SUPPLEMENTARY MATERIAL

Socio-economic environment and survival in patients after ST-segment elevation myocardial infarction (STEMI): A longitudinal study for the City of Vienna

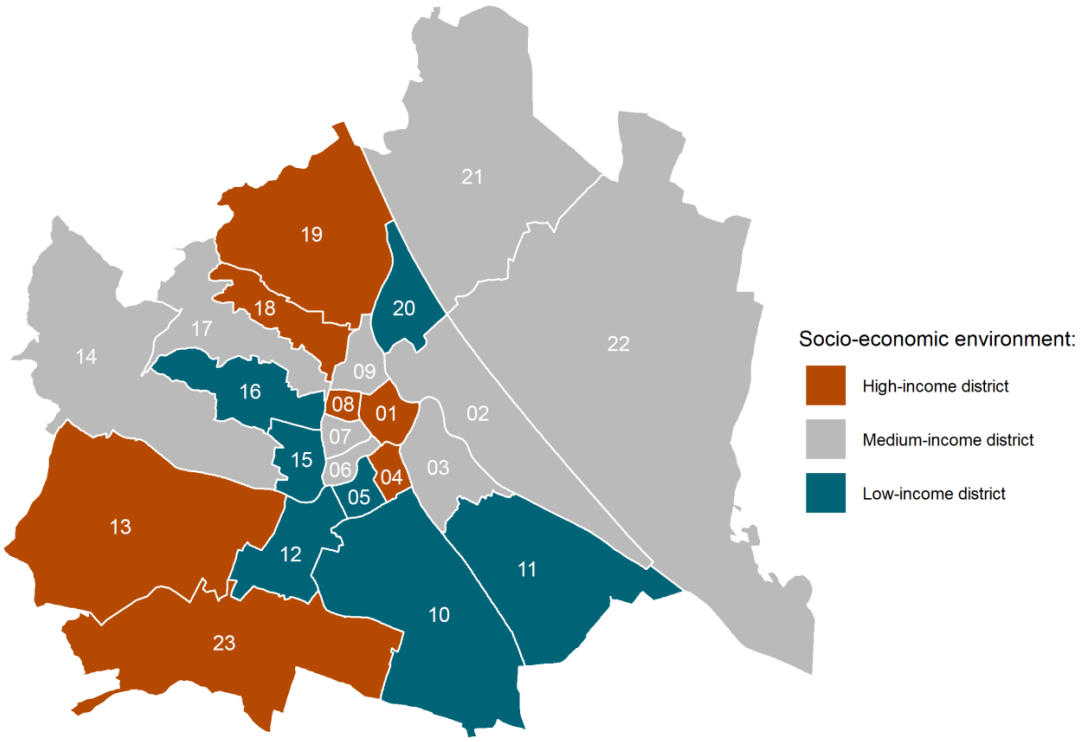

Figure A.1: Map of the 23 Viennese municipal districts, grouped by mean individual gross income from employment

Spitzer S, *et al. BMJ Open* 2022; 12:e058698. doi: 10.1136/bmjopen-2021-058698

Figure A.2: Relationship between age at STEMI and time to death after STEMI (all causes); based on patients presented with STEMI in the General Hospital of Vienna on weekends between the years 2000 and 2012. Individuals were followed and thus their deaths registered until December 31st, 2018.

