COST ESTIMATES FOR NO-FAULT INSURANCE

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SUMMARY

On 12 February 1974, a limited no-fault insurance system was introduced to cover persons killed or injured in road accidents in Victoria, Australia. This system supplements the existing compulsory third party insurance system, under which payments are made only if an insured driver can be shown to be negligent.

The costs of the no-fault benefits are met by compulsory third party insurers, who are allowed to charge not more than the premium fixed by the Government. This paper examines the adequacy of the no-fault component of the premium.

A theoretical model has been developed, covering all the components of compulsory third party and no-fault insurance. This model incorporates the limited available accident and insurance statistics, together with a number of assumptions. As in many practical situations, the limited data available has severely restricted the factors considered, and has reduced the reliability of the estimates made from the model.

The theoretical model does however:

—indicate approximately the premium required for no-fault benefits
—suggest areas where statistical investigation would be valuable
—provide estimates for different types of benefits to different groups of persons, which can be checked as more data becomes available
—provide useful data when considering other forms of no-fault insurance, such as the national rehabilitation and compensation scheme currently being considered by the Australian Government.

1. INTRODUCTION

Estimates of the cost of the limited no-fault insurance system, which began operation in Victoria on 12 February 1974, have been made, based on:

—statistics for persons killed or injured in road accidents in Victoria in 1972
—estimates of the degree of contributory negligence of the different types of persons killed or injured, under compulsory third party insurance
—age and sex groups, and hence likely employment status, of persons killed or injured

—the relative severity of injuries suffered by injured persons, as measured by the ratio of persons killed to persons injured
—the assumption that income earners receive compulsory third party payments three times as large as those received by non-income earners in similar circumstances
—the estimated cost of compulsory third party insurance payments arising from 1972 accidents
—an analysis of the composition of compulsory third party payments, arising from 1967 accidents, to 800 persons
—assumptions as to the increase in accidents, vehicle numbers and average weekly earnings.

The data and assumptions above provide a theoretical model, covering all the major components of compulsory third party and no-fault insurance.

The model provides reasonable estimates of the compulsory third party payments to persons injured in 1967 accidents, as compared with the results of a sample investigation made by the Victorian Government Actuary. The model also gives a reasonable estimate of the cost of the no-fault hospital scheme introduced in Victoria on 1 March 1971.

Estimates of the cost of no-fault insurance, based on the model, may thus be of some value.

2. Theoretical Model

The sex and age groups of persons killed or injured in road accidents in Victoria in 1972 were: [1])

Type of person killed or injured	Males			Females			Total
	0—16	17—59	60+	0—16	17—59	60+	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Drivers	37	5,752	455	7	1,943	142	8,336
Passengers	1,075	2,392	155	1,137	3,073	427	8,259
Motor cyclists	21	1,297	14	—	157	—	1,489
Pedestrians	645	694	221	440	414	207	2,621
Cyclists	509	192	40	89	25	1	856
Total	2,287	10,327	885	1,673	5,612	777	21,561

[1]) "Road Traffic Accidents Involving Casualties, 1972", Australian Bureau of Statistics, Victorian Office, Reference Number 30, September 1973.

The Australian civilian labour force, compared with the total civilian population in May 1972, was: [1])

Age group	Males in labour force as percentage of total males in age group	Females in labour force as percentage of total females in age group
(1)	(2)	(3)
	%	%
15—19	57.2	54.6
20—59	95.7	44.6
60 and over	41.9	7.5

Reasonable assumptions for Victorians killed or injured in accidents in 1972 would thus be:

Age group	Males in labour force as percentage of total males in age group	Females in labour force as percentage of total females in age group
(1)	(2)	(3)
	%	%
0—16	0	0
17—59	95	45
60 and over	42	8

As compared with passengers and pedestrians of the same sex and age, drivers and motor cyclists are more likely to be employed, because of the economic cost of owning a vehicle. No correction has been made in the following calculations for this bias, as its effect is likely to be small.

The proportions of persons killed or injured who are income-earners are thus estimated as:

[1]) "Official Year Book of the Commonwealth of Australia", Australian Bureau of Statistics, Canberra, Australia, No. 58, 1972, page 698.

