To support paramedics’ decision-making to make transportation or treat at home.

To support paramedics’ decisions to transport patients to hospital, or treat and leave them at home.

Background
Modified Early Warning Scores (MEWS) are used in hospitals to identify patients who may benefit from admission or intensive care. They are calculated from physiological measures (systolic blood pressure, heart and respiratory rate); the higher the MEWS the greater the clinical risk of mortality. There has been increasing interest in their use in the pre-hospital ambulance setting, although there remains a paucity of evidence of their use from prospective studies.

Our aim
To evaluate the use of MEWS to support paramedics’ decisions to transport patients to hospital, or treat and leave them safely at home.

Method
We used an interrupted time series design. We trained nineteen paramedics how to use MEWS (figure 1). Using their existing clinical skills, they were encouraged to carefully consider all cases where the MEWS was 0 or 1, and decide whether their patient needed to be transported to hospital or whether they could be treated and left safely at home.

Analysis
We used linear regression to evaluate differences in weekly transportation rates (percentage of patients attended and transported to hospital) and revisit rates (Percentage of patients attended, treated at home and subsequently revisited within 7 days), comparing trends in rates 17 weeks prior (pre-MEWS) and 17 weeks post-implementation of MEWS.

Results
Participating paramedics attended 4140 emergencies. Of the data, 2235 were excluded owing to missing values (n=1897), recording errors (n=21) or excluded clinical complaints (n=290).

From the remaining data (n=1932) we found no significant difference in transportation rates (pre MEWS: 55±6% to post MEWS: 63±11%) by catering for existing trends where the confidence intervals of the regression overlap. Likewise, there was no significant difference in revisit rates (pre MEWS: 4±4% to post MEWS: 2±4%) catering for similar trends (table 1).

Auto-calculated scores retrospectively applied to all data provided pre-MEWS and were compared, using a Chi square test, with paramedic calculated scores post-MEWS.

Where paramedics had recorded MEWS (n=622), we found 39% were incorrect; X² (1) = 213.878, p<0.001, 0.613 (phi).

Discussion
Transportation and revisit rates were unaffected by the introduction of MEWS and were comparable to those found nationally; 70% (range 52% to 83%) and 6% (range: 12% to 10%) respectively. We therefore deduce MEWS had little influence on clinical-decision making.

Of the 622 recorded MEWS, more than a third were incorrect. Previous studies have reported similar findings. We believe omissions and errors were owing to time-factors, misunderstandings regarding the application of MEWS and confusion with the matrix itself. Mathematical symbols (≥ ≤ > <) were often misconceived, for example, oxygen saturation of 96 was often incorrectly scored as 0.

Strengths & limitations
This was one of the first prospective studies evaluating an early warning score system used by paramedics. Our findings will be of value to other ambulance services who may be considering adopting such a system.

Time to provide support, clinical feedback and motivation was limited. Although others found extensive training, regular feedback and reminders made little difference to errors or uptake.

Recommendation
If adopted, early warning score systems should be computer based; auto-calculated using the physiological measures entered on the patient record. This will save paramedics’ time and ensure clinical decisions are based on correct measurement of risk.

Conclusion
MEWS had no effect on transport or revisit rates. Scores were frequently not calculated or recorded, or calculated incorrectly. Opportunities for on-going training, clinical support and feedback were limited, although evidence suggests this may have made little difference.

References