

TIME-INTEGRATED EXPOSURE TO FLUID OVERLOAD AND BLOOD PRESSURE PREDICTS MORTALITY IN HD PATIENTS

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Introduction

Fluid overload (FO) and Blood Pressure (BP) may independently contribute to mortality in hemodialysis (HD) patients. In the largest international study performed so far (DOPPS, *Kidney Int.* 2012; [1]) pre-dialysis BPsyst showed a U-shaped relationship with mortality, and a range of 130-160 mmHg was associated with the lowest death risk.

Aim: To assess whether categorization of BP according to DOPPS (optimal BP: 130-160 mmHg) combined with fluid status can identify discrete risk categories for mortality in the hemodialysis population..

Methods

- Pre-dialysis FO and BPsyst were measured monthly in 27,632 patients from the Fresenius NephroCare Network (Europe, Middle East, Africa and Latin America).
- FO (in liters) was measured pre-dialysis using bioimpedance spectroscopy (BCM Body Composition Monitor, Fig. 1).
- Normohydrated extracellular volume was defined as fluid overload divided by extracellular volume (FO/ECV) less than 13% (females) and 15% (males).
- Patients were classified as being “on target” according to a dedicated flow chart (Fig. 2) taking into account BPsyst, FO and anti-hypertensive therapy (AHT, but excluding certain cardio-protective medication).
- Each individual patient’s “% time on target” was calculated by dividing number of months spent “on target” by the total # of months (Fig. 3).
- Patients were then grouped into quartiles (0-25%, 25-50%, 50-75%, 75-100%) according to their “% time on target” (Fig. 3+4).
- All-cause mortality hazard ratios (HR) were calculated for each quartile using Cox’s analysis adjusting for 31 different co-morbidities and laboratory parameters.