Type of person killed or injured	Proportion of persons killed or injured who are income-earners		
	Males	Females	Persons
(1)	(2)	(3)	(4)
	%	%	%
Drivers	90.6	42.4	78.5
Passengers	64.5	30.6	45.5
Motor cyclists	92.9	45.0	87.9
Pedestrians	48.2	19.1	36.4
Cyclists	26.9	9.8	24.5

Some indication of the severity of injuries received by different types of persons can be obtained from the numbers of persons killed per 1,000 persons injured:

Type of person killed or injured	Number killed	Number injured	Number killed per 1,000 persons injured	Relative severity scale
(1)	(2)	(3)	(4)	(5)
Drivers	324	8,012	40.4	1.00
Passengers	285	7,974	35.7	0.88
Motor cyclists	59	1,430	41.3	1.02
Pedestrians	216	2,405	89.8	2.22
Cyclists	31	825	37.6	0.93
Total	915	20,646	44.3	

It is clear from the above that pedestrians have on average much more severe injuries, while there are not statistically significant differences between the other groups. The relative severity scale has been constructed as a measure of the severity of injuries sustained by different groups, by taking the ratios of numbers killed per 1,000 persons injured.

Of the 21,561 persons killed or injured, 13,058 were involved in multiple vehicle collisions, i.e. 60.6%.

No Victorian data is available on the proportion of drivers killed or injured in single vehicle, rather than multiple vehicle accidents. A reasonable assumption may be that 40% of all killed or injured

drivers are in single vehicle accidents, and thus not covered by compulsory third party insurance (CTP insurance).

About 200 claims are made each year on the Victorian "Incorporated Nominal Defendant", in cases where an unidentified vehicle has caused another vehicle to crash, without itself being involved. In other cases the responsible vehicle may be identified and a CTP claim made.

A small proportion of drivers killed or injured in single vehicle accidents thus receive some CTP cover.

Drivers injured in multiple vehicle accidents should in theory average 50% contributory negligence. In practice the average degree of contributory negligence of such drivers is less than 50%, for several reasons:

—where only one driver is injured, juries will tend to minimize negligence out of sympathy for the injured person
—where both drivers are injured, but one claim is settled out of court, prior to the hearing of the other driver's claim, then again the jury is free to be sympathetic
—where the claims of both drivers are heard separately, the legal mechanism for sharing liability is imperfect, and degrees of contributory negligence adding to less than 100% may result
—it is unusual for the claims of both drivers to be heard together.

If 40% of drivers are injured in single vehicle accidents, and have 100% negligence, and 60% of drivers have an average of 50% negligence, then the average degree of negligence by drivers should be 70%. For the reasons outlined above, average negligence of only 62.5% has been assumed.

In rare cases, passengers may be found to have some contributory negligence. For example, a passenger may have caused an accident by some reckless action, or may have accepted a ride knowing the driver to be dangerously drunk. These cases are, however, very rare and for practical purposes passengers can be assumed to have no contributory negligence.

Motor cyclists have been assumed to be similar to drivers in accident pattern, with average contributory negligence of 62.5%.

Pedestrians in general receive sympathetic treatment from juries, and it is difficult to prove contributory negligence by pedestrians.

Discussions with insurance staff and solicitors suggest average contributory negligence of about 20%. It is easier to show contributory negligence by cyclists, and an average of 40% negligence has been assumed.

If it is assumed that:

—the average killed or injured income-earning driver with no contributory negligence represents a "unit cost" under CTP insurance
—other income-earning groups receive CTP payments (before reductions for negligence) related to those of drivers by the relative severity scale shown on page 294
—the proportions of income-earners are as set out on page 293
—non-income earners receive CTP payments only one-third of those received by income-earners (this is an arbitrary assumption, whose validity is examined later)
—reductions for contributory negligence occur as above

then the following table of "cost units" is obtained:

Type of persons killed or injured	"Cost units" under CTP		
	Income earners	Non-income earners	Total
(1)	(2)	(3)	(4)
Drivers	2,454	224	2,678
Passengers	3,307	1,320	4,627
Motor cyclists	501	23	524
Pedestrians	1,694	987	2,681
Cyclists	117	120	237
Total	8,073	2,674	10,747

In Victoria for the year ended 30 June 1972 CTP premiums received were $ 47.176 m. A reasonable estimate of CTP premiums earned during 1972 is thus $ 47.2 m. Assuming a loss ratio of 110%, CTP claims resulting from 1972 accidents will total about $ 51.9 m. This total cost can be allocated in the ratio of the cost units for each group:

Type of person killed or injured	Estimated CTP claims costs for 1972 accidents		
	Income earners	Non-income earners	Total
(1)	(2)	(3)	(4)
	$m	$m	$m
Drivers	11.85	1.08	12.93
Passengers	15.97	6.38	22.35
Motor cyclists	2.42	0.11	2.53
Pedestrians	8.18	4.77	12.95
Cyclists	0.56	0.58	1.14
Total	38.98	12.92	51.90

From the above costs, and the average degree of contributory negligence for each group, the total 1972 cost of a no-fault scheme offering the same level of benefits as CTP insurance can be estimated:

Type of person killed or injured	Estimated no-fault costs for 1972 accidents		
	Income earners	Non-income earners	Total
(1)	(2)	(3)	(4)
	$m	$m	$m
Drivers	31.60	2.88	34.48
Passengers	15.97	6.38	22.35
Motor cyclists	6.46	0.29	6.75
Pedestrians	10.23	5.96	16.19
Cyclists	0.93	0.97	1.90
Total	65.19	16.48	81.67

To estimate the cost of the limited no-fault scheme operating at present in Victoria, some knowledge of the components of claim payments is required. The following claim payment proportions were obtained by the Victorian Government Actuary by exa-

mination of payments to about 800 persons injured in 1967 accidents:

Type of payment	Passengers	Other than passengers	All combined
(1)	(2)	(3)	(4)
	%	%	%
Hospital	5.0	5.8	5.5
Medical	4.0	3.4	3.6
Loss of income	6.6	11.3	9.4
Other special damages	2.6	1.7	2.1
Investigation	2.4	2.8	2.6
Legal	17.1	16.4	16.7
General damages	62.3	58.6	60.1
Total	100.0	100.0	100.0

In the above table, all items except "general damages" were the expenses actually incurred without reduction for contributory negligence. The "general damages" item is the difference between all the amounts so determined, and the total amount paid in relation to the claim.

"Loss of income" payments for 1967 accidents were obtained from claim files, and were only available when:

—a legal document specified the extent of losses of income up to the date of the court hearing, or
—other evidence was available as to temporary loss of income.

For cases settled without litigation, some loss of income may have occurred, but have been included without mention in the settlement amount. General damages would thus include:

—a small amount of past income losses
—future income losses
—pain, suffering and loss of future enjoyment
—the whole reduction as a result of contributory negligence.

Of the 8,259 passengers killed or injured, 45.5% were employed. so that 3,758 passengers would receive $ 4,250, and 4,501 would receive $ 1, 417. Total payments would thus be $ 22.35 m, allocated as follows:

Type of payment	Total payments to passengers for 1972 under no-fault scheme		Total amounts of payments to income and non-income earning passengers	
	Proportions	Amounts	Income earners	Non-income earners
(1)	(2)	(3)	(4)	(5)
	%	$m	$m	$m
Hospital	5.0	1.12	0.51	0.61
Medical and special damages	6.6	1.48	0.67	0.81
Loss of income	6.6	1.48	1.48	—
Investigation	2.4	0.54	0.39	0.15
Legal	17.1	3.82	2.73	1.09
General	62.3	13.91	10.19	3.72
Total	100.0	22.35	15.97	6.38

The above table was constructed by assuming that:

—hospital, medical and special damages are the same for all passengers
—loss of income relates solely to income earners
—investigation and legal fees are constant proportions of the claim payment
—general damages are the balancing items.

From the above table, the payment proportions and amounts per person can be obtained:

Type of payment	Proportion of claim payments for passengers		Amounts paid to each passenger	
	Income earners	Non-income earners	Income earners	Non-income earners
(1)	(2)	(3)	(4)	(5)
	%	%	$	$
Hospital	3.2	9.6	136	136
Medical and special damages	4.2	12.7	179	179
Loss of income	9.3	—	394	—
Investigation	2.4	2.4	102	34
Legal	17.1	17.1	727	242
General	63.8	58.2	2,712	826
Total	100.0	100.0	4,250	1,417

The amounts per passenger calculated above can be used to estimate payments to all persons killed or injured in road accidents (taking into account the relative severity factors and estimated degrees of contributory negligence set out previously). As a test, the payments to 800 persons injured in 1967 accidents have been estimated and compared with the amounts obtained by the Government Actuary's examination of claim files.

In making this comparison the estimated figures have been multiplied by 800/21, 561 to allow for the sample size of 800, as compared to the 21,561 persons killed or injured in 1972.

Average weekly earnings per employed male unit in Victoria were $ 66.80 in the September quarter of 1967, and $ 99.00 in 1972, an increase of 48.2%. The estimated figures were thus divided by 1.482, on the assumption that CTP payments have increased proportionately with average weekly earnings.

Hospital and medical expenses, and special damages, have been estimated on a per person basis, ignoring reductions for contributory negligence. Losses of income have been estimated on a per income-earner basis again ignoring reductions for contributory negligence. Investigation and legal expenses have been taken as 2.4% and 17.1% of the total CTP payments, after reductions for contributory negligence. General damages have been calculated as balancing items.

