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Fatalities and Serious Injuries in Side Impact Crashes by Age

Victoria, Australia, 2000-2009

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Acknowledgement

- Elizabeth Hovenden – VicRoads
 - For extracting fatality and serious injury side impact data by age from the VicRoads CrashStats database.

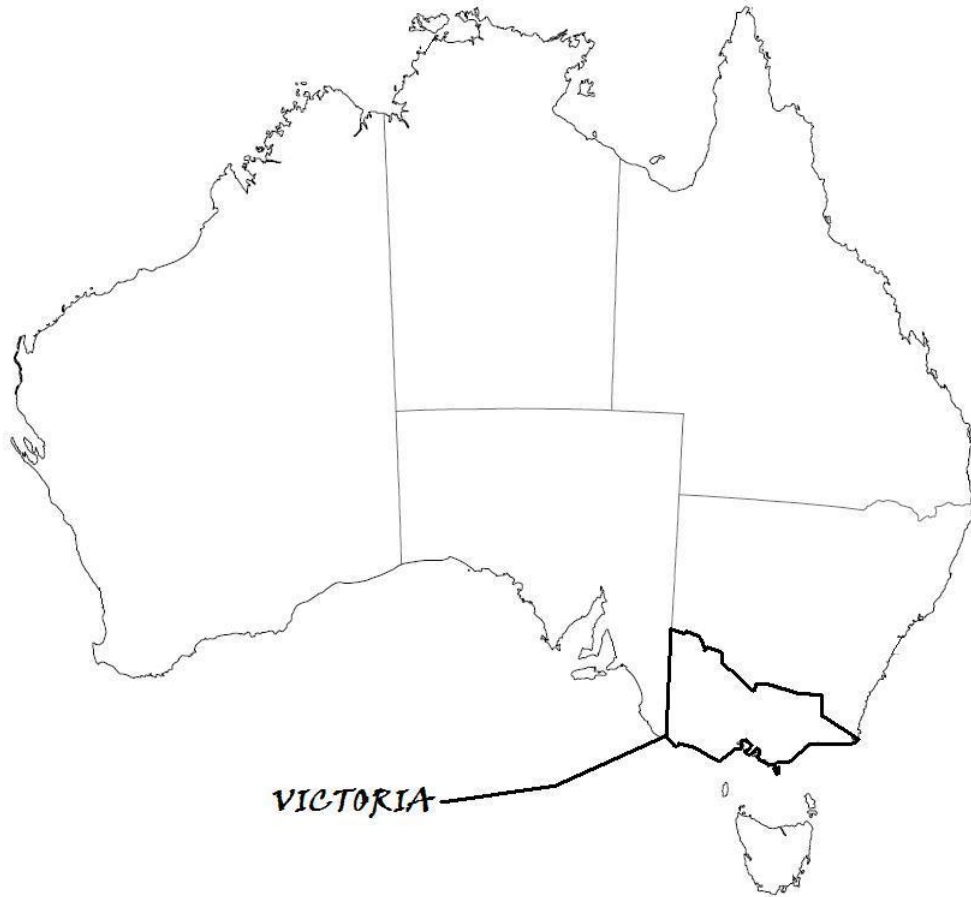


Background

- Dummy injury risk curves are constructed to represent the injury risk of an occupant of a particular age.
- Typically regulatory side impact standards (e.g. FMVSS 214 and UNECE R95) have used 45 years.
- Injury risk increases with age (for example rib fractures occur more easily).
- Increasing the age used for injury risk curves used to determine injury criteria limits in a regulation would be expected to increase both benefits and costs.
- Field crash data by age (if and where available) can be used to determine the most appropriate age for which the injury criteria limits used in regulation should be derived.



Pole Side Impact and Other Side Impact Fatality and Serious Injury Data by Age



Pole Side Impact and Other Side Impact data for all 4-wheel vehicles disaggregated by age for state of Victoria.

