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To cite this article: S.M. Sawyer, R. Cooke, J. Conn, M.K. Marks, R. Roseby & B. Cerritelli (2006) Improving medical student performance in smoking health promotion: effect of a vertically integrated curriculum, Medical Teacher, 28:5, e135-e138, DOI: [10.1080/01421590600726615](https://doi.org/10.1080/01421590600726615)

To link to this article: <https://doi.org/10.1080/01421590600726615>



Published online: 03 Jul 2009.



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WEB PAPER

Improving medical student performance in smoking health promotion: effect of a vertically integrated curriculum

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ABSTRACT *The majority of medical schools have curricula that address the health effects of smoking. However, there are many gaps in smoking education, especially in relationship to vertical integration. The authors aimed to determine whether medical students would better address adolescent smoking within a vertically integrated curriculum in comparison with the previous traditional curriculum. They studied two groups of fifth-year students; one group received a specific smoking intervention. Each group consisted of the entire cohort of students within the Child and Adolescent Health rotation of a newly designed medical curriculum. Two groups of students from the previous traditional undergraduate curriculum were available for direct comparison, one of which had received the same teaching on adolescent smoking. An objective structured clinical examination station was used to measure adolescent smoking enquiry. Intervention students in the new curriculum were more likely to enquire about smoking in the objective structured clinical examination than students who did not receive the intervention ($p < 0.005$). New curriculum students performed better than students from the previous curriculum, whether or not they had received the smoking intervention ($p < 0.001$). This study suggests that integrated undergraduate teaching can improve student clinical behaviours with regard to opportunistic smoking enquiry in adolescents.*

Practice points

- Most undergraduate curricula address smoking but with little focus on the vertical integration of smoking education.
- This study uses an evidence-based smoking and health intervention to determine, first, whether students within a new medical curriculum perform better than previous cohorts taught using a traditional curriculum, and second, to assess the effect of vertical integration of smoking education within the new curriculum.
- New curriculum students performed better than students from the previous curriculum, whether or not they had received the smoking intervention ($p < 0.001$).
- Within the new vertically integrated curriculum, students who received a specific smoking intervention were more likely to enquire about smoking in an objective structured clinical examination than those who did not receive the intervention ($p < 0.005$).
- Clinically integrated teaching can improve knowledge, skills and clinical behaviour in relationship to smoking health promotion.

Introduction

The negative health effects of tobacco constitute the single largest preventable cause of death and disease in economically developed countries with increasing implications in the developing world (Mokdad *et al.*, 2004; World Health Organization, 1996). Given the scale of this health impact, there should be little debate about the importance of providing medical undergraduates with the knowledge and skills to reduce the impact of tobacco.

An international survey of medical schools found that 88% had curricula that addressed the effects of smoking on health in at least some way (Richmond, 1999). A recent analysis of tobacco intervention training in medical schools in the United States, however, revealed many gaps in undergraduate education around smoking (Spangler *et al.*, 2002). In particular, they described significant deficiencies in vertical integration within medical curricula.

Specifically, the literature suggests that smoking is still largely conceptualized within undergraduate medical curricula as an adult health problem (Richmond, 1999; Spangler *et al.*, 2002). Adolescence, however, marks the beginning of dependent smoking in over 80% of adult smokers (Khuder *et al.*, 1999). Despite the gradual decline in adult smoking rates in many countries, young people continue to take up smoking at high rates. In Australia, for example, approximately one in three young people smoke in comparison with one in five adults (Hill *et al.*, 2002). As well as the well-described long-term health concerns, smoking in adolescence can also be viewed as a risk marker

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for important comorbidities such as substance abuse, depression and anxiety (DuRant *et al.*, 1999).

We have previously shown that a focused education intervention can improve how medical students address smoking in the adolescent age group (Roseby *et al.*, 2003). Since our original study, a new undergraduate medical curriculum has been introduced at our university. Key features of this new curriculum are early exposure to clinical skills training and problem-based learning, and greater emphasis on communication skills, health promotion and preventive medicine.

One of the principles informing the development of the new medical course was the importance of integration of key subject matter and clinical skills. An example of this has been the introduction of an explicit smoking curriculum. Starting in the early clinical skills programme, students learn how to take a quantitative and qualitative smoking history, including an assessment of a patient's stage of change according to the transtheoretical model (Prochaska *et al.*, 1992). During the fourth year of the course, students are provided with supervised opportunities to integrate this skill into the clinical assessment of patients in adult teaching hospitals. In the following year, the education programme on adolescent smoking, as previously described (Roseby *et al.*, 2003), is delivered during the Child and Adolescent Health rotation. Finally, students acquire the skills of motivational interviewing, with smoking cessation as one example, during their primary care rotation in the final semester of the six-year course.

The new curriculum provided us with the opportunity to measure how a firmer foundation of clinical skills might impact on undergraduate medical student performance in addressing adolescent smoking. We hypothesized that students would better address adolescent smoking within a vertically integrated curriculum in comparison with the previous traditional curriculum, where there was little clinical contact before the fourth year.

Methods

Ethics permission for this study was obtained from The University of Melbourne Ethics Committee.

Participants

Two groups of students in the fifth year of a six-year medical course were studied during their nine-week Child and Adolescent Health rotation. One group (Group 1) received the education intervention. The other did not receive this intervention (Group 2). Each group consisted of the entire cohort of students within a Child and Adolescent Health rotation. Some 23% of the participants were graduate entry students, spread equally between the two groups.

Results from two groups of students from within the previous traditional undergraduate medical curriculum were available for direct comparison (Roseby *et al.*, 2003). One group had received the same education intervention on adolescent smoking (Group 3) while the other group (Group 4) had not (see Table 1).

Table 1. Study design.

