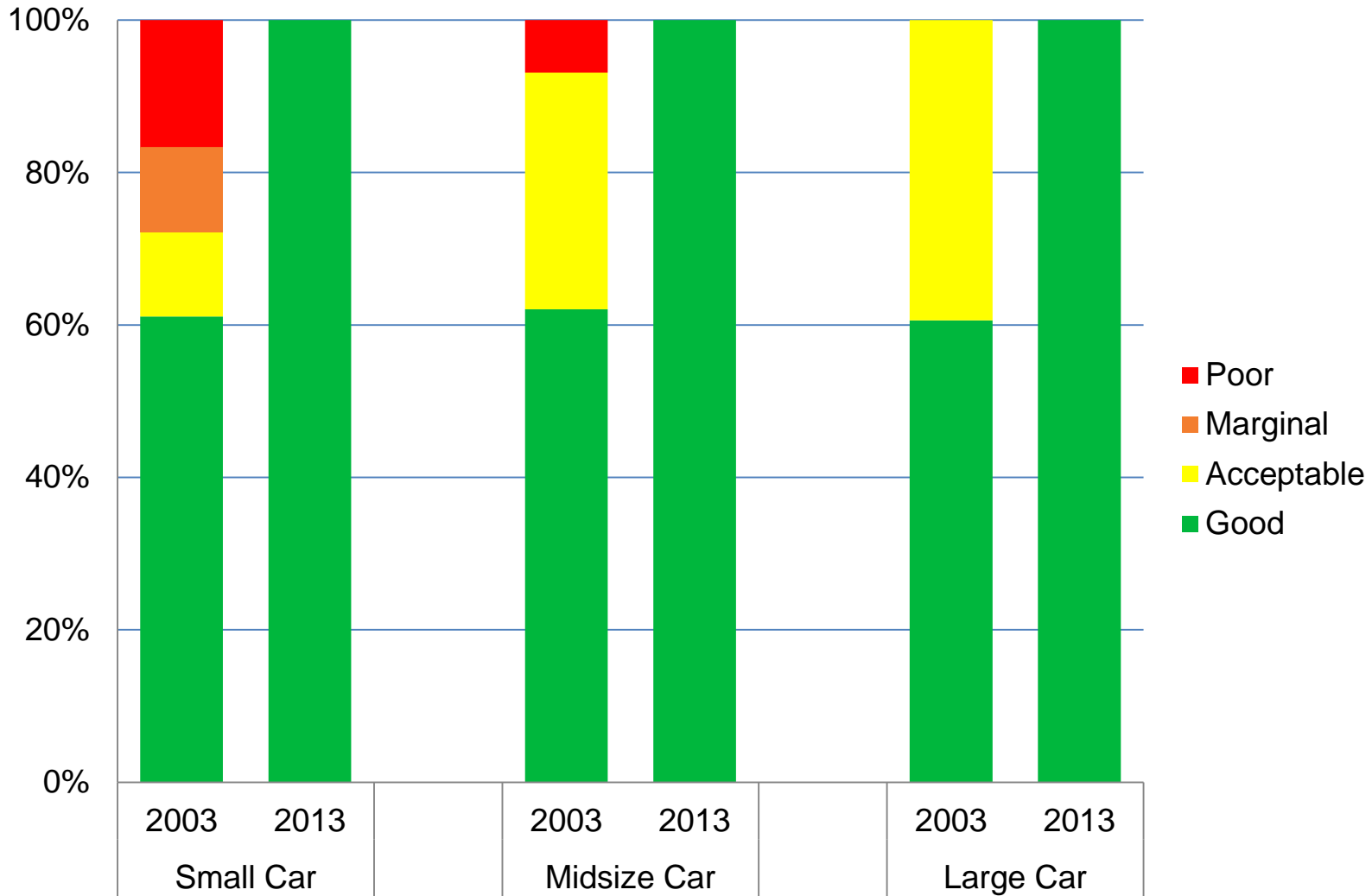
Countermeasures for improved occupant protection in a mixed-size fleet



Improved crashworthiness

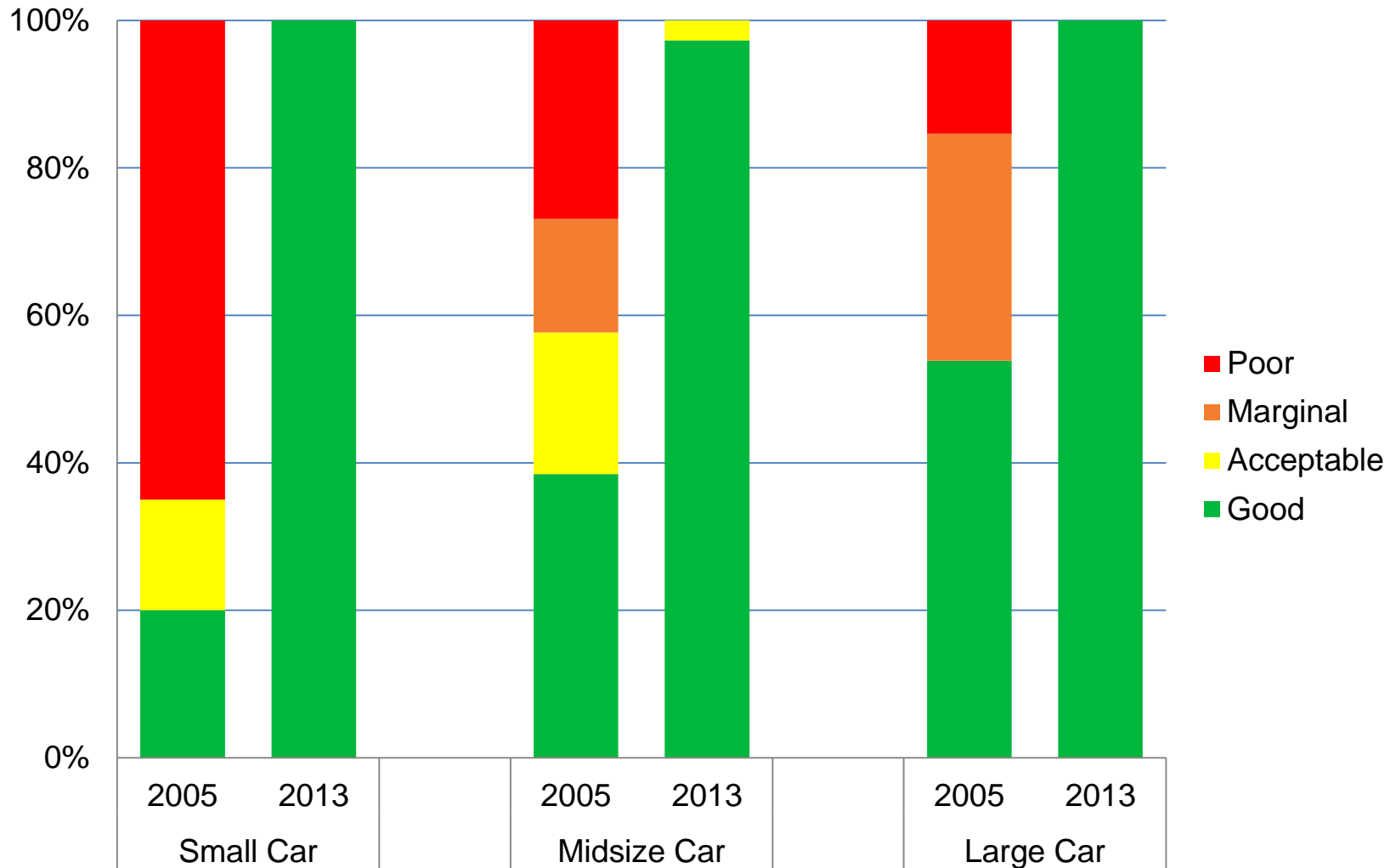
Ratings in IIHS moderate overlap crash test

