We found that low socioeconomic status in adulthood was related to adverse changes in control beliefs during the six year follow up (results not shown), suggesting that adult socioeconomic conditions further contribute to beliefs of low control. More information is needed on the specific socioeconomic correlates that induce beliefs of low control as these may be easier to modify than the beliefs themselves. Low job control may be one of these conditions. Other studies with larger numbers are needed to examine the behavioural or psychophysiological pathways through which perceived control affects mortality. Our findings emphasise that only by examining psychological mechanisms more thoroughly can we determine the complex pathways through which social structure affects individual disease and mortality.

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Cost effectiveness analysis of inhaled anticholinergics for acute childhood and adolescent asthma

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A recent systematic review by the Cochrane Airways Group showed that adding multiple doses of anticholinergics to β₂ agonists is safe and effective in improving lung function and avoiding hospital admission for school aged children and adolescents attending casualty departments with severe acute asthma. The estimated reduction in the risk of admission was 9.4% (0.4% to 18.4%). This intervention presumably improves bronchodilatation until systemic corticosteroids take effect. Evidence of cost effectiveness, however, is lacking. To clarify whether scarce health resources should be spent on this intervention we conducted an economic evaluation.

Methods and results

We used various assumptions to estimate the financial implications of treatment (see table on the BMJ’s website). The costs of drug administration were not included, as anticholinergics are always given with β₂ agonists and involve little additional manipulation. The cost of nebulisers, other drugs, and the casualty attendance were also excluded. No consideration was given to possible changes in length of stay in casualty. The effect of changing the various assumptions was tested by simple, one way, sensitivity analysis, and by multivariate probabilistic sensitivity analysis. The latter is a simulation approach that enables estimation of uncertainty ranges containing 95% of replicated results.

We estimated that treatment would cost about £8 (uncertainty range £1 to £47) per admission avoided (table). This implies a net saving of £80 (£0 to £157) per severe case treated. Varying the risk reduction within 95% confidence limits varied the mean net saving from £3 to £157 per severe case treated. More precision is expected when the Cochrane review is updated. Varying the cost of hospital admissions within the interquartile range for English providers (£620 to £907) varied the mean savings from £58 to £85 per severe case treated. Changes to the dose and unit cost of ipratropium had very little effect on the results.

Further assumptions were used to extrapolate the findings to a national level. About 7200 children aged 5-15 years are admitted from casualty with a diagnosis of asthma each year (hospital episode statistics 1988 to 1996). About 40% of children in this age group attending casualty with asthma are admitted. We assumed that 50% of people with asthma attending casualty have severe asthma. The rate of uptake of the review recommendations was assumed to be 5% a
year; therefore an additional 5% of eligible patients would be treated in the first year, 10% in the second year, and so on. If doctors treated patients with mild or moderate asthma, this would add to treatment costs with no evidence of clinical benefit. We assumed that for every five patients with severe asthma who were treated, one patient with mild or moderate asthma would be treated. Costs were discounted at an annual rate of 6%.

Net savings were estimated to be £437 800 (– £3700 to £1 078 100) over five years in England. An increase in the number of patients for whom treatment is indicated, or in the proportion of eligible patients who are treated, leads to a proportionate increase in savings. For example, if all eligible patients were to be treated, after five years the estimated savings would be quadrupled. A reduction in the annual discount rate from 6% to 3% leads to an increase of £47 600 in expected savings. Increasing the ratio of inappropriate to appropriate treatment from 20% to 100% leads to a small decrease (£2800) in expected savings.

Comment

The addition of multiple dose anticholinergics to inhaled β₂ agonists for children and adolescents attending casualty with severe acute asthma would result in savings in health service resources. This finding is robust to changes in modelling assumptions, although some uncertainties remain. The personal value of the health effects and avoided hospital admissions provide additional benefits that have not been quantified in this analysis.

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Contributors RJF had the original idea for the project, JL conducted the computer modelling and drafted the report. FMD gave specific advice on the systematic review and the modelling assumptions. All contributors participated in the design of the project and commented on drafts of the report. JL will act as guarantor.

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