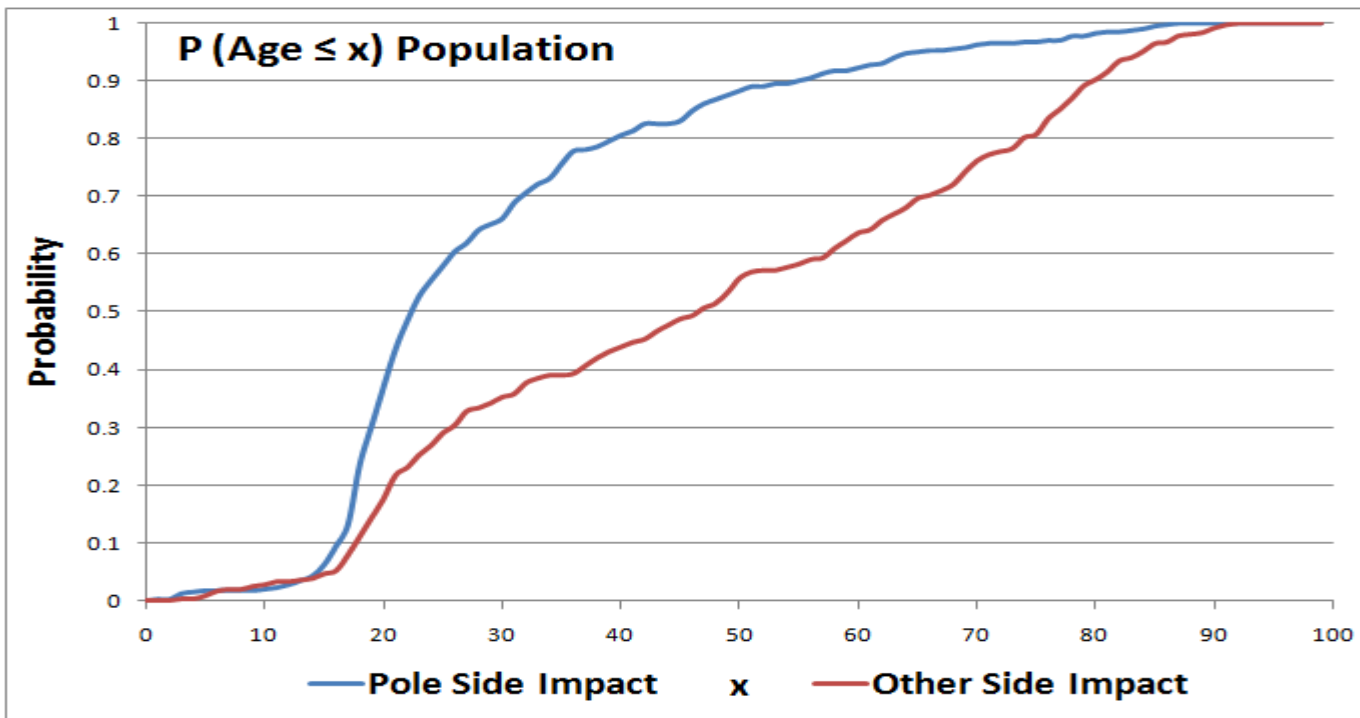
Serious Injury Definition: *Taken to hospital and admitted or taken to hospital and admission status unknown.*



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Cumulative Distribution: Fatalities (2000-2009)



Mean age: 29 years (pole side impact); 47 years (other side impact)

P (Age ≤ 45): 0.83 (pole side impact); 0.49 (other side impact)

P (Age ≤ 55): 0.90 (pole side impact); 0.58 (other side impact)