By size, 2003 vs. 2013



Ratings in IIHS side impact

By size, 2005 vs. 2013



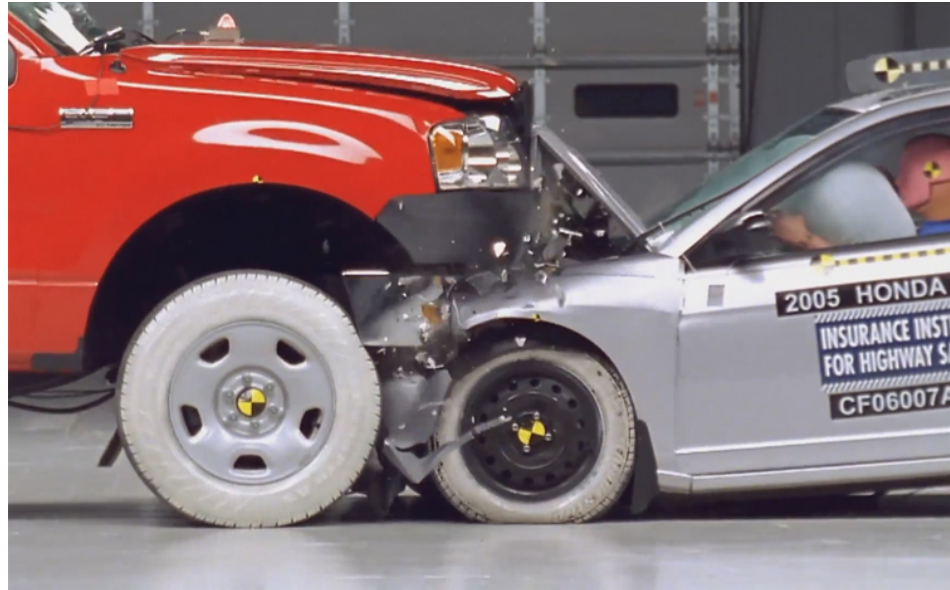


Improved compatibility

Enhancing vehicle compatibility (EVC) WG

Voluntary design guides to improve light truck compatibility

- Goal to improve car occupant safety in crashes with a light truck (SUV and pickups)

