



Mandatory Retesting of Drivers

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Introduction

- The demographic profile of drivers in many countries are changing as the baby boomer generation matures.
- Older drivers on the roads have generated much concern among some road safety researchers and policy makers.
- Major concerns: Anticipated decrease in driving ability.
- Extensive research have been conducted on the relative performance of older drivers and on their crash risks relative other age groups.
- Antsey et al (2005) provides a good summary of the major findings in the research literature.



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Ageing Driver Performance

- **Selective attention** is found to be correlated with crashes but the correlation is only 0.03, which implied that these abilities were able to explain less than **0.1%** of the variations in crash risks.
- **Divided attention** is also found to be correlated with crashes but the correlation is only 0.14, which implied that these abilities were able to explain less than **2%** of the variations in crash risks.
- **Visual attention** is found to be correlated with crashes. The highest correlation (0.32) is for the useful field of view. UFOV is able to explain about **10.2%** of the variations in crash risks.
- **Movement Perception Test:** correlation is only 0.26, which implied that these ability were able to explain less than **7%** of the variations in crash risks.



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Ageing Driver Performance

- **Mental flexibility – Incompatibility Test:** correlation is only 0.14, which implied that these abilities were able to explain less than **2%** of the variations in crash risks.
- **Visual-spatial Test – Paper Folding Test:** correlation is only 0.33, which implied that these abilities were able to explain less than **11%** of the variations in crash risks.
- **Reaction Time:** correlation is only 0.25, which implied that these abilities were able to explain about **6.25%** of the variations in crash risks.
- **Visual Memory – Wechsler Test:** correlation is much higher at 0.5, which implied that these abilities were able to explain about **25%** of the variations in crash risks.
- **Traffic Sign Recognition Test:** correlation is much higher at 0.65, which implied that these abilities were able to explain about **42%** of the variations in crash risks.



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Ageing Driver Performance

- **Mental Status – MMSE:** Results very mixed from not important at all to correlation of 0.72, which implied that these abilities were able to explain **0%-52%** of the variations in crash risks.
- **Mental Status – MMSE:** Results very mixed from not important at all to correlation of 0.34, which implied that these abilities were able to explain **0%-11.5%** of the variations in crash risks.
- **Overall, the results are not encouraging for the various driver performance tests.**
- **They do fairly well in predicting test scores on driving simulator or even on-road test driving test but only low-moderate in predicting crashes.**
- **Driver Performance \neq Driver Behavior \neq Safety**