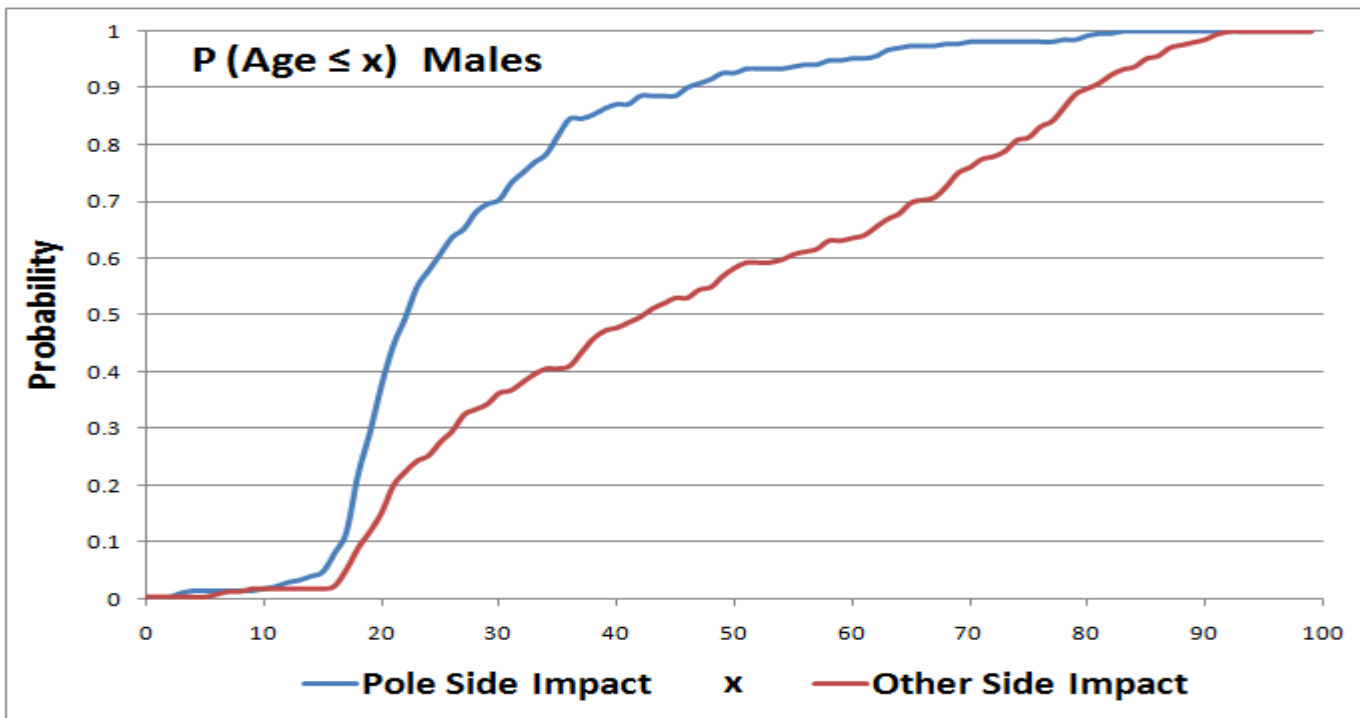
P (Age ≤ x) ≥ 0.90 is not reached until age 80 for other side impacts



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Cumulative Distribution: Fatalities (2000-2009)



Mean age: 27 years (pole side impact); 47 years (other side impact)

$P(\text{Age} \leq 45)$: 0.89 (pole side impact); 0.53 (other side impact)

$P(\text{Age} \leq 55)$: 0.94 (pole side impact); 0.61 (other side impact)

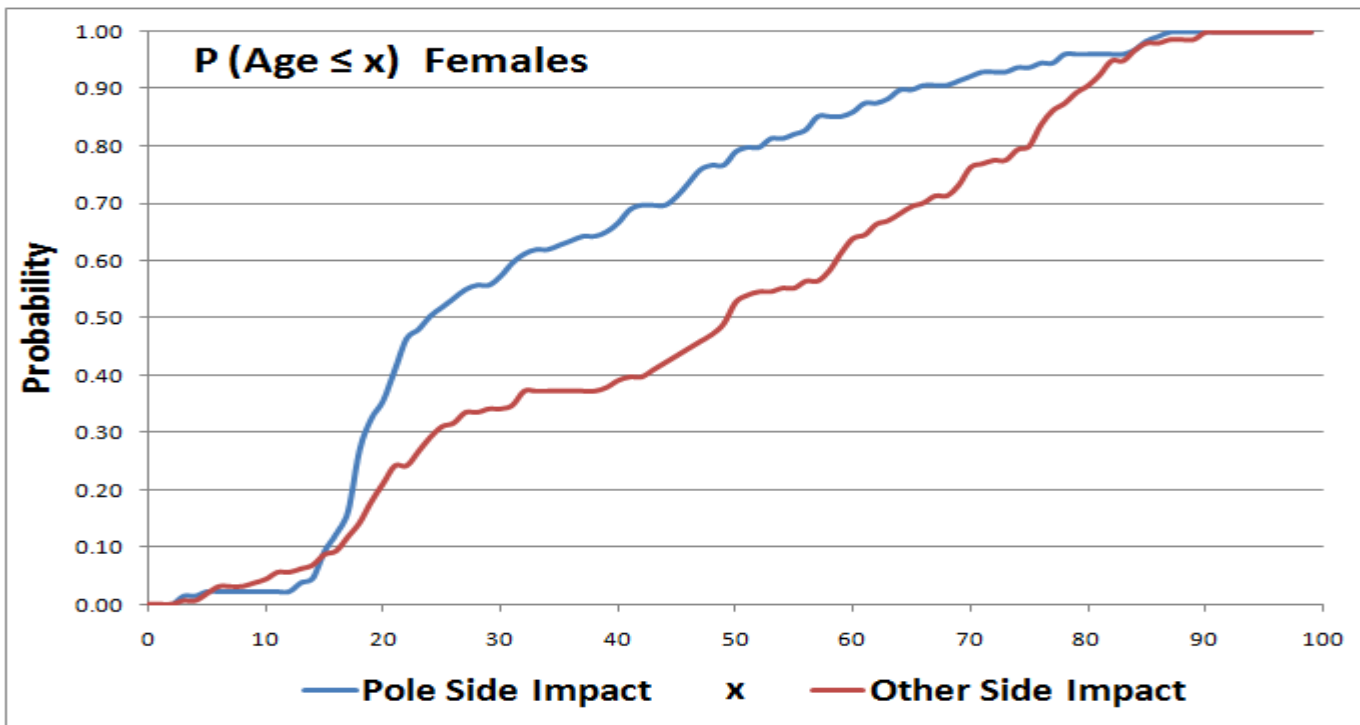
$P(\text{Age} \leq x) \geq 0.90$ occurs at age 80 for other side impacts



