The effect of seatbelt use on injury patterns, disposition, and hospital charges for elders
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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Seatbelt use in the elderly was examined.

Type of intervention
Primary prevention.

Economic study type
Cost-effectiveness analysis.

Study population
The study population comprised people aged 65 years or older who were victims of a MVC. Amongst the patients excluded were those without documentation of seatbelt use and those who were on a return visit to the emergency department (ED) for the same MVC.

Setting
The setting was primary care (ED). The economic analysis was conducted in Rhode Island.

Dates to which data relate
The effectiveness and resource data were collected between October 1997 and October 1999. The dates to which the unit costs/charges related were not reported.

Source of effectiveness data
The effectiveness data were gathered from a single retrospective study.

Link between effectiveness and cost data
The costing was carried out retrospectively on the same sample of patients as that used in the effectiveness study.

Study sample
All patients presenting to the ED between October 1997 and October 1999 were eligible for the study. The participants were identified using injury E-codes from ED billing data. A total of 339 patients were included in the study. Of these, 241 (71%) had been wearing a seatbelt (seatbelt group) and 98 (29%) had not (control group). A sample size of 474 patients would have been required to detect a 5% difference in the need for rehabilitation or nursing home placement.

Study design
The study was a retrospective cohort study that was conducted in a single centre. A retrospective chart review was
conducted for a 2-year period. The effectiveness data were obtained from rescue run sheets, ED records, hospital records and the hospital trauma registry (TRACKS software). One author and a research assistant abstracted the data.

Analysis of effectiveness
All patients included in the study were accounted for in the analysis. The primary health outcomes used in the analysis were sustained injuries, injury severity score, the need for nursing home or rehabilitation placement, and mortality. There was no statistical difference between belted and unbelted patients in terms of their gender or position in the vehicle.

Effectiveness results
Elderly MVC victims had a high reported rate of seatbelt compliance (71%).

The proportion of individuals with neck strain was 39.8% (95% confidence interval, CI: 33.6 - 46.3) for belted individuals and 22.4% (95% CI: 14.6 - 31.9) for unbelted individuals, (p=0.002).

The proportion of individuals with a chest contusion was 15.7% (95% CI: 11.4 - 20.9) for belted individuals and 7.1% (95% CI: 2.9 - 14.1) for unbelted individuals, (p=0.03).

The proportion of individuals with an open head wound was 1.66% (95% CI: 0.4 - 4.2) for belted individuals and 9.2% (95% CI: 4.2 - 16.7) for unbelted individuals, (p=0.001).

There was no statistical difference between the two groups in terms of head contusions and rib fractures.

The hospital admission rate was 17% (95% CI: 12.8 - 22.8) for belted individuals and 29% (95% CI: 19.9 - 38.6) for unbelted individuals, (p=0.02).

The percentage of deaths was 0.4% (95% CI: 0.01 - 2.4) for belted individuals and 3.4% (95% CI: 0.72 - 9.8) for unbelted individuals, (Fisher's exact p=0.064).

Clinical conclusions
The authors did not provide a summary clinical conclusion.

Measure of benefits used in the economic analysis
The authors did not develop a summary benefit measure. A cost-consequences analysis was therefore performed.

Direct costs
The perspective adopted in the analysis was not stated. Hospital charges were used as a proxy for the health care costs of caring for injured patients. The costs included ED charges and total hospital charges, derived by identifying resources represented on the final bill (e.g. room charges for observation stay, tests and medication). The quantities were obtained from the hospital's cost accounting system. Inpatient imaging and laboratory testing were not evaluated. Each of the resources was multiplied by a constant, the per-unit cost, to give the total charge. The per-unit costs included labour, supplies, equipment depreciation and allocation of hospital-wide indirect costs. The dates to which the resource quantities related were unclear. The costs and the quantities were not reported separately. Discounting was not reported. A sample size of 3,610 patients would have been required to detect a 10% difference in inpatient charges.

Statistical analysis of costs
Descriptive statistics and t-tests were used to compare the seatbelt and control groups. The precision of the estimates was described using CIs and standard deviations. A logarithmic transformation was used to analyse hospital charges.
Indirect Costs  
The indirect costs were not included.

Currency  
US dollars ($).

Sensitivity analysis  
No sensitivity analysis was carried out.

Estimated benefits used in the economic analysis  
See the 'Effectiveness Results' section.

Cost results  
The ED charges were significantly lower in the seatbelt group ($351, 95% CI: 276 - 405) than in the control group ($451, 95% CI: 305 - 596), (p=0.01).

The inpatient charges were lower in the seatbelt group ($12,340, 95% CI: 6,149 - 18,531) than in the control group ($27,288, 95% CI: 8,586 - 45,990), (p=0.1).

Head computer tomography utilisation was significantly lower in the seatbelt group (12.7%, 95% CI: 8.69 - 17.7) than in the control group (25.6%, 95% CI: 16.9 - 35.8), (p=0.005).

Synthesis of costs and benefits  
Not applicable.

Authors' conclusions  
Improved seatbelt compliance in the elderly age group can reduce injuries, hospitalisation rates, emergency department (ED) charges, and mortality resulting from motor vehicle crashes (MVC).

CRD COMMENTARY - Selection of comparators  
The reason for the choice of the comparator, no intervention, was clear.

Validity of estimate of measure of effectiveness  
The analysis used a retrospective cohort study, which was appropriate for the study question. However, the authors noted that there was significant potential for confounding and selection bias. For example, confounding factors such as speed and impact, airbag deployment and driving conditions were not available, and these factors may have influenced the results. The authors reported several selection biases, for instance, patients with minor injuries or those who died were not captured in the data set. These may have limited the findings and limited the generalisability of the results to the elderly population as a whole. The study sample was too small to detect a significant difference in the need for rehabilitation or nursing home placement. Self-reporting of seatbelt compliance may have biased the results in favour of the seatbelt group.

Validity of estimate of measure of benefit  
The authors did not derive a measure of health benefit. The analysis was therefore a cost-consequences analysis.
Validity of estimate of costs
The perspective adopted was not reported, but it is likely to have been that of the hospital. ED and hospital charges were reported and these do not reflect opportunity costs. The costs and the quantities were not reported separately, and the price year was not reported. These factors limit the generalisability of the results. The study sample was too small to detect significant difference in inpatient charges. Statistical analyses of resource quantities (tests performed) or costs were carried out.

Other issues
The limitation of generalisability of the results was addressed. Adequate comparisons were made with studies dealing with the same topic. The study considered elderly patients involved in MVCs and this was reflected in the author’ conclusions. The authors highlighted limitations of their study and do not appear to have reported their results selectively. This study has strong limitations (lack of power and selection biases) that may reduce the relevance of the study.

Implications of the study
The authors concluded that their findings may assist the emergency physician in evaluating and managing the elderly patient who has been injured as a result of a MVC. The findings may also be useful to policy makers and medical insurance providers in increasing seatbelt compliance rates in the elderly.

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Other publications of related interest


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