The role of triage nurse ordering on mitigating overcrowding in emergency departments: a systematic review

CRD summary
The review concluded that triage nurse ordering appeared to be an effective intervention to reduce length of stay in emergency departments, but this was based on a small number of studies with weak methodological quality. The review was well conducted. The authors’ conclusions are suitably cautious and seem appropriate.

Authors’ objectives
To examine the effectiveness of triage nurse ordering on mitigating the effect of emergency department overcrowding.

Searching
MEDLINE, EMBASE, CINAHL, Cochrane Central Register of Controlled Trials (CENTRAL), SCOPUS, Web of Science, HealthStar, Dissertation abstracts and ABI/INFORM Global were searched from October 2004 to May 2009 without language restrictions. Controlled trials registries, conference proceedings, study reference lists, study authors and experts in the field were consulted. Search terms were available online. The search was an update of a previous review (see Publications of Related Interest) and the studies from this review were also included. An update search was conducted in January 2011 in MEDLINE, EMBASE, SCOPUS and CINAHL.

Study selection
Randomised controlled trials (RCTs), controlled clinical trials, prospective cohorts, retrospective cohorts, interrupted time-series, case-control studies and before-and-after studies of triage nurse ordering versus control for mitigating the effect of emergency department overcrowding in adults were eligible for inclusion. Studies had to report numerical data on one of the outcomes of emergency department length of stay, time to physician initial assessment and proportion of radiographs ordered by nurses. Definitions were provided in the review. Studies of nurse practitioners or floor nurses were excluded. Studies that compared the levels of the same intervention were excluded.

The included studies considered triage nurse ordering versus emergency department physician ordering (some studies specified certain test results, such as X-ray). Most studies were single centre; one was multicentre. Training and experience of nurse triage staff varied across studies. The intervention period ranged from two weeks to two years, where reported.

Four reviewers independently undertook screening and pairs of reviewers independently performed study selection; disagreements were resolved by discussion.

Assessment of study quality
Study quality was assessed according to the Effective Public Health Practice Project tool with six criteria: selection bias, study design, blinding, data collection methods, confounders and withdrawals and drop-outs. Each criterion was rated as weak, moderate or strong and studies were then rated as weak, moderate or strong.

Two reviewers independently performed quality assessment. Disagreements were resolved by consensus.

Data extraction
Data were extracted on emergency department length of stay, physician initial assessment and proportion of radiographs ordered by nurses and used to calculate mean differences and risk ratios (RRs), with 95% confidence intervals (CIs).

Two reviewers independently performed data extraction. Study authors were contacted for missing data.

Methods of synthesis
Random-effect meta-analysis was used to calculate pooled mean differences and risk ratios, with 95% CIs. Statistical
heterogeneity was assessed with $I^2$. Analyses were stratified by study type (RCTs versus other studies). Subgroup analysis was conducted by injury/suspected fracture status.

**Results of the review**
Fourteen studies were included in the review (24,096 participants, range 40 to 15,188); three studies were RCTs. All studies were classed as weak quality.

Compared with emergency department physician, triage nurse ordering statistically significantly reduced emergency department length of stay in an RCT (mean difference -37.20 minutes, 95% CI -44.10 to -30.30; one RCT) and other study designs (mean difference -50.92 minutes, 95% CI -56.32 to -45.52, $I^2=0$%; three studies). Triage nurse ordering did not have a statistically significant effect on physician initial assessment (three studies) and proportion of radiographs ordered by nurse (two RCTs).

Subgroup analysis indicated that emergency department length of stay was influenced by whether or not patients had suspicion of injury/fracture.

**Authors’ conclusions**
Triage nurse ordering appeared to be an effective intervention to reduce length of stay in emergency departments, although this is based on a small number of studies with weak methodological quality.

**CRD commentary**
Inclusion criteria for the review were clearly defined. Several relevant data sources were searched without language restrictions. Publication bias was not assessed as the authors felt that the small number of studies would render any assessment meaningless; more than 10 studies were found so this was questionable and the risk of publication bias could not be ruled out (although the thorough search limited the chances). Attempts were made to reduce reviewer error and bias throughout the review. Quality assessment indicated that all of the data was of weak methodological quality. Data were pooled using standard methods and statistical heterogeneity was considered, which was appropriate.

The review was well conducted. The authors’ conclusions were suitably cautious and seem appropriate.

**Implications of the review for practice and research**

**Practice:** The authors did not state any implications for practice.

**Research:** The authors stated that further studies must include a more comprehensive description of the contextual factors surrounding the interventions. Studies should explore the effect of triage nurse ordering on other indicators of quality and crowding.

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