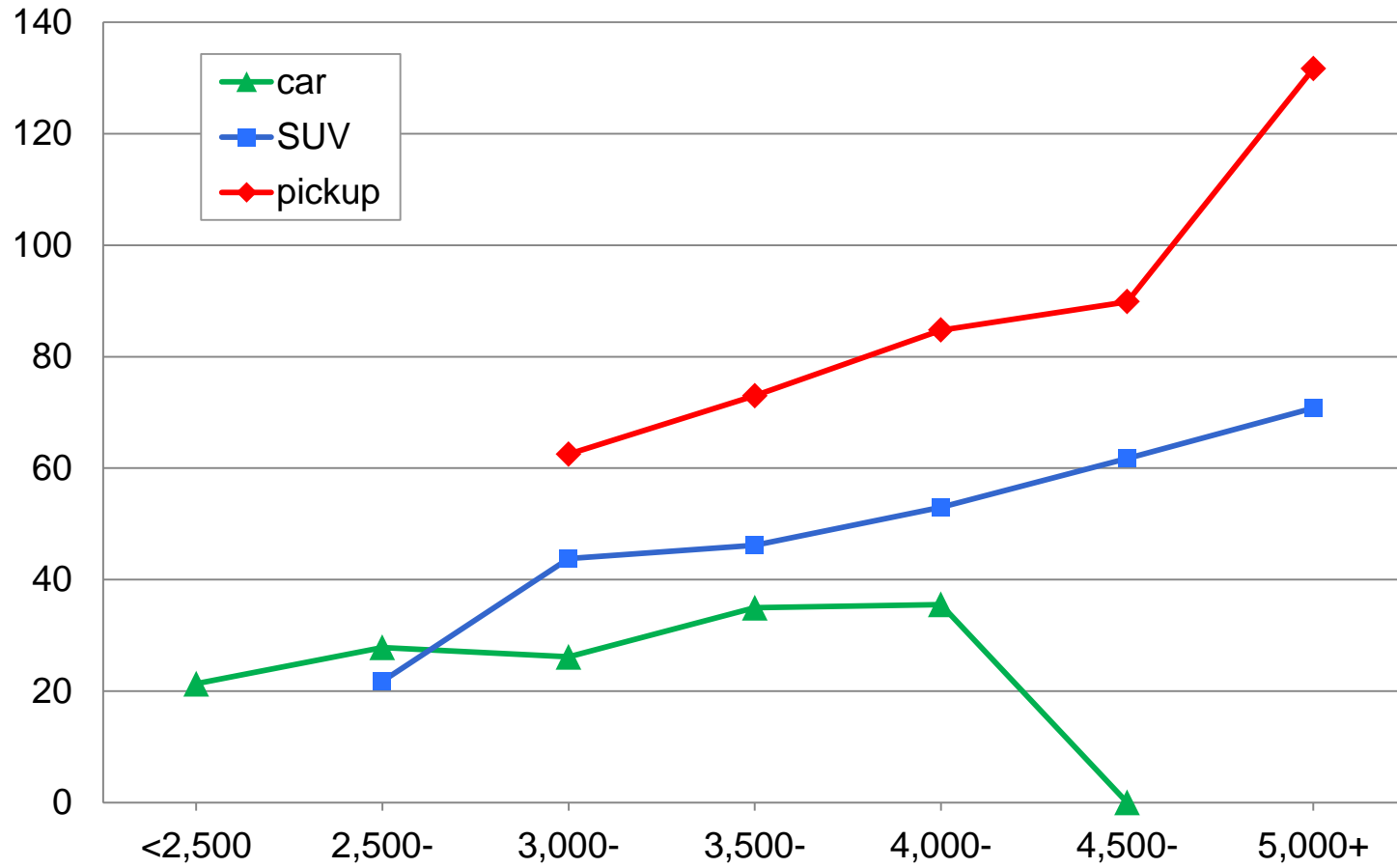


Agreement established:

- Height-matching of light truck structure with car front structure
- Expedited fitment of side airbags with head protection in cars
- Fully adopted by MY 2010 vehicles

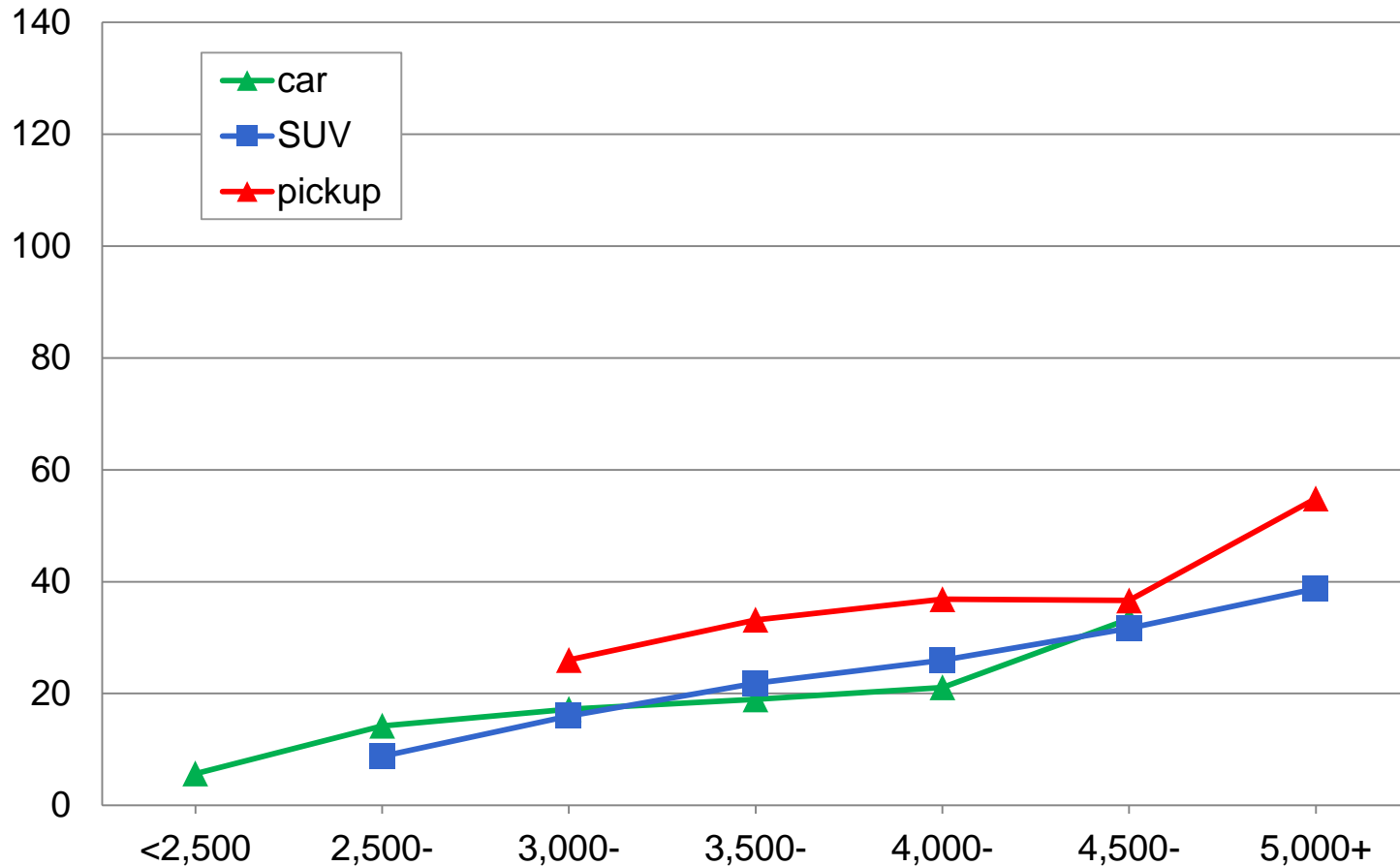
Partner protection

Car crash partner deaths per million registrations
1-4 year-old vehicles, 2000-01



