**S1 Text: Supplementary material: Mathematical description of the Cox Models included**

The mathematical formula for the Cox Model is:

h(t) = h0(t) \* exp (b1x1 + b2x2 + … + bpxp)

t represents the survival time and h0(t) denotes the hazard function as determined by the included covariates (x1, x2, …, xp)

The coefficients (b1, b2,...,bp) measure the impact (i.e., the effect size) of covariates

h0 is the baseline hazard

In the present study, we calculate the Cox Model for an association between road traffic noise as a time-varying variable, in relation to survival after colorectal cancer with two levels of adjustment:

**Model 1 – Crude.**

Adjusted only for age in 5-year groups (by stratification, in order to allow for different underlying baseline hazards), calendar year of diagnosis, and sex

As described by the below Cox Model:

h(t) = hage5(t) \* exp ((Traffic noise(t), continuous) + (Calendar year, continuous)+(Sex, categorical))

**Model 2 – Adjusted.**

Adjusted as Model 1 i.e. for age (by stratification, in order to allow for different underlying baseline hazards), calendar year of diagnosis, and sex, and additionally for railway noise at diagnosis (0-20, >20-50, >50 dB), baseline smoking status (never, former, current, unknown), baseline smoking duration (linear, years), baseline alcohol intake (linear, g/day), baseline abstainers (yes, no), baseline red meat intake (linear, g/day), baseline recreational physical activity (yes, no), education 1 year before diagnosis (<7, 8-10, >10 years), and income 1 year before diagnosis (household income after taxation and interest, adjusted for number of persons in the household and divided into tertiles)

As described by the below Cox Model:

h(t) = hage5(t) \* exp ((Traffic noise(t), continuous) + (Age, categorical) + (Calendar year, continuous)+(Sex, categorical) + (railway noise, categorical) + (smoking status, categorical) + (smoking duration, linear) + (alcohol intake, linear) + (abstainer, categorical) + (red meat intake, linear) + (recreational physical activity, categorical) + (education, categorical) + (income, categorical)

For both levels of adjustment, we calculated traffic noise at time t for two different time-periods, i.e. two different t:

 Cumulated noise from t-1, t

Traffic noise (t) =

Cumulated noise from diagnosis to t