

# Non-adherence with weekend treatment sessions does not explain excess admissions after the 'long gap' in thrice-weekly haemodialysis

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## Introduction

Admissions and deaths have been shown to vary according to day of the week in patients receiving haemodialysis (1).

Non-adherence with haemodialysis sessions is associated with an increase in admissions and deaths in the immediate two days after the missed session (2).

It is plausible that when considering which haemodialysis sessions not to attend, patients may preferably miss sessions associated with the weekend: Friday in those with a Mon/Wed/Fri schedule and Saturday in those with a Tue/Thu/Sat schedule. Missing these session converts a two day break to a four day break. How non-adherence (and perfect adherence) influences the excess admissions after the long gap has not previously been explored.

## Methods

### Patients and Data Sources

Data on patients starting renal replacement therapy between 2002 and 2006 was obtained from the UK Renal Registry, a disease registry collecting information on patients with RRT from all centres in England. This data was then linked to the Hospital Episode Statistics (HES) database, which captures date, location, diagnoses and procedures for all hospital delivered care in England.

Follow-up time included in the analysis was the period of time receiving haemodialysis according to the UKRR dataset. Patients and treatment time was limited to renal centres and dialysis units that employed HES to document haemodialysis attendance (approximately 24% of total cohort patient time).

### Definition of a missed haemodialysis session

HES coded attendance for haemodialysis was used to assign a Mon/Wed/Fri or Tue/Thu/Sat haemodialysis regimes. Non-adherence of specific haemodialysis sessions was tailored to reflect potential clinical practice and defined as:

Absence of a scheduled HD session with a preceding attended HD session plus:

- No hospitalisation or death on the HD session day
- No discharge on the preceding day
- No elective admission the day after the missed HD session

### Endpoints

- Compliance rate on specific haemodialysis day of the week
- Admission rate after the missed haemodialysis session (specific to haemodialysis day of the week)
- Admission rate across dialysis week in patients who have perfect compliance.

