USING POLICE ENFORCEMENT TO PREVENT ROAD CRASHES: THE RANDOMISED SCHEDULED MANAGEMENT SYSTEM

by

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Abstract: *Police traffic enforcement for the prevention of road crashes can be considered in two dimensions: technology and organisation. In recent years in Australia, there has been considerable development in technology, including breath testing apparatus and the speed camera. In parallel with such developments in technology, there are opportunities for further development of the systems of organisation that underlie the delivery of the technology. A management system is outlined that attempts to enhance the effectiveness of police traffic enforcement resources for crash prevention by utilising quality management principles at each step of the organisational process. In the system sites for enforcement are clearly labelled; police vehicles are deployed to individual sites by a formal, randomised timetable; and data on police attendance and crash occurrence are collected on a site-by-site basis. Dose-response relationships between police attendance and crash reduction are continuously evaluated and management adjustments to the program fully guided by these results. In six implementations throughout Australasia since 1984, evaluation suggests the ap-*

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proach has generated an average 32% reduction in major casualty crashes, at an average and marked benefit/cost ratio of approximately 70:1. Some $200 million in crash social costs is estimated to have been saved. Opportunities are outlined for the further use of the organisational system in road safety management and crime prevention.

INTRODUCTION

Road crashes represent a major social cost to most societies, and their management has thus been a high priority. Efforts in management have been at the levels of both prevention (via education, enforcement and engineering) and cure (via the hospital and insurance systems). This paper focuses on road crash prevention by means of police enforcement.

Despite the involvement of police in their management, the causes of most crashes cannot truly be considered crimes except in the sense that negligence — driving "without due care and attention" or breaking road rules — is a crime. Nonetheless, the methods and opportunities for road crash prevention and crime prevention — in particular, situational crime prevention (Clarke, 1980) — are at heart closely similar. Both involve the notion that coordinated action to make (breaking the law) more difficult or risky can achieve general reductions in the volume of law-breaking (Clarke, 1992).

This paper describes the results of efforts to systematise the deployment of police traffic enforcement resources. The goal is to change the motorist's road environment in a permanent way so as to increase the risks of traffic lawbreaking and reduce its rewards as perceived by potential offenders. This approach is in harmony with the concept of problem-oriented policing (Goldstein, 1990). Goldstein argues that even where policing practice has changed in recent decades, there has been "a continuing preoccupation with means over ends; with operating methods...over effectiveness in dealing with substantive problems" (p. 15). The randomised scheduled management system for police deployment for road crash reduction attempts to address this issue fundamentally: the location and time of occurrence of the *problem* — crashes — explicitly calls out the police response — deployment — while the *effectiveness* of the response — crash reduction — is the performance indicator that informs all management adjustments to the response.

In general, this article aims to bring together several skeins of development in relation to the best use of traffic police resources for traffic crash prevention. First, best practice methods of organisational management in general are discussed. Second, the extent to which these principles are used in the randomised scheduled system of organisation of traffic policing is reviewed, and an overview is presented of the crash reduction outcomes that have resulted from the approach. Third, the outcomes of the approach and of other enforcement programs involving various mixes of management and technology are compared from a standardised point of view. Finally, prospects for the future are considered.

Developments (and Rediscoveries) in Management Systems

In the western world over the last 10 years, there has been a marked increase in the critical review and development of management systems. This process has led to the current promulgation of a wide range of methods and terminologies. Many of the methods currently proposed as new have been standard practices in well-managed organisations for a long time (most were taught in progressive U.S. business schools in the early 1950s [Sayles, 1993]). A distillation of current best-practice management methods would be likely to include these stages:

(1) Vision (what ones ideal world would look like).
(2) Assessment of operating environment (taking stock of both the system under management and the managing organisation, including performance benchmarking).
(3) Needs assessment (prioritising needs across the entire system under review).
(4) Project option review (to meet needs, including search for world's best practice).
(5) Project selection (based on capacity to generate greatest net present value; achieved by maximising market share [coverage] times profit margin [benefit/cost ratio]).
(6) Project implementation, with continuous evaluation and feedback (managed by statistical quality control, especially involving the concept of the continuous improvement cycle).