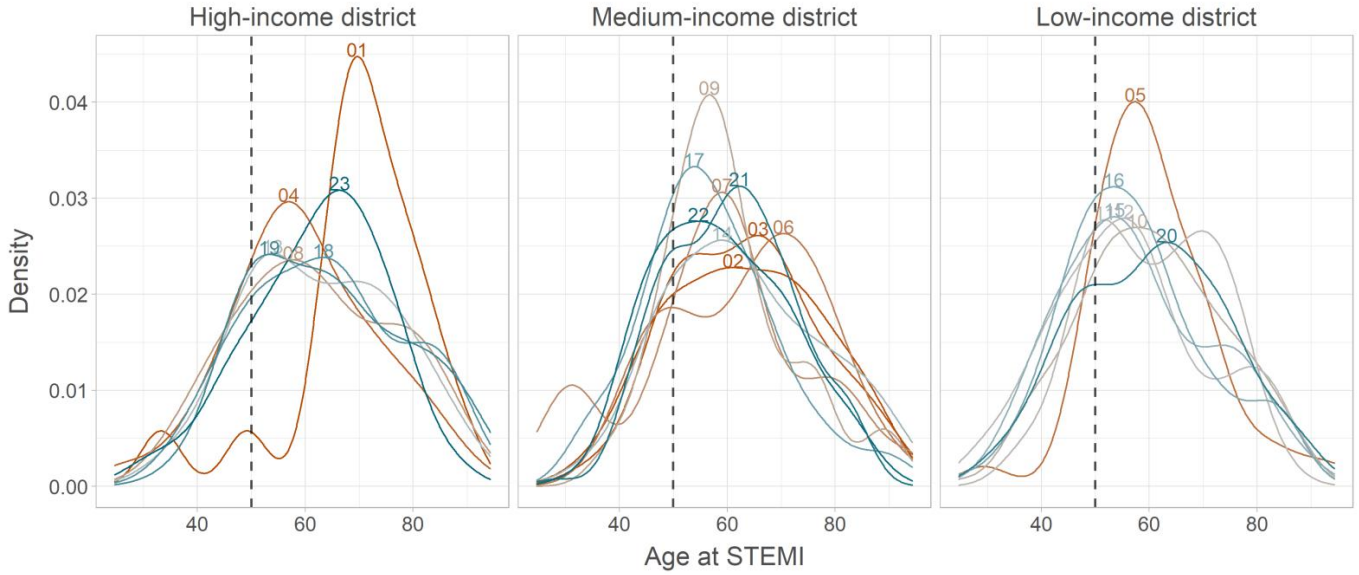

Figure A.3: Age distribution of STEMI patients per district and socio-economic environment; based on patients presented with STEMI in the General Hospital of Vienna on weekends between the years 2000 and 2012. Individuals were followed and thus their deaths registered until December 31st, 2018. The dashed line indicates very young STEMI patients aged 50 and younger.