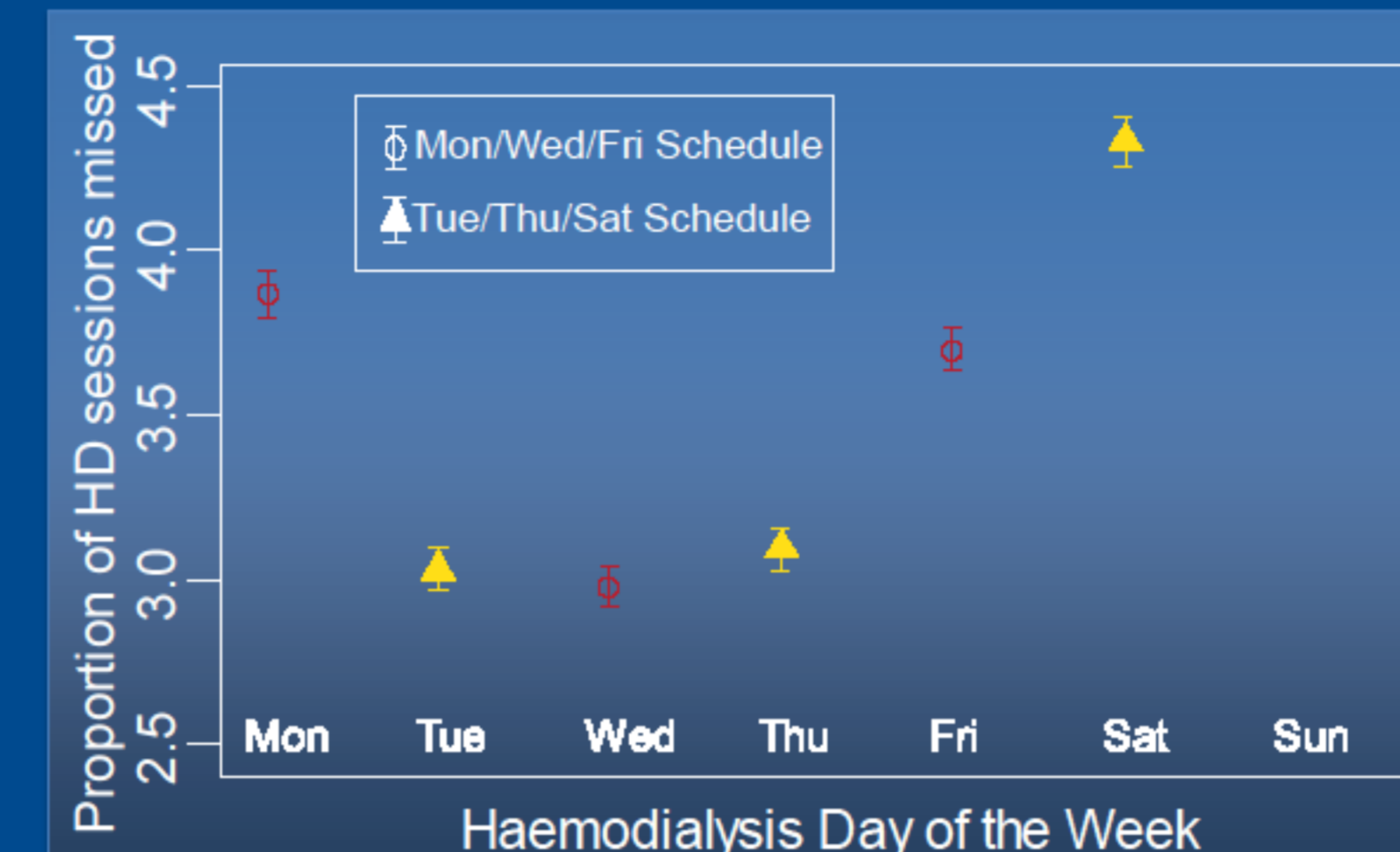
### Statistical Techniques

Logistic regression with clustering for patient was employed to identify variables predicting non-adherence. Poisson regression was used to derive admission rate confidence limits.

Admission rates on specific days were annualised for reporting.

## Results

Figure 1: Adherence according to dialysis day



10,580 patient years in 5748 patients were available for analysis. Overall, non-adherence was 3.5%, with variation in adherence in dialysis days according to HD regime (P<0.001).

Adherence was poorest on Saturdays in patients dialysing Tue/Thu/Sat (Figure 1).