(7) Project evaluation, in terms of benefit/cost ratio (BCR) and net profit or savings (net present value [NPV]) accounting, also with continuous evaluation and feedback.

Selecting and Implementing a Traffic Enforcement Management System

Based on the foregoing strategic management cycle, in 1984 the Department of Transport and the Tasmania Police jointly agreed on the following mission, though the terminology used in 1984 was often different. The *vision* for traffic law enforcement was to maximise the effectiveness, particularly the *spread of effect,* of traffic policing in road crash reduction. The *assessment of operating environment and needs* was conducted primarily by a statewide review of the state crash database (clients defined as those who could be prevented from having a crash as inferred from the characteristics of those who had had crashes). The *project option review* involved a survey of world's best practice as recorded in published literature. *Project section* was based on documented relative effectiveness and spread of effect (BCR or NPV data were not readily available from the literature in 1984). *Project implementation* was initially conducted on a trial basis. Continuation as a program was contingent on positive *evaluation* of the trial.

The Method Selected: Randomised Scheduled Enforcement

The project option review stage of the strategic management cycle involved a review of published studies into ways of increasing the effectiveness of police enforcement in reducing traffic accidents. As outlined in reviews by Armour (1984) and by Shinar and McKnight (1985), most of these studies have focused on evaluating the effect of programs involving increased human resource allocations. Even for program designs for which accident reductions had been convincingly demonstrated, the drawback of such an enforcement approach was considered to be the difficulty of sustaining the increased resources required, especially in an environment of public expenditure restraint. For this reason, any increase in resource utilisation tended to be only short-term (a "blitz"), and any accident reduction achieved was not maintained (see Ross [1981] and Bjornskau and Elvik [1992] for comprehensive reviews of this situation).

In contrast, in a 1978 Texas study, Edwards and Brackett hypothesised that randomised scheduling methods could enable low levels of police presence to achieve accident reductions. The potential benefit was that, if demonstrated, such accident reductions could be maintained routinely and indefinitely from normal staff levels, overcoming the drawback of the blitz approach. In addition, the proportion of the total road network covered could be markedly increased, a crucial goal if the overall road toll were to be seriously tackled. A further key benefit would be that the low intensity of enforcement at the heart of the concept would not be intrusive or produce images of excessive police surveillance.

Edwards and Brackett (1978) investigated the effects on open-road vehicle speeds of a program in which single stationary police vehicles were deployed at random times to randomly chosen sectors of specific rural highway sections. The aim of the scheduling procedures was to establish and maintain in motorists a belief that a patrol vehicle could be located somewhere along the particular road each day, while keeping them uncertain of its exact location. The result of the trials was that the spread of effect per patrol vehicle was, on average, 22 kilometres. These speed suppression "halos" were four times greater than those demonstrated in previous studies. On this basis, the randomised method of Edwards and Brackett was selected for implementation.

METHODS

The method used for implementation of randomised scheduled enforcement in Australasia has generally been as follows. Any program targeting only high-accident locations can by definition treat only part of the road crash population of an area. For this reason, rather than focusing simply on the high-accident locations in a jurisdiction, each police station in the area operates an individual program, and each program covers as many routes in the station's territory of operation as possible.

Following the method of Edwards and Brackett (1978), all routes in the program of a participating police station are divided into sections of approximately one to five kilometres in length, and between 10 and 40 in number. The 6 a.m.-to-midnight period is generally chosen for enforcement; the midnight-to-6 a.m. period is not generally covered due to police resource constraints. The period is divided into two-hour segments for scheduling purposes. The whole week is enforced, and computerised schedules for site visits are generated quarterly. Each specific segment that is scheduled to be visited and the time of day and the day of week of the visit is allocated randomly. The enforcement routine involves a single marked police vehicle taking up position for a two-hour period at a convenient point, conspicuous to traffic, within the specified route segment, on the specified day at the specified time.

Evaluation

Participating police complete a log entry for each site visit, including sections on offences detected, weather conditions and general comments. These logs are reviewed to enable the determination of the percentage of programmed site attendances carried out. The rate of offence detection per site visit per month is also determined, to provide an additional indication of activity. Site attendance is flexible: if officers cannot attend at the time specified, they may select alternative times within the overall program time span.

