Developing a Paediatric Observation Priority Score (POPS)
The challenge of using scoring systems to define hospital admission

Damian Roland, Gareth Lewis, Ffion Davies

University Hospitals of Leicester

Background
Children with serious illness can sometimes be difficult to spot, especially for non-experienced clinicians. Although adult “early warning scores” are now commonly used in Emergency Departments (EDs), there is no standard scoring system for children. Unfortunately previous attempts at determining outcome or disposition have always had low specificity due to the extreme range of normal variation in children’s physiology and very low incidence of adverse outcomes.

The Paediatric Observation Priority Score (POPS) is a physiological and observational scoring system designed for use by health care professionals of varying clinical experience, aiming to improve patient triage; and allow senior clinicians to assess casemix / level of risk in the ED (Figure 1).

Aims
This first stage of a validation process assesses the use of POPS in the Children’s ED of a large teaching hospital to examine how the combination of behavioural and physiological variables relate to patient acuity and disposition.

Methods
The POPS system is an integral part of the assessment process at the Leicester ED (Figure 2). POP Scores are calculated during initial triage assessment of the patient, and recorded in the patient notes.

Results
942 casenotes were studied although 344 records were incomplete. 337 (36%) were admitted to the paediatric wards and 2 (0.2%) were admitted directly to the intensive care unit.

Of those with a POPS of 0 or 1 (478/942), 16 (3%) were prioritised, and 374 (78%) were discharged whereas of those with a score of 4 and above (170/942), 94 (55%) were prioritised, and 59 (35%) were discharged (Figure 3). No child with a POPS above 7 was discharged. POPS was not discriminatory for children presenting with seizure but increasing scores related to increasing admission rates for children with breathing difficulty (Figure 4).

Learning Points
POPS is functioning as an effective prioritisation tool in the ED setting for certain presentations. Lack of complete observation documentation is disappointing but consistent with previous research. POPS appears to function as an adjunct to existing prioritisation systems.

POPS alone cannot be used as a predictor of admission. Of those with POPS 0-3, 59/286 (21%) were admitted. This was partly due to presentations necessitating further paediatric review (seizure, deliberate self harm, overdose).

35% of POPS > 4 (59/170) were not admitted. Although 13/59 had documented improvement prior to discharge; 6 represented within 72 hours and were subsequently admitted.

These confounding factors affecting sensitivity and specificity illustrate the difficulty in designing scoring systems to aid illness identification across all diagnoses in Children’s EDs.

Conclusion
Our results have given us confidence that POPS will differentiate patient acuity at initial assessment and predict risk of admission. We plan to evaluate its role in risk stratification and resource utilisation.