A review of computer and Internet-based interventions for smoking behavior
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CRD summary
This review assessed the effects of computer and Internet-based interventions on smoking behaviour. The authors concluded that there is some evidence that computer-based interventions change smoking behaviour, but that further research is required. Poor reporting of review methods and study quality make it difficult to comment on the strength of the evidence underpinning the authors' conclusions about effectiveness.

Authors' objectives
To assess the effects of computer and Internet-based interventions on smoking behaviour.

Searching
MEDLINE, CINAHL and PsycINFO were searched from 1995 to August 2004 for English-language peer-reviewed journal articles published after 1995; a previous review had been conducted in 1999 (see Other Publications of Related Interest). The search terms were reported. The reference lists of identified studies were screened.

Study selection
Study designs of evaluations included in the review
Studies with at least one comparison or control group were eligible for inclusion. The duration of follow-up ranged from 1 to 24 months.

Specific interventions included in the review
Studies of computer-based interventions (web-or server-based or stand alone programmes) for smoking prevention or cessation were eligible for inclusion. The studies had to have at least one intervention that did not involve significant human contact. The included studies targeted smoking prevention in adolescents and smoking cessation in adult smokers. Most of the included interventions involved computer-generated feedback and advice sent through the mail; other interventions used multiple iterations of feedback, computer-generated feedback as an adjunct to nicotine replacement, cointervention with telephone counselling, interactive computer programmes and teacher-led programmes for adolescents (full details of the interventions were reported). Control interventions included no treatment and untailored information or manuals.

Participants included in the review
Inclusion criteria for the participants were not explicitly reported but it was clear that the review included both adolescents and adults. The participants in the included studies were aged from 11 to 65 years and 40.5 to 100% were female. Some studies included pregnant women and another included college students. Some studies included participants who were seeking treatment while others included those who were not seeking treatment.

Outcomes assessed in the review
Studies that directly assessed smoking behaviour were eligible for inclusion. The review assessed continuous (no smoking from baseline to follow-up) and point abstinence (no smoking for the period of time before follow-up) smoking rates.

How were decisions on the relevance of primary studies made?
Two reviewers independently screened the identified abstracts.

Assessment of study quality
The authors did not state that they assessed validity.
Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction. For studies of adolescents, the percentage of baseline never-smokers who initiated smoking during the longest follow-up period and the percentage of baseline ever-smokers who reported smoking at the longest follow-up period were extracted, together with the statistical significance of comparisons between treatments. For studies of adults, cessation rates at 24 hours, 30 days and the most recent (or longest) follow-up were extracted.

Methods of synthesis
How were the studies combined?
The studies were grouped by age of the participant (adolescent or adult) and individual studies were described.

How were differences between studies investigated?
Some differences in methodology and participant characteristics between the studies were discussed in the text.

Results of the review
Nineteen studies were included: 4 studies of adolescents (12,221 adolescents plus 36 schools) and 15 studies of adults (n=28,594). The sample size ranged from 65 to 8,352.

Adolescents (4 studies).
Two studies reported a statistically significant reduction in smoking initiation and prevalence with computer-tailored material sent to the home of the student, compared with a no treatment control. The other 2 studies reported no difference between a classroom lecture and a computer intervention (1 study), or between computer-generated material appropriate to the stage of change compared with a computer intervention advising on action strategies (1 study).

Adults (15 studies).
Seven of the 15 studies in adult smokers reported a statistically significant increase in cessation with computer-based interventions at the longest follow-up compared with control.

Two studies compared computer-generated feedback and mailed advice with control and reported increased point abstinence with the intervention at 24 months.

One study reported no significant difference between a self-help manual, manual plus computer-generated feedback and both interventions plus telephone calls at 21 months in smokers who had not sought advice.

One study reported increase abstinence at 7 months with an intervention tailored to stage-of-change compared with control.

One study that reported a tailored intervention highlighting the benefits of cessation plus advice on cessation skills was superior to an intervention highlighting only one aspect.

One study reported no significant difference at 12 months between computer-tailored information and similar non-tailored information. One study reported increased cessation at 6 months in heavy smokers who received a non-tailored compared with a tailored letter.

Two of 3 studies evaluating multiple iterations of feedback reported that multiple tailored letters were more effective than single tailored letters, but one of these studies only reported increased intent-to-quit rather than actual quit rates. The third study reported no dose-related effect of the intervention.

One of 2 studies using computer-generated feedback in addition to nicotine replacements reported a significantly higher 30-day abstinence rate with the intervention; the other study reported no difference between treatment groups.

Three studies evaluated interactive computer programmes. One study of pregnant women reported no significant...
difference in cessation rates between an interactive computer programme and control. One study reported more attempts to quit and higher 30-day cessation rates with an enhanced intervention that included follow-up e-mails. One study reported no difference in cessation rates at 7 months between computer sessions based on stage-of-change and control.

**Authors' conclusions**
There was some evidence that computer-based interventions changed smoking behaviour but further research is required.

**CRD commentary**
The review addressed a clear question that was defined in terms of the intervention, outcomes and study design; criteria for the study design and outcomes were broad. Three relevant databases were searched but no attempts were made to minimise publication or language bias; the authors acknowledged these limitations. Two reviewers independently selected the studies, thus reducing the potential for reviewer bias and errors. However, the methods used to extract the data were not reported, so it is not known whether any efforts were made to reduce reviewer errors and bias. Only controlled trials were eligible but the design of the individual studies was not consistently reported. In addition, study validity was not assessed, so the results from these studies and any synthesis may not be reliable.

The narrative synthesis was appropriate given the diversity of the studies. However, the narrative was predominantly a description of the individual studies rather than a synthesis of the evidence. Lack of full reporting of review methods and study quality make it difficult to comment on the strength of the evidence underpinning the authors' conclusions on effectiveness. The conclusions about the need for further research seem appropriate.

**Implications of the review for practice and research**
Practice: The authors did not state any implications for practice.

Research: The authors stated that more well-designed studies will be required to evaluate future smoking intervention programmes, and that smoking prevention and cessation programmes should be based on theory and should be evaluated rigorously. They also stated the need for an examination of user-media-message interactions, economic analyses and diffusion studies.

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**Other publications of related interest**

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.