In an authoritative overview, Council et al. (1980) analyse a number of methods for assessing the effects on crashes of road safety countermeasures. Acknowledging that the experimental ideal of randomised trials is rarely achievable, they note that in practice most evaluations are conducted using the quasi-experimental design of before-and-after analysis with comparison group. They observe, however, that evaluations of this type that group before-and-after data into two-by-two tables run the risk of ignoring confounding effects of differential trends and regression to the mean. These issues can be addressed by not aggregating the data and by explicitly examining the resulting time-series by regression analysis or formal time-series analysis.

In this paper, the above points are taken into account by using a simple regression method (Heckard et al., 1976; Frith and Toomath, 1982) with comparison group (Frith, 1987) to derive estimates of the magnitude of crash changes and their statistical significance. In this method, the prior trend on enforced routes at enforced times (EE) allowing for the trend on unenforced routes at the same times (UE) is derived by determining the EE/UE ratio for each of a number of years prior to the program. Linear regression analysis of the prior trend is then used to predict the likely value of the EE/UE ratio that would have occurred in future years in the absence of the program (the expected value under the null hypothesis). The value of the EE/UE ratio actually experienced during the program (the observed value) is determined next. This is then compared with the value expected in the absence of the program to determine estimates of both effect size and statistical significance.

The expected EE/UE ratio divided by the observed EE/UE ratio is the point estimate of the effect size. The arithmetical difference between the ratios can be interpreted as a *t* value with *n-2* degrees of freedom where, in this instance, *n* is the number of years in the prior period. This *t* value (one-tailed) is used to provide an estimate of the statistical significance of the difference (Heckard et al., 1976). Chi-square tests comparing observed crash frequencies with those expected from the regression model are also conducted.

Accident severity is reviewed in six categories: minor property damage (vehicle could be driven); major property damage (tow-away accident); first aid (slight injury, did not receive medical attention); minor injury (received medical attention but not admitted to hospital); major injury (admitted to hospital); and fatal (died within 30 days of accident). In benefit/cost assessments standard crash costs are used (Andreassen, 1992). Police operating costs are derived from police records. For the purposes of this paper, previous published results have been reanalysed using this standard form.

RESULTS

Australasian Implementations of Randomised Scheduled Enforcement

Since the initial Tasmanian implementation of the randomised scheduled method in 1984 (Leggett, 1988), the method has been further introduced in trial form in New Zealand (Graham, 1992), New South Wales (Leggett, 1992) and Queensland, and has continued or been established as a major program in Tasmania and Queensland. Tables 1 through 4 and Figures 1 to 4 show changes in crash levels associated with each implementation of the program. Data in each case are from the relevant transport authority.

Table 1: Offence Deterrence Operations-Tasmania: Fatal and Hospitalization Crashes per Year at Enforced Routes and Times (EE) and on Remaining Routes at Equivalent Times (UE) Before and During Program

	Before					During					
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
EE	10	7	7	6	9	3	2	3	4	3	2
UE	81	93	66	47	57	45	57	68	54	60	59
EE/UE	.123	.075	.106	.128	.158	.067	.035	.044	.074	.05	.034

Table 2: Random High Visibility Enforcement Trial-New Zealand: Fatal and Hospitalization Crashes per Year at Enforced Routes and Times (EE) and on Remaining Routes at Equivalent Times (UE) Before and During Program*

	Before	During
	Jan. 1986 to Oct. 1988	Dec. 1988 to Mar. 1990
EE	80	22
UE	52	19
EE/UE	1.54	1.15