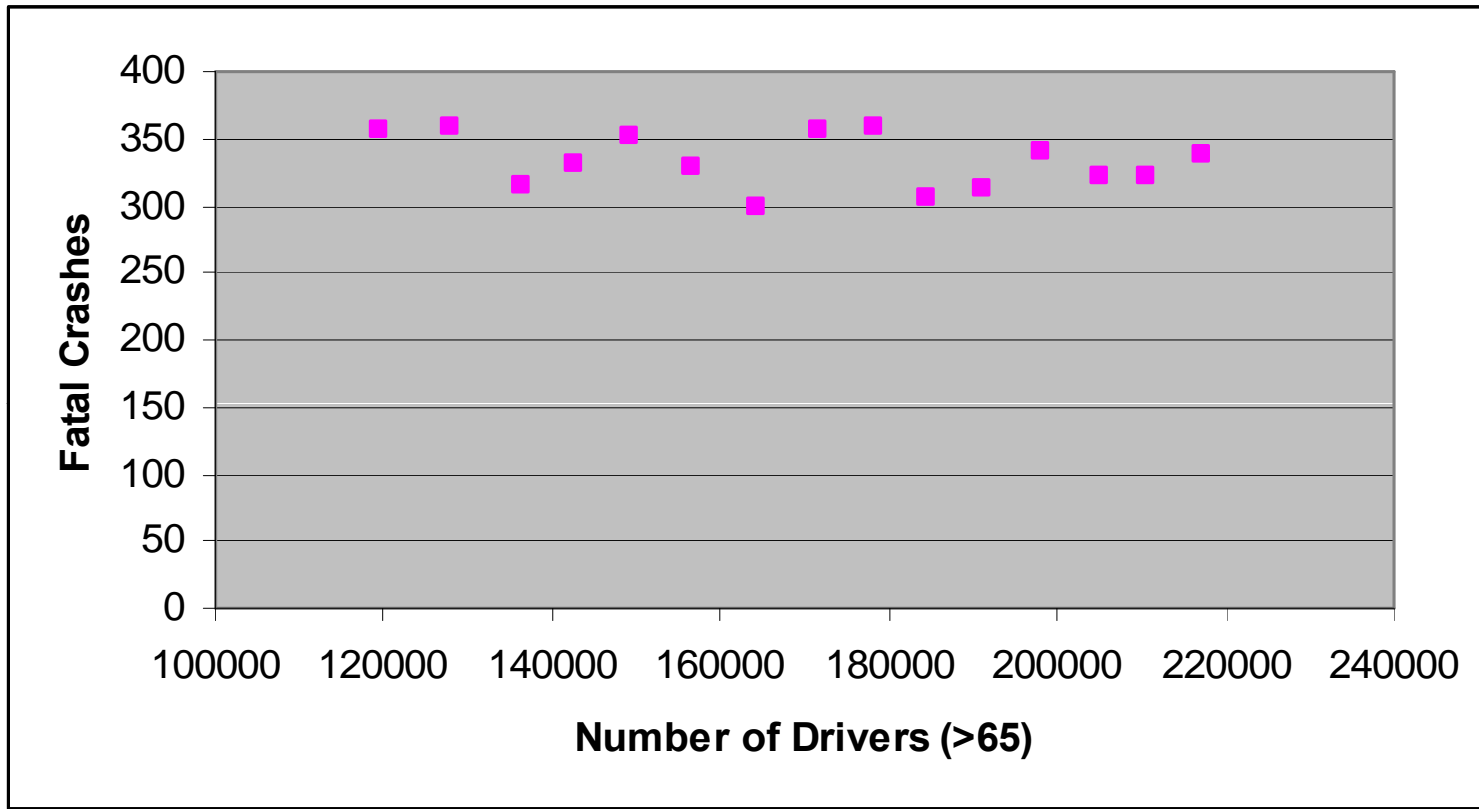


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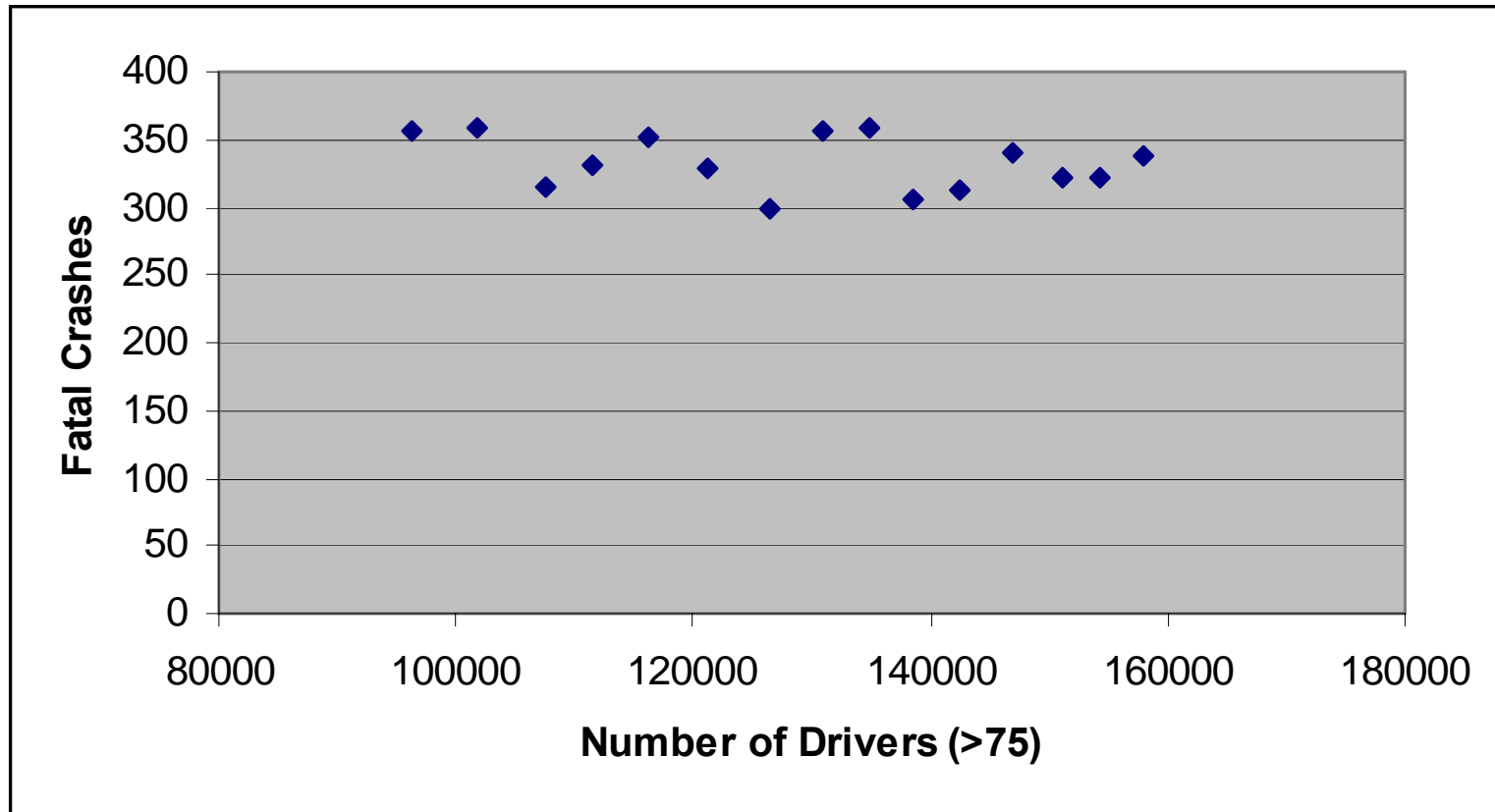
Ageing Drivers Licensing in Alberta