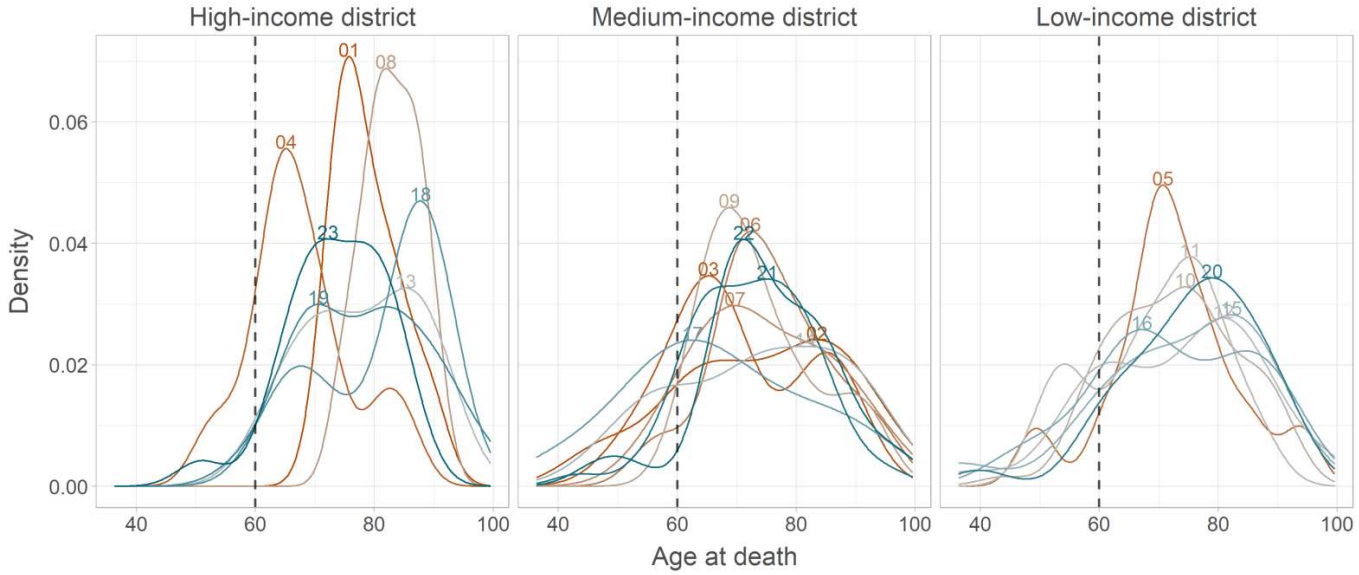

Figure A.4: Age distribution of all-cause deaths after STEMI per district and socio-economic environment; based on patients presented with STEMI in the General Hospital of Vienna on weekends between 2000 and 2012. Individuals were followed and thus their deaths registered until December 31st, 2018. The dashed line indicates very young deaths after STEMI aged 60 and younger.

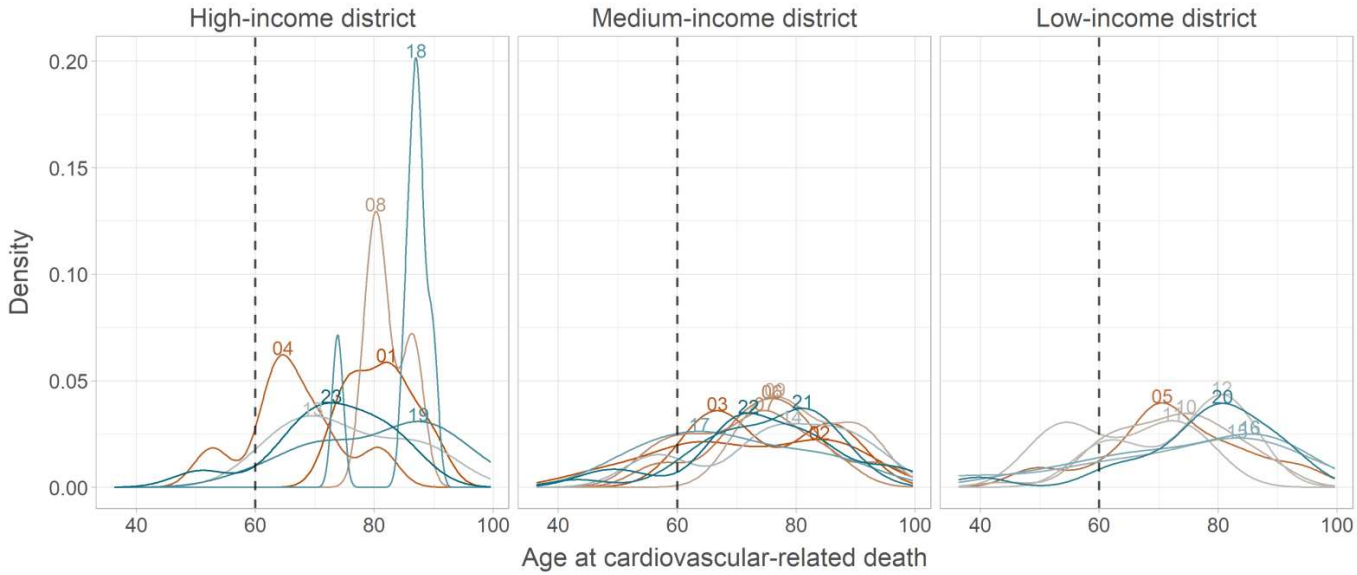

Figure A.5: Age distribution of deaths related to CAD and ACS after STEMI per district and socio-economic environment; based on patients presented with STEMI in the General Hospital of Vienna on weekends between the years 2000 and 2012. Individuals were followed and thus their deaths registered until December 31st, 2018. The dashed line indicates very young deaths after STEMI aged 60 and younger.