*Time-series data not available

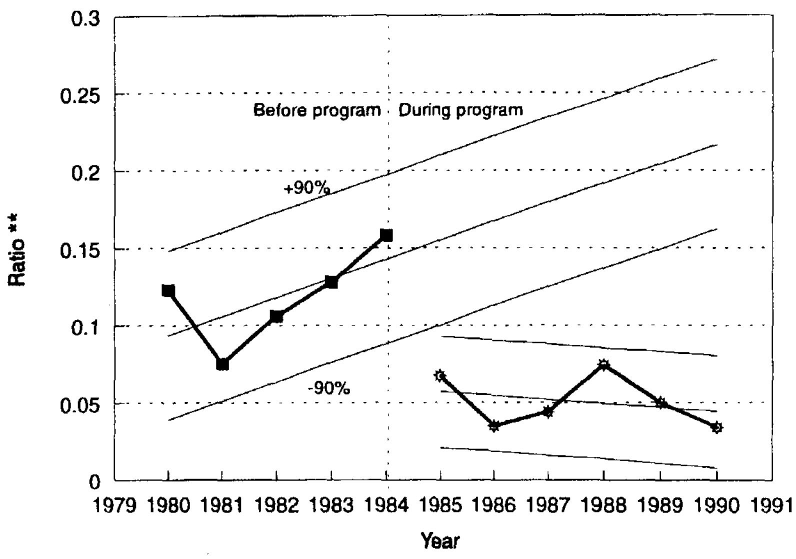
Table 3: Static Deterrence Operations-New South Wales: Fatal and Hospitalisation Crashes at Enforced Routes and Times (EE) and on Remaining Routes at Equivalent Times (UE) Before and During Program

	Before				During
	1986	**1987**	**1988**	**1989**	**1990**
EE	93	102	120	113	71
UE	470	459	493	449	410
EE/UE	.198	.222	.243	.252	.173

Table 4: Random Road Watch-Queensland Police Southern Region: Fatal and Hospitalisation Crashes at Enforced Routes and Times (EE) and in Rest of Region (RR) Before and During Program

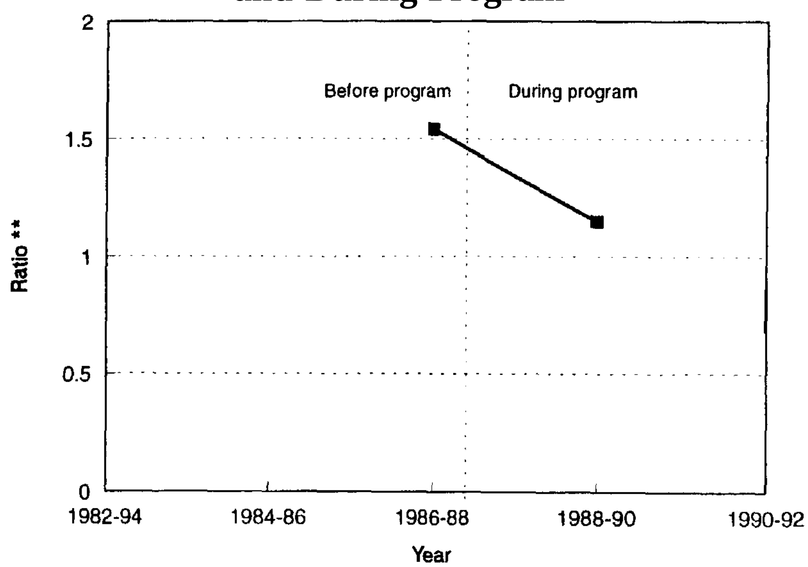
	Before						During		
	1986	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**
EE	176	184	233	180	181	196	168	142	107
RR	320	309	305	328	301	301	280	316	423
EE/RR	0.518	0.595	0.764	0.549	0.601	0.651	0.600	0.449	0.253

Figure 1: Offence Deterrence Operations-Tasmania: Initial Three Routes Relative Trend in Serious Crashes* by Year Before and During Program



