



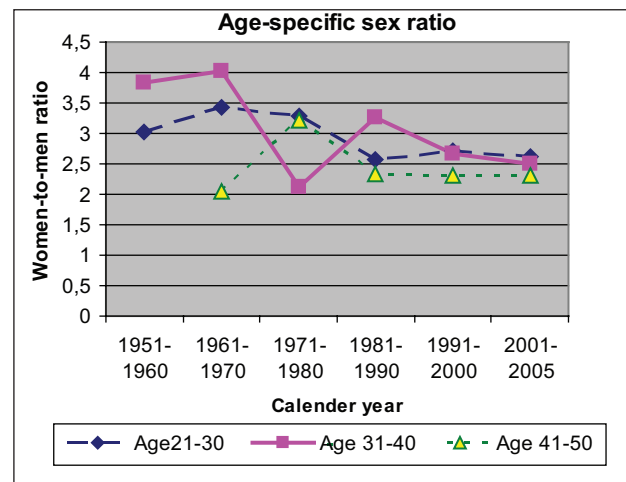
## Age-specific sex ratio of multiple sclerosis in the National Swedish MS Register (SMSreg)

In several countries, an increase in the women-to-men ratio in multiple sclerosis (MS) has been observed but, interestingly, this trend has not been confirmed in Sweden<sup>1</sup> as was quoted in the editorial of *Multiple Sclerosis Journal*, 2012; 19: 3–4. Important observations on the potential influence of environmental factors were introduced in the editorial, e.g. an older age at first birth or fertility rates. The increase of the women-to-men ratio seems to be correlated to a reduced number of child births in the populations from Canada and Denmark, but not from Sweden. This is in spite of the fact, that the changes in fertility rates during 1940–2000 in Sweden are quite similar to the Danish (editorial). It is intriguing that the Nordic countries differ regarding the changes in sex ratio in MS with time, and the cause of this difference is not clear, although hormonal factors are of interest.

A Swedish study<sup>2</sup> revealed that combined oral contraceptives and childbirth delayed MS onset and a recent study from Denmark<sup>3</sup> showed that childbirths and pregnancies may have a protective effect in women. It may also be, like the authors in the editorial mentioned, that Sweden already for a long time had a higher women-to-men ratio compared to Canada and Denmark. On the other hand, Sweden may demonstrate an increasing women-to-men ratio in the future.

Our results on sex ratio, discussed in the editorial, were calculated on the total of MS patients, by year of birth and by year of onset. If hormonal factors have an effect on the tendency to develop MS, it is logical to suspect that changes of such factors may affect the sex ratio in the fertile subgroup of women. Therefore we stratified our data and added an analysis of the age-specific sex ratio. This gives more information about the trends in the fertile age groups in Swedish women with MS.

Our previous results regarding the sex ratio in MS in Sweden<sup>1</sup> were reused to analyse the age-specific sex ratio by year of onset (n=9098). The study period was divided into six time periods and into six age groups. For these time periods the age- and sex-adjusted incidence rates were calculated, thereafter the sex ratios were analysed. There was a variation of the women-to-men ratio in all groups during 1951–2005, but no significant changes were found. The age-specific sex ratios in MS from 21 to 50 years are shown in Figure 1.



**Figure 1.** Age-specific sex ratio in multiple sclerosis (MS) from age 21 to 50 years during the time period 1951 to 2005.

In conclusion, when the sex ratio of MS in Sweden was calculated to give an age-specific women-to-men ratio, the result did not show any significant increase of the women-to-men ratio in the fertile age-groups. One may speculate that the short peak (presented in the editorial) in fertility rates in the Swedish women during the time period 1985–1995 actually prevented an increased women-to-men ratio of MS 1990–2005.

Follow-up studies are needed to determine whether the women-to-men ratio in Sweden has increased after 2005, which has now been noticed in the Netherlands.<sup>4</sup> One should also adjust for the latitude, since differences regarding sunshine exposure and effects of vitamin D intake may be present.

### Conflict of interest

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