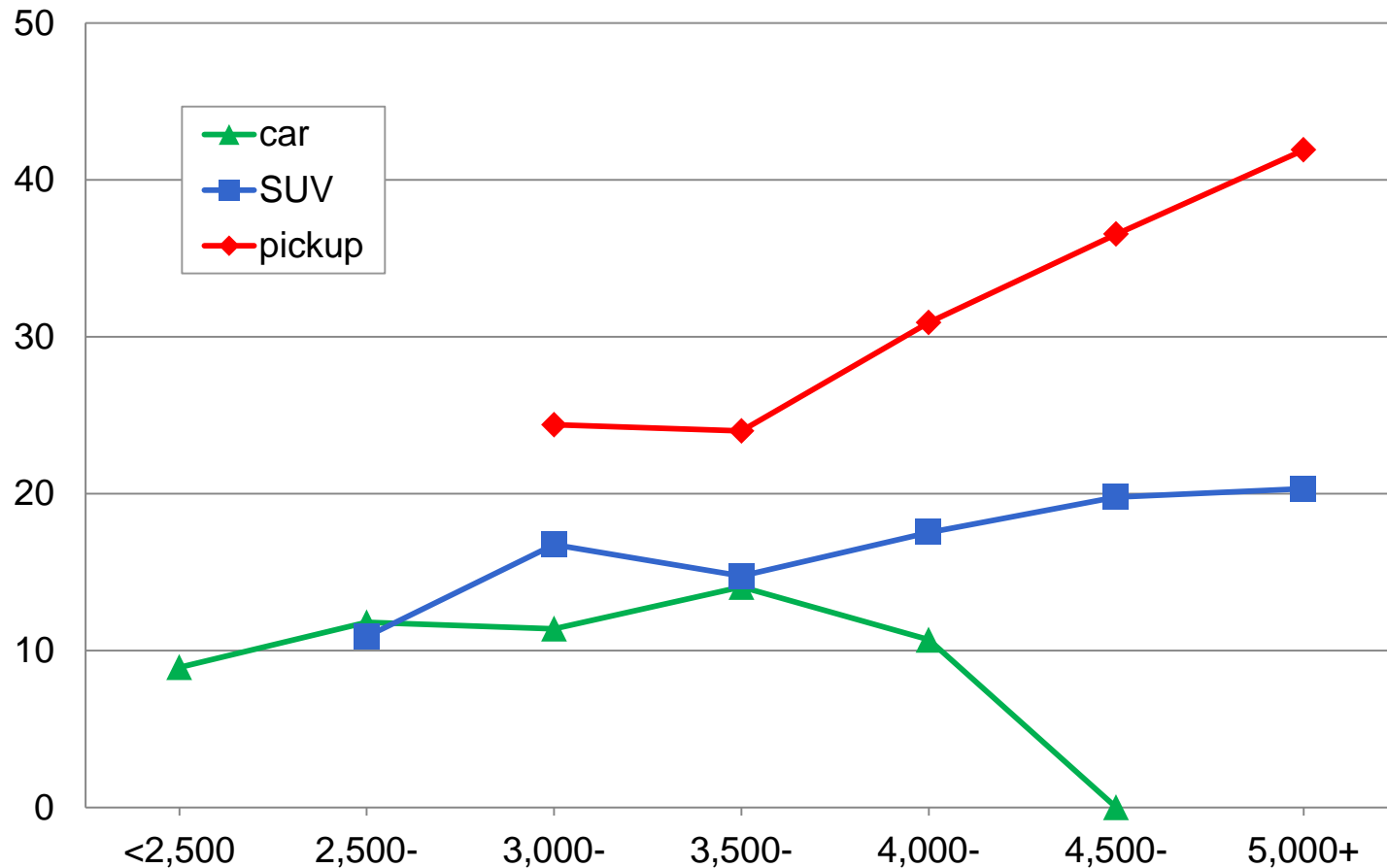
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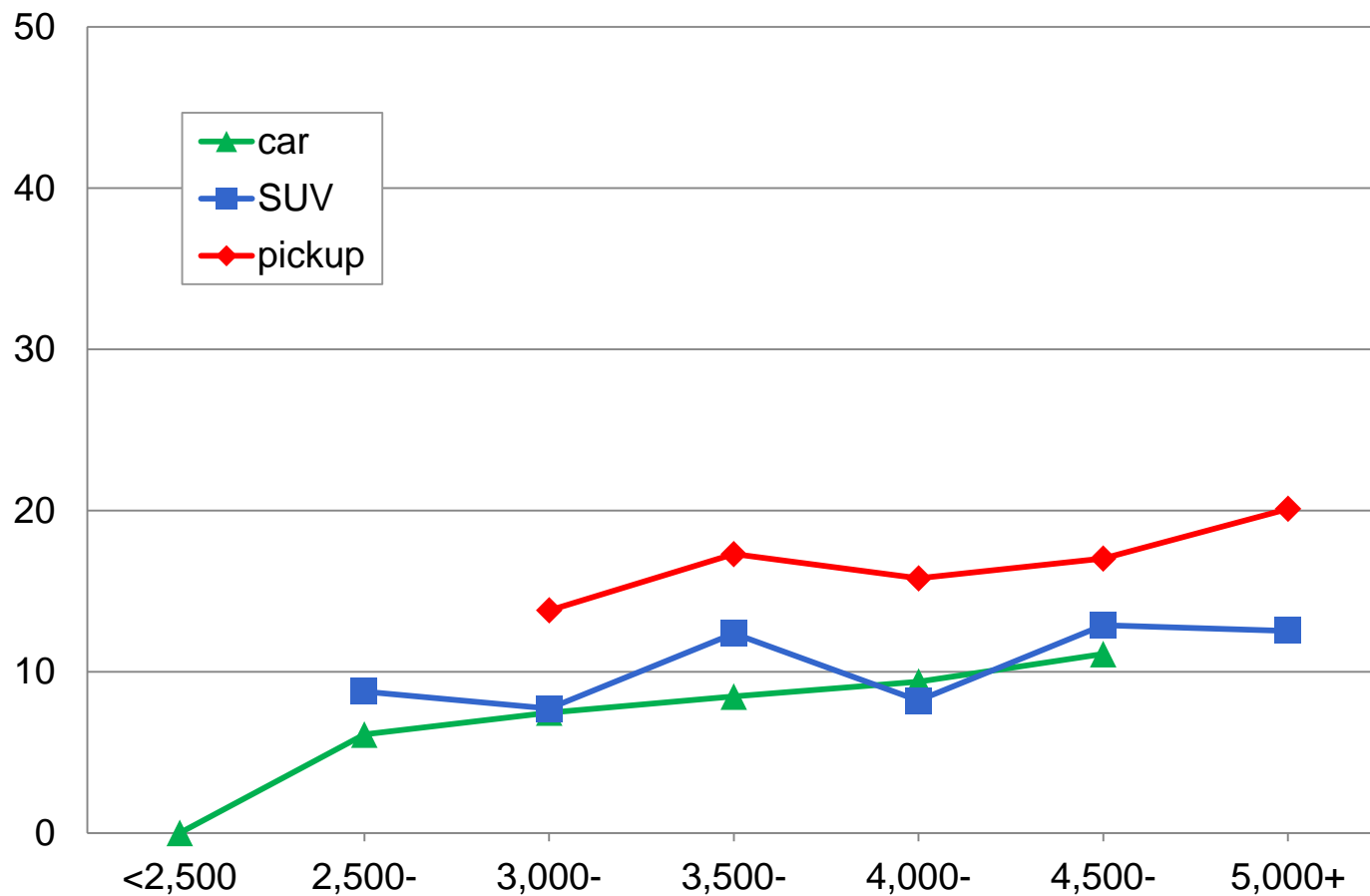
Partner protection in front-to-front crashes

