

## Declining incidence and mortality of ischaemic stroke between 1996–2016: a nationwide study

A. Yafasova<sup>1</sup>, E.L. Fosboel<sup>1</sup>, M.N. Christiansen<sup>1</sup>, N.E. Vinding<sup>1</sup>, C. Andersson<sup>2</sup>, C. Kruuse<sup>3</sup>, S.P. Johnsen<sup>4</sup>, G.H. Gislason<sup>2</sup>, C.T. Torp-Pedersen<sup>5</sup>, L. Koeber<sup>1</sup>, J.H. Butt<sup>1</sup>

<sup>1</sup>Rigshospitalet - Copenhagen University Hospital, Copenhagen, Denmark; <sup>2</sup>Gentofte University Hospital, Gentofte, Denmark; <sup>3</sup>Herlev Hospital, Herlev, Denmark; <sup>4</sup>Aarhus University Hospital, Aarhus, Denmark; <sup>5</sup>Nordsjællands Hospital, Hillerød, Denmark

**Funding Acknowledgement:** Type of funding source: None

**Background:** The incidence and mortality of ischaemic heart disease have been declining over many years. The development with ischaemic stroke is less well studied, and with an increasing elderly population, there is a need for large-scale studies. Recent changes in stroke prevention and treatments may have affected the incidence and mortality of ischaemic stroke.

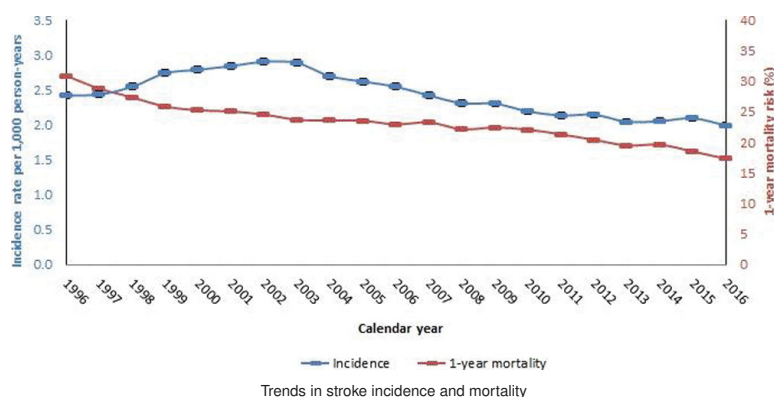
**Purpose:** To examine time trends and sex and age differences in the incidence and mortality of first-time ischaemic stroke in Denmark between 1996–2016.

**Methods:** In this observational cohort study, we used Danish nationwide registries to identify all individuals >18 years of age admitted with a first-time diagnosis of ischaemic stroke between 1996–2016. We calculated age- and sex-stratified annual incidence rates and absolute 30-day and 1-year mortality risks. Further, we calculated annual incidence rate ratios using multivariable Poisson regression, odds ratios for 30-day mortality using multivariable logistic regression, and hazard ratios for 1-year mortality using multivariable Cox regression.

**Results:** The study population consisted of 224,617 individuals >18 years of age with first-time ischaemic stroke between 1996–2016. The figure

displays the unadjusted incidence rates and 1-year mortality risks of ischaemic stroke by calendar year. The overall unadjusted incidence rates of ischaemic stroke per 1,000 person-years increased from 1996 (2.43 [95% confidence interval [CI], 2.38–2.47]) to 2002 (2.91 [95% CI, 2.86–2.96]) and then gradually decreased to below the initial level until 2016 (1.99 [95% CI, 1.95–2.03]). Men had higher incidence rates than women in all age groups except in patients between 18–30 years and >85 years. The absolute mortality risk decreased between 1996–2016 (30-day mortality from 17.1% to 7.6% and 1-year mortality from 30.9% to 17.3%). Women had higher mortality than men in the age groups 55–64 years and >85 years. Similar trends were observed for all analyses after multivariable adjustment.

**Conclusions:** The overall incidence of first-time hospitalization for ischaemic stroke increased from 1996–2002 and then gradually decreased to below the initial level until 2016. The absolute 30-day and 1-year mortality risk decreased between 1996–2016. These findings correspond to the increased awareness of stroke prevention and introduction of new treatment options during the study period.



Trends in stroke incidence and mortality