

EDITORIALS



Making sense of the evidence for the “weekend effect”

Sicker patients at the weekend, but even after adjustment for this their risk of death is higher

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In their analysis of 2013-14 English hospital administrative data, Freemantle and colleagues again find an increased risk of death in patients admitted at a weekend compared with weekdays.¹ Their analysis combines both emergency and elective admissions and updates their earlier study.² They confirm a persistent “weekend effect” in England, which they claim is “not otherwise ignorable,” and add to a substantial body of literature demonstrating this phenomenon both nationally³⁻⁵ and internationally.⁶⁻⁸

The findings of such studies and the resultant media coverage are being used by politicians to bring about changes in working practices,⁹ but against a strong background of criticism of these kinds of statistics.¹⁰ At first glance, there is conflicting evidence about whether the weekend effect exists at all.^{11 12} However, closer scrutiny shows that apparently “contradictory” studies tend to be smaller, carried out in single hospitals, and lack statistical power. Death after hospital admission, particularly for a planned surgical procedure, is relatively rare, and small studies simply don’t have the numbers to be able to show an effect.

Freemantle and colleagues find an increased risk of death of 10% for admissions on a Saturday and 15% for admissions on a Sunday compared with patients admitted on a Wednesday, which on the face of it, does not seem trivial. However, this represents a 10-15% increase on a relatively low risk of death overall (1.8%). The difference between relative risk and attributable risk is key. Researchers in this area have often focused on death as an outcome because it is important to patients and easily measured, but there is also evidence of a weekend increase in avertible errors in care leading to other complications.¹³ Though the proportion of admissions ending in death is relatively low, there is an assumption that an increased risk of death may indicate a much greater burden of complications and error, causing unnecessary harm to patients.

An obvious criticism of some of these observational studies is that patients admitted at the weekend are simply sicker. Freemantle and colleagues do indeed find a higher proportion of sicker patients at the weekend but attempt to account for this by adjusting for case mix using a wide range of variables included in administrative data. They are not the first group to adjust for this,³ yet the weekend effect seems to persist. No

attempt to account for sicker patients in an analysis is perfect, but risk adjustment models based on administrative data have been shown to be as good, if not better, than models based on clinical data.¹⁴ The possibility, however, of residual confounding can never be entirely ruled out.

In an attempt to get around this problem, one of my group’s studies looked at planned surgical procedures and focused on the day of the week on which the procedure was performed. We found an increasing risk of death as the day of procedure approached the weekend, with 44% higher odds of death if an operation was carried out on a Friday (with the most critical postoperative period occurring over the weekend) compared with a Monday.⁴ The case mix of patients varies much less in planned procedures on weekdays, and therefore confounding was less of a problem. In a follow-up paper, we also ruled out a lower level of experience in consultants carrying out procedures on a Friday as a contributory factor for this effect.¹⁵ Freemantle and colleagues look specifically at stroke as well as other conditions for which there is less reason to believe that patients would be sicker at the weekend. We have also examined emergency stroke admissions and, even after adjusting for case mix, found not only an increased risk of death for patients admitted at the weekend but also that patients were less likely to receive computed tomography on the day of admission, were less likely to receive thrombolysis, had higher rates of pneumonia, and were less likely to be discharged back to their usual place of residence.¹⁶ This combination of both process and outcome measures strengthens the case for poorer quality of care at the weekend. If patients were sicker, we might expect higher rates of diagnostic tests and interventions.

So if the “weekend effect” is real, what are the reasons behind poorer outcomes? Freemantle and colleagues point towards reduced services inside and outside the hospital as a possible explanation, but few studies have examined this important issue directly. Researchers in the US found a Friday effect in non-emergency major surgery but not in patients admitted directly to an intensive care unit, where there were more consistent levels of staffing throughout the week.¹⁷ A recent UK study found that ward rounds by stroke specialists on seven days a week did not affect risk of stroke mortality but did find an association with the intensity of weekend staffing by

registered nurses.¹⁸ A recent, very large European study found a strong relation between overall hospital mortality and nurse staffing and education.¹⁹

Much evidence exists on the subject of weekend care, and there is a need for a comprehensive systematic review of findings. More research is needed to understand the complex relation between staffing levels and services and patient safety, using both process and outcome measures. With promised changes to how the NHS provides weekend and out of hours care, it will be an ideal opportunity to evaluate their impact on the “weekend effect.”

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