A comparison of the actual and estimated payments for the 1967 sample is:

Type of payment	Actual and estimated CTP payments to 800 persons injured in 1967 accidents					
	Passengers		Other than passengers		All persons	
	Actual	Estimated	Actual	Estimated	Actual	Estimated
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	$m	$m	$m	$m	$m	$m
Hospital	.028	.028	.051	.063	.079	.091
Medical and special damages	.037	.037	.045	.084	.082	.121
Loss of income	.037	.037	.100	.114	.137	.151
Investigation	.014	.014	.024	.018	.038	.032
Legal	.096	.096	.146	.127	.242	.223
General	.350	.348	.519	.334	.869	.682
Total	.562	.560	.885	.740	1.447	1.300

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The estimated total payments to passengers are surprisingly close to actual, in view of the many assumptions on which the estimates are based. The correspondence between the components of the actual and estimated payments to passengers is to be expected, as the components of payments in the theoretical model are based on the actual components of payments to passengers in the 1967 sample.

The total amount estimated for injured persons other than passengers is $ 0.740 m, i.e. 84% of the actual amount of $ 0.885 m. The agreement between estimated and actual is reasonable, because:

—injured persons other than passengers are a heterogeneous group, likely to show large statistical fluctuations in a total sample size of 800

—an investigation by the Victorian Government Actuary has shown that a proportion of persons injured in accidents made no CTP claims, while other persons not reported by police as injured do make successful CTP claims.

Estimated medical and special damages for non-passengers were almost twice actual, but the actual payments to non-passengers are not consistent with those to passengers. If it is assumed that medical and other special damages should bear a constant relationship to hospital expenses, then non-passenger medical and other special damages should have been (.051 × .037/.028), or $ 0.067 m, as compared to $ 0.045 m actual and $ 0.084 m estimated. The theoretical model therefore seems to have made worse an inconsistency already present in the sample data.

Economic losses for non-passengers were estimated to be $ 0.114 m, as compared with $ 0.100 m actual. The agreement is reasonably good, and provides some confirmation for the theoretical model. Estimated investigation and legal expenses compare reasonably with the actual payments to non-passengers, but estimated general damages are considerably lower than actual. These three components of CTP payments are not however relevant when considering the cost of the Victorian no-fault scheme.

3. Cost Estimates for No-Fault Insurance

From the theoretical model developed, approximate cost estimates can be made for the limited no-fault scheme which began operation in Victoria on 12 February 1974:

Hospital expenses

Type of person killed or injured	Estimated hospital expenses from 1972 accidents
(1)	(2)
	$m
Driver	1.29
Passenger	1.12
Motor cyclist	0.23
Pedestrian	0.90
Cyclist	0.12
Total	3.66

On 1 March 1971, a Road Accident Hospital Accounts Committee (RAHAC) was established in Victoria. This Committee arranged with all major hospitals to pay 80% of all hospital expenses of road accident victims, and in return for this prompt payment the hospitals agreed to waive the remaining 20%. RAHAC levied CTP insurers for all payments it made, so that effectively hospital expenses were paid by CTP insurers on a no-fault basis, but at a reduced level.

For the year ended 30 June 1972, payments by RAHAC, plus the increase in RAHAC's outstanding liabilities, were $ 3.164 m. From the theoretical model hospital expenses for 1972 accidents were estimated above to be $ 3.66 m, and 80% of this amount is $ 2.93 m. This suggests that the theoretical model does provide reasonable estimates, at least for hospital expenses.

The number of registered vehicles has grown by about 5% in each of the years 1969 to 1972. Assuming that this growth rate continues, and that half this increase is absorbed by new safety measures such as the 60 m.p.h. absolute speed limit, there are likely to be 5% more accidents in 1974 than in 1972.

Between the December quarters for 1972 and 1973, average

weekly earnings in Victoria increased by 14.6%. Assuming a similar increase in 1974, a total increase between 1972 and 1974 of about 30% is likely.

The hospital expenses of $ 3.66 m estimated for 1972 accidents are thus likely to increase by about 37% to $ 5.01 m.

The Motor Accidents Board, which administers the Victorian no-fault scheme, is liable for 70% of these expenses, but it has the right to make contractual arrangements with hospitals whereby it pays an agreed part of the costs, and the hospital waives the remainder. In practice CTP insurers are likely to have to meet about 80% of all hospital expenses, as under the RAHAC scheme. The cost to insurers in 1974 is thus likely to be about $ 4.01 m, and virtually all this amount will be paid through the Board, rather than by insurers to insured persons.

