

Increase in HbA_{1c} at Time of Diagnosis upon Change to new Diagnostic Criteria in Denmark

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Introduction

The diagnostic criterion for diabetes in Denmark was changed in 2011 from OGTT to HbA_{1c}. OGTT identifies diabetes at a lower HbA_{1c} level than the current HbA_{1c} diagnostic threshold, possibly leading to a decrease in incidence of DM. Thus it is conceivable that HbA_{1c} at the time of diagnosis should be increasing after 2011.

Our **aim** was to describe levels of HbA_{1c} in newly diagnosed type 2 diabetes (T2D) patients in Denmark in the period 2010-16.

Methods

We obtained HbA_{1c} measurements from the national laboratory database which contains person-identifiable laboratory measurements on all Danish citizens. These were linked to a national register on all type 2 diabetes patients. We chose the HbA_{1c} measurement closest to the date of diabetes, but only in a window from 3 months before to 1 month after diagnosis.

We fitted quantile regression models for the percentiles of the HbA_{1c} distribution with date of diagnosis as predictor. One model with linear effect and a single join-point at 2012, and one model with a spline effect; separately for **men** and **women**.

Results

Information on HbA_{1c} was available for 98,010 out of 132,534 persons with type 2 diabetes registered in the period 2010-16 incl. Before 2012 we saw no consistent pattern in HbA_{1c}. From 2012 we saw a weak increase in HbA_{1c} at diagnosis, an increase of about **1 mmol/mol/year** after 2012 for all percentiles except for the highest (figure 1). Using models with splines we showed a more stable, increasing pattern among men than among women (figure 2).

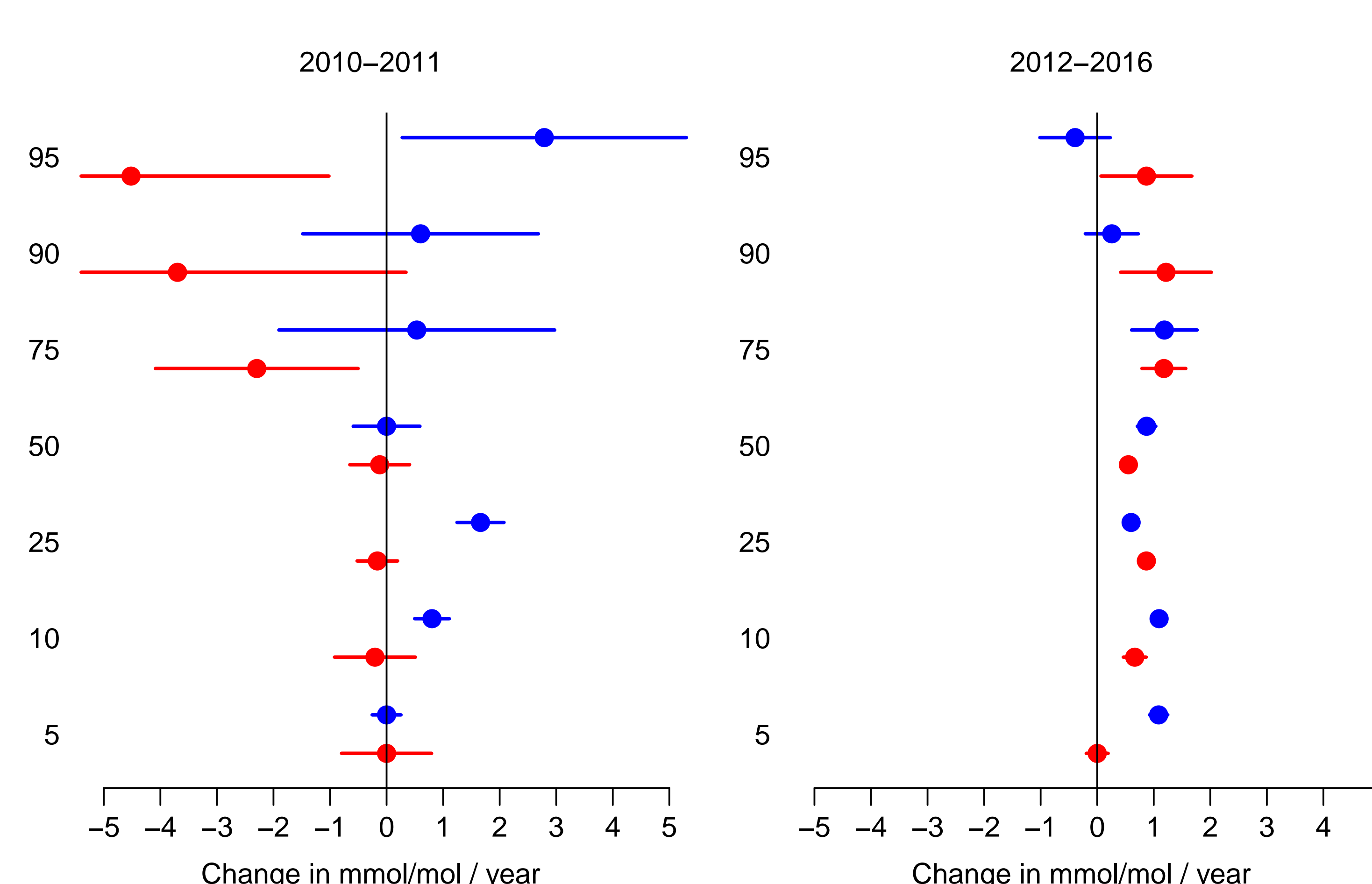


Figure 1: *Quantile regression with a single join-point at 1 Jan 2012: Average annual change in percentiles of HbA_{1c} levels before and after 2012, for **men** and **women** separately.*

