



**A life-course approach to chronic kidney disease  
– risks and consequences**

av

**Per-Ola Sundin**

**Akademisk avhandling**

Avhandling för medicine doktorexamen i  
Medicinsk vetenskap,  
som kommer att försvaras offentligt  
fredag den 6 september 2019 kl. 13.00,  
Hörsal C1, Campus USÖ, Örebro Universitet

Opponent: Professor Dorothea Nitsch  
London School of Hygiene and Tropical Medicine  
United Kingdom

Örebro universitet  
Institutionen för Medicinska vetenskaper  
701 82 ÖREBRO

## Abstract

Per-Ola Sundin (2019): A life-course approach to chronic kidney disease – risks and consequences. Örebro Studies in Medicine 196.

Successful primary prevention of chronic kidney disease (CKD) relies on understanding the pathways leading to established disease, including how they extend over the life-course. Projects in this thesis examine risk factors for CKD and consequences of impaired kidney function from a life-course perspective using routinely collected health-data in Swedish registers and research cohort data from the United Kingdom.

The main findings regarding risk factors for CKD are, that markers of health and development determined at conscription assessment in adolescence, independently predict diagnosis of end-stage renal disease in middle age. We also identified a persistent increased risk of CKD following hospital admission with pneumonia in adulthood with highest magnitude risks in years immediately following infection, but still statistically significantly raised more than 15 years after the pneumonia episode. Our main findings relevant to predicting the consequences of impaired kidney function are that creatinine and cystatin C used clinically to estimate kidney function (estimated glomerular filtration rate, eGFR) have associations with increased mortality risk independent of GFR measured with an exogenous filtration marker (mGFR). If cystatin C and creatinine are combined, adding mGFR does not improve mortality risk prediction. Another important finding is that moderately reduced eGFR is only associated with a statistically significant increased mortality risk among individuals in the lowest third of the distribution of grip strength in a general population sample followed for 4-5 years, after adjustment for potential confounding factors.

These results highlight the importance of adopting a life-course perspective when studying risk factors for CKD, since these associations can extend over different stages in the life-course. When assessing increased mortality risk associated with measures of GFR, combining cystatin and creatinine improves risk prediction. Potential effect modification across subgroups, including by grip strength, should be considered.

*Keywords:* chronic kidney disease, pneumonia, grip strength, creatinine, cystatin C, adolescence, life-course epidemiology, risk factor, mortality

Per-Ola Sundin, School of Medical Sciences, Örebro University, SE-701 82 Örebro, Sweden, perola.sundin@regionorebrolan.se