Safer Journeys Alcohol Impairment Project - CBA for lowering legal adult BAC limit to 50 mg/dL
A register of the comments from independent reviewers

November 2013

The cost-benefit analysis was peer reviewed by three independent reviewers.

- Dr. Mike Keall, Senior Researcher of University of Otago (NZ)
- Dr. Adolf Stroombergen, Director of Infometrics Consulting (NZ)
- Dr. Anthony Ockwell, Director of Economic Connections Pty Ltd (Australia)

The independent reviewers were asked to provide comments on an earlier draft and a final review report once the CBA report has been revised to address any issues or concerns raised. The following tables summarised the key comments or issues raised during this process and the actions taken by the Ministry in response to the comments provided.

Comments from Dr. Mike Keall (University of Otago)

Topic	Reviewer's comments	Ministry's comments and responses
Relative risk for at-fault drivers	"The benefits from reduced road trauma are most certainly vastly understated, however, perhaps because conservative options were adopted at each stage of estimating projected reductions, and these have compounded multiplicatively along with the use of incompatible risk curves." In particular, "at-fault involvement in fatal crashes has a much steeper risk curve, meaning that benefits from lowering BAC levels would be much higher for this group".	The Ministry has adopted a conservative approach mainly to demonstrate that even under the most conservative assumptions the policy proposal still present a strong case for change and result in a large net benefit to the nation and save lives. Because some of the crashes would still occur even with a sober driver (i.e. with a zero BAC), the Ministry has chosen to focus on casualties caused by at-fault drivers with a positive BAC to avoid over-stating the potential benefits. Although the relative risk of fatal crash involvement could be higher for at-fault drivers, the analysis focused on the percentage change in the relative risk at different BAC levels which means the potential effects would be small. Further, a sensitivity analysis was carried out assuming a 99% reduction in the relative risk for those over the current legal BAC limit and found such an assumption would only result in a small increase in the estimated road fatalities and injuries (an additional 0.4 fatalities and 8 injuries saved per year). This is because the analysis

		assumes only a small proportion of drivers with a BAC over 80 mg/dL would change behaviours. **Changes to the CBA report:** • A footnote has been added to clarify that the relative risks for at-fault drivers (which are currently unavailable) could be higher than those used in the analysis and therefore the results are conservative. • A footnote has also been added to describe the above sensitivity analysis results.
Compliance costs to offenders	"This issue is a bit complicated as the imposition of costs on offenders is part of deterrence. If there were no costs, there would be no deterrence. I wonder whether this should even be included in the CBA."	According to Treasury's CBA primer (2005)[1], a national CBA includes incremental costs and benefits incurred as a result of the policy change irrespective of who bears the costs and who benefits. The Ministry agrees with the Treasury's view and therefore an allowance for such costs has been included in the analysis. However, it has relative small impact on the overall results. **Changes to the CBA report:** • No change.
Overall comments: This is a very thorough CBA, which is also very clearly presented. The benefits from reduced road trauma are almost certainly vastly understated, however, perhaps because conservative options were adopted at each stage of estimating projected reductions, and these have compounded multiplicatively along with the use of incompatible risk curves.		

[1] NZ Treasury (2005), "Cost Benefit Analysis Primer", http://www.treasury.govt.nz/publications/guidance/planning/costbenefitanalysis/primer/cba-primer-v12.pdf

Comments from Dr. Adolf Stroombergen (Infometrics)

