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.

CRD summary
This study examined the cost-effectiveness of head protection for all riders of all-terrain vehicles, considering the reductions in both fatal and non-fatal head injuries. The authors concluded that the universal wearing of head protection by riders of all-terrain vehicles was extremely cost-effective from the societal perspective. There were some limitations that could affect the validity of the authors’ conclusions, but the main findings appear to be robust.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
This study examined the cost-effectiveness of head protection for all people riding on all-terrain vehicles, considering the reductions in fatal and non-fatal head injuries.

Interventions
The intervention was the universal wearing of head protection while riding on all-terrain vehicles and the comparator was no helmet while riding.

Location/setting
USA/community.

Methods
Analytical approach:
The analysis was based on a decision-tree model, with a 50-year horizon. The authors stated that the study was carried out from a societal perspective.

Effectiveness data:
The clinical data were from selected relevant studies. The main source was administrative data published by the Consumer Product Safety Commission (CPSC). The other published sources included a study conducted in Australia. Several adjustments were necessary and were described. The key input was the efficacy of the intervention, which was defined as the reduction in fatal or non-fatal injuries while wearing protection. Six levels of injury, from minor to fatal, were considered.

Monetary benefit and utility valuations:
Not considered.

Measure of benefit:
The summary benefit measure was the number of head injuries averted.

Cost data:
The intervention costs included the helmet, supervision to ensure that it was worn, and injuries, which was divided into direct medical costs (medical and emergency services) and indirect costs (productivity losses, insurance administration, workplace and legal expenses, and property damage). These data were derived from published studies, using the maximum Abbreviated Injury Scale (AIS) score for motor vehicle incidents. The costs were in US dollars ($) and were discounted at an annual rate of 5%. The price year was 2008.
Analysis of uncertainty:
A one-way sensitivity analysis was undertaken on the key model inputs, using ranges generally assumed by the authors.

Results
The universal helmet strategy resulted in a reduction of two fatalities and 237.5 non-fatal head injuries per 100,000 riders per year and saved $364,306 per helmet worn. The helmet strategy was dominant, as it reduced head injuries and saved money.

Changes in the key model inputs altered the magnitude of the savings, but the universal helmet strategy remained dominant. The most influential input parameter was the exposure rate, defined as the number of hours on all-terrain vehicles per year.

Authors’ conclusions
The authors concluded that the wearing of head protection for all riders of all-terrain vehicles was extremely cost-effective from the societal perspective.

CRD commentary
Interventions:
The selection of no helmet wearing as the comparator was appropriate. It would have been interesting to compare universal wearing against different percentages of helmet use.

Effectiveness/benefits:
The sources of evidence were selected without a systematic review. An administrative database was used as the main source and this included a large number of cases, which were presumably representative of the general population, but the reported data did not fit the model; the data for riders who wore helmets were not separate from the data for those who did not. This database also only collected data for injured patients who sought emergency treatment. Some data were from a study conducted in Australia, but appropriate adjustments were made. The benefit measure was specific to the intervention and might not allow comparisons to be made with the benefits of other interventions.

Costs:
A broad perspective was adopted and all the relevant cost categories appear to have been considered. The authors stated that intangible costs were taken into account, but no details were provided. The costs were presented as category totals and were not broken down into individual items. No information on the derivation of the costs was given, reducing the transparency of the analysis. The price year and discount rate were reported. The cost estimates appear to have been treated deterministically.

Analysis and results:
The results were reported for the base case and for alternative scenarios. The uncertainty was investigated in a deterministic analysis that considered variations in individual inputs. A probabilistic analysis could have assessed the overall uncertainty, but the results appear to have been robust. The authors stated that a conservative approach was taken as facial injuries and long-lasting brain injuries were not considered. The results were representative of the US context and it is likely that universal helmet wearing would be cost-effective in other countries with similar all-terrain vehicle use.

Concluding remarks:
There were some limitations that could affect the validity of the authors’ conclusions, but the main findings appear to be robust.

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