SUPPLEMENTARY MATERIAL: HOSPITALIZATION AND MORTALITY FOLLOWING NON-ATTENDANCE FOR HEMODIALYSIS ACCORDING TO DIALYSIS DAY OF THE WEEK: A EUROPEAN COHORT STUDY

Figure S1. Country specific non-attendance rates according to session of the dialysis week.

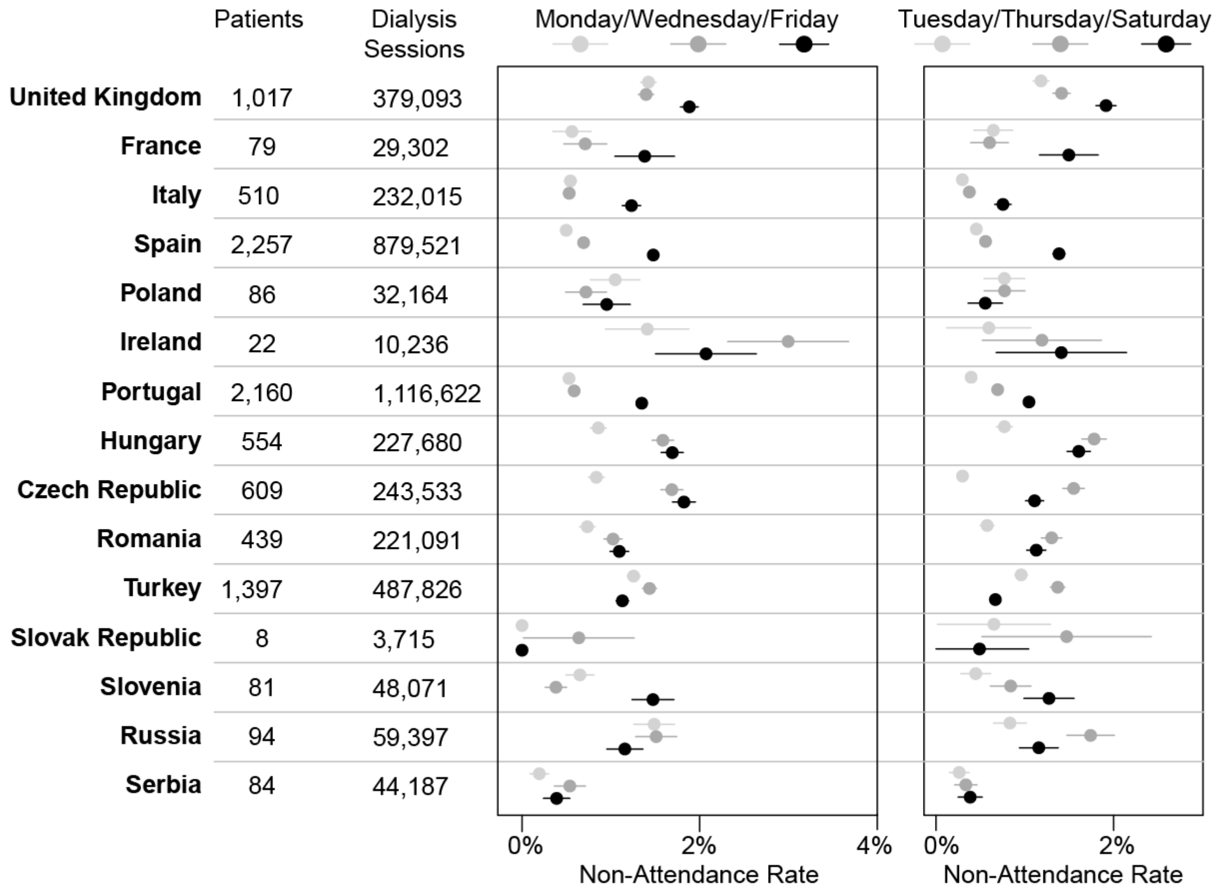
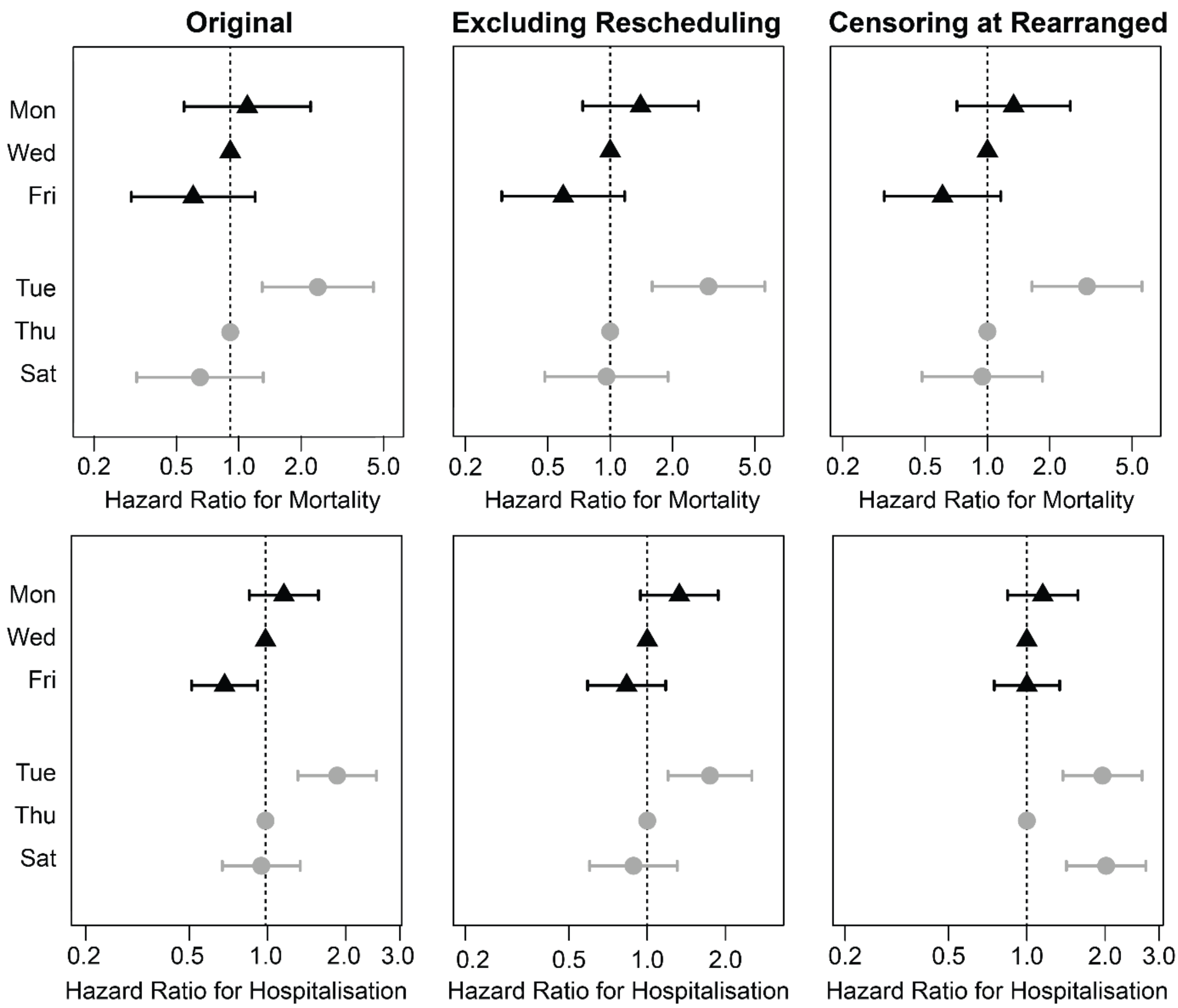


Figure S2. Comparison of hazard associated with non-compliance according to dialysis day of the week based on primary analysis, with established changes in dialysis schedules excluded, and censoring at first rearranged dialysis session. Black: Monday/Wednesday/Friday patients, Grey: Tuesday/Thursday/Saturday patients.



