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# To what extent does achievement of the best practice tariff explain between-hospital variation in hip fracture outcomes?

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## Background

Each year in England over 60,000 older adults fracture a hip, impacting quality-of-life, survival and health costs. Fracture services are provided through complex multidisciplinary organisational structures. Despite UK standards and guidelines, hospital delivery of hip fracture care is highly variable, as are patient outcomes across the country.

## Objective

To determine the impact of organisational factors on the variation in hip fracture outcomes between English hospitals.

## Methods

Analysis of National Hip Fracture Database (NHFD), Hospital Episodes Statistics (HES) and Office for National Statistics (ONS) mortality data for 2014/15, linked at the patient-level, and combined with Best Practice Tariff (BPT) organisational-level audit data. Statistical analyses used multi-level models, to identify which BPT organisational factors are responsible for the greatest variation in two patient outcomes: 30-day mortality and 'superspell' length of hospital stay (SLOS) (*i.e.* the acute plus rehabilitation length of NHS stay).

## Results

We analysed 51,714 patient records from 162 English hospitals. Documentation of pre-operative Abbreviated Mental Test Score (AMTS) was associated with lower mortality risk (OR 0.74 [95%CI 0.58, 0.94];  $p=0.02$ ) independent of patient case-mix; other components of BPT did not substantially change mortality risk. Substantial between-hospital variation in 30-day mortality persisted, ranging from 2.7% to 7.5% (Figure 1), after adjusting for within-hospital clustering, patient case-mix and BPT factors. Factors predicting reduced SLOS were documented pre-operative AMTS and physiotherapy assessment, difference in mean SLOS was 0.29 (95% CI: -0.61, 0.03;  $p=0.08$ ) and 0.05 (95% CI: -0.12, 0.01;  $p=0.08$ ) fewer days, respectively. After full adjustment, substantial between-hospital variation in SLOS remained varying from 13.1 to 39.8 days.

## Discussion

We identified important BPT parameters which predict reduced mortality and length-of-stay, independent of patient characteristics. Although these BPT parameters could explain variation in outcomes between patients, they explained little of the variation in outcomes between hospitals.

## Conclusion

We believe that understanding sources of variation in the delivery of current hip fracture care across different NHS organisations with concomitant effects on patient outcomes should inform service-level interventions to reduce unwarranted variation in adverse patient outcomes and maximise health equity. This is currently the focus of ongoing work.

Figure 1: Variability in 30-day mortality, adjusted for patient case mix and hospital BPT parameters, across English hospitals