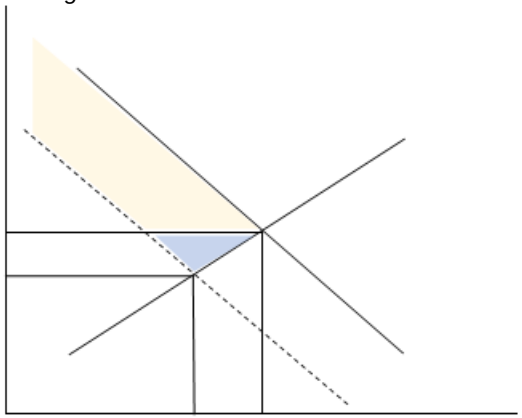
Topic	Reviewer's comments	Ministry's comments and responses
Urban and rural risk	"The study by Keall et al does not appear to control for urbanisation". "The net benefit produced by the CBA probably hides a large difference between urban and rural areas. Because of the difference in travel speeds, it is possible that the same analysis applied to rural areas would result in an even better benefit-cost ratio, while applying it to urban areas would result in only a small, or even negative benefit. This would have implications for how the proposed policy is best implemented." The reviewer thought, the above is one of the two issues that could be distorting the results.	The Ministry believes it is extremely unlikely that the analysis overstate the benefits. The reasons are: i. Keall et al and Austroads studies have already controlled for urbanisation (**note**). ii. The analysis has already halved the relative risks of those in the Austroads study. iii. There are many conservative assumptions used throughout the process. In view of the above, the estimated benefits are highly conservative and therefore unlikely to overstate the benefits. In terms of enforcement, "risk-targeted road policing is the fundamental basis of road policing. Risks are identified through a number of mechanisms including the examination of crash data, recorded offending levels, traffic complaints, and details about repeat offenders and repeat offending. Risk-targeted road policing operates through the Police tasking and coordination process which occurs at national, district and area level." "The Police uses this intelligence-led approach to develop an annual thematic calendar of higher risk events and times, which will also influence the planning of the national road safety advertising programme run by the NZTA, to enhance the effectiveness of both." (Source: Road Policing Programme 2011/12) **Changes to the CBA report:** • A comment has been added to clarify the relative risk estimates have been controlled for confounding effects, including urbanisation. **Note**: This has been confirmed with Dr Mike Keall that their relative risk analysis did control for urbanisation (via a statistical technique called "conditioning").
Effects on drivers with a BAC over 80 mg/dL	The reviewer thought the second issue that could be distorting the result relates to spillover effects to drivers with a BAC over 80 mg/dL. *"That is, most of the projected benefit of the lower BAC limit is attributable to those who are currently over 80 mg/dl, not*	The Ministry disagrees with this view. The reasons are: 1. The CBA has been carried out considering the merits of the policy proposal including the potential incremental costs and benefits to the nation as a whole. The assessment considered the spillover effects to drivers with BAC over 80 mg/dL considering the evidence found both overseas and domestically.

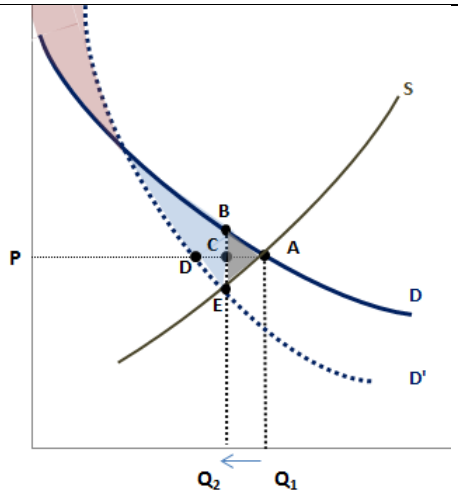
	to those in the 51-80 mg/dl group. Thus one wonders if there is an alternative policy option that would deliver the same favourable road safety outcomes, but with an even better benefit-cost ratio."	2. The analysis adopted a highly conservative approach when estimating the spillover effects. This means the actual BCR could well be significantly higher than those reported. 3. More importantly, whether there are alternative policy options available is independent of whether the CBA has been conducted in an appropriate manner. The Ministry has applied the best practice approach to conduct the CBA and do not agree with the view that the approach adopted distort the results.
Relative crash risk	Has the relative risk isolated the pure effect of higher alcohol levels from other correlated factors? Failure to allow for confounding factors will lead to an overstatement of benefits and an understatement of costs – due to poorly targeted enforcement.	Both the Austroads (2013) and Keall et al (2004, 2013) studies assessed driver risk while controlling for the effects of alcohol, age, influence of carrying a passenger, urbanisation and for driving trips at a time of night and days of the week where the vast majority of travel in New Zealand is associated with socialising. **Changes to the CBA report:** • The discussion around relative risk has been amended to clarify the above.
Consumer surplus	*"The calculation of the change in consumer surplus and producer surplus contains less detail than in the draft report It also has a puzzling sentence:* *… it has been assumed that there is no overall change in the value to consumers for the amount of alcohol they would still be able to consume after the policy change."* *"The amount of alcohol that could potentially be consumed after the change in BAC limit is the same as before the change. However, the imposition of a lower BAC limit can be modelled as a leftward shift of the supply curve for a number of reasons:* • *The effective cost of an extra alcoholic drink away from home has increased as more has to be paid for public transport to get home.* • *As most people do not know when they are over the limit, they would reduce consumption by more*	In the longer term, the law change may manifest a change in drink driving culture and result in a shift in the demand for alcohol consumption (for those who would drink then drive). Such a cultural change is also likely to reduce the price sensitivity of alcohol demand (because price would become less of a determinant). This means the slope of the new demand curve will be steeper (therefore, a change in price will have a lower impact on volume compared to previously). However, it is difficult to predict exactly how the new demand curve may look. In some circumstances, there may be a net reduction in consumer surplus for the amount of alcohol consumers would still be enjoying. In other circumstances, some consumers may value the amount they do consume more than previously. This is the case if the new demand curve is steeper than the original demand curve such that the two demand curves cross over (as shown in the figure below). Therefore the net change in consumer and producer surplus would equal the red shaded area minus the blue shaded area minus the grey shaded area. In this case, the red shaded area and the blue shaded area may cancel out, leaving us with the grey shaded area.

than is actually needed to be within the new imit. So even for someone who is below the limit the statistically expected cost of an extra drink (the demerit points and/or fine) has increased.