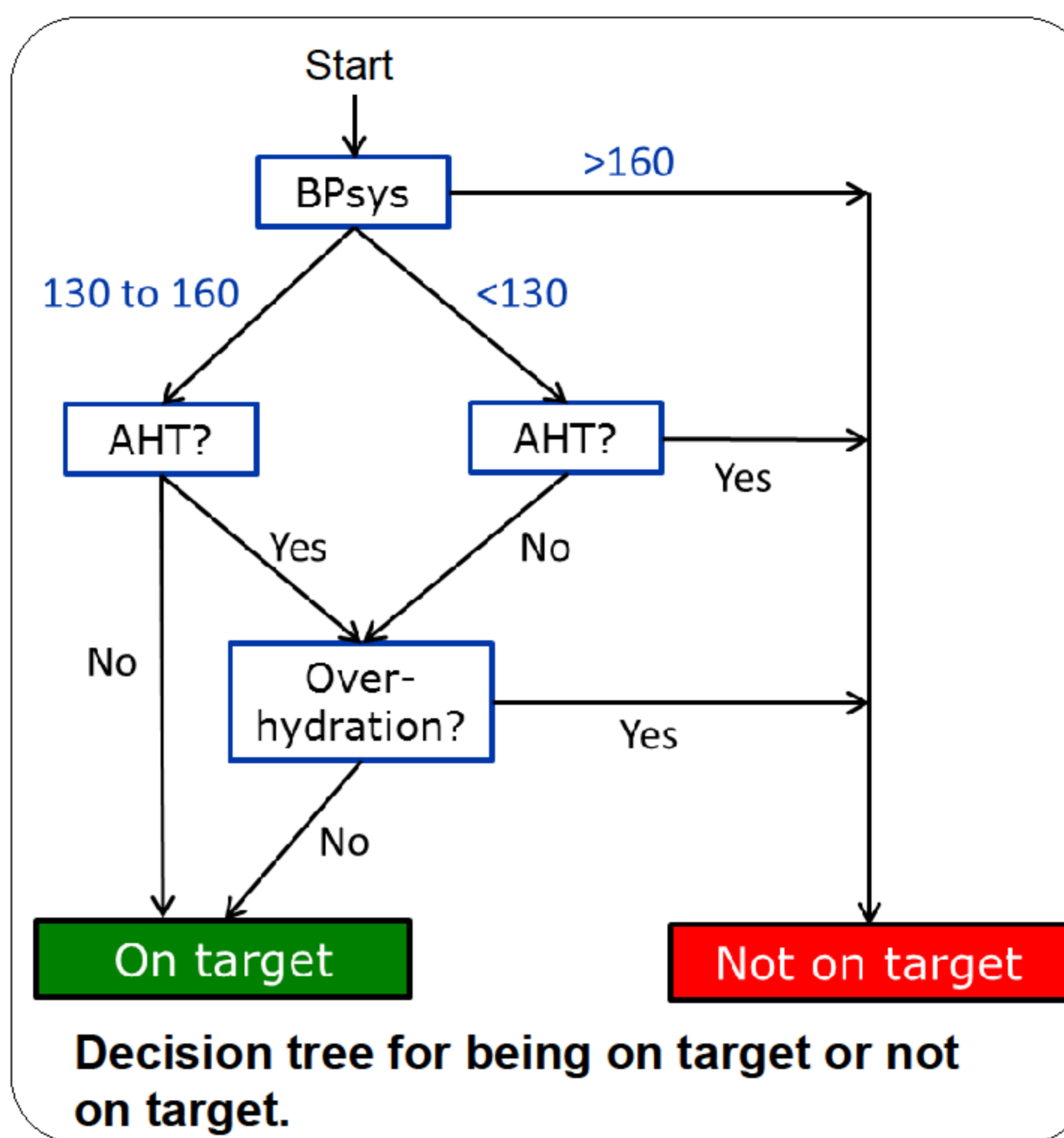
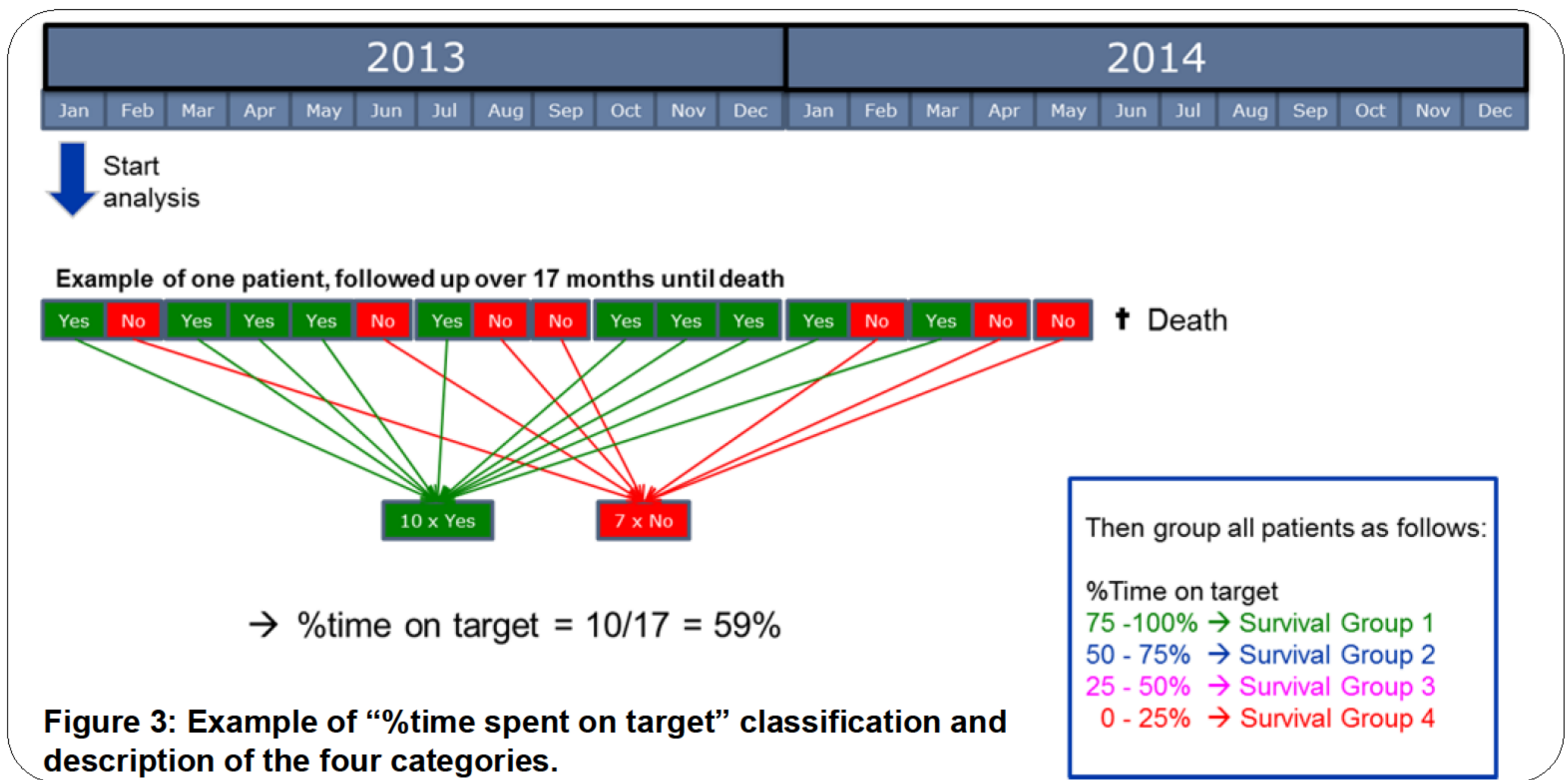


Table 1: Cox model for the four categories of %time spent on target, additionally adjusted for 31 co-morbidities and laboratory parameters. HR=Hazard ratio, CI=confidence interval.