- Increasing number of licenses issued to ageing does **not** result in more fatal crashes on the roads



Ageing Drivers Licensing in Alberta

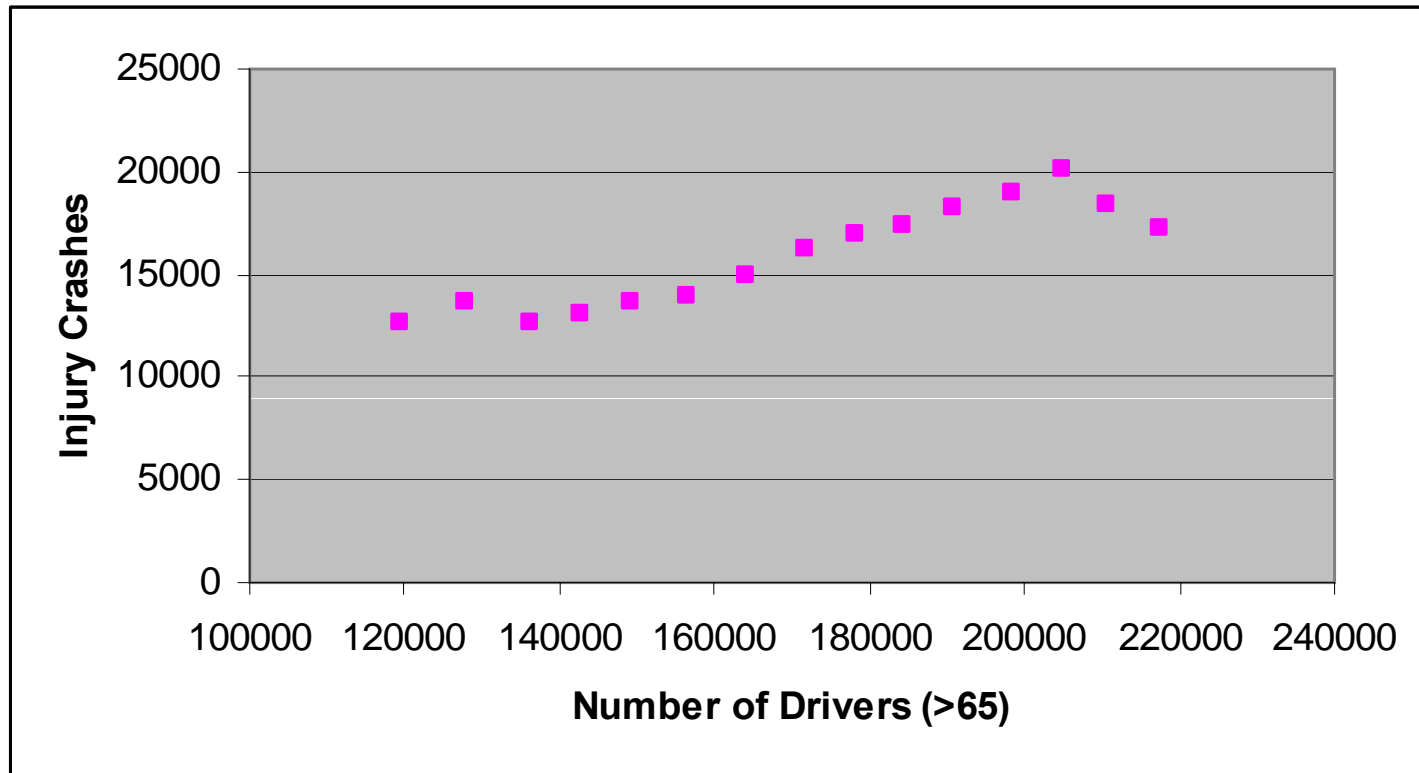


- Increasing number of licenses issued to ageing does **not** result in more fatal crashes on the roads





Ageing Drivers Licensing in Alberta



- Increasing number of licenses issued to ageing is correlated with more injury crashes on the roads

