Impact of introducing a sedation management guideline in intensive care
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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
The study examined the use of sedation management guidelines (adapted from the Ramsay sedation scale) for patients in the intensive care unit (ICU).

Type of intervention
Treatment.

Economic study type
Cost-effectiveness analysis.

Study population
The study population consisted of medical and surgical patients admitted to an ICU.

Setting
The setting was tertiary care. The economic study was carried out in Birmingham, UK.

Dates to which data relate
The effectiveness data and resource use data were gathered from 1996 to 2000. The price year was not reported, although it is likely that the costing was based on the prices over the study period.

Source of effectiveness data
The effectiveness data were derived from a single study.

Link between effectiveness and cost data
The costing was undertaken on the same patient sample as that used in the effectiveness study. The data were collected prospectively for the intervention group and retrospectively for the comparator group.

Study sample
The authors did not report whether power calculations were conducted to calculate the sample size. Patients were identified as those treated at the study centre between set dates. All patients admitted to the ICU during the 48-month study period were included in the analysis. This comprised a total of 1,633 patients in the pre-guideline group and 1,476 patients in the post-guideline group.

Study design
This was a single-centred, prospective, comparative study with a historical control. The study was carried out over a
48-month period, with 24 months of prospective data (post-guideline) and 24 months of retrospective data (pre-guideline) being collected.

Analysis of effectiveness
The primary outcomes for the clinical study were LOS and mortality. The study groups appear to have been comparable at baseline, where gender, case-mix and severity of illness (APACHE scoring) were considered. Owing to confounding factors, LOS data were only analysed for non-cardiac patients.

Effectiveness results
The pre-guideline LOS stay in non-cardiac patients was 4.6 days (standard deviation, SD=4.4), compared with 5.1 days post-guideline (SD=4.3), (p=0.22).

The overall mortality was 13% pre-guideline and 14% post-guideline, (p=0.48).
Cardiac mortality was 4% in both the pre- and post-guideline groups, (p=0.95).
Mortality was 24% pre-guideline in the non-cardiac group, compared with 23% post-guideline, (p=0.67).
The number of bed days pre- and post-guideline, (p<=0.001) and admissions per month pre- and post-guideline, (p=0.11) were also reported.

Clinical conclusions
ICU mortality remained constant before and after the introduction of the guidelines. The LOS for non-cardiac surgery patients was not significantly different in the two periods.

Measure of benefits used in the economic analysis
No summary measure of benefit was derived. The authors suggested that the clinical effectiveness was similar and the economic analysis was based on cost-differences only.

Direct costs
Only the direct hospital costs for sedative drugs were evaluated. The quantities and the costs were not reported separately. Discounting was not carried out, but it was not relevant as the costs were incurred during less than 2 years. The unit costs for the included drugs were obtained monthly from the hospital pharmacy and were used to derive the monthly cumulative costs of the eight drugs identified.

Statistical analysis of costs
The costs were treated deterministically.

Indirect Costs
The indirect costs were not included.

Currency
UK pounds sterling ().
Estimated benefits used in the economic analysis
Due to the cost-consequences approach taken, see the 'Effectiveness Results' section.

Cost results
Over the 24-month study, the cost of sedatives and analgesic agents was 150,851 pre-guideline versus 87,092 post-guideline (a cost-saving of 63,759).

The mean cost per month over the 24 months was 6,285 pre-guideline versus 3,629 post-guideline (p<=0.0001).

The costs of nursing time required to carry out the guideline procedures was not taken into account. This is relevant as it would have lowered the apparent cost-saving described above.

Synthesis of costs and benefits
Not applicable.

Authors' conclusions
Guideline-directed management for sedation significantly reduces the cost of sedative drugs per bed day without any negative effect on length of stay (LOS) in the intensive care unit (ICU) and outcome. The authors stated "guidelines can be introduced in a complex multidisciplinary ICU environment. They can have a beneficial effect on efficiency without compromising the quality of service".

CRD COMMENTARY - Selection of comparators
The reason for the choice of the comparator was clear. It was chosen because it represented the routine care provided to patients in the ICU before sedation guidelines were introduced. You should consider whether this is a widely used technology in your own setting.

Validity of estimate of measure of effectiveness
The analysis of effectiveness was based on a prospective observational study with historical controls. As no power calculations were performed it was not certain whether the sample size was sufficiently large. The authors used a convenience sample with all patients admitted to the ICU being included. The authors stated that there was no statistically significant difference between the groups at baseline and the APACHE scores were comparable, suggesting that the groups were comparable at baseline. However, the observational nature of the study and the use of retrospective data represent limitations to the internal validity of the analysis.

Validity of estimate of measure of benefit
The reader is referred to the comments in the 'Validity of estimate of measure of effectiveness' field (above).

Validity of estimate of costs
The perspective adopted in the study was not explicitly reported and only the costs for sedation drugs were included. The quantities and the costs were not reported separately. The costs were treated deterministically and sensitivity analyses were not carried out. Nursing time costs for carrying out the nurse-led sedation management as per protocol were not included. These represent serious limitations to the validity of the estimate of costs.

Other issues
The authors did not compare their findings with those from other studies. In addition, the issue of generalisability to other settings was not addressed. This limits the external validity of the analysis. The results were not reported.
selectively and the conclusions would appear to reflect the scope of the analysis.

**Implications of the study**
There were no recommendations for further research. However, the authors highlighted that the impetus for developing clinical guidelines should be to improve patient care.

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