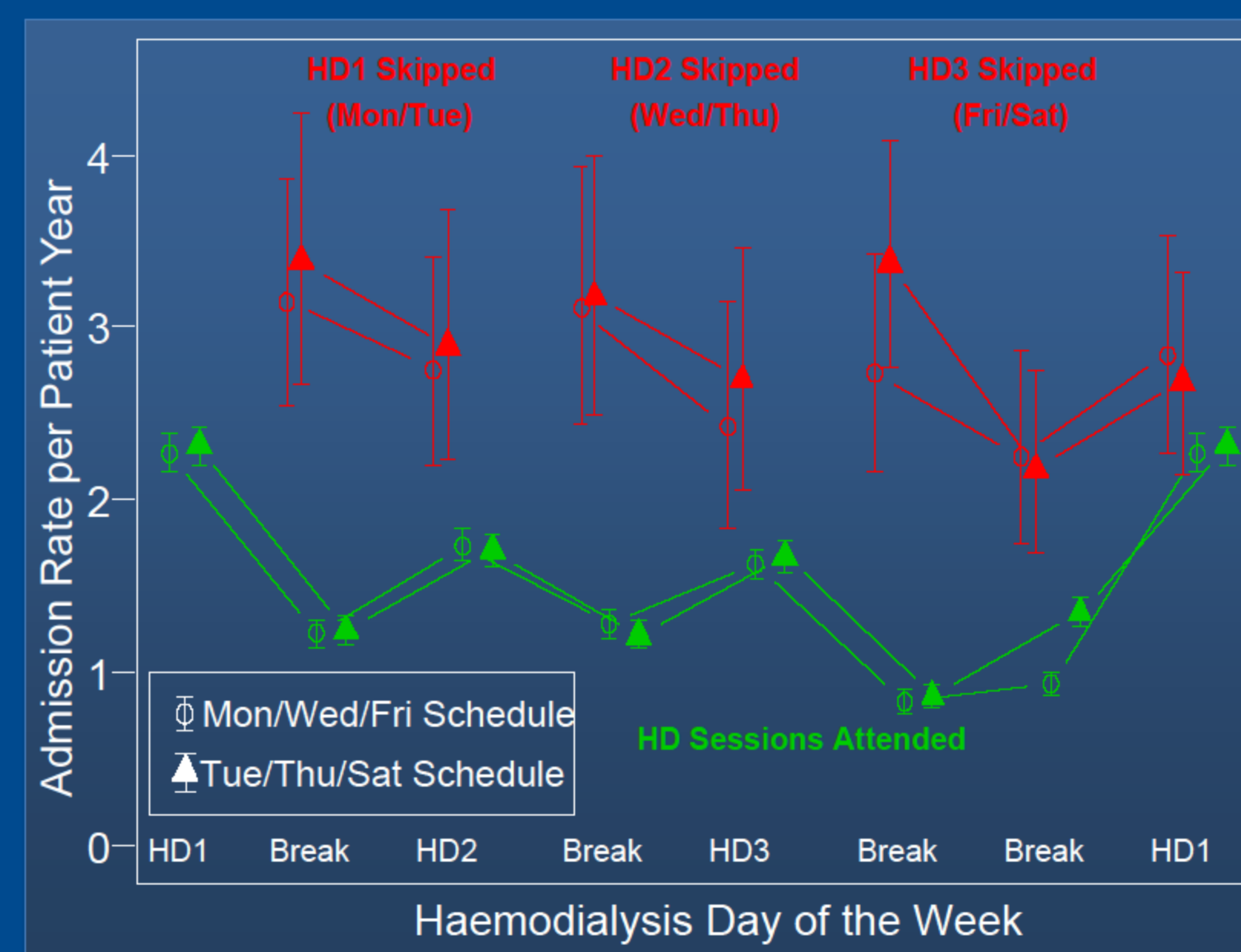
Table 1: Patient level factors influencing compliance

	Any HD session		Last HD session	
	Odds Ratio for non-compliance (95% CI)	P	Odds Ratio for non-compliance on HD3	P
Age per year	0.993 (0.992 - 0.994)	<0.001	0.997 (0.995 - 0.999)	0.001
Non-white	1.080 (1.019 - 1.143)	0.009	1.139 (1.063 - 1.222)	<0.001
Male Sex	0.972 (0.929 - 1.016)	0.210	1.012 (0.957 - 1.069)	0.681
Comorbid score	0.960 (0.949 - 0.971)	<0.001	1.026 (1.008 - 1.043)	0.004
Tue/Thu/Sat	1.015 (0.982 - 1.048)	0.376	1.226 (1.167 - 1.289)	<0.001

Younger, non-white and less comorbid patients were more likely to miss haemodialysis sessions.

Patients who were younger, non-white and more comorbid were more likely to miss the third HD session