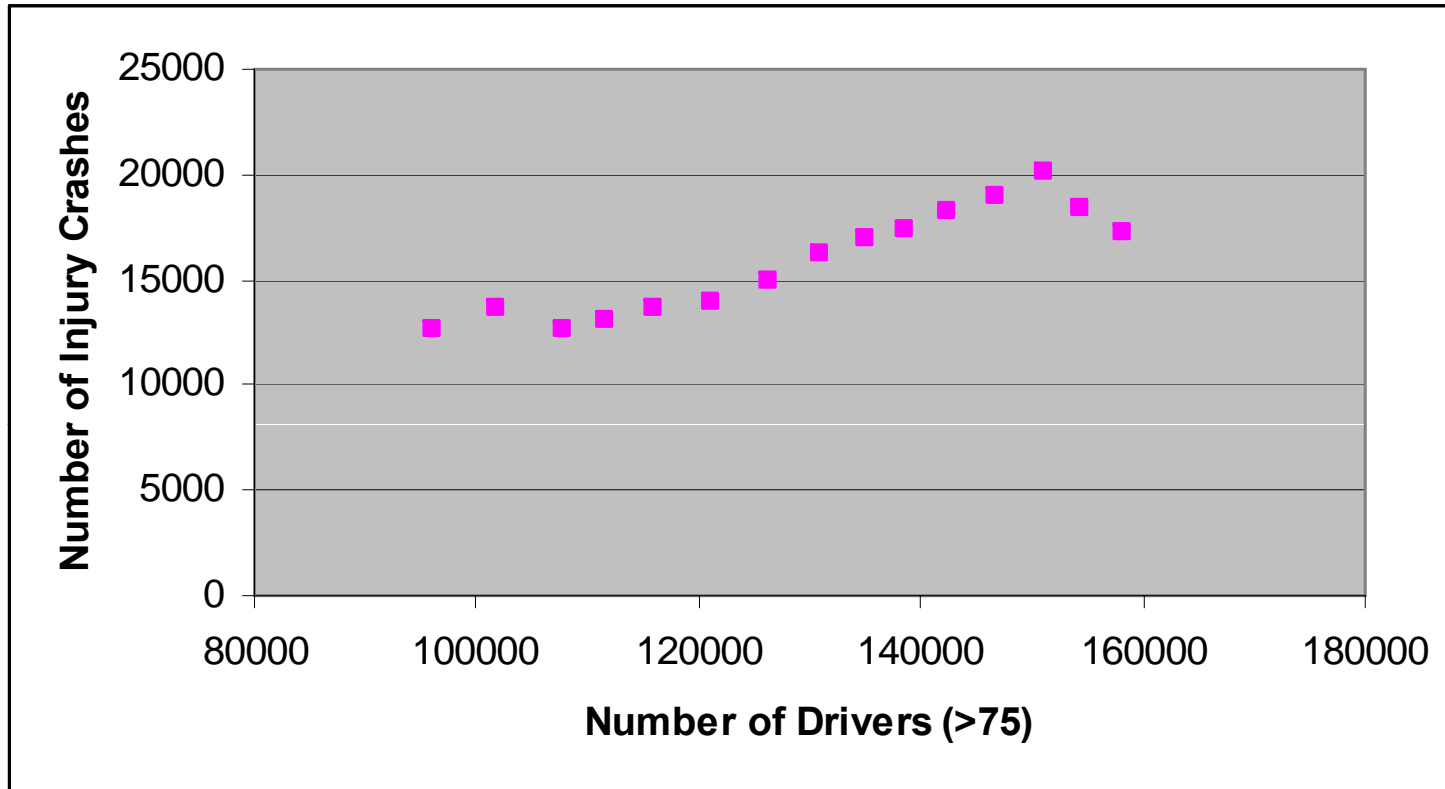


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Ageing Drivers Licensing in Alberta



- Increasing number of licenses issued to ageing is correlated with more injury crashes on the roads



Ageing Drivers Licensing in Alberta

- **However**, the positive relationship is also true for both younger drivers (25 yrs and below) and middle-aged drivers (25-65 yrs old).
