Child pedestrian mortality and traffic volume in New Zealand

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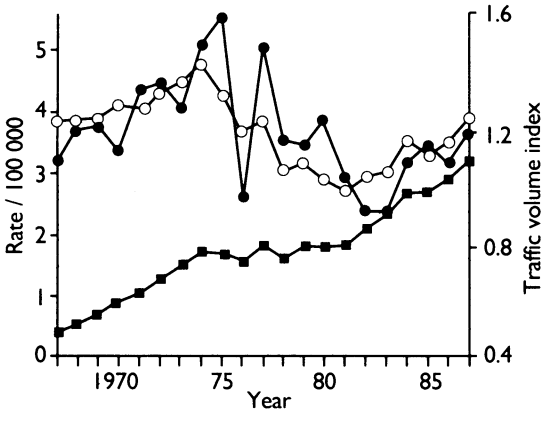
Pedestrian injuries are a leading cause of childhood mortality.[1] The analysis of trends in pedestrian death rates may provide information on the determinants of the incidence of these injuries.[2] We have examined the relation between child pedestrian mortality and traffic volume in New Zealand from 1967 to 1987.

Methods and results

Child (aged <15 years) pedestrian death rates (ICD code E814·7) were calculated by using National Health Statistics Centre mortality data for 1967 to 1987. A traffic volume index, based on data from traffic counters on urban highways throughout New Zealand, and the number of registered vehicles were obtained from the Ministry of Transport.

There was an annual average of 32·5 pedestrian deaths over the study period (3·7/100 000 children yearly). From 1967 to 1975 there was a 57·1% increase in traffic volume and a 69·7% increase in the death rate. Between 1975 and 1981 traffic volume increased by only 5·2% and death rates fell by 46·4%. After 1982 traffic volume rose by 27·6% and death rates by 53·7% (see figure). The number or registered vehicles increased steadily by 91·3% between 1967 and 1987.



Relation between child pedestrian death rates (●), traffic volume (■), and rates predicted by model (○)

The trend in child pedestrian death rates was examined by Poisson regression modelling.[3] Death rate was the dependent variable and traffic volume index (V), number of registered vehicles (R), and year (Y) the explanatory variables. The expected death rate (F) was modelled by a log linear equation, of the form: $\log F=\beta_0+\beta_V V+\beta_Y Y+\beta_R R$. After fitting the model only the variables V ($\beta_V=3{\cdot}089$, SE 0·929; p=0·0009) and Y ($\beta_Y=-0{\cdot}095$, SE 0·025; p=0·0002) were significant. The number of registered vehicles (R) was not significant in the model (p=0·244) or in a model with only R and Y (p=0·102). When rates were modelled with the unusual year 1976 excluded the coefficients were essentially unchanged. The relation between the death rates, traffic volume, and rates predicted by the model are shown in the figure.

Comment

A definite decline in child pedestrian death rates occurred between 1975 and 1981, a period in which there was very little growth in traffic volume. The energy crisis of 1974, which was accompanied by a fourfold increase in the price of petrol, was probably important in retarding the growth in traffic volume. As a result of the crisis the New Zealand government introduced "carless days" (when each car was required to be off the road for one day each week) and a ban on weekend petrol sales, which lasted until August 1980.[4] That the pedestrian death rates fell, as opposed to having levelled off in line with the plateau in traffic volume, suggests that the safety of the transport system was also improving during the period.

The results of modelling support these findings. A positive coefficient was derived for traffic volume, showing that death rates increase when traffic volume increases. A negative coefficient was derived for year, showing that, after controlling for traffic volume, death rates decline over time.

The impressive fall in death rates that occurred between 1975 and 1981 suggests that limiting the future growth in traffic volume has the potential significantly to reduce child pedestrian mortality. This would require public policy changes that strengthen the public transport system, discourage the use of private vehicles, promote cycling, and encourage the use of rail, river, and sea transport by freight. Ultimately the impetus for reducing the growth in traffic volume may come from an increasing awareness of the health effects of road traffic apart from injury.[5] With cities in Britain, North America, and Australia having recently experienced episodes of photochemical pollution, the environmental effects of motorisation are increasingly becoming the focus of attention.

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Cardiac rehabilitation programmes: are women less likely to attend?

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Cardiac rehabilitation programmes offer valuable secondary prevention after myocardial infarction and other cardiac events. Research attests to the effectiveness of rehabilitation programmes—for example, in decreasing death rates after myocardial infarction.[1] However, the evidence is based almost exclusively on male patients under 70. Though the positive impact of exercise training by female cardiac patients has been documented,[2] women are perceived as being less motivated to attend structured programmes, especially those entailing vigorous exercise.[3]

Some studies have noted higher drop out rates for women. Oldridge and colleagues noted a higher one year drop out rate from a cardiac rehabilitation programme for female (18/28; 64%)[4] than male (65/153; 42%)[5] patients after myocardial infarction or coronary artery surgery in the 1970s. A study of similar patients in the early 1980s found a female drop out rate of 18·9% (*v* 7·9% in men) and a lower programme attendance record for women (77% *v* 87%) (n=37 women, 227 men).[2]

To our knowledge no recent study has explicitly compared programme uptake rates of men and women. We have therefore examined cardiac rehabilitation programme uptake for men and women at this centre.