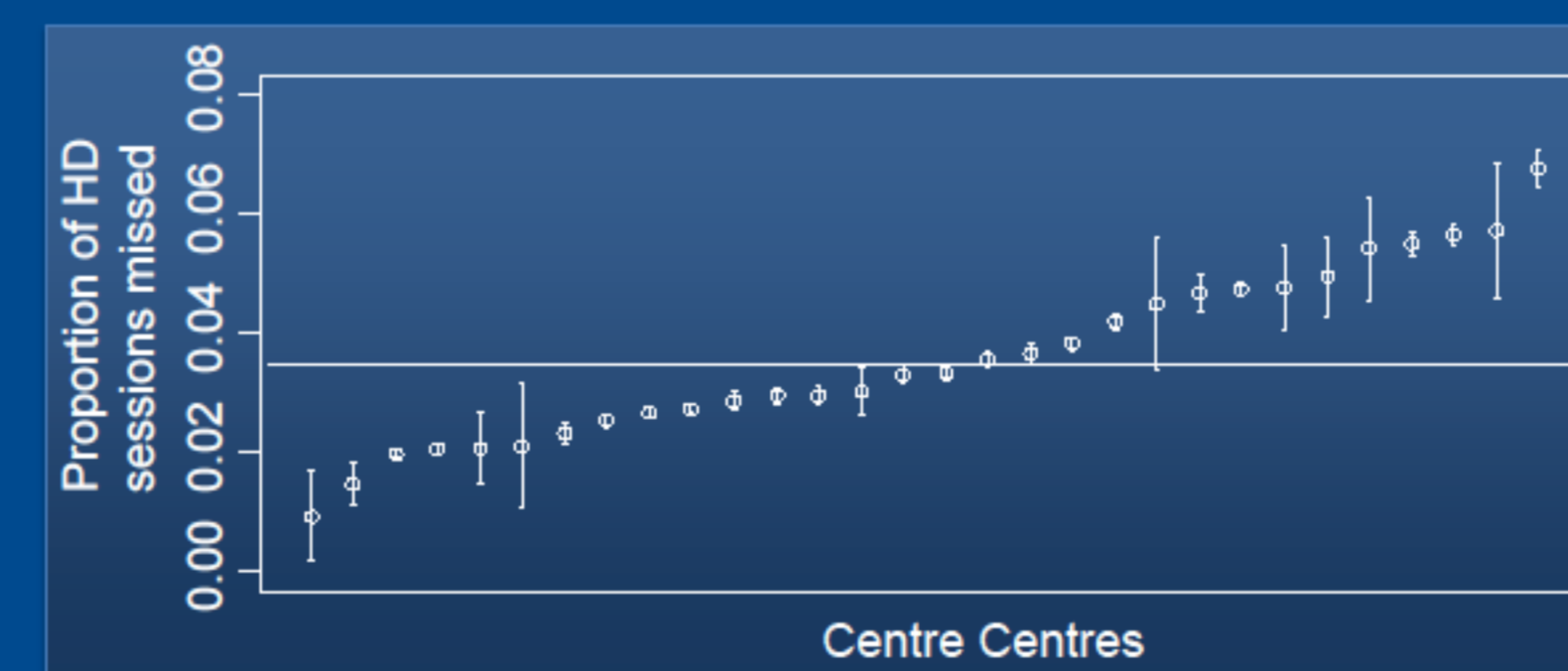
Table 2: Patient level factors influencing compliance on the third HD session



Admission rates were doubled after a missed HD session (2.82 admissions per year days vs 1.45 for attended, P<0.001), with similar daily admission rates seen after a missed Friday or Saturday (F/S) HD session.

Admission rates after the two day break were marginally greater in non-attended F/S HD sessions compared to those attended (2.76 vs 2.29 per year, P=0.02), but increases in admissions after the two day break persisted in patients with perfect adherence (2.29 vs 1.45 per year, P<0.001).

Figure 3: Centre-specific compliance rate across all haemodialysis days



Narrow confidence intervals were obtained for centres due to the large number of observations, leading to many centres displaying significantly worse non-adherence rates than the mean.

## Conclusions

This study identifies a higher rate of missed HD sessions than other studies(2), and a large increase in admissions following skipped HD sessions. Although non-adherence rates are higher in Saturday HD sessions in patients on Tues/Thu/Sat regimes, poorer adherence is unlikely to be responsible for the increase in admissions seen after the two day break as the increases persist in patients with good adherence.

Larger, more detailed datasets are needed to explore adherence and mortality, and determine the impact of shortened treatment times on event rates.

## References

1. Foley RN, Gilbertson DT, Murray T, Collins AJ. Long Interdialytic Interval and Mortality among Patients Receiving Hemodialysis. *New England Journal of Medicine*. 2011 Sep 22;365(12):1099-107.
2. Chan KE, Thadhani RI, Maddux FW. Adherence barriers to chronic dialysis in the United States. *J Am Soc Nephrol*. 2014 Nov;25(11):2642-8.

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