Risk of dying according to if a patient has attended or not attended for dialysis

Statistical justification

Let λ_{it} be the risk of dying for individual i on day t.

Assume a model of the form

$$\eta_{it} = \mu + \alpha_i + \sum_{K=1}^{6} \beta_k WD_k + \beta_7 \ g(t)$$

η_{it} is the linear function using a link function which is either log for a Poisson error function or Logistic for binomial error function. i.e. for a

WD_k is a weekday dummy for day k with Wednesday as the baseline.

$g(t)$ is a function of time

Assume a M/W/F schedule

$g(t) = 1$ if t is a Tue, Thu, Sat and patient did **not** attend day $t, t-1$
$g(t) = 1$ if t is a Wed, Fri, Sun and patient did **not** attend day $t, t-2$
$g(t) = 1$ if t is a Mon and patient did **not** attend day $t, t-3$
$g(t) = 0$ otherwise

For a T/T/S schedule

$g(t) = 1$ if t is a Wed, Fri, Sun and patient did **not** attend day $t, t-1$
$g(t) = 1$ if t is a Thurs, Sat, Mon and patient did **not** attend day $t, t-2$
$g(t) = 1$ if t is a Tue and patient did **not** attend day $t, t-3$
$g(t) = 0$ otherwise

Likelihood

For patient i at time t

Let P_{Nti} =The probability of dying when not at risk (ie $g(t) = 0$)
P_{Rti} =The probability of dying when at risk (ie $g(t) = 1$)

Assume, for present, α_i is constant and no weekday effect from model

Ie. $y_{it} = \mu + \beta \ g(t)$

Using a log link $\log(P_N) = \mu$
$\log(P_R) = \mu + \beta$

Let N_i be the number of days the patient is observed

Let $N_{Ri} = \sum_{t=1}^{N_i} g\ (t)$, $N_{Ni} = N_i - N_{Ri}$

N_{Ri} is the number of exposed days for patient i
N_{Ni} is the number of not exposed days for patient i

If patient i dies on a day not exposed, probability of event is proportional to

$$l_i = P_N(1 - P_N)^{N_{Ni-1}}(1 - P_R)^{N_{Ri}}$$

i.e. they die on one day, they don't die on N_{Ni-1}other not exposed days and N_{Ni} exposed days.

If a patient i dies on an exposed day

$$l_i = P_N(1 - P_N)^{N_{Ni}}(1 - P_R)^{N_{Ri}-1}$$

If a patient i does not die on an exposed day

$$l_i = P_N(1 - P_N)^{N_{Ni}}(1 - P_R)^{N_{Ri}}$$

Let D_R number of deaths on an exposed day
D_N number of deaths on a not exposed day

$D = D_R + D_N$ $N =$Number of patients

Then log likelihood is

$$\log l = \sum_{i=1}^{D_N} \log P_N + (N_{Ni} - 1)\log(1 - P_N) + \log\,(1 - P_R)$$

$$+ \sum_{i=D_N+1}^{D_N+D_R} \log P_R + (N_{Ni})\log(1 - P_N) + (N_{Ri} - 1)\log\,(1 - P_R)$$

$$+ \sum_{i=D_N+D_R+1}^{N} N_{Ni}\log(1 - P_N) + N_{Ri}\log\,(1 - P_R$$

If you differentiate with respect to $P_N$and P_R and equate to zero you find after a bit of algebra

$$P_N = \frac{D_N}{\sum_{i=1}^{N} N_{Ni}}\ and\ = \frac{D_R}{\sum_{i=1}^{N} N_{Ri}}$$

i.e. The risk of dying for someone not exposed is the number of deaths in the not exposed divided by the number of days not exposed and similarly for the number in the exposed group