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Cumulative Distribution: Fatalities (2000-2009)



Mean age: 34 years (pole side impact); 47 years (other side impact)

P (Age ≤ 45): 0.71 (pole side impact); 0.43 (other side impact)

P (Age ≤ 55): 0.82 (pole side impact); 0.55 (other side impact)

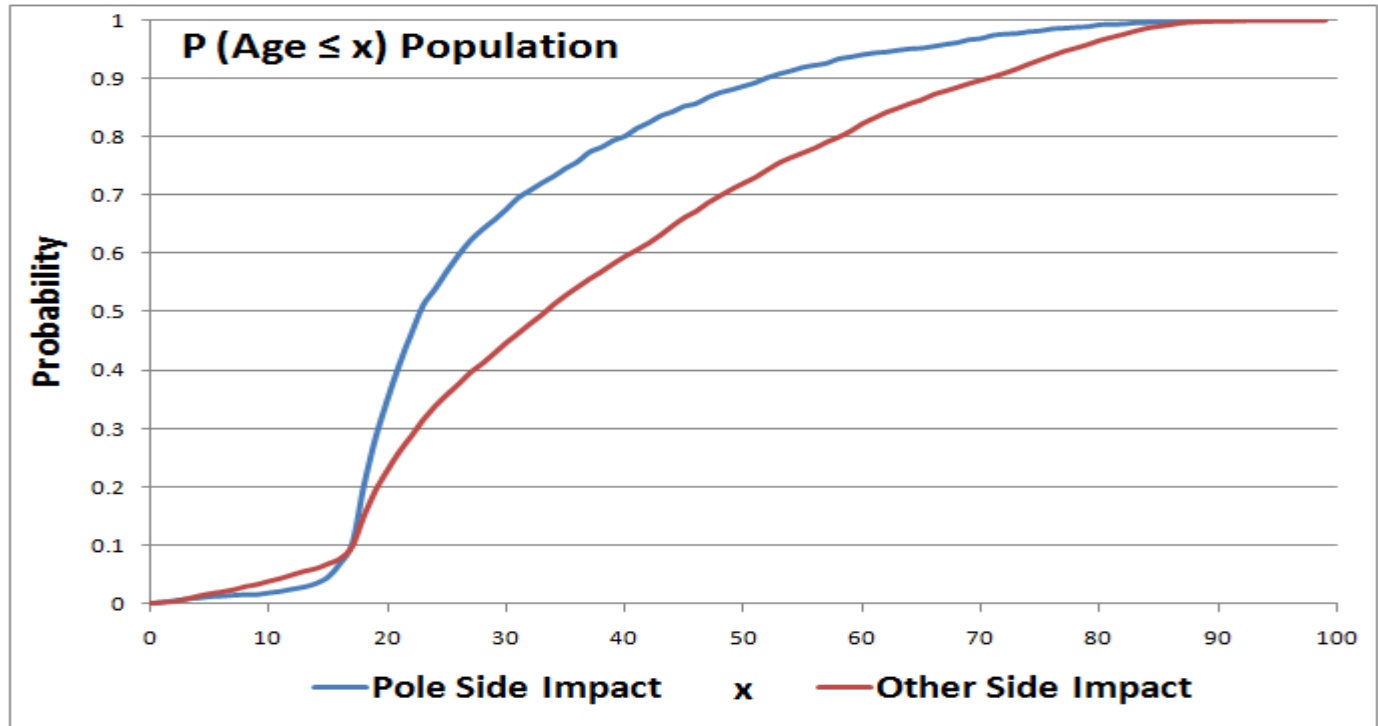
P (Age ≤ x) ≥ 0.90 occurs at age 79 for other side impacts