Patients, methods, and results

Records of all patients admitted to the coronary care unit at this hospital over 30 months (January 1989 to June 1991) and with a confirmed diagnosis of myocardial infarction were cross referenced with cardiac rehabilitation programme records to the end of 1991. A total of 686 myocardial infarctions were recorded in 652 patients. Seventy patients (11%) died in hospital. Surviving patients were routinely offered participation in the programme. All such patients in the study period would have had the opportunity to attend before the end of 1991.

Programme uptake was 49% in men and 34% in women ($\chi^2=11{\cdot}9$, df=1; $p<0{\cdot}001$). The mean age of surviving patients was 59·9 (SD 10·5) years for men and 65·2 (9·7) years for women ($t=6{\cdot}4$; $p<0{\cdot}001$). The hypothesis that the level of programme uptake changes as a linear function with age was examined by χ^2 trend analysis. There was a significant interaction, older patients being less likely to attend ($\chi^2=82{\cdot}5$, df=1; $p<0{\cdot}001$). The table shows programme uptake by age and sex combined. There was no significant interaction between sex of patient and programme uptake across age bands (Mantel-Haenszel summary $\chi^2=0{\cdot}2$, df=6; $p=0{\cdot}62$).

Cardiac rehabilitation programme uptake by age and sex after myocardial infarction at Beaumont Hospital, January 1989 to June 1991

Age (years)	Number of patients surviving (% of those attending)*		Mortality	
	Men	Women	No of men	No of women
20-29	1 (0)	0	0	1
30-39	6 (83)	2 (0)	0	0
40-49	67 (72)	9 (56)	4	1
50-59	124 (64)	35 (51)	7	2
60-69	139 (37)	61 (38)	10	12
70-79	66 (32)	54 (15)	17	6
80-89	12 (0)	7 (0)	2	8
Total	415	168	40	30

*One man is included in both survival and mortality columns as he survived two myocardial infarctions in 1990 but died of subsequent myocardial infarction in 1991.

Comment

As a higher proportion of surviving older patients are women (73% of female and 52% of male patients are aged 60 and over) it is fairly easy to associate non-participation in the cardiac rehabilitation programme with sex rather than with age. Men in their 70s were over twice as likely to attend the programme as were women in their 70s. However, a patient in his or her 40s was 6·9 times more likely to take advantage of cardiac rehabilitation than a patient in his or her 70s. Thus both age and sex are salient factors in determining programme uptake at this centre.

Female sex and increasing age are independently associated with decreasing cardiac rehabilitation uptake. As the demographic profile of cardiac patients is changing in the direction of more older patients and more cases in women there is a possibility of decreasing uptake of rehabilitation programmes. It is not clear what factors are responsible for these decreases. Difficulties in access to outpatient rehabilitation programmes and attitudes of patients and doctors to rehabilitation are among the factors which may influence uptake. Rehabilitation programmes in the future might, for instance, include former attenders as support and information providers to patients after myocardial infarction as a method of promoting programme uptake.

Given the changing cardiac population profile, the impact and value of cardiac rehabilitation and the attitudes of patients to standardised programmes need careful evaluation.

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ONE HUNDRED YEARS AGO

THE VARIATION IN HOSPITAL INCOMES; AND ITS EFFECTS.

The financial position of the London general hospitals has long been a cause of anxiety to those entrusted with the care of those institutions. But it is an ill wind that blows no good to any section of the community; and those whose interest has led them to regard the work of our large medical establishments from the social rather than from the purely scientific point of view, have sometimes hoped that the physician's extremity may prove the reformer's opportunity, and that the necessity of retrenchment may ultimately lead to some modification in the system of gratuitous medical and surgical treatment which obtains at present—a system which, in the opinion of many, is one of the most potent causes of pauperisation in the metropolis. How far these hopes are likely to be justified by the event we cannot say; but one fact is tolerably clear: it is extremely difficult to draw from the financial statements published by the different institutions any inference as to the effect which pecuniary embarrassments have hitherto produced upon the policy of the governing bodies.

It is a matter of common experience among the managers of charitable institutions that, in order to appeal with success to the public, they must remain constantly in debt. The beggar who can exhibit the most sores obtains most sympathy. This fact, however, does not account for the great deficits which are shown year after year in the balance sheets of our general hospitals. Take the figures for the year 1887, which were used as the basis of the petition to the House of Lords, and led to the appointment of the Committee whose report was summarised in our last issue. Seven out of the eight general hospitals with medical schools which depend upon voluntary contributions, closed that year with deficits varying in amount from £1,200 in the case of Charing Cross Hospital, to £8,800 in the case of Middlesex. If anything were necessary to convince us that these deficits were not intentionally left unmet in order to ensure the continued support of the public, we should be satisfied by the fact that even of the three great endowed hospitals which do not habitually appeal for subscriptions, two—St Thomas's and Guy's—ended the year with unmet liabilities of £7,000 and £900 respectively. (*BMJ* 1892;ii;:31)