	Current curriculum	Previous curriculum
Specific teaching on adolescent smoking (intervention groups)	Group 1 (<i>n</i> = 65)	Group 3 (<i>n</i> = 56)
No specific teaching on adolescent smoking (comparison groups)	Group 2 (<i>n</i> = 59)	Group 4 (<i>n</i> = 58)

Education intervention

The intervention consisted of a one-hour symposium on adolescent smoking (Roseby *et al.*, 2003). A major aim of the symposium was to highlight the importance of enquiring about smoking as an important health promotion tool. The same symposium was delivered to the students in the intervention groups from both curricula (Groups 1 and 3).

All students from the new medical curriculum (Groups 1 and 2) also took part in a generic adolescent health education programme that had quantitative and qualitative differences from that of the previous traditional curriculum (Groups 3 and 4). While the cohorts from both curricula had two hours of tutorial time allocated to adolescent health issues, students in the new curriculum were able to practise psychosocial history-taking skills with adolescent simulated patients during their tutorial; in addition, they participated in a problem-based learning tutorial that focused on an adolescent with psychosocial issues.

Measurement tool

An objective structured clinical examination (OSCE) station was used to measure student behaviour in adolescent smoking enquiry. This station, which was a component of the summative assessment for the Child and Adolescent Health rotation, required each student to interview a simulated patient playing the role of a 15-year-old female with poorly controlled asthma. Of the total score, 16% was allocated to smoking-related questions.

The station was identical to the OSCE station used in our previous study (Roseby *et al.*, 2003). Neither students nor examiners were aware of the prospective plans for performance-based evaluation of smoking-related enquiry. The OSCE examiners were blinded to the intervention status of the students. Results were analysed on an intention-to-treat basis (91% of Group 1 students participated in the intervention).

The primary outcome measure was student performance on the smoking-related questions. Results were compared using the Pearson chi-squared test or Fisher's exact test, with a level of $p < 0.05$ regarded as significant.

Results

The results showed that students in the new curriculum who received the smoking intervention were more likely to enquire about smoking in the adolescent asthma OSCE than students

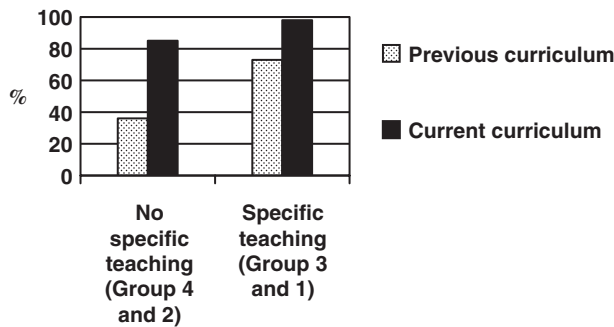


Figure 1. Effect of specific teaching about adolescent smoking on OSCE performance (smoking enquiry) within the current medical curriculum compared with the previous curriculum.

who did not receive the intervention: 98% of Group 1 students asked about smoking in comparison with 85% to Group 2 students ($p < 0.005$) (see Figure 1). Both groups of students performed similarly in their total score across OSCE stations: the mean total score for the assessment was 66.8% ($SD \pm 14.3\%$) in Group 1 and 65.7% ($SD \pm 15.3\%$) in Group 2 ($p > 0.1$). There was no difference in performance between graduate entry students and undergraduate entry students.

Comparison of results with those of the students from within the previous traditional undergraduate medical curriculum demonstrated that the new curriculum students performed better, whether or not they had received the smoking intervention. Without any specific smoking intervention, 50 of 59 (85%) current curriculum students enquired about smoking in comparison with 21 of 58 (36%) of previous curriculum students ($p < 0.001$) (see Figure 1).

Specifically, the performance of new curriculum students who had received the education intervention was better than previous curriculum students who had also received the intervention: 64 of 65 (98%) of students within the new curriculum asked about smoking in comparison with 41 of 56 (73%) from the previous curriculum ($p < 0.001$).

Discussion

Our study demonstrated that compared with students from the previous traditional curriculum, new curriculum students are better equipped to ask about and deal with the important issue of adolescent smoking; this was the case even without explicit education on adolescent smoking. The study showed, however, that specific teaching further improved student performance. We argue that these results support our hypothesis that students who learn within a vertically integrated undergraduate medical curriculum are better able to recognize the importance of opportunistic smoking enquiry.

We considered other factors that might explain the results. Almost one quarter of the new cohort of students are graduates, compared with the previous cohort that comprised totally undergraduates. Graduate students, who have greater life experience and who are selected in part on their

communication skills assessed at interview, might enter the course with a greater awareness of smoking as a health issue. The results of the graduate students, however, were not different from those of the undergraduate cohort in the new curriculum.

We also considered the potential learning effect of the OSCE station from the original study (Roseby *et al.*, 2003). There was an interval of three years between the original and present studies. The station had not been used for assessment in the intervening time and the marking scheme had not been released to students. Students from the previous curriculum may have passed on information that interviewing an adolescent with asthma was a potential OSCE task but they would not have been aware that marks were allocated for smoking enquiry behaviour.

In summary, this study suggests that integrated undergraduate teaching can modify student behaviour in respect of health promotion, specifically with adolescent smoking enquiry. While we acknowledge that the measurement tool used to assess behaviour change in this study was relatively crude (Wilkes, 2003) and that more systematic research is required to evaluate the impact of new medical curricula on student performance in health promotion, we argue that this study sits well within the context of emerging evidence that clinically integrated teaching can improve knowledge, skills and clinical behaviour (Straus & Jones, 2004).

Acknowledgement

The authors wish to acknowledge Dr Jenny Proimos for setting the OSCE and Ms Agnes Dodds for her assistance with statistical analysis.

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