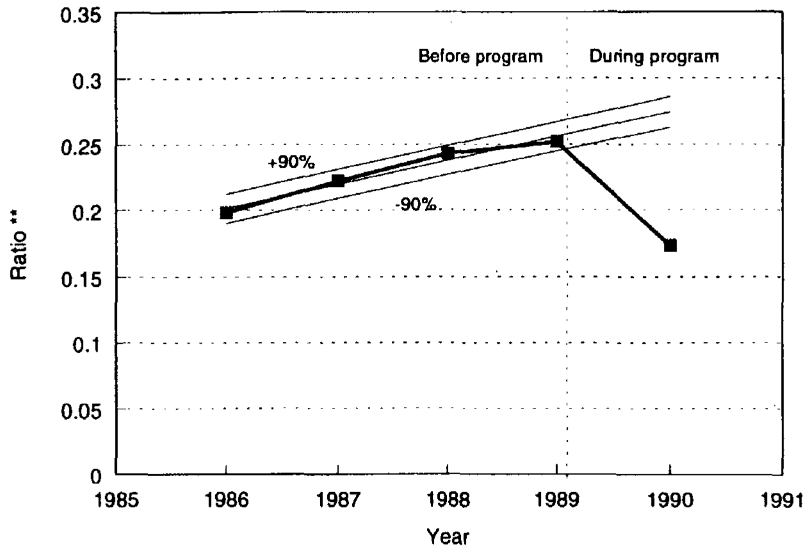
*Fatal and hospitalisation crashes; ** ratio of serious crashes on enforced routes and times to serious crashes on unenforced routes at equivalent times

Figure 2: Random High Visibility Enforcement Trial-New Zealand: Relative Trend in Serious Crashes* by Year Before and During Program



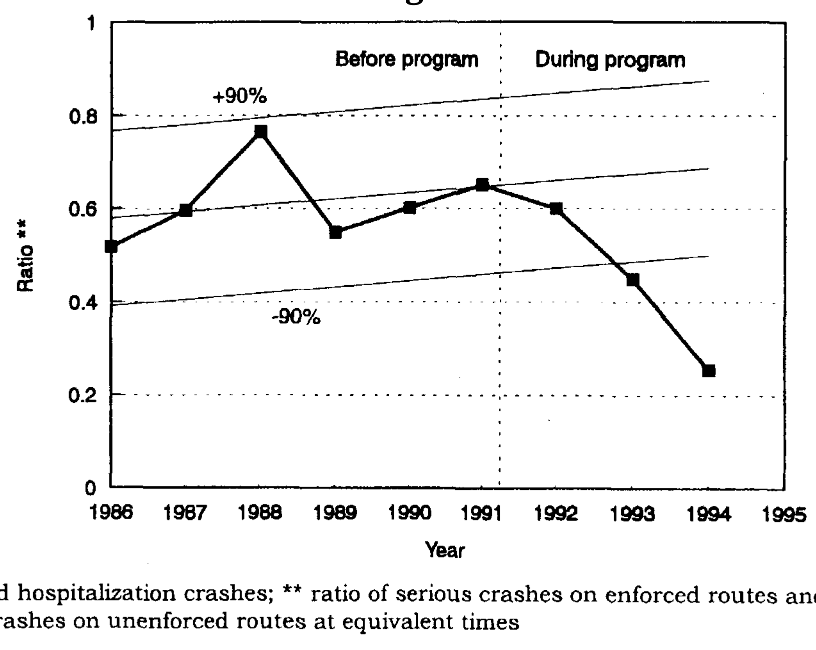
* Fatal and hospitalization crashes; ** ratio of serious crashes on enforced routes and times to serious crashes on unenforced routes at equivalent times

Figure 3: Static Deterrence Operations-New South Wales: Relative Trend in Serious Crashes* by Year Before and During Program



*Fatal and hospitalization crashes; ** ratio of serious crashes on enforced routes and times to serious crashes on unenforced routes at equivalent times.

Figure 4: Random Road Watch-Queensland Southern Region: Relative Trend in Serious Crashes* by Year Before and During Program



*Fatal and hospitalization crashes; ** ratio of serious crashes on enforced routes and times to serious crashes on unenforced routes at equivalent times

While a detailed discussion of the foregoing tables and figures is beyond the scope of this paper, Table 5 summarises results from them and from further unpublished assessments. The table shows that, of the six implementations of randomised scheduled enforcement reviewed:

(1) all showed crash reductions (averaging 32%) over that expected from comparison groups;
(2) all reductions but one were highly statistically significant (by chi-square test or t-test or both);
(3) all crash reductions were achieved with high benefit/cost ratios (average 70:1); and
(4) the aggregate community savings generated by the programs were over $200 million.