Time-to-event as time scale

Tables A.1 and A.2 below show the Cox regression models using the time-to-event framework, with and without adjusting for age at STEMI at baseline, controlling for SEE, and stratifying by year. Being a woman is positively associated with a higher risk of dying relative to men, with women having a Hazard Ratio that is 36% higher than men when age is not included, as shown in Table A.1. However, when including age at STEMI, as shown in Table A.3, the direction of this relationship changes, with women experiencing a risk of death that is 0.7 times lower. This suggests that higher age is mediating the sex link to mortality in case of STEMI. In order to appropriately incorporate this effect – as the present study focuses on mortality in the long-term – it is important to take into consideration the fact that people age simultaneously to the follow-up of event of interest. It also implies taking into consideration the strong female survival advantage that is observed across major populations for both all-cause and cause-specific mortality, in order not to confound the effect of age.

In addition, the districts in Vienna have different age composition, as shown in Figure 1 of the main text, with some districts being relatively older than others. This interacts with levels of SEE, since more advantaged districts tend to have an older age distribution and thus also a higher risk of dying. Because of the aforementioned, we chose to keep the Cox regression model that uses age as the time-scale, and not time-to-event. We refer to the reader that, indeed, the model with age as a time-scale shows a similar effect, both in magnitude and direction, as the Cox regression with age as a covariate, as presented in the main manuscript. The difference is that in the first case, we are performing a more robust comparison for longer term follow-up and considering not only the percent increase in mortality risk with a one-year increase in age, but comparing men and women of the same age in terms of their mortality risk.

Table A.1: Cox regression model without age at STEMI at baseline, time-to-event

		Coefficient	Hazard Ratio	95% CIs		p-value
Full sample	SEE = medium	-0.080	0.923	1.177	-0.648	0.517
(N = 1,481)	SEE = low	-0.135	0.874	1.115	-1.081	0.280
	Sex = women	0.307	1.359	1.647	3.122	0.002

Note: Cox proportional hazard estimates, using time-to-event as time scale and stratified on the year variable; based on patients presented with STEMI in the General Hospital of Vienna on weekends between the years 2000 and 2012. Individuals were followed and thus their deaths registered until December 31st, 2018. High-income districts serve as a reference category for SEE and men serve as a reference category for sex. N = Number of observations; CIs = Confidence intervals

Tables A.2: Cox regression model with age at STEMI at baseline, time-to-event

		Coefficient	Hazard Ratio	95% CIs		p-value
Full sample	SEE = medium	0.039	1.040	0.815	1.327	0.752
(N = 1,481)	SEE = low	0.090	1.094	0.857	1.398	0.470
	Sex = women	-0.319	0.727	0.592	0.892	0.002
	Age	0.078	1.081	1.073	1.091	<0.001

Note: Cox proportional hazard estimates, using time-to-event as time scale and stratified on the year variable; based on patients presented with STEMI in the General Hospital of Vienna on weekends between the years 2000 and 2012. Individuals were followed and thus their deaths registered until December 31st, 2018. High-income districts serve as a reference category for SEE and men serve as a reference category for sex. N = Number of observations; CIs = Confidence intervals

Figure A.5 shows the trajectories of survival for women and men at all ages; in the left panel, considering days of follow-up until the event for the first year of observation (ends at day 365.25). In the right panel, we have the same follow-up in days, but only considering women and men between the ages 60 to 70. The figure suggests that the lower survival for women, when considering time-to-event, is mainly driven by the difference in age at STEMI in this sample. The right panel shows that when comparing women and men of the same age, women actually experience higher survival than men in the long-term. The only moment where women and men have similar survival is in the first 10 days, which is most likely connected to in-hospital deaths and other short-term STEMI-related factors. Higher longevity among women has been extensively documented in the literature, and this may be connected to the male-female morbidity mortality paradox. Nonetheless, our sample does not allow to extrapolate this conclusion.