Percent of time spent on target	HR	95% CI
0-25% (reference)	1.00	n.a.
25-50%	0.85	[0.78 to 0.93]
50%-75%	0.76	[0.70 to 0.84]
75%-100%	0.58	[0.53 to 0.63]

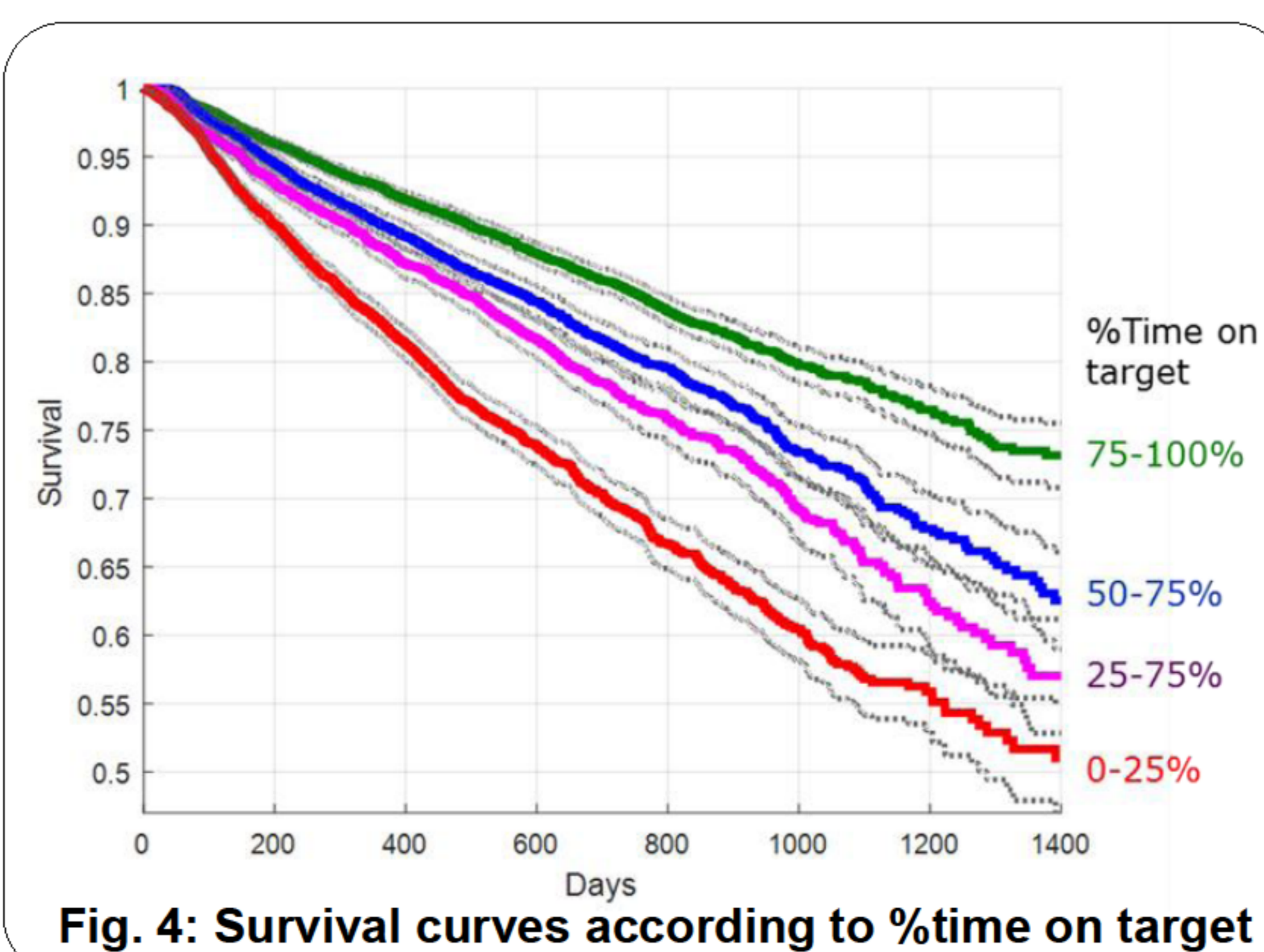
*Not included in AHT:

Diuretics (C03), Agents acting on RAS (C09), Cardio-selective B-Blockers (C07AB), Metoprolol-Carvedilol (C07AG)



Results

- In adjusted analysis, patients who spent most of their time on target (highest quartile) had significantly better survival after four years compared with patients in the lowest quartile, Table 1.
- The mortality hazard of patients in the highest quartile was reduced by 42% (HR=0.58, 95% CI: 0.53 to 0.63) compared with the lowest quartile reference, followed by the second (HR=0.76) and third (HR=0.85) highest quartile.