- Multivariate statistical analysis is needed to estimate the marginal effects of changing driver mix on injury crashes.
- Poisson regression model is estimated.

Variable	Coefficient	P[Z >z]	Mean of X
Constant	6.407530386	.0000	
TREND	-.2035608051	.0000	8.0000000
GAS	.2156007E-06	.0000	3840244.3
Young	.7978394E-05	.0000	356724.13
MidAge	-.3995102E-05	.0000	1545380.1
Ageing	.4338395E-04	.0000	170185.93



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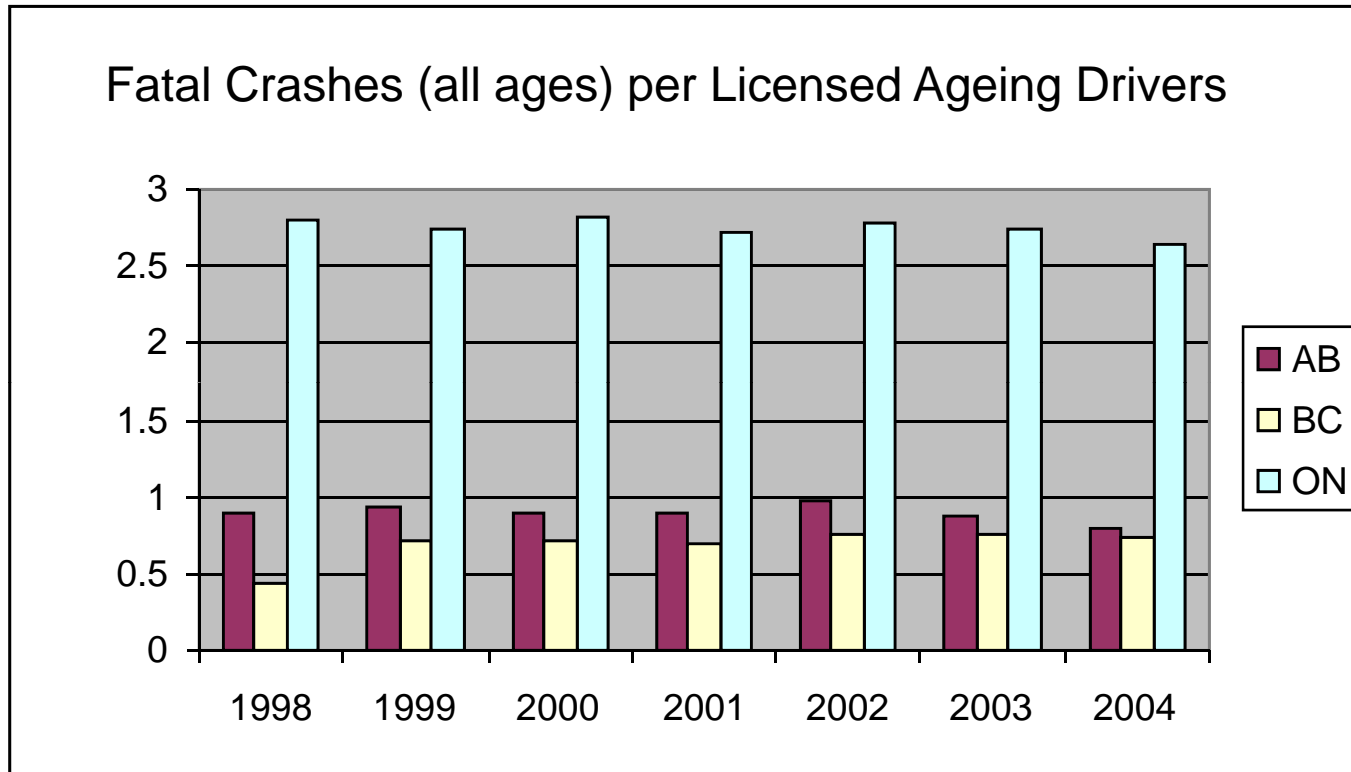