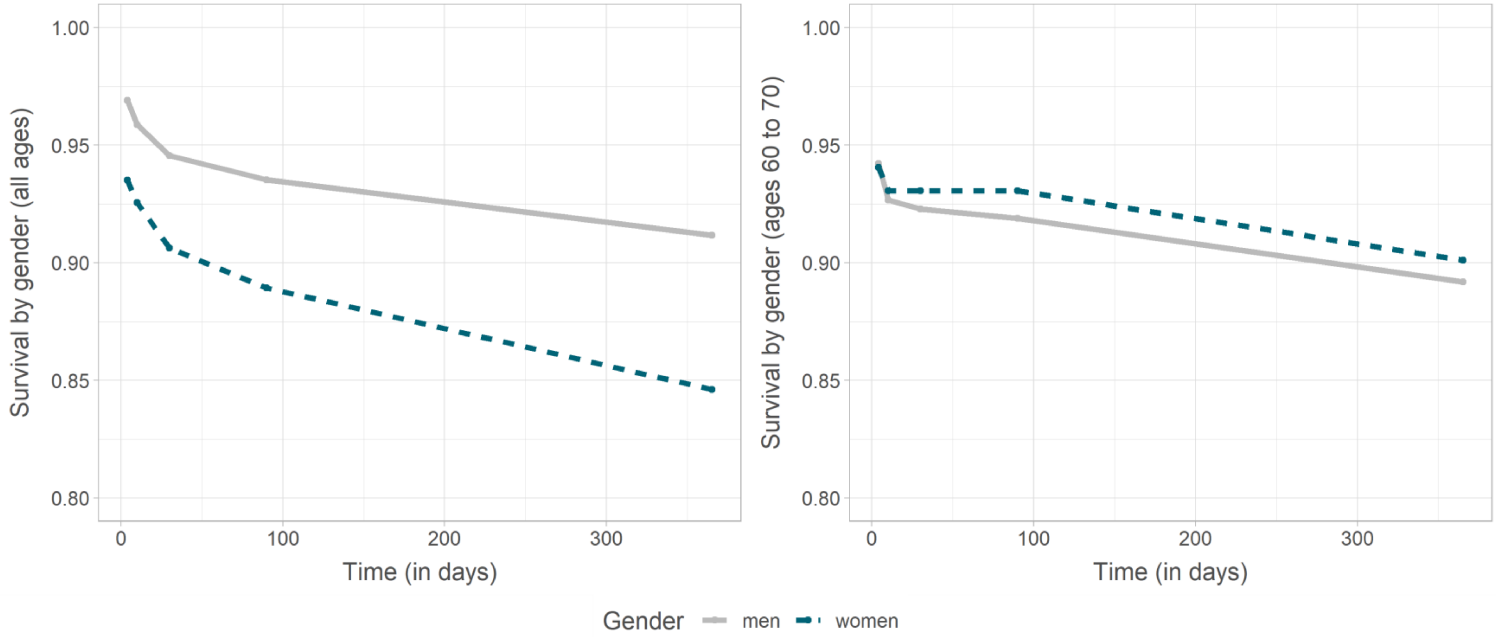

Figure A.6: Trajectories of survival for women and men considering days of follow-up until the event for the first year of observation (ends at day 365.25). Left panel is for daily survival for all ages combined. Right panel is for daily survival for ages 60-70.

Table A.3: Proportion of young STEMI cases and deaths, compared to all STEMI patients (in %)

SEE	Total	High	Medium	Low
Age at STEMI < 50 (%)	23.6	19.2	22.5	26.8
Age at death < 60 (%)	11.3	4.0	12.1	14.4
Age at cardiovascular-related death < 60 (%)	12.0	5.3	13.1	14.4

Notes: Based on 1,481 patients presented with STEMI in the General Hospital of Vienna on weekends between the years 2000 and 2012. Individuals were followed and thus their deaths registered until December 31st, 2018.

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