The hazard \( h_i(t) \) represents the events occur to individual \( i \) at time \( t \) (defined in Equation 1),

\[
h_i(t) = h_0(t) \ast \exp\{\beta_1x_{i1} + \beta_2x_{i2} + \cdots + \beta_kx_{ik}\}
\]

where the baseline hazard function \( h_0(t) \) can be any function of time \( t \) as long as \( h_0(t) > 0 \). \( x_i \) and \( \beta_i \) represent independent variables and corresponding coefficients. Equation 1 can also be formulated as Equation 2, where the ratio of two individuals’ hazard functions does not depend on time \( t \).

\[
\frac{h_i(t)}{h_j(t)} = \exp\{\beta_1(x_{i1} - x_{j1}) + 1 + \beta_k(x_{ik} - x_{jk})\}
\]

By using Maximum Likelihood Estimation, \( \beta \) can be estimated with regards to the hazard. \( \beta_k = 0 \) would indicate that independent variable \( x_k \) has no association with survival time; \( \beta_k > 0 \) means that independent variable \( x_k \) induces a higher hazard of event occurring, and vice versa. Correspondingly, \( \exp\{\beta_k\} \) is the hazard ratio of independent variable \( x_k \).