Table 5 shows that both proportional crash reduction and benefit/cost ratio have varied between program implementations. Variation in both these outcomes may relate in part to the level of the expected density of crashes on the routes managed by an individual police station. Table 5 shows that where crash density is highest (the New South Wales enforced routes), the benefit/cost ratio is also highest.

Over all, the foregoing analysis suggests that both highly predictable and highly cost-effective outcomes are achieved from the use of the randomised scheduled method of enforcement organisation.

Comparison with Breathalyser/ RBT and Speed Camera Programs

In what follows, the foregoing implementations of the randomised scheduled organisational method are compared with examples of the major current Australian programs based on enforcement *technology:* the breathalyser/random breath testing program (New South Wales example), and the Victorian speed camera program. (The widespread use of the breathalyser in the 1970s and random breath testing in the 1980s are considered to be two phases of a single overall program of management of alcohol-related crashes.)

Table 5: Summary Performance Data for Randomised Scheduled Enforcement by Program

				Expected Crashes/Program						$ m Saving			
Phase	Program Title	Juris-diction	No. of Participating Police Stations	Expected Fatal & Hospitalization Crashes per Year	Expected Crashes per Year/ Participating Police Station	Observed Fatal & Hospitalization Crashes per Year	Crash Change	Chi Square*	Signifi-cance	Total	Annual	Input Cost Per Year	BCR
Trial 1	Offence Deterrence Operations	Tas	3	10	3.3	3.4	-66%	21.8	3 x 10 -6	7.6	1.3	$14,000	90:1
Imple-mentation 1	Offence Deterrence Operations	Tas	47	166	3.5	105	-37%	67.2	<10 -6	19.5	6.5	$97,500	125:1
Trial 2	Random High Visibility Enforcement	NZ	3	21	7.0	15.8	-25%	.64	.22	1.47	1.10	$46,000	37:1
Trial 3	Static Deterrence Program	NSW	6	110	18.3	69.3	-37%	7.27	.007	4.07	8.14	$50,000	162:1
Trial 4	Random Road Watch	Qld	70	199	2.84	84.3	-58%	107	<10 -6	82	27.4	$580,000	47:1
Implemen-tation 2**	Random Road Watch	Qld	233	1984	3.21	1424	-28%	158	<10 -6	167	167	$4.94 m	34:1

**Conducted on unannualised data
*Aggregated results of seven regional programs 1994

In Table 6, data from the breathalyser/RBT program (Cashmore, 1985) and the Victorian speed camera program (Bourne and Cooke, 1993; Sullivan et al., 1993; Cameron et al., 1992) are used to estimate crash reduction outcomes as a function of expected crashes and various combinations of inputs. A comparison of Tables 5 and 6 shows that all three enforcement types have generated substantial performance in terms of both crash reduction and benefit/cost ratio. By both these measures, implementations of randomised scheduled enforcement have performed best.

Table 7 compares further indicator variables for a mid-range randomised scheduled enforcement program (the Tasmanian implementation) with the Victorian speed camera program (similar data were not available for RBT). The table shows the way in which randomised scheduled enforcement is coverage-based, while speed cameras are ticket-based.

The policy of wide coverage means randomised scheduled enforcement has 19 times as many sites per expected crash at which police vehicles may be expected by motorists. Conversely, speed cameras compensate for this by obtaining 21 times more tickets/crash than randomised scheduled enforcement, and requiring fewer man-hours. Concerning outcomes, Table 7 suggests that randomised scheduled enforcement has a greater effect in reducing crashes, and at a greater BCR. The focus in randomised scheduled enforcement upon maximising and controlling the *spread of enforcement* via a large number of sites appears to be the means by which the method delivers these outcomes. In broad terms, it appears that a randomised program with 20 times the enforcement sites of a speed camera program can deliver the same outcomes per input cost, without speed cameras.

A further benefit of randomised scheduled enforcement is that implementation does not require the finding of lump sum capital for major new technology before commencement, making the method easier to initiate in new jurisdictions. Being markedly less focused on tickets, randomised scheduled enforcement avoids a punitive approach to behaviour management. Further, such enforcement avoids the moral hazard of governments being seen to be motivated by revenue raising rather than crash reduction. This said, a speed camera program delivers more revenue from fines per unit input cost, and as crashes are reduced, the extreme moral hazard (of revenue from fines without crash reduction) is avoided.

