How much of the Diabetes Prevalence is due to decreasing Mortality and how much to increasing Incidence?

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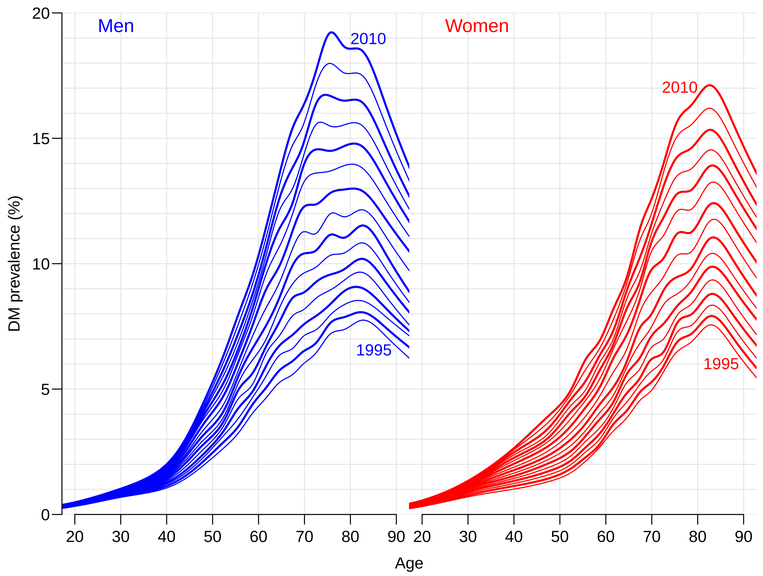

Figure 1: *Age-specific prevalences of diabetes in Denmark for the years 1995 through 2010 Red: Women, Blue: Men*

Introduction and Aims

The incidence rates of diabetes have been increasing, whereas mortality rates both among diabetes patients and in the general population have been decreasing. As a consequence, the prevalence of diabetes has been increasing.

The aim of this study was to quantify the relative contribution of the two factors to the increase in prevalence in Denmark in the period 1995–2010.

Methods

We used estimated incidence and mortality rates as changing over time to predict prevalences in 2010 from prevalences in 1995. Changing the scenario to one with incidence rates and/or mortality rates as in 1995, enabled estimation of the relative contribution from the two factors as well as from the existing imbalance between incidence and mortality in 1995.

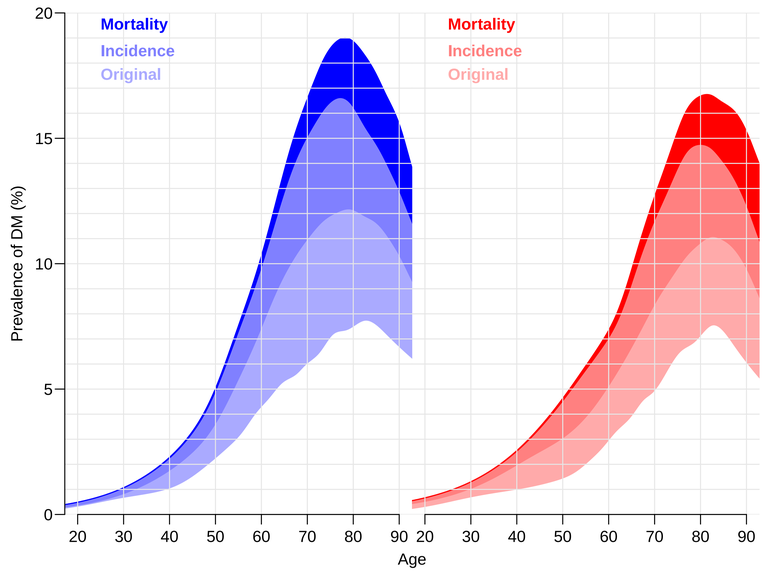

Figure 2: *Relative contribution of decreasing mortality, increasing incidence and 1995 imbalance ("Original") to age-specific prevalence of DM in Denmark 2010. Red: Women, Blue: Men*

Incidence and mortality for diabetes patients were obtained from the Danish National Diabetes Register, and population size and mortality for the entire population from Statistics Denmark's data bank.

We compiled tables of events (DM diagnoses and deaths) and risk time by sex, age and calendar time in 1-year classes for the non-diabetic and the diabetic part of the population, and analyzed these by age-period-cohort models with natural splines.

These were used to derive probabilities of transition from non-diseased to DM and death and from DM to death in intervals of 1/10 year. Starting with the age-specific prevalences at 1.1.1995 and using the estimated transition rates we could quite accurately reproduce the prevalences at 1.1.2010.

Therefore we could estimate the effect of decreasing mortality by fixing the mortality rates as they were in 1995 and repeating the calculations. Similarly we estimated the effect of increasing incidence rates by fixing the incidence rates as they were in 1995. Fixing both mortality and incidence gave the effect of the existing imbalance in 1995 on the prevalence in 2010.

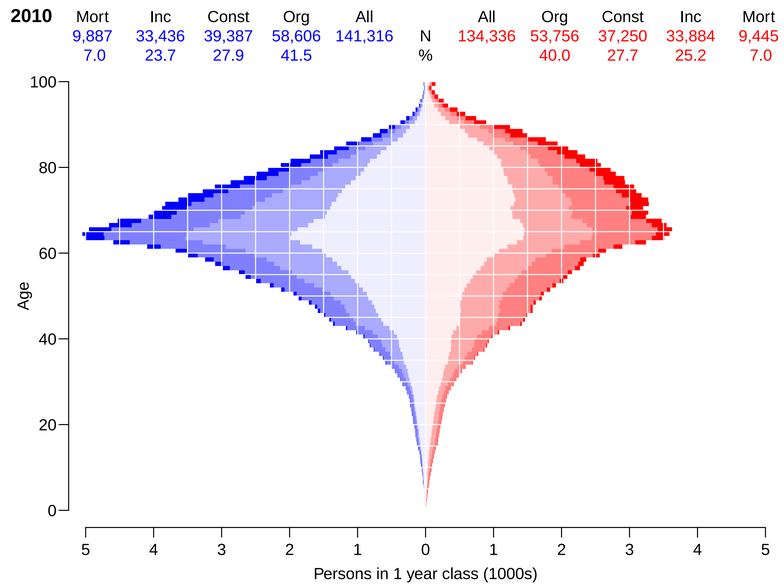

Figure 3: *The number of DM patients in Denmark 1.1.2010 by attribution to changes in incidence and mortality since 1995*

Results

The age-specific prevalences (Figure 1) shows a continuing increase from a peak prevalence of some 7% in ages around 80, to a peak of over 15% in ages about 70 in 2010.

Figure 2 shows the different factors' contribution to the age-specific prevalences in 2010, with almost equal contributions in the older ages for women.

When translating into **number** of patients attributable to the three factors, we found that increasing incidence rates and imbalance between incidence and mortality in 1995 were major contributors with about a quarter of all cases each, whereas the decreasing mortality only contributed about 7% of the cases.

Conclusion

- Increasing incidence of diabetes is a major contributor to the changes in prevalence of diabetes, whereas the decreasing mortality contributes less than a third of increasing incidence.
- The results are not immediately generalizable to other populations, but the method is applicable if incidence, mortality and prevalence is available over a given time-period.