Simulation results

General model:

$$\mu(t|Z) = f(t, \beta_0^\top Z) g(\gamma_0^\top Z),$$

where for fixed $x \in \mathbb{R}$, $f(\cdot, x)$ is an unspecified density function on $[0, \tau]$, and $g(x)$ is unknown but monotone in x. We assume $\|\beta_0\| = \|\gamma_0\| = 1$.

Simulation settings used in the paper:

- Z is generated from a multivariate truncated normal distribution satisfying $Z \sim N_2(0, I_2)$ and $\|Z\| \leq 1$.
- Censoring time is an exponential distribution with mean $10 \cdot (1 + |z_1|)$.
- Recurrent event times are generated from Poisson process with rate functions:

  M1: $\mu(t|Z) = \mu_0(t) \exp(\gamma_0^\top Z)$
  - $\mu_0(t) = \frac{2}{1+t}$.
  - $\beta_0 = (\beta_1, \beta_2) = (0, 0)$, $\gamma_0 = (\gamma_1, \gamma_2) = (0.28, 0.96)$.

  M2: $\mu(t|Z) = \mu_0(t) + \alpha_0^\top Z$
  - $\mu_0(t) = e^{0.1t}$.
  - $\beta_0 = \gamma_0 = \alpha_0 = (0.6, 0.8)$.

  M3: $\mu(t|Z) = \mu_0\{t \exp(\alpha_0^\top Z)\}$
  - $\mu_0(t) = e^{-t}$.
  - $\beta_0 = \gamma_0 = \alpha_0 = (0.6, 0.8)$.

  M4: $\mu(t|Z) = \mu_0\{t, \exp(\beta_0^\top Z)\} \exp(\gamma_0^\top Z)$
  - $\mu_0(t, x) = \frac{t \cdot (1-t)^{1+x}}{B(2, 1+x)}$
  - $\beta_0 = (0.6, 0.8)$, $\gamma_0 = (0.28, 0.96)$

- Set $\tau = 10$ for **M1, M2, M3** and $\tau = 1$ for **M4**.

Table 1: Point estimator (PE) and empirical standard error (ESE) for **M1** to **M4**. Sample size is $n = 200$, with 1000 replications. **M1-ind** assumes $\beta_0 = (0, 0)$ and shape-independence.

	M1		**M1-ind**		**M2**		**M3**		**M4**	
	PE	ESE	PE	ESE	PE	ESE	PE	ESE	PE	ESE
β_1	0.192	0.669	0.000	0.000	−0.584	0.219	−0.584	0.185	−0.585	0.238
β_2	0.204	0.689	0.000	0.000	−0.761	0.208	−0.778	0.177	−0.770	0.249
γ_1	0.273	0.054	0.272	0.052	0.608	0.062	−0.603	0.070	0.279	0.087
γ_2	0.961	0.015	0.961	0.014	0.789	0.048	−0.793	0.054	0.956	0.025

Table 2: Bias and empirical standard error (ESE) for (γ_1, γ_2) in the above models. Sample size is $n = 100$, with 500 replications.

		Proposed		coxph	
Model		Bias	ESE	Bias	ESE
M1	γ_1	0.002	0.042	-2.319	0.050
	γ_2	0.010	0.028	-0.094	0.034
M2	γ_1	0.043	0.130	-0.687	0.059
	γ_2	0.107	0.360	-0.908	0.042
M3	γ_1	-0.010	0.118	-1.107	0.076
	γ_2	0.051	0.142	-0.700	0.055
M4	γ_1	0.010	0.049	1.502	0.107
	γ_2	0.021	0.104	-1.983	0.073
M5	γ_1	0.048	0.096	-0.184	0.058
	γ_2	0.014	0.159	0.092	0.042
M6	γ_1	0.099	0.357	0.002	0.058
	γ_2	-0.086	0.369	-0.002	0.035
M7	γ_1	0.000	0.018	-1.815	0.060
	γ_2	0.002	0.037	0.902	0.041