The potential of public breath testing to reduce drink driving

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ABSTRACT

While considerable resources have been expended in attempting to educate the public about the concept of a standard drink and how to count standard drinks (which have limited validity), many drivers are still unsure whether their BAC is under the legal limit or not. Thus, improving drivers' ability to estimate their BAC as a basis for deciding whether or not to drive has potential for further reducing the incidence of drink driving, and thus, road trauma. Public breath testing equipment in licensed premises provides one source of this information.

Two studies were conducted which interviewed drinkers in licensed premises. The first estimated the benefit-cost ratios needed to decide whether public breath testing should be promoted as a road safety initiative and to what extent. The second study aimed to determine

1. whether any promotional activity or combination of activities will result in 10% or more of drivers with BAC > 0.05% testing themselves
2. the relative effectiveness of different promotional activities
3. the commercial viability of breath test machines charging 20 cents, $1 or $2.

INTRODUCTION

Drink-driving is a major road safety issue at which considerable enforcement and education efforts have been directed. Yet drivers continue to be unsure of whether their Blood Alcohol Concentration (BAC) is under the legal limit or not. If drivers could more accurately estimate their BAC, they would have better information to decide whether or not to drive after drinking. Public breath testing equipment in licensed premises provides one source of this information.
ESTIMATION OF BENEFIT-COST RATIOS FOR PUBLIC BREATH TESTING

The first study reported here estimated the benefit-cost ratios (BCRs) for public breath testing equipment, in terms of crash reductions (Haworth and Bowland, 1995). There are both direct crash savings and indirect savings to be gained from the use of public breath testers (formulae are presented in the Appendix). Direct crash savings result from the immediate reduction in crashes from drinkers with BAC>0.05% deciding not to drive home after testing themselves.

Indirect savings result from two sources. First, the immediate reduction in crashes from drinkers moderating their total consumption after testing (they may still have BAC>0.05%). Secondly, longer-term crash reductions are expected due to drivers who test themselves learning to better estimate their BAC and so being better at deciding when not to drive, even when they have not tested themselves on that occasion. This second effect was not quantified in the current study.

Patron survey

Surveys of patrons at 10 licensed premises in metropolitan Melbourne which had breath-testing machines installed (Alcolizer or Breathometer BM-2) were undertaken to estimate the proportion of drinkers who decided not to drive after finding out that their BAC was greater than 0.05%. All drinkers who used the testing machines of their own initiative (self-testers) were approached to be interviewed. Some drinkers who did not use the testing machines of their own initiative were also interviewed and invited to use the machines with coins supplied by the interviewers (prompt testers).

Combining data for self- and prompt-testers, 16% of drivers who had intended driving home changed their minds after finding out that their BAC was greater than 0.05%. An additional 63% of self-testers decided to modify their subsequent drinking behaviour after testing over 0.05%. The study also found that the number of tests per venue was approximately double for $1 compared with $2 machines.

Benefit-cost ratios

Targeting of those premises with the highest alcohol sales was found to be necessary to maximise the cost-effectiveness of promotion of public breath testing. The 150 highest volume premises, while comprising only 3% of licensed premises, sell 33% of the liquor. A range of financial outcomes were calculated, assuming different usage rates and levels of promotional expenditure. Table 1 shows the expected financial outcomes for providing support of $500, $1000, $1500 or $2000 per machine per annum for three years, and assuming 10% of the target
group used the machines. No allowance was made for any increase in the proportion of the target group using the machines as a result of the higher levels of support expenditure.

Table 1: Sample benefit-cost ratios based on social costs. The data relate to support levels of $500, $1000, $1500 or $2000 per machine per year for 150 machines if used by 10% of target group. Benefits and costs have been calculated over three years.

<table>
<thead>
<tr>
<th></th>
<th>$500</th>
<th>$1000</th>
<th>$1500</th>
<th>$2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Present Benefits ($000)</td>
<td>1780.00</td>
<td>1780.00</td>
<td>1780.00</td>
<td>1780.00</td>
</tr>
<tr>
<td>Net Present Costs ($000)*</td>
<td>306.64</td>
<td>517.24</td>
<td>727.84</td>
<td>938.44</td>
</tr>
<tr>
<td>Net Present Value ($000)</td>
<td>1473.36</td>
<td>1262.76</td>
<td>1052.16</td>
<td>841.56</td>
</tr>
<tr>
<td>Benefit-cost ratio</td>
<td>5.80</td>
<td>3.44</td>
<td>2.45</td>
<td>1.90</td>
</tr>
</tbody>
</table>

*includes revenue minus rental

It must be stressed that only the crash savings of not driving at a BAC greater than 0.05% and driving at a lower BAC were included as benefits in these calculations. The effect of learning to better judge BAC in the long term may provide substantial additional benefits, which have not been included.

**PILOT STUDY OF PROMOTION OF PUBLIC BREATH TESTING**

Given the low usage of public breath testing machines but potential large road safety benefit demonstrated in the first study, a pilot study was undertaken to evaluate the effectiveness of various promotional activities in increasing the usage rates. This information was needed to decide whether to commit substantial resources to promote the wider use of these machines.

The specific objectives of the project were to determine:

1. whether any promotional activity or combination of activities will result in 10% or more of drivers with a BAC over 0.05% (the target group) using public breath test machines
2. the relative effectiveness of different promotional activities or combinations of activities in achieving increased usage rates for this target group
3. the commercial viability of breath test machines charging 20 cents, $1 or $2

The two levels of promotional activity undertaken were placement of posters and coasters in venues (Level A) and posters and coasters plus an inhouse promotional event and local media coverage (Level B). There were 15 breath testing machines available at venues where promotion
took place and 14 machines at control (no promotion) venues. All breath testing machines were modified by their distributors to store date, time, venue and BAC level data.

