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## **Impact of smoking and smoking cessation on major cardiovascular events and total mortality at older age**

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Due to demographic change and an increasing life span of people, as well as due to the causal role of smoking in the genesis of multiple chronic diseases and consequently premature mortality, the impact of smoking and smoking cessation at older age is of highest public health concern.

In this dissertation the associations of smoking with all-cause mortality and cardiovascular outcomes (myocardial infarction, stroke, cardiovascular death) at older age were analysed. Especially the beneficial effects of smoking cessation up to the oldest ages were of interest.

A systematic review with meta-analysis of the medical literature on smoking and all-cause mortality at older age was conducted and analyses on the impact of smoking on all-cause mortality as well as on cardiovascular outcomes were performed in a large population-based cohort from Germany. To enhance simple, direct and strong risk communication, risk and rate advancement periods (RAP) were calculated additionally to standard epidemiological measures.

Reviewing and summarizing the results from 17 cohort studies from the medical literature, 83% increased mortality for current smokers and 34% increased mortality for former smokers compared to never smokers was observed. Relative mortality of former smokers decreased with time since cessation. A dose-response relationship of the amount of currently smoked cigarettes and premature death was consistently observed. Current smoking was significantly associated with increased mortality even in the oldest age groups, for both genders and people from different geographical regions.

Analysing the impact of smoking on all-cause mortality in people aged 60 years and older from a large population-based cohort from Germany, all-cause mortality was found to be 2.5-fold increased in current smokers when compared to never smokers, with a rate advancement period of more than 10 years. The rate advancement period was strongly reduced to 2.8 years among former smokers.

Analysing the impact of smoking on cardiovascular outcomes and mortality in people aged 50 years and older from a large population-based cohort from Germany, the risk for incident myocardial infarction, incident stroke, cardiovascular death and the combined end-point of major cardiovascular events was more than 2-fold as high in current smokers compared to never smokers. Corresponding rate advancement periods ranged from 8.4 years for cardiovascular death to 19.3 years for myocardial infarction.

In both analyses strong dose-response relationships were found for current and life-time amount of smoking, whereas excess mortality of former smokers decreased substantially even shortly after smoking cessation.

The results of this dissertation demonstrate that smoking is a strong risk factor for premature mortality, cardiovascular events and cardiovascular mortality at older age. Furthermore, the results strongly suggest that a substantial proportion of excess risk and RAP can still be avoided by quitting at old age. Smoking cessation should be encouraged and supported at any age. Special smoking cessation programs for older people should be developed.