



Mortality in the General Population (GP) and its Relationship with RRT

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Introduction

In Europe, a large variety in the incidence of RRT and the mortality on RRT has been observed. In the northern European countries the incidence of RRT is low and mortality on RRT is high. In the southern European countries, on the other hand, the incidence is high and mortality is low. Several factors have been suggested as explanatory for this north-south gradient: case mix differences (ageing of the population, prevalence of renal diseases), genetic factors, access to healthcare, referral, artefacts in data collection and more particular in relation to RRT mortality: co morbidity and practice patterns (figure 1). In addition to these factors, GP mortality characteristics are believed to play a role as well.

In this study we aim to describe two relationships:

- The relationship between mortality in the GP and the incidence of RRT
- The relationship between mortality in the GP and mortality on RRT

To this end, we used data from national and regional registries which collaborate with the European Renal Association-European Dialysis and Transplant Association (ERA-EDTA) Registry.

Methods

We studied GP statistics obtained from EUROSTAT and data on 38,950 RRT patients from 13 European registries starting RRT between 1991-2000. These 13 registries were grouped into three geographical regions:

Northern (N):	Denmark, Finland, Norway and Sweden
West-Central (W-C):	Austria, Dutch-speaking Belgium, French-speaking Belgium, The Netherlands and Scotland
Southern (S):	Greece and the Spanish regions Basque country, Catalonia and the Valencian region

Cox regression was used to assess the relative risk of death (RR) for each region with adjustment for age, gender and diabetes (north is reference).

Figure 1. Sources of bias

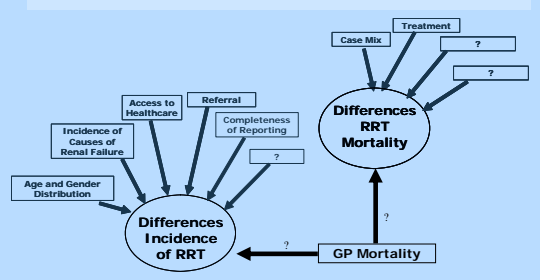
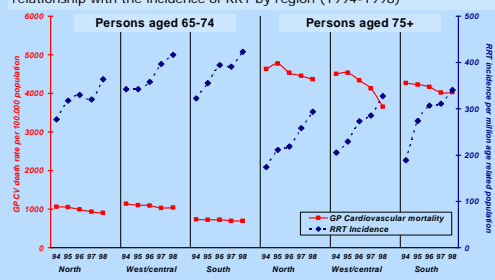


Figure 2. Cardiovascular death rates of the general population and the relationship with the incidence of RRT by region (1994-1998)



Results

- In the GP, differences in all cause mortality between regions were mainly due to differences in cardiovascular (CV) mortality.
- Figure 2 shows that in the GP of N and W-C Europe CV mortality was higher and the incidence of RRT was lower than in S Europe.
- Over the period 1994-1998 a clear reduction in CV mortality occurred in the GP of all three regions (-10% in persons aged 65-74 and in persons aged 75+). At the same time the incidence of RRT increased markedly (+28% in patients aged 65-74 and +69% in patients aged 75+).
- For mortality in the GP a north-south mortality gradient was present. The RR of all cause of death for all ages together was 0.98 for W-C Europe and 0.87 for S Europe (N Europe=reference). Figure 3 shows, however, that there is some variation between the different age groups and that regional differences become more clear if analyses are restricted to CV mortality only (RR is 0.92 for W-C and 0.80 for S Europe).
- As indicated in figure 4, a clear north-south gradient was present in RRT mortality as well. The all age RR of death was 0.90 [95% CI 0.87-0.93] for W-C Europe and 0.58 [95% CI 0.55-0.60] for S Europe. This difference in mortality increased with age and was more apparent in females than in males.

Figure 3. Relative risks for total and cardiovascular mortality in the GP by age group and region

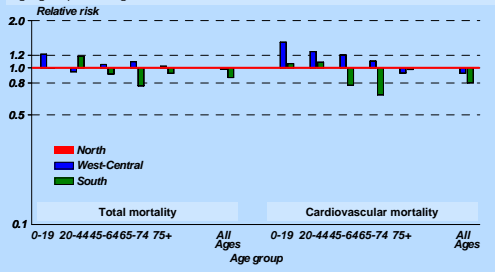
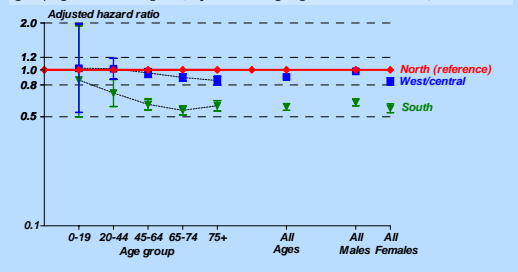


Figure 4. Adjusted hazard ratios for all cause mortality in RRT patients by age group, gender and region (adjusted for age, gender and diabetes)



Conclusions

These data show that

- A decreasing CV mortality in the GP is associated with an increasing incidence of RRT
- In the GP's of southern European regions the mortality was 13% lower and in RRT patients 42% lower. This supports the hypothesis that differences in RRT mortality are in part explained by (factors underlying) the differences in GP mortality.
- More in-depth analyses e.g. focusing on different treatment modalities and on cardiac and non-cardiac death groups separately are needed.