HOW DO THE BENEFITS OF DUI COUNTERMEASURES COMPARE WITH THEIR COSTS?

WHY RAISE THE QUESTION?

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Summary: This paper comments on the economic and non-pecuniary costs and benefits of safety legislation and its enforcement. Diverse sources of costs are identified and attention is called to various problems with the definition and measurement of benefit. The greater pertinence of 'bottom-line' evaluation of countermeasure effectiveness, as compared to ex ante assessment is emphasized. Some empirical evidence on the (lack of) influence of enforcement on accidents is mentioned. It is concluded that countermeasure are quantitatively unknown, but definite, while benefits remain quite uncertain.

Introduction: No cure should be implemented if it can be expected to do the patient more harm than good. No cure should be implemented if it cannot be expected to benefit the patient. If two cures are available, the one with the least cost and the greatest benefit should be chosen. That much is obvious.

Uncertainty arises from four sources. For one, we often have no complete inventory of the possible costs and the benefits. Second, it is often difficult to quantify these on one, and the same numerical scale could serve to determine benefit/cost ratios. Third, there may be major uncertainty to assigning probabilities of occurrence to the potential costs and benefits. Fourth, it is sometimes difficult to establish which consequences of a treatment exactly do constitute a benefit. The need for appropriate criteria is mostly pointed out by the story of the defensive surgeon who said: "Yes, the patient died, but the operation was successful."

The explicitly stated purpose of interventions against drinking and driving is to reduce the frequency and severity of accidents due to the effects of alcohol on the road used involved. At first sight, this would seem a perfectly adequate criterion for the assessment of the benefit of the interventions concerned with alcohol, but closer scrutiny seems to indicate that the pertinence of this criterion can be questioned on both theoretical and empirical grounds.

Future policy and practice for the promotion of traffic safety can only gain from an analysis of the costs and benefits of past and present interventions. This is why such an analysis should be performed and the results be debated in the community of road safety researchers and practitioners. Cost benefit analysis is the subject matter of this panel discussion, and this paper is intended to offer a few introductory remarks.

What are the costs? Costs refer to the societial and individual expenditures associated with the development and implementation of DUI countermeasures as well as any negative secondary effects of their implementation. These include the following:
1. Time and money spend on preparing, introducing, debating and passing (or not passing) legislation.

2. The training of police forces and providing them with equipment.

3. The cost of police surveillance and the time taken to carry out arrests and charge offenders.

4. The time spent by police officers in court.

5. Court costs, including the time expenditures of judges and other court personnel, the cost of prosecution and defence lawyers as well as that incurred by witnesses.

6. Administrative costs (e.g., associated with licence suspension).

7. The money spent on incarceration.

8. Job loss and/or job opportunity loss on the part of the offenders, unemployment insurance and social welfare payments to offenders and their families.

9. The cost of public announcements and education via the mass media.

This list is certainly not complete. Many items are missing. There is a lack of information regarding the expenses associated with each of the above sources of costs.

What are the benefits? Although quantitative estimates of the particular or aggregate costs of the items listed above would not seem to be available at the present time, it would seem safe to assume that we are dealing with major expenditures on the part of governments and society as a whole. For countermeasures to be cost effective, the benefits must be greater still.

What evidence do we have on the effectiveness of DUI countermeasures in reducing the frequency and severity of alcohol-related accidents? Unfortunately, most of the evidence reported in the literature appears to have collected with the use of some intermediate criterion of success: the number of DUI arrests made, the degree of recidivism among violators of the law, the proportion of (single vehicle) fatal nighttime crashes relative to the frequency of all fatal accidents, BAC levels of drivers examined at roadside surveys or stopped at (random) spot checks.

The reliance on intermediate criteria of intervention effectiveness is unfortunate because the relationship between these criteria on the one hand and the yardstick of the frequency of alcohol-related accidents on the other remains very much in the dark (Voas and Lacey, 1989). More unfortunately still, there is no compelling evidence that a reduction of the alcohol-related accidents is accompanied by an overall reduction in the rate of fatal traffic accidents per capita (Wilde, 1989b).
This brings up another issue of the assessment of intervention effectiveness. A strong argument for "bottom-line" evaluation has been made by Blomquist (1988). Accordingly, the merit of an accident countermeasure should not be assessed in terms of the ex ante estimates of safety benefits, but in the ex post (and actually) observed reduction in fatalities (or other issues).

Effectiveness estimation of the ex ante variety takes the following form. On the basis of existing data, such as accident reports, roadside surveys and experimental tests, an estimate is made of the safety benefit of some characteristic, like sobriety, or wearing the seatbelt. Next, it assumed that the frequency of this characteristic in the road-user population can be raised to a given level. A to-be-expected reduction in the fatalities is then calculated. In making this projection, it is tacitly assumed that countermeasures that raise the frequency of the characteristic in question will in no way alter other risk-relevant aspects in road-user behavior.