Car crash partner deaths per million registrations
1-4 year-old vehicles, 2000-01



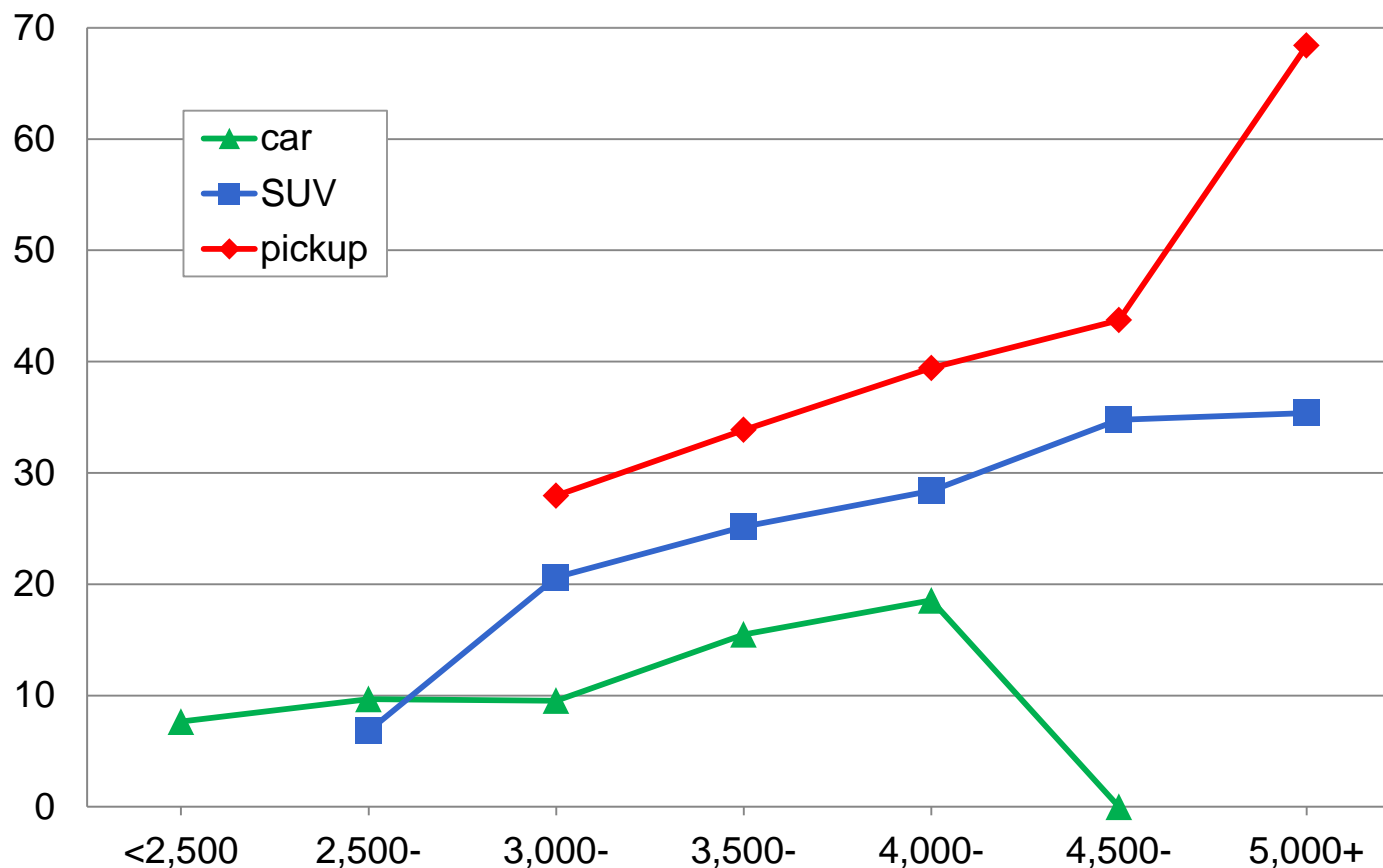
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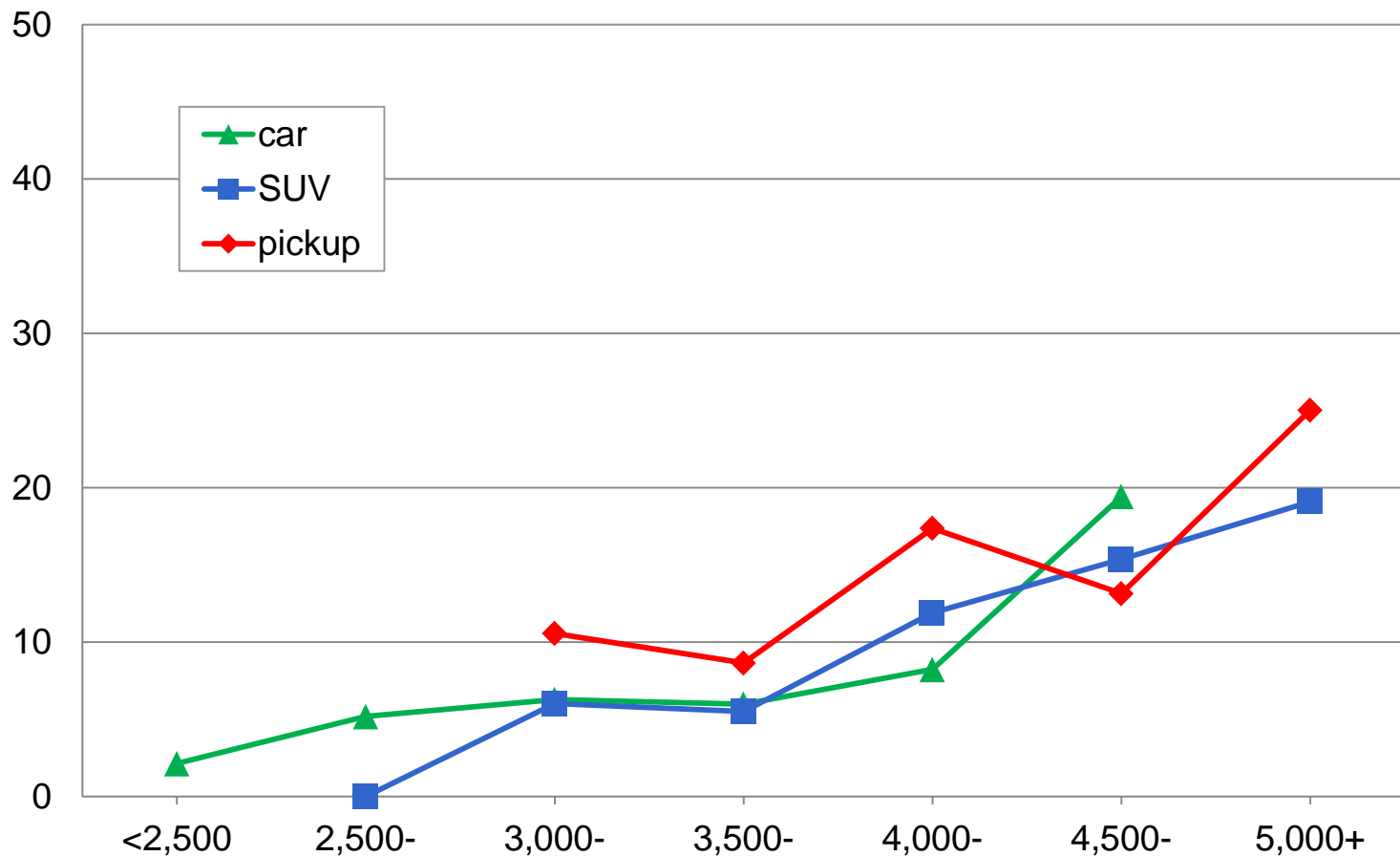
Partner protection in front-to-side crashes

