

**Conference presentation "Mortality by Independent and Dependent Causes of Death", Olomouc (CZ), May 22-24, 2024. Author: Elizabet Ukolova.**

The standard approach to cause-specific mortality analysis relies on the assumption of independence between causes. Specifically, if a person aged  $(x; x+n)$  avoids death from, for example, heart failure, it is assumed that their probability of death from neoplasms at that age interval is the same as in the general population. However, this assumption is somewhat unrealistic, as individuals at risk of dying from neoplasms or, more generally, chronic diseases, usually suffer from these conditions for some time before death. This contradicts the assumption of independent mortality risks operating simultaneously. We present life tables that model dependencies between diseases explicitly, allowing for an analysis of cause-specific mortality due to the combined influence of multiple risks. For the U.S. population from 2000 to 2021, we identify biases in age-specific probabilities of death that arise in a competing risk setting if causes of death are dependent. Each cause of death group is characterized by specific age groups where these biases are most pronounced (up to 25%). Since 2000, both period and cohort effects in the distribution of these biases have been observed.