Ageing Driver Re-Licensing in Canada

- No uniform license renewal and re-testing policies across Canada.
- **Ontario:**
 - Every 2 years from 80 onwards
 - Vision test
 - Written test
 - Discussion
 - On-road test if recommended after discussion
- **Alberta:**
 - 75 onwards
 - Medical report
 - Vision test
- **British Columbia:**
 - Every 2 years from 80 onwards – medical exam
 - Testing only when reported (police or medical)



Ageing Driver Re-Licensing in Canada



- No clear relationship between testing requirements for ageing drivers and overall safety.



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Concluding Remarks

- The general conclusion is that age is NOT an important factor in deciding whether one should get a license or not.
- Physical & cognitive abilities vary considerably among drivers of the same age group.
- Although our physical abilities decrease as we aged, we gain experience and many of compensate by driving more carefully, driving in less risky environment and simply driving less.
- There is **no correlation** between the number of **fatal** crashes on the roads and the number of licenses issued to drivers aged 65 and above.
- There is a **positive correlation** between the number of **injury** crashes on the roads and the number of licenses issued to drivers aged 65 and above.
- This correlation may reflect the increased fragility of ageing drivers.



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Concluding Remarks

- Although several perceptual and cognitive tests have been found to be correlated with crash risks, most of the correlations are quite small.
- More importantly, most of the studies did not report any measure of predictive validity or accuracy of the tests.
- Without knowing the sensitivity and specificity, we do not know if these tests can accurately predict whether a driver will be involved in the crash in the near future.
- It is therefore not surprising that jurisdictions with stricter license renewal requirements for ageing drivers did not necessarily experience lower crash rates.
- More research into identifying tests with higher predictive validity is needed before any mandatory re-testing can be recommended.

Thank You!
Questions?



References

- Anstey K, Wood J, Lord S & Walker J (2005) Cognitive, sensory and physical factors enabling driving safety in older adults, *Clinical Psychological Review*, 25, 45-65
- Grabowski D, Campbell C & Morrissey M (2006) Elderly licensure laws and motor vehicle fatalities, *Journal of the American Medical Association*, 291(23), 2840-2846
- Langford J, Fitzharris M, Newstead S & Koppel S (2004) Some consequences of different older driver licensing procedures in Australia, *Accident Analysis and Prevention*, 36, 993-1001
- Li G, Braver E & Chen L (2003) Fragility versus excessive crash involvement as determinants of high death rates per vehicle-mile of travel among older drivers, *Accident Analysis and Prevention*, 35, 227-235
- Morrissey M & Grabrowski D (2005) State motor vehicle laws and older drivers, *Health Economics*, 14, 407-419
- Tay R (2006) Ageing Drivers: Storm in a teacup? *Accident Analysis and Prevention*, 38, 112-121
- Tay R (in progress) *Effectiveness of Mandatory Re-testing of Drivers*, report to the Alberta Motor Association Traffic Safety Foundation.