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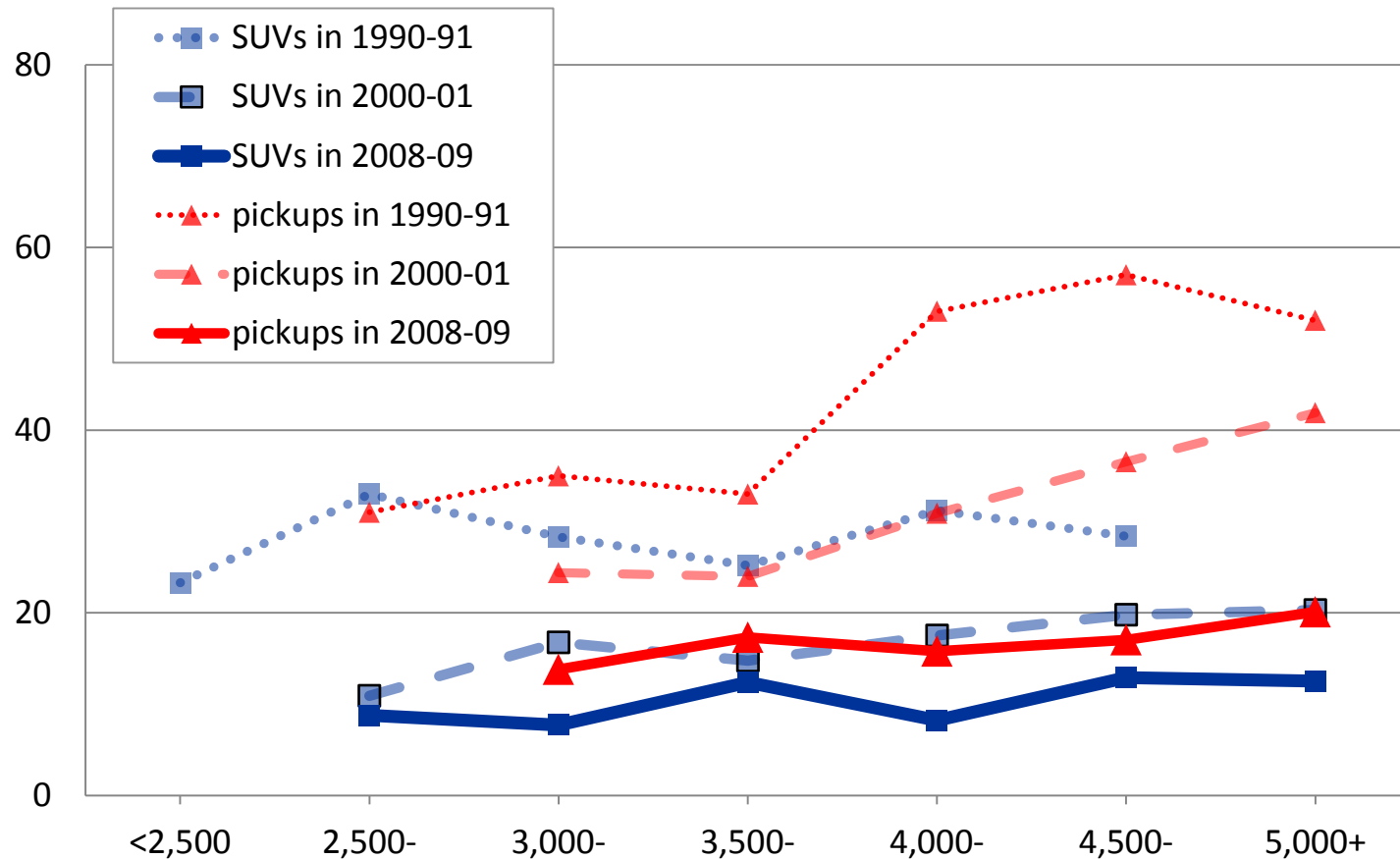
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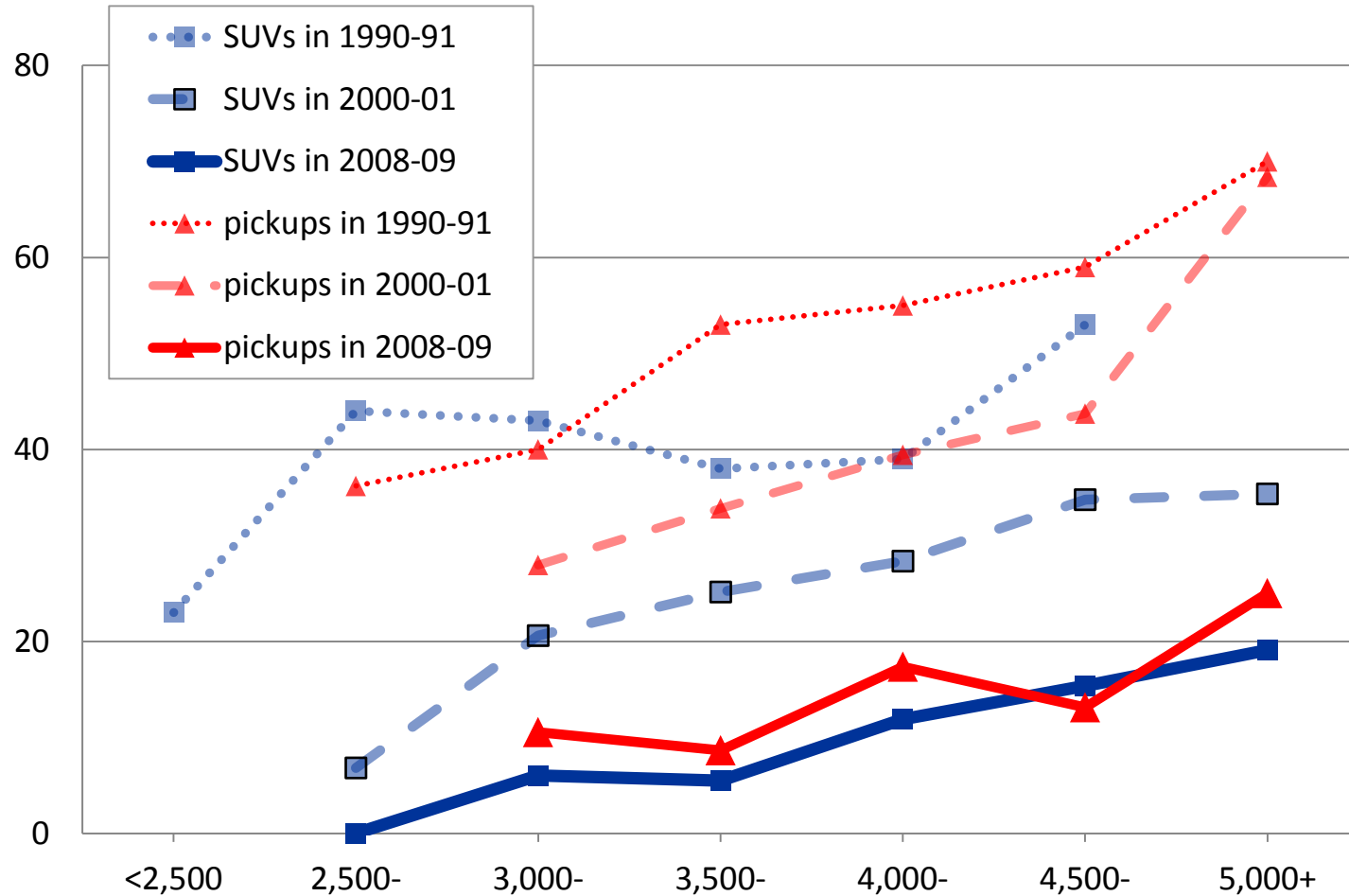
Partner protection in front-to-front crashes

