School-based interventions to prevent smoking-Economic modelling report - Executive summary

The National Institute for Health and Clinical Excellence (NICE) has been asked by the Department of Health (DH) to develop guidance on public health interventions for the NHS and local authorities aimed at preventing the uptake of smoking among schoolchildren (National Institute for Health and Clinical Excellence 2008).

Two accompanying systematic reviews of the literature cover the effectiveness and cost-effectiveness evidence on school-based smoking prevention programmes. A further evidence review focuses on qualitative evidence related to such interventions. The review of the economic literature revealed no published economic evaluations of school-based smoking prevention programmes in the UK. Studies based in other countries are of limited relevance to the UK situation because of differences in both the populations being studied and the methodological framework used. A further limitation with the existing literature is that most published studies assume that school-based smoking prevention programmes can achieve a lasting reduction in smoking prevalence beyond school-age which is not supported by evidence in the effectiveness literature. Consequently, we conducted a *de novo* model to provide information in order to determine whether the implementation of a school-based smoking prevention initiative would be cost-effective.

Because of the lack of evidence for a lasting effect from school-based smoking prevention programmes, the modelling focused on exploring whether a delay in the age of smoking uptake may make smoking cessation later in life more likely. The modelling took place in two steps. Firstly, data from the General Household Survey were used to explore the association between the age at which someone

initiates smoking and the probability that the person will quit in later life. This was called the "age of initiation model". We found a significant association between the age at which someone initiates regular smoking and the probability that the person will quit smoking later in life. The association is reduced but is still significant when confounding variables (sex, ethnicity, socioeconomic class, education and geographical location) are taken into account.

Secondly, effect sizes (in terms of odds ratios of being a smoker in control and intervention arms) extracted from 26 randomised controlled trials identified during the systematic review of the effectiveness literature were used to determine the parameters for a second model, called the "effect model". Several forms of this model were fitted to the data, representing assumptions about whether a smoking intervention actually decreases smoking uptake in the long-term or simply delays the onset of smoking, and whether changes in the effect that the intervention has on participants over time are governed by the age of the participants or the time since the intervention began.

The outcomes from both the "age of initiation" and "effect" models were used in an economic analysis to extrapolate the lifetime health outcomes and cost-effectiveness of a school-based smoking prevention programme. Most of these analyses suggested that such a programme may be cost-effective at a willingness-to-pay threshold of £20,000 to £30,000 per QALY gained. The findings are fairly robust to changes in key model parameters governing the association between age of smoking initiation and probability of smoking in later life, mortality in smokers and non-smokers, health-related quality of life in smokers and lifetime medical costs of smokers.

The only analysis that predicted that an intervention would not be cost-effective was one using an effect model where an intervention simply delays smoking onset, and is dependent on time since start of intervention rather than age of participant. This suggests that further work needs to be done both on the long-term effect of interventions beyond adolescence, and also to determine whether

the attenuation of the effects of such interventions over time is governed by the age of participants or the time since the intervention began.