Resting heart rate is a health outcome indicator in EPIC-Norfolk

Introduction

Resting heart rate is an easy-to-measure indicator of cardiovascular health. Both resting heart rate and changes in resting heart rate over long periods of time (i.e. resting heart rate trajectories) may be used as a predictors for mortality.

Aims

- Examine the association between resting heart rate and all-cause mortality
- Examine whether resting heart rate trajectories alter this association

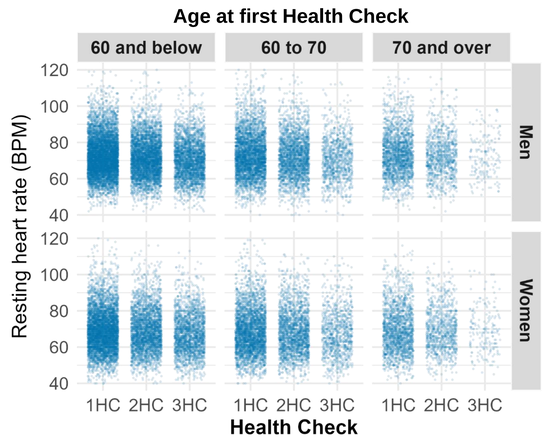
Methods

- Data for all baseline participants (n = 25,636) of EPIC-Norfolk were included. Information from the initial three Health Checks conducted between 1993 and 2011 were used.
- Mortality data were collected in 2018 for all participants present at baseline (median follow-up 21.3 years, IQR 4.9 years).
- Resting heart rate was measured at each Health Check using an automated blood pressure cuff.

- Participants were grouped by their baseline resting heart rate and associations with mortality by these groups were explored.

All-cause mortality risk is higher in those with higher resting heart rate

Resting heart rate by age and sex across health checks

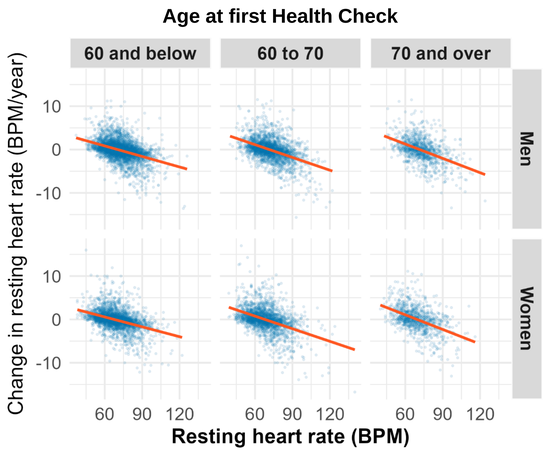


Probability of survival at 10 and 20 years of follow-up

Category	Probability of Survival (%)	
	At 10 years of follow-up	At 20 years of follow-up
Overall	89.7	70.1
Group 1 (<60 bpm)	90.1	68.8
Group 2 (60 - 70 bpm)	90.8	72.9
Group 3 (70 – 80 bpm)	90.7	71.4
Group 4 (>80 bpm)	85.6	64.4

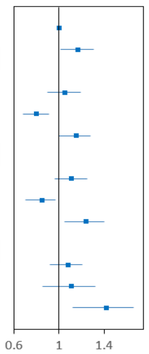
An increasing resting heart rate trajectory is associated with higher mortality risk

Resting heart rate trajectories by age and sex



Survival analysis of resting heart rate trajectories with mortality

RHR trajectory	Mean HC1 RHR	Deaths	Hazard ratio (95% CI)
Group 1 (<60 bpm)			
Maintain	56	397	Reference group
Increase	55	571	1.17 (1.03 - 1.33)
Group 2 (60 - 70 bpm)			
Decrease	66	470	1.05 (0.91 - 1.20)
Maintain	66	386	0.80 (0.69 - 0.92)
Increase	66	721	1.15 (1.02 - 1.30)
Group 3 (70 – 80 bpm)			
Decrease	75	670	1.11 (0.97 - 1.26)
Maintain	75	256	0.85 (0.73 - 1.00)
Increase	75	439	1.24 (1.08 - 1.43)
Group 4 (>80 bpm)			
Decrease	89	642	1.08 (0.95 - 1.24)
Maintain	86	120	1.11 (0.90 - 1.37)
Increase	87	160	1.42 (1.18 - 1.72)



Conclusions

- Both baseline resting heart rate and its trajectory are associated with all-cause mortality.
- Compared to other resting heart rate groups, resting heart rates that were >80 bpm had the greatest mortality risk across analyses.
- Resting heart rate is a strong independent risk factor for all-cause mortality.
- Additional research is needed to determine the influence of cardioactive medications, such as betablockers, on observed health associations in those with lower resting heart rates.

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