Conclusion

Combining information on pre-dialysis systolic BP, AHT and fluid status over time identifies meaningful risk categories in the hemodialysis population. These findings highlight the risk of long term exposure to fluid overload and deranged systolic BP in the HD population. Optimizing fluid status and BP control in the HD population may substantially improve clinical outcomes in HD patients.

⇒ **The more time a patient spends on target, the better the outcome!**

References

- [1] Robinson BM et al, “Blood pressure levels and mortality risk among hemodialysis patients in the Dialysis Outcomes and Practice Patterns Study.” *Kidney Int.* 2012, 82(5):570-80

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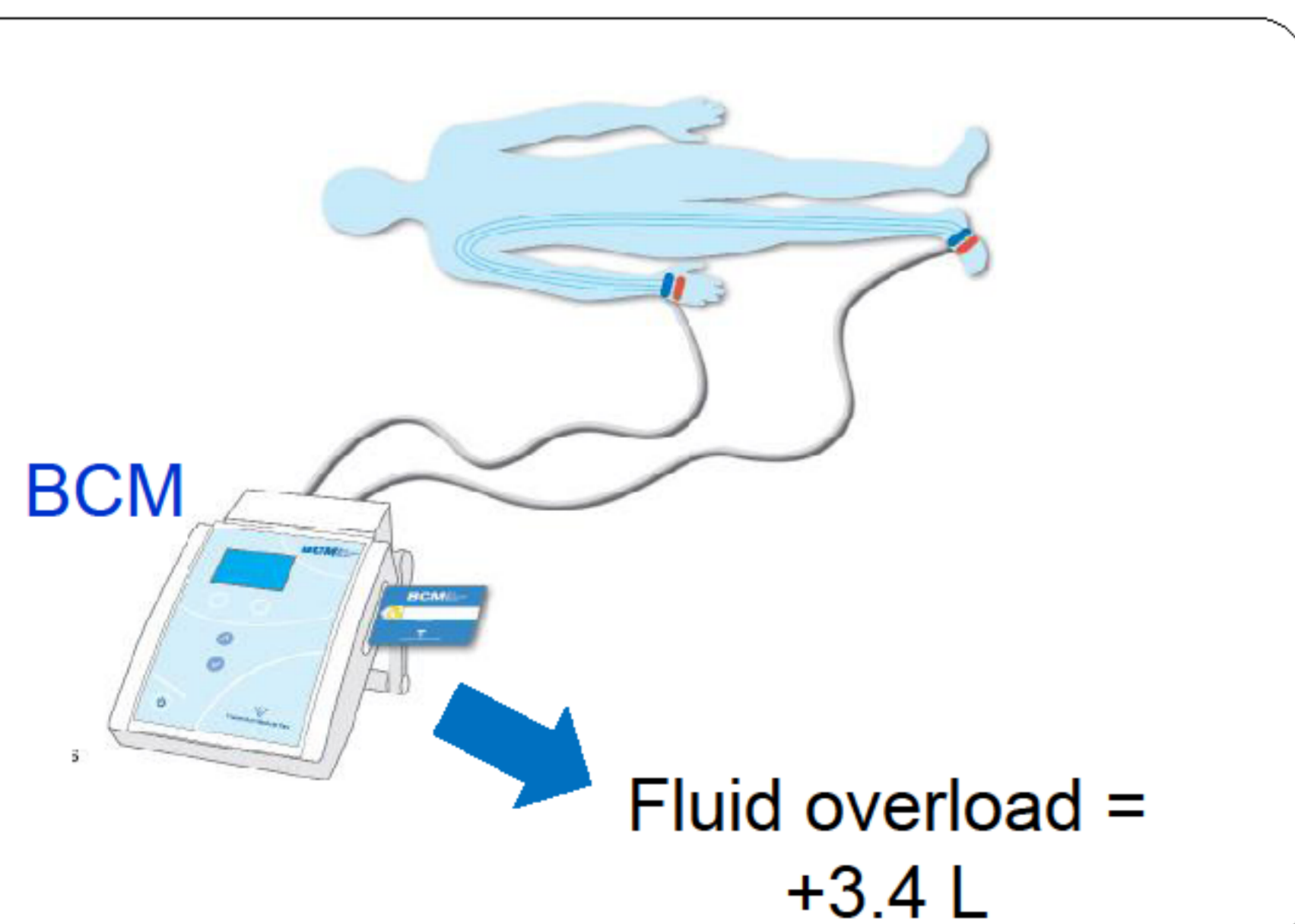


Figure 1. Measuring fluid overload with the Fresenius Body Composition Monitor (BCM)