Medical expenses and other special damages

Type of person killed or injured	Estimated medical expenses and special damages from 1972 accidents	Average degree of contributory negligence	Estimated CTP payments for medical expenses and special damages
(1)	(2)	(3)	(4)
	$m	%	$m
Driver	1.70	62.5	0.64
Passenger	1.48	0	1.48
Motor cyclist	0.31	62.5	0.12
Pedestrian	1.18	20.0	0.94
Cyclist	0.16	40.0	0.10
Total	4.83		3.28

Medical expenses and other special damages during 1974 are likely to be about 37% more than $ 4.83 m, i.e. $ 6.62 m. Of this amount, the no-fault scheme will pay about 80%, or $ 5.30 m. Of this amount, CTP insurers would in any event have been liable for $ 3.60 m, so the extra cost of no-fault medical and other benefits will be about $ 1.70 m.

The Board also has the right to make contractual arrangements with doctors and ambulance services, which may reduce the extra cost of no-fault benefits below that estimated above.

Income losses

Type of person killed or injured	Estimated income losses from 1972 accidents	Average degree of contributory negligence	Estimated CTP payments for income losses
(1)	(2)	(3)	(4)
	$m	%	$m
Driver	2.93	62.5	1.10
Passenger	1.48	0	1.48
Motor cyclist	0.60	62.5	0.23
Pedestrian	0.95	20.0	0.76
Cyclist	0.09	40.0	0.05
Total	6.05		3.62

Income losses during 1974 would be about 37% higher than $ 6.05, i.e. $ 8.29 m. Of this amount, the no-fault scheme is likely to pay out about 70% (allowing for reductions caused by the two day, two year and $ 120 per week limits). Of this $ 5.80 m, CTP insurers would in any event have been liable for $ 3.47 m, so the extra cost of no-fault income benefits will be about $ 2.33 m.

Total no-fault payments in 1974

In summary, the payments made by the present limited no-fault scheme, assuming it started on 1 January 1974, for all 1974 accidents, would be:

Type of no-fault benefit or cost	Amounts paid by Board	Amounts CTP insurers already liable for	Extra cost of no-fault benefits
(1)	(2)	(3)	(4)
	$m	%	$m
Hospital	4.0	4.0	—
Medical and other expenses	5.3	3.6	1.7
Income losses	5.8	3.5	2.3
Administration costs	0.8	—	0.8
Total	15.9	11.1	4.8

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Administration costs of 5% have been assumed. The State Motor Car Insurance Office of Victoria has an expense rate of 3%, but the Board's expense rate may be higher, as it has to process all CTP claimants, while only paying a proportion of total payments.

Total earned CTP premiums for 1972 were estimated to be $ 47.2 m, and total claims to be paid as a result of 1972 accidents were estimated to be $ 51.9 m. Allowing for 37% increase in accident costs, the corresponding figures for 1974 are $ 64.7 m and $ 71.2 m.

The structure of the present premium for private vehicles garaged in the metropolitan area is:

Purpose of premium	Premium amount
(1)	(2)
	$
Government charge	3.40
$ 1.00 to finance 6 months "free cover"	1.00
Extra cost no-fault benefits	4.90
Payments made by Board on behalf of CTP insurers	5.00
Remaining payments by CTP insurers	50.80
Total premium	65.10

Assuming that $ 55.80 is in fact a fair premium to meet the payments CTP insurers are liable for, and that this corresponds to the $ 64.7 m estimated CTP premiums, then the extra premium required for no-fault costs of $ 4.8 m in 1974 would be

$$\frac{4.8 \times 55.80}{64.7}, \text{ or } \$\ 4.10$$

On the evidence of these calculations, the no-fault premium of $ 4.90 appears to be reasonable.

The theoretical model set out in this report is based on a number of assumptions, which require verification. A model such as that set out here is however necessary to estimate the cost of no-fault benefits. In particular, the high employment rate, and low CTP coverage, of drivers and motor cyclists needs to be taken into account when estimating the cost of no-fault benefits.

The assumption that CTP awards to non-income earners are on average only one-third of those for income earners was made as an arbitrary starting point. A revised version of these calculations, using one-half instead of one-third, gave cost estimates very little different to those set out here. The available data thus does not allow the accuracy of this assumption to be checked, but its accuracy is not of major importance.

The cost estimates are however very sensitive to the assumptions made about the average degree of contributory negligence of each group of persons killed or injured. If for example drivers and motor cyclists are assumed to have higher average contibutory negligence than 62.5%, then the number of persons effectively covered by CTP drops, and the average CTP payment per person covered increases. There are then more persons covered by a no-fault scheme but not by CTP, each receiving a higher amount.

If reliable estimates of the cost of any no-fault scheme are required, then the extent of coverage provided by compulsory third party insurance should be further examined.