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Cumulative Distribution: Serious Injuries (2000-2009)



Mean age: 29 years (pole side impact); 38 years (other side impact)

P (Age ≤ 45): 0.85 (pole side impact); 0.66 (other side impact)

P (Age ≤ 55): 0.92 (pole side impact); 0.77 (other side impact)

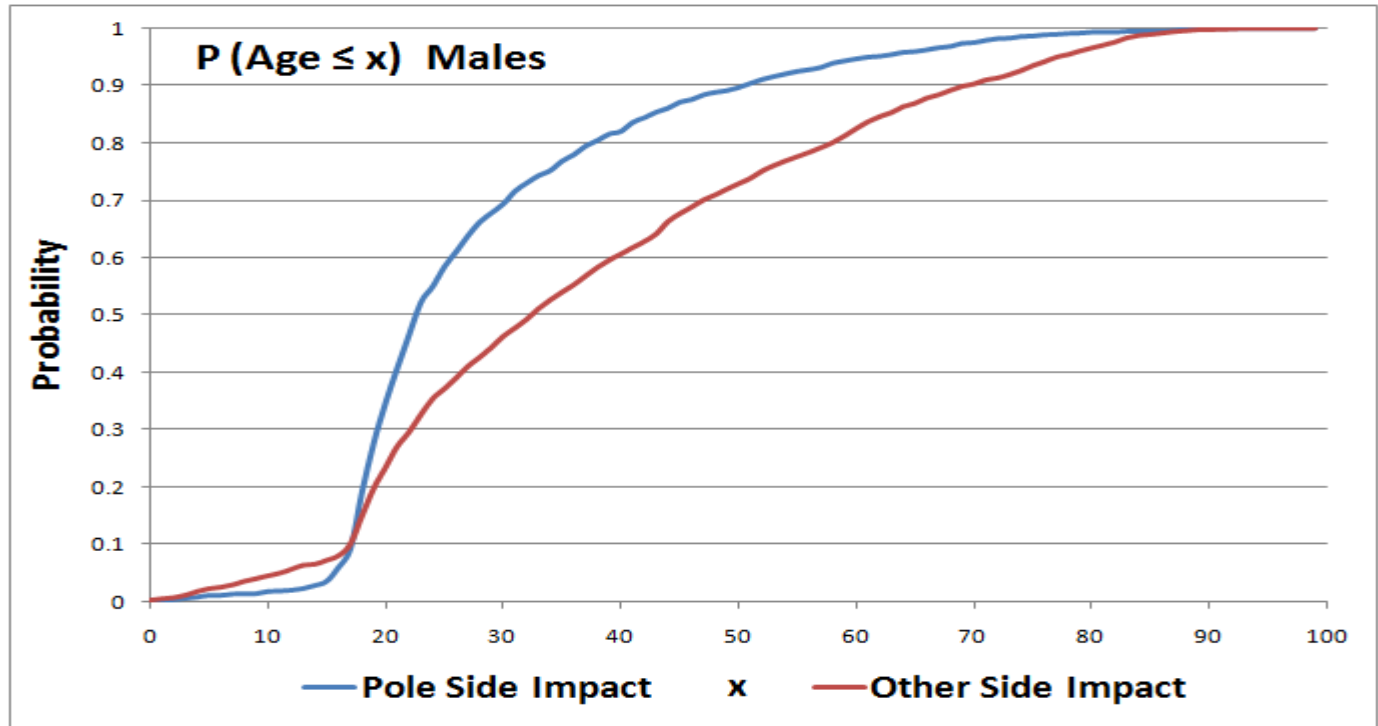
P (Age ≤ x) ≥ 0.90 occurs at age 71 for other side impacts



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Cumulative Distribution: Serious Injuries (2000-2009)



Mean age: 28 years (pole side impact); 37 years (other side impact)

