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O. Silverman-Retana[1,2], A. Hulman[1,2], J. Nielsen[3,4], C.T. Ekstrøm[5], B. Carstensen[6], R.K. Simmons[7], D.R. Witte[1,2];
[1]Department of Public Health, Aarhus University, Aarhus, Denmark, [2]Danish Diabetes Academy, Odense, Denmark, [3]Global Health Section, Department of Public Health, University of Copenhagen, Copenhagen, Denmark, [4]Hubert Department of Global Health, Rollins School of Public Health, Emory University, Atlanta, GA, USA, [5]Section of Biostatistics, Department of Public Health, University of Copenhagen, Copenhagen, Denmark, [6]Clinical Epidemiology Department, Steno Diabetes Center Copenhagen, Gentofte, Denmark, [7]The Healthcare Improvement Studies Institute, University of Cambridge School of Clinical Medicine, Cambridge, UK.

Background and aims: Individuals with a family history of diabetes have an increased risk of developing the same disease. Despite known effects of the shared environment and genetic determinants, familial aggregation of diabetes at the population level is not fully understood. This study aims to quantify the association between parental and sibling diabetes status and individual's risk of developing the disease at the level of the entire Danish population.
Materials and methods: We performed a register-based analysis of all individuals in Denmark who were 30 years or older and did not have diabetes on January 1st 1995, following them until the end of 2012. We restricted the analysis to those individuals who had available information on their parents. Parental and sibling diabetes status (exposure) and date of diabetes onset in the index individual (outcome) were defined from the Danish National Diabetes Register. We used Poisson models to calculate the age and sex-adjusted incidence rate of diabetes among individuals whose parents and siblings did not have diabetes (reference) and incidence rate ratios (IRR) for those with maternal, paternal diabetes and/or siblings with diabetes. We tested interaction terms to determine whether the risk for those with diabetes in both parents and siblings exceeded the contribution from each family member.
Results: We included 877,807 individuals (53.7% male, median age at baseline: 36 years [IQR: 33-40]) who contributed 14,226,923 person-years of follow up (median duration: 17 years). Paternal diabetes was present in 132,468 (15.0%) individuals; maternal diabetes was found in 142,414 (16.2%) and 35,004 (3.9%) individuals had one or more siblings with diabetes. In 26,746 (3.0%) individuals, both parents had diabetes. The number of incident diabetes cases was 60,256; the age and sex-adjusted (for a 50-year-old male) incidence rate of diabetes for those without familial diabetes was 4.1/1000 person-years (95%CI: 4.0; 4.2). The IRR for individuals with maternal diabetes was 1.89 (95%CI: 1.83; 1.96), for individuals with paternal diabetes was 1.79 (95%CI: 1.73; 1.87) and for those individuals with a sibling with diabetes was 2.02 (95% CI: 1.93; 2.11) compared to individuals without familial diabetes. Among individuals whose both parents had diabetes, the IRR was 2.95 (95% CI: 2.79; 3.13). We found no indication of a deviation from the multiplicative effect when both parents and siblings had diabetes.
Conclusion: Family history of diabetes confers a marked risk elevation at the population level. The ability to extract valid familial diabetes data from population-wide registers offers the opportunity to hone and improve population-based strategies for prevention and early detection of diabetes.
Supported by: Danish Diabetes Academy
Disclosure: **O. Silverman-Retana:** None.