Table 6: Summary Performance Data* for Other Enforcement Methods by Program

		Expected crashes/program							
Title	State	Expected Fatal & Hospitalised Crashes per Year	Observed Fatal & Hospitalised Crashes per Year	Crash Change	Chi Square	Signifi-cance	$m Annual Saving **	Input Cost per Year	Approximate BCR **
Speed Camera Program	Vic	4416	3590	-19%	32.0	<10 -6	206	$21.82 m	9.4:1
Breathalyser + RBT Programs	NSW	1099	582	-47%	85.0	<10 -6	164	$8.00 m	25:1

*Data sources: see text.
**Estimates by author based on data from above sources.

Table 7: Random Scheduled Enforcement and Speed Cameras Compared

Factor	Randomized Scheduled Enforcement	Speed Cameras	RSE/Speed Cameras	Comment
Sites/expected crash	7.3	.38	19.2	RSE has more coverage
TINs/expected crash	7.6	163	.047	A speed camera program issues more tickets
Officer hours/ expected crash	23.5	3.01	7.81	RSE uses more officer hours
Crash reduction	37%	19%	1.95	RSE can display greater crash reduction
BCR	125:1	9.4:1	13.3	RSE can be more cost-effective

DISCUSSION

Complementarity of Methods

Given that the methods of randomised scheduled enforcement, RBT and the speed camera are not alternatives but are complementary, there would appear to be benefits to be gained from managing RBT and speed cameras by the randomised scheduled method. This view is in line with one of the most recent international reviews of the effectiveness of law enforcement at permanently reducing traffic crashes. The review, which unfortunately did not cite the existing Australian literature, concluded that "allocating enforcement resources according to a chance mechanism" was the most *theoretically* effective approach (Bjornskau and Elvik, 1992). The foregoing empirical results provide strong support for this view in practice. The authors also speculated that the approach would be "difficult to implement." In contrast, this is a view with which Australian experience differs.

Successful Implementation of Randomised Scheduled Enforcement

What then are some possible factors required for successful implementation? In Table 8, the criteria used by the authoritative U.S. Baldrige Quality Award (e.g. Easton, 1993) for management system assessment are used to indicate the requirements that experience has shown assist in successful implementation of the randomised scheduled enforcement system.

Of the dimensions covered in the table, the key factors are those of leadership, the product champion, the requirement for appropriate statistical methods for management and evaluation, and the frequent use of feedback loops in the improvement cycle.

The results of the use of these elements of the management system to improve input performance by Queensland police indicate that the percentage of scheduled visits actually carried out rose from 70% in 1992, the first year of the program, to 85% in 1994.

Potential Impact of Randomised Scheduled Enforcement

In the following section, using Australia as an example, an approximate assessment is made of the possible costs and benefits of countrywide use of randomised scheduled enforcement to manage programs of general traffic enforcement, RBT, and speed camera operation.

The current Queensland randomised scheduled enforcement program uses 30,000 officer-hours per year, provided by a pool of approximately 3,500 police. (This pool represents approximately 4.9 million officer-hours.) Randomised scheduled enforcement then, currently uses 0.51% of total officer time in participating Queensland regions. This input provides coverage of 23% of the road toll of the five participating Queensland Police Service regions (out of eight regions in all). To extend this coverage to 90%

Table 8: Factors in Successful Program Establishment

Enablers	
1. Leadership	Visible involvement of most senior management in leading introduction of program and supporting its continuous improvement Product champion with technical understanding and appropriate access required
2. Policy and strategy	Cut and dried business plan; specified actions, routes
3. People and management	Continuous improvement via monthly improvement cycles using feedback Agreed achievable performance targets Staff empowered to reschedule inputs
4. Resources	Requirements realistic and sustainable Usage monitored simply, effectively
5. Processes	Process performance parameters specified Parameters used in aggregate and disaggregate form Parameters measured continuously or frequently Parameters used for immediate feedback at all levels of management cycle
Results	
6. Customer satisfaction (customers are those who would have had crashes)	Road toll reduction is key index of satisfaction; statistical methods must be adequate to show change
7. Staff satisfaction	Feedback loop must be provided via monthly cycle; substantial two-way feedback to occur at all levels face-to-face
8. Impact on society	Road toll reduction
9. Business results	Cost-effectiveness of road toll reduction

(i.e., by 3.9 fold) would need, say, five times the resources (assuming a factor for diminishing returns). This would represent 2.5% of officer time.

