

Estimating cohort-based life expectancy using the age-period-cohort model: Application to all-cause mortality in Taiwan

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Abstract

The cohort-based life expectancy is intuitive for application and interpretation but it is difficult to be observed. The age-cohort model was used to estimate the cohort-based life expectancy but the methodology is concerned. We aimed to provide a better estimation of cohort-based life expectancy by using the age-period-cohort model, complete life table and single-year age/period aggregated data to improve the limitations of the previous study. The population-level data of all-cause mortality in Taiwan was used for demonstration and application. This study found the similar results of the age, period and cohort effects between men and women in Taiwan; a J-shaped curve of age effect, a weak period effect, and an overall declining cohort effect. For cohort-based life expectancy, the obvious sex difference and similar temporal change were found; the cohort-based life expectancy for both genders are increased from 1891 to 2022 birth year, and the cohort-based life expectancy in women are all higher than those in men. The cohort-based life expectancy in 2022 being lower than the previous 13 years (between 2009 and 2021) for men and the previous 10 years (between 2012 and 2021) for women. We used the all-cause

mortality data in Taiwan for evaluating the population health from the different perspective of cohort-based life expectancy. This study also found the influence of COVID-19 outbreak on cohort-based life expectancy which implied that such pandemic had diminished the population health including the youngest generation.

Keyword: Life expectancy; mortality; complete life table; age-period-cohort analysis