- *There is also a loss in utility for those who substitute home drinking in place of drinking out. While their cost of alcohol would fall, this option exists currently, implying that for people who currently drink out the higher cost of alcohol is more than offset by the gain in utility – greater socialisation, venue ambience, etc.*

It seems to me that that the correct loss in consumer and producer surplus is the sum of the yellow area and the blue area in the diagram below. The report seems to calculate something different."





Drink driving can be considered as a "demerit" goods. And the marginal social cost of demerit goods is higher than that of the marginal private cost. Therefore when evaluating the overall welfare effects of the drink driving law, it cannot be ignored that many drink driving activities (or excess drinking activities) also lead to utility lost to other road users (e.g. utility lost if people avoid driving at night due to drink driving behaviours of others) and other drinkers (e.g. misconduct behaviours of certain individuals leading to utility lost to other drinkers present at the same drinking locations). As far as we are aware, these utility changes have not been incorporated in the social cost of harmful alcohol use estimated by BERL. When these utility losses are also considered, there will be a net increase in overall utility after the policy change. This is because the proportion of drivers with a BAC less than 50 mg/dL is much higher than that of drivers with a BAC greater than 50 mg/dL. However, due to a lack of information, these elements have not been explored fully.

It must be stressed that the drink driving law does not restrict the amount of alcohol consumers may choose to consume. They may consume any level of alcohol provided they do not drive when they are impaired and exceed the legal allowable limits. There are many strategies consumers can take to minimise any utility lost (e.g. switch to low alcohol drinks or resume drinking after returning home) and similarly that producers can take (e.g. offer low alcohol drinks or courtesy car services for patrons). To simplify the assessment, it has been assumed that following the policy change there is no overall change in the value to consumers for the amount of alcohol they would still be able to consume before

		driving. The analysis also assumed that there is no change in utility from alcohol consumption for drivers who would switch drinking venues or take alternate transport. Therefore, the analysis focused on the deadweight loss (the sum of the loss in consumer and producer surpluses or the grey shaded area as shown in the diagram above) from a reduction. To conclude, the estimated loss in consumer surplus may in fact be overstated. The reasons are: • The analysis ignored the loss in utility to the wider community due to the drink driving activities of a very small proportion of population. • The analysis has not allowed for a potential reduction in utility lost from switching to low alcoholic drinks or resuming drinking after returning home. **Changes to the CBA report:** • The corresponding discussion has been expanded.
Treatment of VOSL	"*Has the VOSL been adjusted for the age profile of road fatalities?"* *"The VOSL is usually expressed in the form of a present value calculated over some period of time, presumably not 10 years. How are these parameters reconciled and is the lower present values of lives saved further into the future recognised."*	The VOSL of a fatality is inclusive of the costs over the remaining life time of an unidentified individual. The current NZ practice is to adopt the same VOSL irrespective of age. Because the VOSL is the same for everyone and it is inclusive of the costs over the remaining life time of an individual, it is not necessary to estimate the future values for individual saved in a given year. However, for individuals that could be saved in future years, they are discounted back to obtain the present value of these future savings in present value's terms. **Changes to the CBA report:** • No change to the report has been made as the methodology used is a common practice in road safety assessments both domestically and internationally.
Compliance cost	*"Why is there no allowance for the disbenefit to drivers who have to undergo alcohol testing when the vast majority of them will not cause a crash if their BAC in below 80 mg/dL."*	All drivers are currently subject to random breath testing and the policy proposal does not include an increased enforcement effort. Therefore, the compliance cost to drivers around alcohol testing has not changed. **Changes to the CBA report:**