Curiously, countermeasures have also been retrospectively evaluated with the ex ante method. Instead of looking for actual reductions in fatalities following the introduction of a countermeasure, the investigator calculates an estimate of the number of fatalities that would have occurred in case the countermeasure had not been implemented, and thus arrives at an estimate of the "number of lives saved" (e.g., Partyka, 1988). Again, the possibility that road users may have changed their behavior in ways other than intended by the countermeasure is not at all considered.

The National Highway Traffic Safety Administration (1988) in the USA disseminated a "Drunk Driving Facts" pamphlet containing the statement that "... although more teenaged drivers are becoming involved in fatal crashes, fewer of them are intoxicated at the time" (p. 2). Is that progress? And does it mean that the less teenagers drink, the higher their accident involvement?

Several authors have argued on theoretical as well as empirical grounds that citizens are no robots and react in various and sometimes surprising ways to those actions taken by the authorities that fail to reduce the amount of accident risk they are willing to take (e.g., Adams, 1985; Biehl, 1989; Blomquist, 1988; Viscusi, 1985; Wilde, 1982; 1988b, 1989a). In contrast, accident countermeasures that were designed to reduce the level of accident risk people are willing to take by offering incentives for accident-free behavior, have generally been found effective in cutting down the accident rate per person (e.g., Fox, Hopkins and Anger, 1987); McAfee and Winn, 1989; Wilde and Murdock, 1982, Wilde, 1985, 1988a). Reductions down to 50% or even 20% of baseline are not uncommon. These studies employed analyses of the ex post variety.

The Denominator Issue: If it is agreed that ex post evaluation of the effectiveness of countermeasure effectiveness is to be preferred to ex ante prospective and retrospective estimations, there remains the issue of what should constitute the "bottom line".

Do the authorities wish to reduce the accident rate per unit distance driven (like per 100 million km driven) or per head of population? That these two criteria do not go hand in hand is shown in Figure 1 (data derived from the National Safety Council, 1988). Between 1923 and 1987, there has been a major
decrease in the death rate per 100 million miles driven in the USA, but no such decrease is obvious in the long-term death rate per 100,000 inhabitants in the years that cover almost two-thirds of the present century. In fact the traffic death rate per citizen is about the same in 1928, 1961 and 1987. A major part of the fluctuations around the same mean value across the years may well be due to fluctuations in the economic juncture, in the USA as well as in other countries (Wilde, 1989b).

Phrasing the question as to what type of benefit is wanted in other words: Is the objective to put more kilometers in people's years, or is it to add more years to their lives? Are governments and their civil servants actually aware of which of these goals they are pursuing, and do they clearly proclaim the goal of their choice? As has been argued elsewhere, "safety measures," such as building faster highways and issuing manufacturing standards for more crashworthy cars, can indeed reduce the fatality rate per head of population by the same token (e.g., When the new provisions lure people onto the road and out of the train, which is much safer per passenger kilometer? Wilde, 1982, 1988b).

Would a ministry responsible for public health measure success (of actions to reduce deaths due to cigarette smoking) in terms of an increase in cigarette consumption while maintaining overall mortality, or in terms of a reduction of smoking-related deaths in the nation? Most likely the latter, because it would seem more sensible.

Non-pecuniary costs and benefits:

Some people feel that safety legislation, such as concerning BAC, speed limits and seat belts, unjustly limits their civil liberties (as documented by Schmidt, 1974). Although difficult to quantify in monetary terms, this does constitute a cost. In some countries, there are associations of people who oppose the seat belt-wearing law, the West Germans refuse to accept a general speed limit on their expressways.

In addition, governments may receive political benefits from yielding to lobbies and advocacy groups. They may harvest the public relations gains that governments and politicians can make from being seen by the general public to be doing something about the problem (as distinct from doing something about the problem).

Does enforcement reduce accidents?

According the Bonnie (1985) the past record is not very encouraging. The international review published by the OECD (1974) on this matter noted that "(...) despite the lack of scientifically verified facts, decisions relevant to the traffic law enforcement area are having considerable economic effects on the countries involved are being made all the time" (p. 70).

The police department of Nashville, Tennessee, organized a "crackdown" on moving traffic violations in 1978 that lasted one month. The citation rate rose to 52% above baseline. This was followed by a one month "slowdown" by police officers to support their demands for salary increases. In this period,
the citation rate dropped to as low as 36% of baseline. Following this, police activity returned to normal. This, there were four periods: normal, crackdown, slowdown, and normal. Accident rates were investigated for differences between these four periods by Carr, Schnelle and Kirchner (1980), who concluded that "The present retrospective analysis of police traffic enforcement shows that wide variations in the overall levels of enforcement has no immediate measurable impact on the frequency of severity of traffic accidents, even when these interventions are "highly publicized" (p. 39).

Conclusion:

It would seem fair to infer that many of the costs of legislated accident countermeasures are unknown but definite, while the benefits in terms of accident reduction per head of population remain quite uncertain. Thus, the following question arises. Is society doing the right thing, or would the available resources for accident prevention be better spent on policies of a different nature?

References


Fig. 1: Death rate per capita and per mile driven, and mileage per capita in the USA, 1923-1987.