Car crash partner deaths per million registrations
1-4 year-old SUVs and pickups



Partner protection in front-to-side crashes

Car crash partner deaths per million registrations
1-4 year-old SUVs and pickups

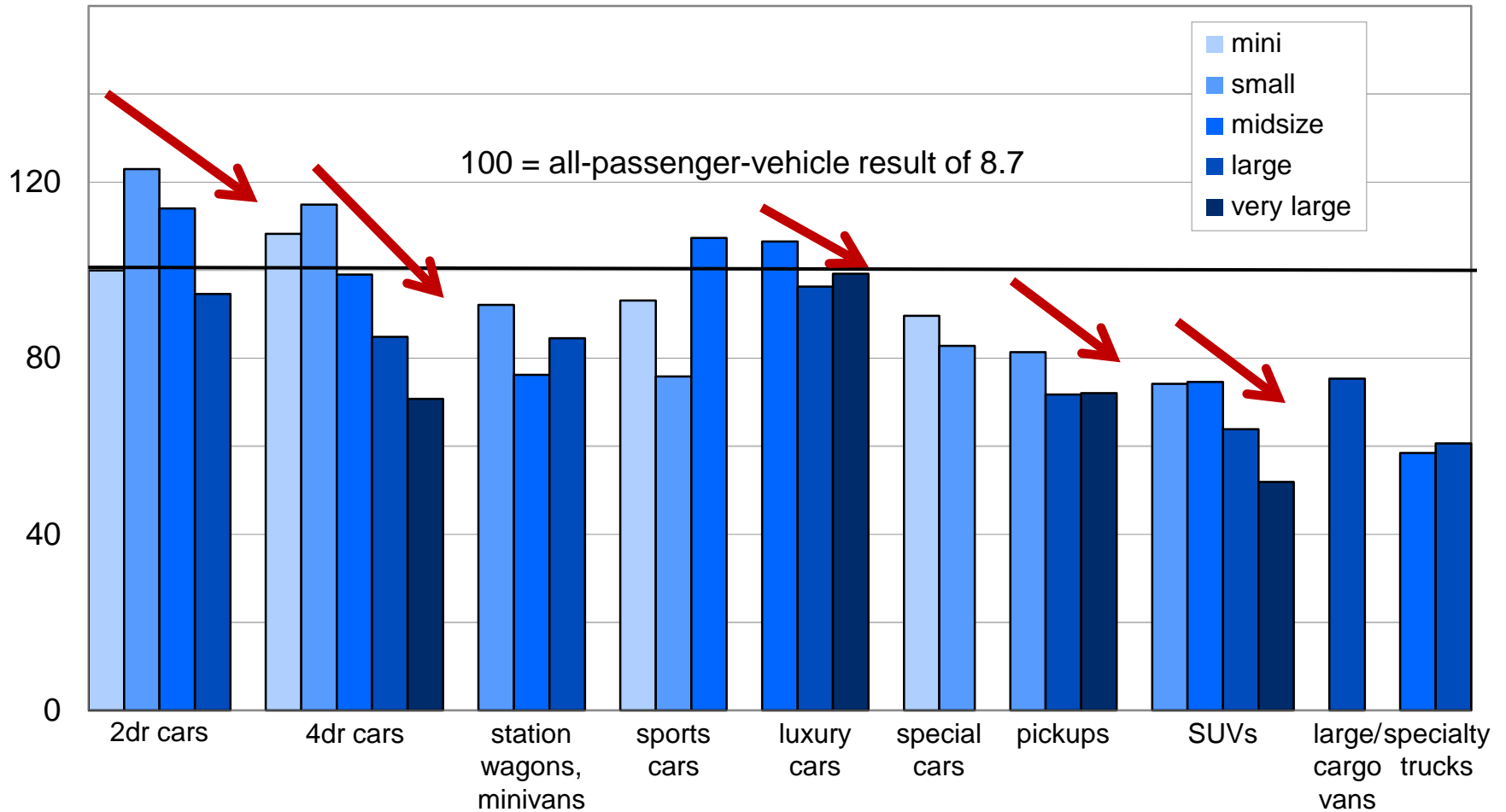




Insurance claims by size

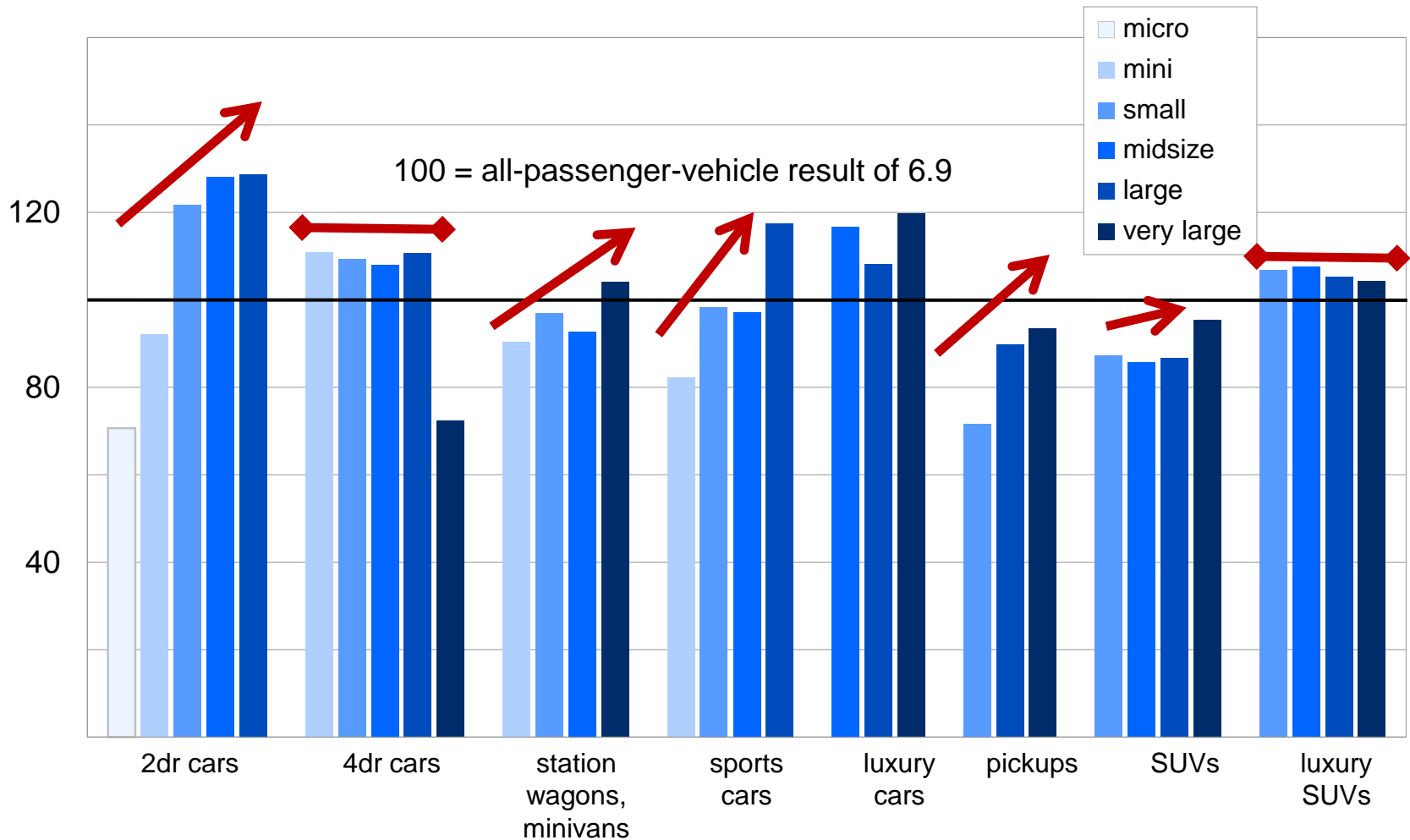
Relative collision claim frequencies

By body style and size class, 2000-02 models



Relative collision claim frequencies

By class and size, 2010-12 models



Why the change in collision trends by size?

- ESC
 - Is it possible that smaller wheelbase vehicles experience more benefit?
- Improvements in small vehicle handling?
- Changing demographics
 - Commuters downsizing vehicles?
- Economic factors
 - Less discretionary travel?
 - Censoring claims to avoid insurance penalty?

Summary of countermeasures that help equalize occupant safety in a mixed-size fleet

- Crashworthiness improvements, especially for smallest vehicles
 - Strong front, side, roof structures
 - Head-protecting side airbags with rollover deployment
- Better light truck compatibility with cars
 - Lowering light truck structure to car levels
- Electronic stability control
- Continued improvement in belt use rates

Thoughts for the future

- Disparate size & weight vehicles will always exist in the fleet
- Smaller and lighter vehicles will always have some disadvantage

BUT,

- Advanced structural engineering and technology innovations have improved the fleet compatibility and occupant protection across all vehicle sizes
- Advanced crash avoidance and mitigation will help, especially if fitted to the most vulnerable vehicles
 - Counter to industry trend of fitting expensive technologies to larger (and more expensive) vehicles first



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