	"More importantly, there is no allowance for the disbenefit to drivers from receiving demerit points for no reason other than that their BAC is over some essentially arbitrary amount; an amount which has only a very small probability of contributing to a serious accident?"	• A section on compliance costs to offenders has been added. • Also a comment has been added to make it clear that the analysis assumed there is no change in alcohol control related police enforcement hours.
Cost of crime	*"The cost of crime calculation is fairly rough. Why use those who drink occasionally as the denominator and where is the justification for the assumed relationship between a low BAC and crime."*	**Changes to the CBA report:** • The method has been simplified to make the cost savings proportional to the reduction in alcohol consumed. The revised approach only focused on drivers with a BAC over 80 mg/dL and decided to reduce alcohol consumption. Since the proportion of drivers to be affected is very small, the estimated reduction in social cost of crime is also small. Exclusion of such effects would have almost no impact on the estimated BCR.
Transport cost	This discussion around transport costs is unclear.	**Changes to the CBA report:** • Additional explanation has been added to resolve any ambiguity between transport cost savings and the generation of additional transport costs.
Gradual improvement in road trauma trend	*"Not sure why the benefits are reduced over time because of gradual improving trend in road safety."*	Due to a range of road safety interventions in place, the risk of crash involvement has been falling over time. With improving vehicle and roading engineering technologies and other on-going road safety interventions, this downward trend is likely to continue over time. The adjustment is needed to avoid over-stating future benefits that would have been achieved due to technology improvement or other policy changes over time. **Changes to the CBA report:** • Minor wording changes made.
Overall comments: "The conceptual scope of the CBA is good and seems to capture the main costs and benefits of the proposed policy. I have a few questions on some of the calculations though I doubt that they are significant enough to upset the main results. The Monte Carlo sensitivity analysis demonstrably adds to the robustness."		

Comments from Dr. Anthony Ockwell (Economic Connections Pty Ltd)

Topic	Reviewer's comments	Ministry's comments and responses
Relative risk	The analysis may benefit from looking at distribution of drivers with readings recorded at various BAC levels to work out the median value. Then for a change in behaviour, this median value is compared to the estimated changed value.	There is no data on distribution of drivers by BAC, apart from the three BAC categories used in the analysis (i.e., under 50 mg/dL, 51-80 mg/dL and over 80 mg/dL). Therefore, it is not possible to work out the median BAC for each band. This means our results are conservative because the likely reduction in risk would be higher than those assumed in the analysis. However, a sensitivity analysis was carried out assuming a 99% reduction in the relative risk for those over the current legal BAC limit and found such an assumption would only result in a small increase in the estimated road fatalities and injuries (an additional 0.4 fatalities and 8 injuries saved per year). This is because the analysis assumes only a small proportion of drivers with a BAC over 80 mg/dL would change behaviours. **Changes to the CBA report:** • A footnote has been added to discuss the data issue around distribution of drivers by BAC. • Also a footnote has been added to describe the above sensitivity analysis results.
Blood test	It is unclear when a blood test is required or whether it is compulsory. It is also unclear whether breath tests are sufficient to result in offence notices issued.	**Changes to the CBA report:** • These have been clarified in the report that breath test can be used as evidential purposes and that blood test can be used as a check of accuracy or as requested by Police (e.g. if a person refuses to do a breath test) or by the offenders.
Transport cost	The analysis of transport cost impacts required some additional work to provide more detail on the derivation of savings in own-vehicle travel costs.	**Changes to the CBA report:** • Additional explanation has been added to resolve any ambiguity between transport cost savings and the generation of additional transport costs.

Discount rate	The analysis used 8% real discount rate which is not consistent with current practice contained in the NZTA-EEM which now suggests a discount rate of 6% with sensitivity testing at 4% and 8%.	Although the NZTA recently amended the real discount rate from 8% to 6% real, NZ Treasury advised that an 8% real rate is more appropriate for the evaluation of policy proposals that seek Cabinet's approval. Should the analysis adopt a 6% discount rate, the NPV and BCR would be higher than estimated. For this reason, a sensitivity testing of a lower discount rate is not necessary. **Changes to the CBA report:** • A footnote has been added to the report.
Other effects not considered	There are other effects that need to be discussed: • A possible switch to lower alcohol content drinks and therefore reduce the estimated loss in consumer surplus • A possible reduction in transport cost due to increased car-pooling • Any additional compliance cost to offenders ended up with their licence suspended	Making allowance for the first two items will increase the NPV and BCR for the policy while making allowance for the third item will have the opposite effect. However, due to a lack of information, we have opted to exclude them. Since the estimated number of people to ended up with their licence suspended is low (around 500 under the mid-range assumption), the additional compliance cost is likely to be low. Therefore, the net impact of excluding the above is likely to result in higher NPV and BCR estimates. But the effect is unlikely to be significant. **Changes to the CBA report:** • Discussions have been added to the report to pick up these three aspects.
Overall comments: In my view, the CBA of the likely economic impacts of lowering the legal BAC limit represents a high quality analysis of the proposed policy change, and provides a strong evidence-based approach to the assessment of policy options (ie., remain at a BAC of 80mg/dL as the base case or lower the BAC to 50mg/dL).		