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The population attributable fraction for the impact of obesity on diabetes: A contextual framework

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The contribution of a risk factor to a disease or a death may be quantified using the population attributable fraction (PAF). Standard measures of the attributable fraction assume a binary risk factor even if the factor was originally continuous, but the estimated PAF may be sensitive to cut-points and potentially understated. Additionally adjustments for confounders made in estimating disease relative risks are generally limited to patient characteristics. This presentation considers an estimation strategy for the PAF for obesity as a risk factor for diabetes appropriate when the observed data are local disease registers. It adopts a multilevel approach allowing for neighbourhood level risk factors and spatially varying impacts of risk factors. It therefore considers, as confounders on the diabetes-obesity link, both patient confounders (e.g. hypertension, age, ethnicity), and neighbourhood factors such as area deprivation and environmental influences. Additionally a logit regression methodology is used that allows for the impact of continuous BMI on diabetes, without simply dichotomising the exposure (e.g. between obese and non-obese patients). It is still important to consider the form of the exposure-outcome relationship, and a model with linear impacts of BMI on diabetes is compared with one assuming potentially nonlinear gradients. The data concern 80 thousand male subjects aged 40-74 from a disease register in North London, with 6.4% of subjects having diagnosed diabetes. The PAF is found to be highest (over 0.4) when a continuous effect of BMI, allowing for nonlinearity, is adopted. Geographic variation in population attributable fractions is also discussed and illustrated.

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