Nationwide, 2.5% of officer time represents 2.5% of 35,000 officers (Australian Government, 1992). At an annual salary of, for example $50,000, this equals an aggregate cost of approximately $44 million per year. Programs managed by each jurisdiction to provide coverage on this scale would involve a total of some 400,000 randomised scheduled enforcement sites nationwide, on 450,000 kilometres of the 500,000 kilometres of the bitumen and gravel elements of the Australian road system (Australian Government, 1992). Assuming the current average randomised scheduled enforcement casualty crash reduction as a possible outcome, a 37% reduction of the $3 billion per year cost of total Australian major casualty crashes could be expected. This would represent a saving of as much as $1.1 billion per year. The expected benefit/cost ratio would be 25:1.

What increase in effectiveness might be expected from the randomised scheduling of speed camera programs and RBT? Unpublished studies of randomised scheduled enforcement dose-response curves suggest that a doubling of randomised scheduled enforcement input leads to an approximate 66% further crash reduction. Given that randomised scheduled enforcement, RBT, and speed cameras display broadly similar outcomes per input, crash reductions for the latter two programs could therefore be expected to show a similar improvement, with crash reductions at about 1.66 times their present rate.

CONCLUDING THOUGHTS: SUGGESTIONS FOR THE FUTURE

It is well understood that the road crash problem is widespread across most roads in a jurisdiction, not limited to just a few. Perhaps the key outstanding issue in road safety management then is that of achieving the most *widespread* implementation of measures that reduce road crashes. Because of the lack of market mechanisms, available road safety best practice all too often is either not used at all, or covers only a small percentage of the road network. This is particularly true for road safety engineering measures. Further, effort is not concentrated on optimising the performance of programs that are already known to be effective.

At present, traffic policing has a unique responsibility. This paper adds to the previous studies that indicate the high cost-effectiveness of existing traffic policing best practice. In the absence of mechanisms for the widespread implementation of engineering best safety practice, enforcement alone at present — due to the existing widespread distribution of police stations — has the capacity to provide road safety best practice in the required widespread way. Given the foregoing, this paper has provided evidence that workable systems exist for guaranteed delivery, over time, of a visit by a police vehicle to each kilometre of the road system.

There is then a further key issue for traffic enforcement, that of maximising the effectiveness of the enforcement vehicle once it is on site. Given that getting the vehicle to the specific site represents the key costs and effort, it would appear in general to be counterproductive to conduct at that point of the road system only speed checks, RBT, vehicle roadworthiness checks, or seat-belt-wearing checks — practices embodied in the "offence-of-the-month* approach of many traffic enforcement units.

Optimising enforcement would involve establishing the possibility in the public's mind of the presence in each police vehicle of RBT and vehicle-mounted speed camera equipment (the latter possibly only randomly fitted due to cost issues), as well as portable scales (for truck overloads, etc.). In this way, the public would rightly believe that deterrence of all unsafe practices could occur from any vehicle, anywhere, at any time. (Dedicated breath testing or speed camera, mobile radar and other specialist operations would coexist alongside this static car-based program. These options, too, could use randomised scheduled management.) Further, environmental offences such as these concerning emissions, and a wide range of other non-traffic offences such as carriage of stolen goods, could be addressed.

All these operations could thus be fully harmonised as a set of integrated, overlaying systems. Car-based multi-purpose units would be the most widespread (covering at least 90% of all routes), with specialised operations further targeted at strategically determined sites through use of the same deployment system. In this way, fully integrated quality control-managed traffic-based law enforcement could be carried out. This approach could represent a useful further step toward the optimum management of law enforcement for the prevention of both traffic offences and crimes involving the use of motor vehicles.

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