$P(\text{Age} \leq 45)$: 0.87 (pole side impact); 0.68 (other side impact)

$P(\text{Age} \leq 55)$: 0.93 (pole side impact); 0.78 (other side impact)

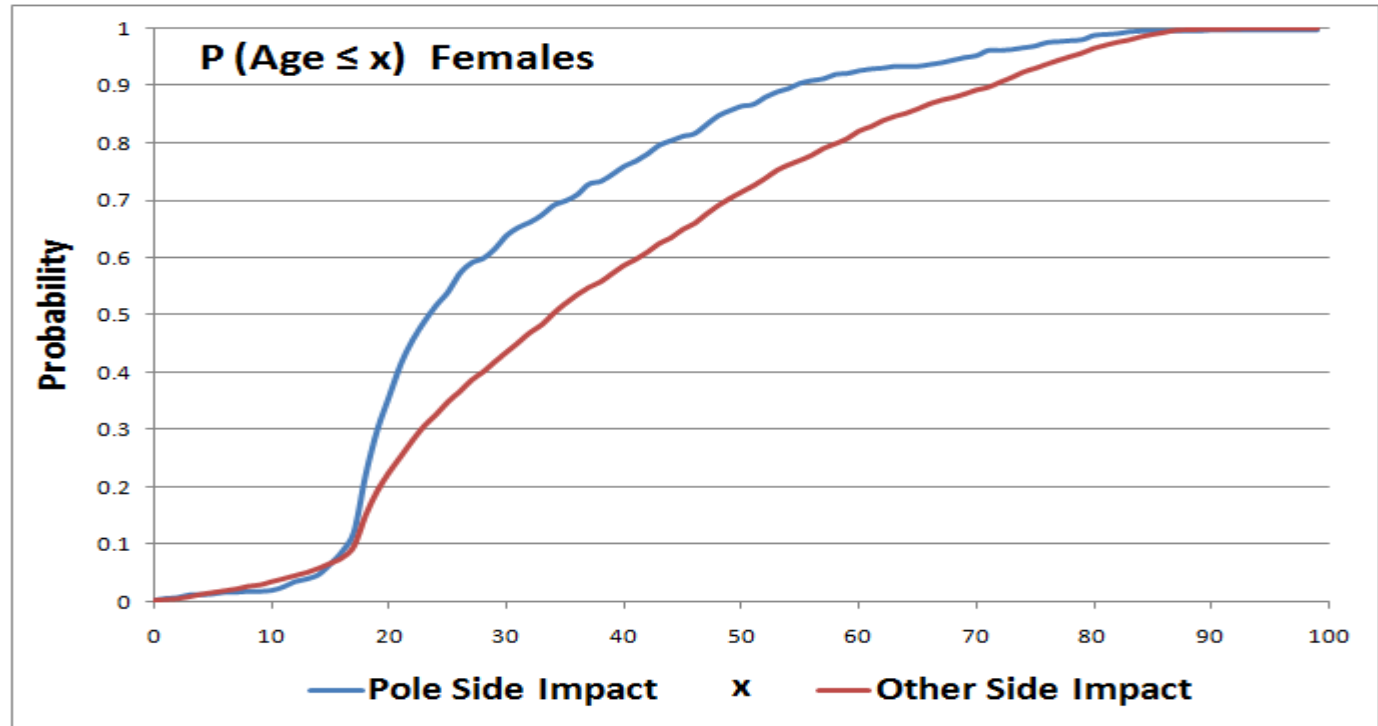
$P(\text{Age} \leq x) \geq 0.90$ occurs at age 70 for other side impacts



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Cumulative Distribution: Serious Injuries (2000-2009)



Mean age: 30 years (pole side impact); 38 years (other side impact)

P (Age ≤ 45): 0.81 (pole side impact); 0.65 (other side impact)

P (Age ≤ 55): 0.91 (pole side impact); 0.77 (other side impact)

P (Age ≤ x) ≥ 0.90 occurs at age 72 for other side impacts



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Conclusion

- The target crash population should be taken into account for age scaling of injury risk curves for the setting of injury criteria limits.
- Differences between fatal and serious injury age distribution functions show evidence of increased likelihood of fatality for older occupants.
- Recommended IARVs for a pole impact standard do not necessarily need to be the same as for vehicle-to-vehicle type tests.
- While the use of 45 year tolerances may be appropriate for a pole test, the value should potentially be reviewed for a barrier test.



Thank you



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