The estimated usage rates are summarised in Table 2. Overall, 10% or more of the target group used public breath test machines after promotions but not before. Usage rates, both before and after Level A promotions, were significantly higher than 10% for the 20c machines. Usage rates were significantly larger than 10% after promotion Level A, but not before, for the $1 machines. Usage rates were not significantly larger than 10% before or after Level A promotion for the $2 machines. This sub-analysis according to machine type should be viewed with caution since it is based on very small numbers of venues. There were insufficient machines with Level B promotion to disaggregate by cost of testing.

Overall, and at each cost of testing, the usage rate after Level A promotion was greater than before promotion. Usage rates after Level B promotion were more than 5% greater than achieved with Level A promotion. However, this increase was not statistically significant, possibly because usage rates were only available for six venues with Level B promotion.

Table 2: Summary of mean usage rates and confidence limits for usage rates

<table>
<thead>
<tr>
<th>Usage rate</th>
<th>Number of venues</th>
<th>Mean usage rate (%)</th>
<th>95% confidence limit*</th>
</tr>
</thead>
<tbody>
<tr>
<td>All experimental machines</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before promotion</td>
<td>14</td>
<td>10.0</td>
<td>9.3 to 12.2</td>
</tr>
<tr>
<td>Promotion Level A</td>
<td>12</td>
<td>17.8</td>
<td>15.8 to 20.2</td>
</tr>
<tr>
<td>Promotion Level B (Level B machines only)</td>
<td>6</td>
<td>17.5</td>
<td>14.2 to 21.3</td>
</tr>
<tr>
<td>20 cent machines</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before promotion</td>
<td>3</td>
<td>21.6</td>
<td>17.8 to 25.9</td>
</tr>
<tr>
<td>Promotion Level A</td>
<td>3</td>
<td>34.3</td>
<td>28.7 to 40.3</td>
</tr>
<tr>
<td>$1 machines</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before promotion</td>
<td>4</td>
<td>11.3</td>
<td>8.4 to 15.0</td>
</tr>
<tr>
<td>Promotion Level A</td>
<td>3</td>
<td>20.5</td>
<td>16.2 to 25.7</td>
</tr>
<tr>
<td>$2 machines</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before promotion</td>
<td>7</td>
<td>5.7</td>
<td>4.4 to 7.4</td>
</tr>
<tr>
<td>Promotion Level A</td>
<td>6</td>
<td>9.7</td>
<td>7.6 to 12.3</td>
</tr>
</tbody>
</table>

* The mean usage rate is greater than 10% if the lower 95% confidence limit is above 10%.
However, the mean number of tests with BAC>0.05% did not increase with promotion when controlled for external influences. The results suggest that the observed increases in usage rates resulted from a reduction in the size of the target group (the denominator of usage rate), rather than an increase in the number of tests (the numerator). The reduction in the size of the target group which was observed may have resulted from concurrent increases in drink-driving publicity and enforcement.

While usage rates of 10% or greater by the target group were achieved, the absolute number of tests, and thus revenue was not great.

Benefit cost ratios were estimated for 20 cent, $1 and $2 machines at varying levels of support for net operational costs (rental minus revenue). The calculations assumed placement of a total of 300 machines at the 150 highest liquor volume establishments. The estimated BCRs were highest for subsidising machine costs for 20 cent machines: 2.56 if net operational costs per month were $150 or 2.13 if the net operational costs per month were $180.

DISCUSSION AND CONCLUSIONS

The first study reported here found that 16% of intending drivers with BAC>0.05% decided not to drive when they found that they were over the legal limit. An additional 63% of intending drivers reacted by saying that they would moderate their drinking for the rest of the evening to drive away at a reduced BAC. Past studies in other countries (e.g. Calvert-Boyanowsky and Boyanowsky, 1980; Oats, 1976; cited by Voas, 1988) showed little change in the intention to drive when drivers found they were over the legal limit. However, these studies were conducted in areas where there was much less rigorous drink-driving enforcement than currently occurs in Victoria. It would be expected that the higher perceived risk of detection accompanying high levels of random breath testing would make deciding not to drive more likely.

The results of the second study suggest that reducing the cost of testing to 20 cents would be a more effective way of increasing the number of drivers with BAC>0.05% who test themselves, rather than committing resources to promotion.
REFERENCES


APPENDIX: FORMULAE FOR CALCULATION OF CRASH SAVINGS

The following formula has been used to estimate the direct crash savings from drivers with BAC greater than 0.05% deciding not to drive after testing:

\[
\text{Direct crash saving} = \text{number of drink driving crashes in Melbourne per year} \times \frac{\text{cost per crash}}{\text{proportion of crashing drink drivers who had come from licensed premises}} \times \frac{\text{proportion of drivers in licensed premises over 0.05% who use the breath tester}}{\text{proportion of drivers in licensed premises over 0.05% who use the breath tester who do not drive after testing}}
\]

The following formula was used to estimate the indirect crash savings from drivers with BAC>0.05% driving at a reduced BAC after testing:

\[
\text{Indirect crash saving} = \text{number of drink driving crashes in Melbourne per year} \times \frac{\text{cost per crash} x}{\text{proportion of crashing drink drivers who had come from licensed premises}} \times \frac{\text{proportion of drivers in licensed premises over 0.05% who use the breath tester}}{\text{proportion of drivers in licensed premises over 0.05% who use the breath tester who drive at a lower BAC after testing \times average reduction in crash risk of driving at a lower BAC (50%)}}
\]

ACKNOWLEDGMENT

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