Conclusion

HbA_{1c} at time of diagnosis increased in the period 2012-16, presumably because the diagnosis is made at a more advanced diabetes stage when using HbA_{1c} as criterion as compared to OGTT. The register data showed that incidence rates of type 2 diabetes were increasing until 2011, then declining till 2015 and after that increased again (data not shown).

Future studies will show whether changes in HbA_{1c} levels influences the prevalence, incidence and mortality of persons identified as diabetes patients in the register.



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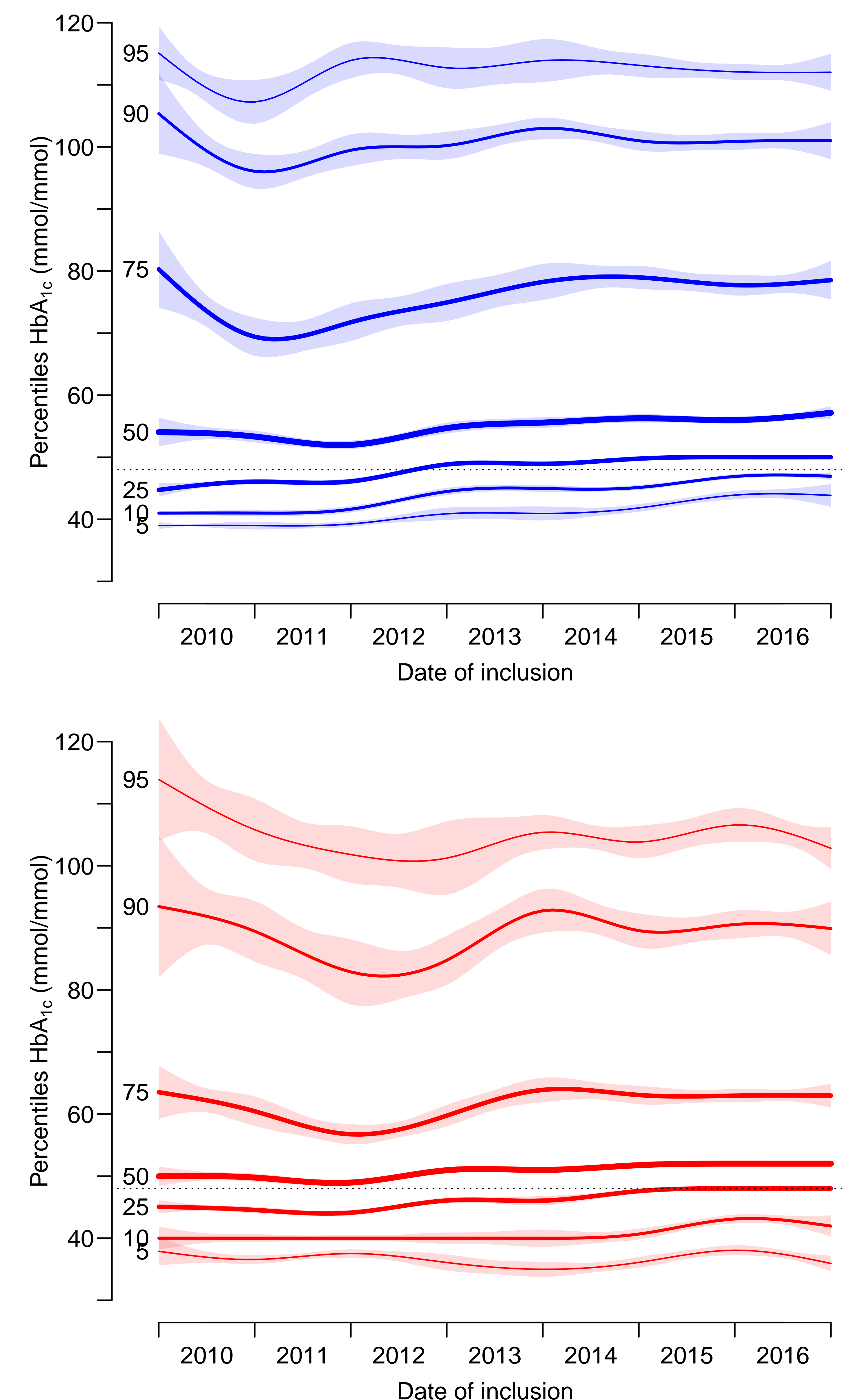


Figure 2: *Smoothed trends in percentiles of HbA_{1c} levels among new T2D patients 2010–2016. Shaded areas are 95% confidence intervals. **Men** in upper panel, **Women** in lower panel.*